PROPOSED GRID CONNECTION INFRASTRUCTURE FOR THE VREDE SOLAR PHOTOVOLTAIC FACILITY, FREE STATE PROVINCE

VISUAL IMPACT ASSESSMENT

Produced for:

Mainstream Renewable Power Developments (Pty) Ltd

On behalf of:

Savannah Environmental (Pty) Ltd
1st Floor, Block 2, 5 Woodlands Drive Office Park,
Cnr Woodlands Drive & Western Service Road
Woodmead, 2191

Produced by:

Lourens du Plessis (PrGISc) t/a LOGIS
PO Box 384, La Montagne, 0184
T: 082 922 9019 E: lourens@logis.co.za W: logis.co.za

- August 2021 -

CONTENTS

FIGURES

MAPS

TABLES

1. STUDY APPROACH

1.1. Qualification and experience of the practitioner

Lourens du Plessis, a specialist in visual impact assessment and Geographical Information Systems (GIS), undertook the Visual Impact Assessment (VIA).

He has been involved in the application of Geographical Information Systems (GIS) in Environmental Planning and Management since 1990. He has extensive practical knowledge in spatial analysis, environmental modeling and digital mapping, and applies this knowledge in various scientific fields and disciplines. His expertise are often utilised in Environmental Impact Assessments (EIAs), State of the Environment Reports and Environmental Management Plans.

He is familiar with the "Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes" (Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning) and utilises the principles and recommendations stated therein to successfully undertake visual impact assessments.

Savannah Environmental appointed Lourens du Plessis as an independent specialist consultant to undertake the visual impact assessment for the proposed Grid Connection Infrastructure for the Vrede Solar Photovoltaic (PV) Facility. He will not benefit from the outcome of the project decision-making.

1.2. Assumptions and limitations

This assessment was undertaken during the planning stage of the project and is based on information available at that time.

1.3. Level of confidence

Level of confidence[1] is determined as a function of:

- The information available, and understanding of the study area by the practitioner:
    - 3: A high level of information is available of the study area and a thorough knowledge base could be established during site visits, surveys etc. The study area was readily accessible.
    - 2: A moderate level of information is available of the study area and a moderate knowledge base could be established during site visits, surveys etc. Accessibility to the study area was acceptable for the level of assessment.
    - 1: Limited information is available of the study area and a poor knowledge base could be established during site visits and/or surveys, or no site visit and/or surveys were carried out.

[1] Adapted from Oberholzer (2005).

- The information available, understanding of the study area and experience of this type of project by the practitioner:

    - 3: A high level of information and knowledge is available of the project and the visual impact assessor is well experienced in this type of project and level of assessment.
    - 2: A moderate level of information and knowledge is available of the project and/or the visual impact assessor is moderately experienced in this type of project and level of assessment.
    - 1: Limited information and knowledge is available of the project and/or the visual impact assessor has a low experience level in this type of project and level of assessment.

These values are applied as follows:

Table 1: Level of confidence.

	Information on the project & experience of the practitioner			
Information on the study area		**3**	**2**	**1**
	3	9	6	3
	2	6	4	2
	1	3	2	1

*The level of confidence for this assessment is determined to be **9** and indicates that the author's confidence in the accuracy of the findings is high:*

- The information available, and understanding of the study area by the practitioner is rated as **3** and
- The information available, understanding and experience of this type of project by the practitioner is rated as **3**.

1.4. Methodology

The study was undertaken using Geographical Information Systems (GIS) software as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed infrastructure. A detailed Digital Terrain Model (DTM) for the study area was created from topographical data provided by NASA in the form of a 30m SRTM (Shuttle Radar Topography Mission) elevation model.

Visual Impact Assessment (VIA)

The VIA is determined according to the nature, extent, duration, intensity or magnitude, probability and significance of the potential visual impacts, and will propose management actions and/or monitoring programs, and may include recommendations related to the proposed Grid Connection Infrastructure for the Vrede Solar PV Facility.

The visual impact is determined for the highest impact-operating scenario (worst-case scenario) and varying climatic conditions (i.e. different seasons, weather conditions, etc.) are not considered.

The VIA considers potential cumulative visual impacts, or alternatively the potential to concentrate visual exposure/impact within the region.

The following VIA-specific tasks were undertaken:

- **Determine potential visual exposure**

  The visibility or visual exposure of any structure or activity is the point of departure for the visual impact assessment. It stands to reason that if the proposed grid infrastructure was not visible, no impact would occur.

  Viewshed analyses from the proposed alignment indicate the potential visibility.

- **Determine visual distance/observer proximity to the Grid Connection Infrastructure**

  In order to refine the visual exposure of the Grid Connection Infrastructure on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for the structures.

  Proximity radii for the proposed alignment are created in order to indicate the scale and viewing distance of the structures and to determine the prominence of the structures in relation to their environment.

  The visual distance theory and the observer's proximity to the grid infrastructure are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly negative visual perception of the proposed infrastructure.

- **Determine viewer incidence/viewer perception (sensitive visual receptors)**

  The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers, then there would be no visual impact. If the visual perception of the structure is favourable to all the observers, then the visual impact would be positive.

  It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed infrastructure.

  It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer; regularity of sighting, cultural background, state of mind, and purpose of sighting which would create a myriad of options.

- **Determine the visual absorption capacity of the landscape**

  This is the capacity of the receiving environment to absorb the potential visual impact of the proposed structures. The visual absorption capacity (VAC) is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC.

  The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or more of the characteristics of the environment would be low.

The VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and structure decreases.

The digital terrain model utilised in the calculation of the visual exposure of the Grid Connection Infrastructure does not incorporate the potential VAC of the natural vegetation of the region. It is therefore necessary to determine the VAC by means of the interpretation of the vegetation cover, supplemented with field observations.

- **Calculate the visual impact index**

  The results of the above analyses are merged in order to determine where the areas of likely visual impact would occur. These areas are further analysed in terms of the previously mentioned issues (related to the visual impact) and in order to judge the magnitude of each impact.

- **Determine impact significance**

  The potential visual impacts are quantified in their respective geographical locations in order to determine the significance of the anticipated impact on identified receptors. Significance is determined as a function of extent, duration, magnitude (derived from the visual impact index) and probability. Potential cumulative and residual visual impacts are also addressed. The results of this section are displayed in impact tables and summarised in an impact statement.

- **Propose mitigation measures**

  Mitigation measures will be proposed in terms of the planning, construction, operation and decommissioning phases of the project.

- **Reporting and map display**

  All the data categories, used to calculate the visual impact index, and the results of the analyses will be displayed as maps in the accompanying report. The methodology of the analyses, the results of the visual impact assessment and the conclusion of the assessment will be addressed in the VIA report.

- **Site visit**

  Undertake a site visit in order to verify the results of the spatial analyses and to identify any additional site specific issues that may need to be addressed in the VIA report.

2. BACKGROUND

South Africa Mainstream Renewable Power Developments (Pty) Ltd is proposing the construction and operation of the grid connection infrastructure for the proposed 100MWac Vrede Solar Energy Facility (SEF), Battery Energy Storage System (BESS) and associated infrastructure located near the town of Kroonstad in the Moqhaka Local Municipality (Fezile Dabi District) of the Free State Province of South Africa.

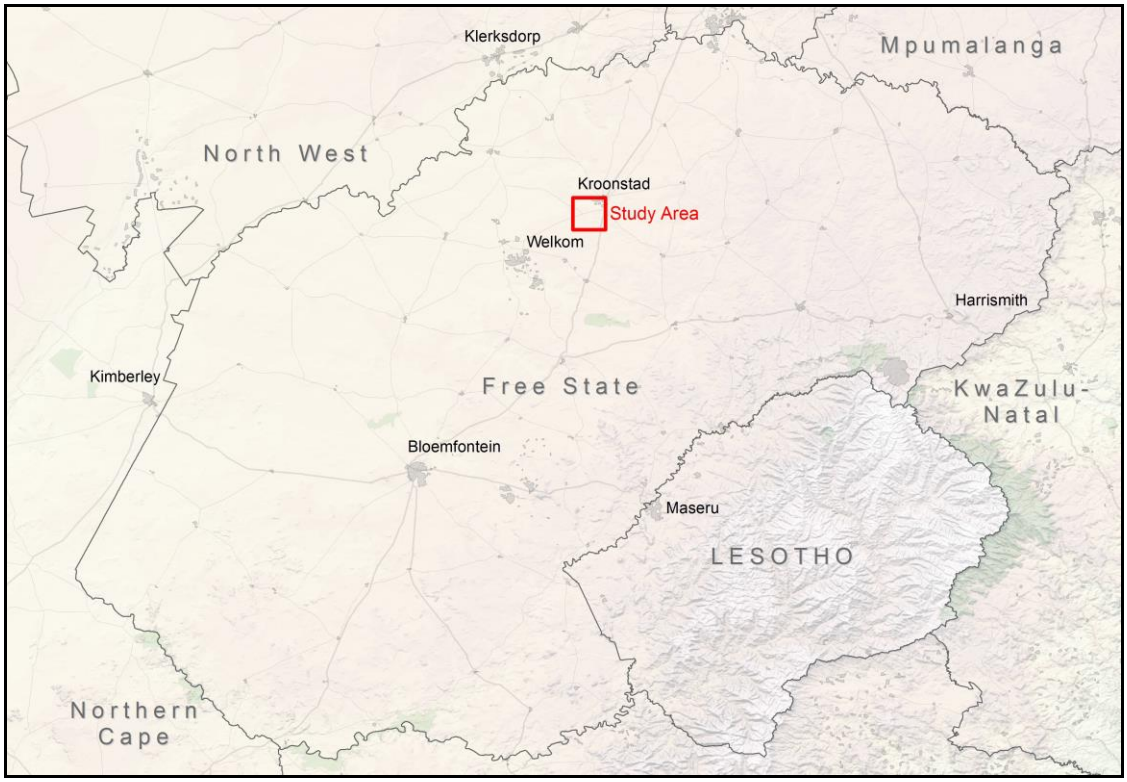


Figure 1: Regional locality of the proposed project area.

The proposed grid solutions comprise the following:

- An on-site substation consisting of:
  - 33/132 kV Eskom substation;
  - Associated equipment, infrastructure and buildings;
  - Access and maintenance raods; and
  - Temporary and permanent laydown areas.

- Distribution Lines:
  - 132kV distribution line from the onsite 33/132 kV Eskom substation via a loop in loop out into the Eskom 132kV Kroonstad Municipal to Theseus 1 power line.

The following two alternatives are assessed:

Alternative 1 – a 3.1km power line traversing from the development site to the Kroonstad Municipal to Theseus 1 132kV power line, east of the site.

Alternative 2 – a 3.4km power line traversing from the development site to the Kroonstad Municipal to Theseus 1 132kV power line, south-east of the site.

It is the Developer's intention to bid the solar PV facility under the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. The power generated from the solar PV facility will be sold to Eskom and fed into the national electricity grid through the proposed grid connections solutions. The development of the facilities and grid connection infrastructure will also assist with achieving the energy mix as set out in the Integrated Resources Plan (IRP).

The proposed infrastructure will be appropriately placed within the respective power line corridors and switching station study area through consideration and avoidance of environmental sensitivities and other energy infrastructure on the affected properties.

The power line towers will either be steel lattice or monopole structures with a maximum height up to 32m above ground level. The servitude will be up to 40m wide and it is expected that the construction phase will be up to 12 months long.

The proposed alignments of the power line alternatives are indicated in **Figure 4** and on the maps displayed within this report. Corridors of 260m in width have been considered within the Basic Assessment process. Sample images of lattice and monopole tower structures are displayed below.

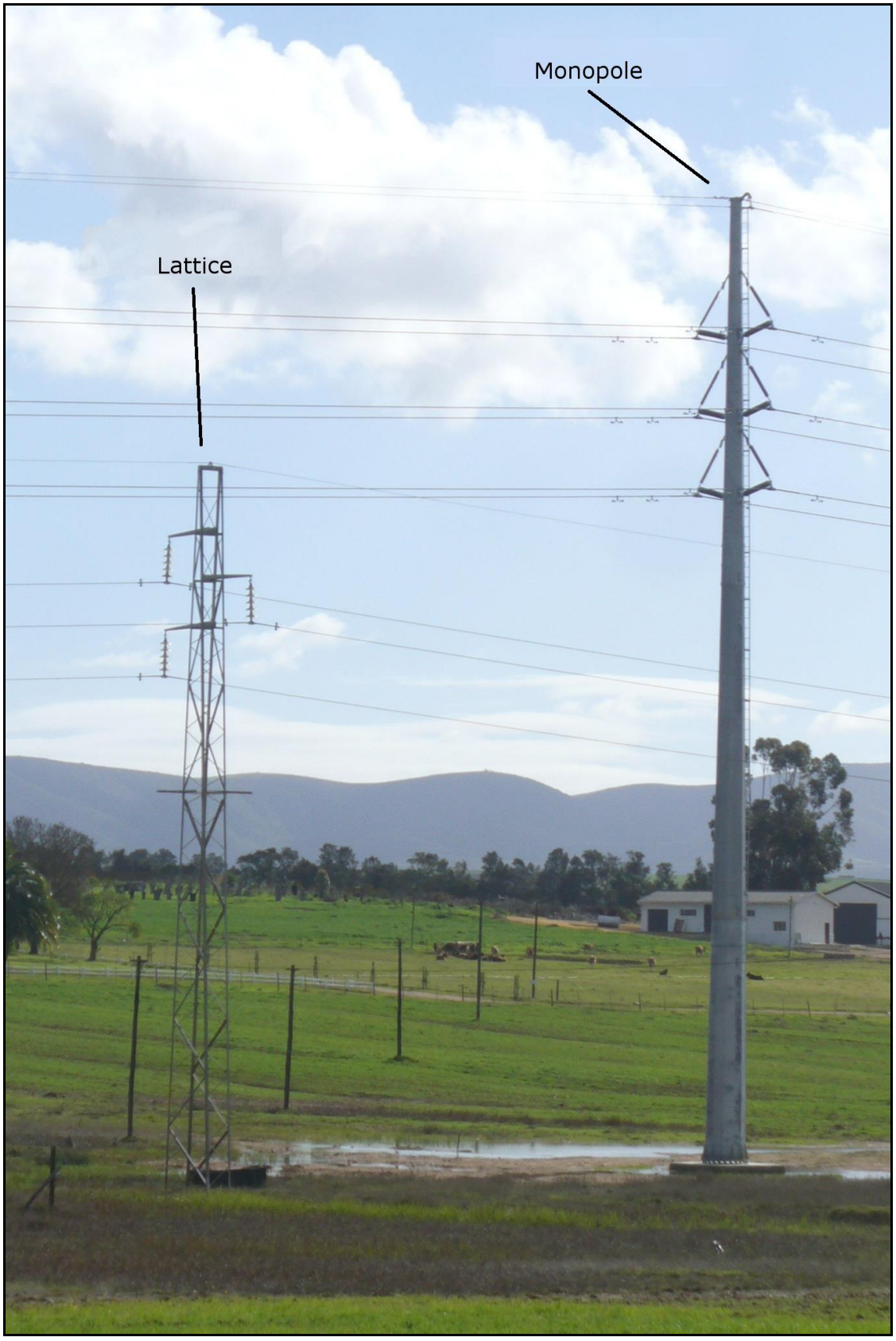


Figure 2: Conventional lattice power line tower compared to a steel monopole structure.

Figure 3: Longer distance view of power line towers.

3. SCOPE OF WORK

This report is the undertaking of a Visual Impact Assessment (VIA) of the proposed Grid Connection Infrastructure as mentioned above.

The determination of the potential visual impacts is undertaken in terms of nature, extent, duration, magnitude, probability and significance of the construction and operation of the proposed infrastructure.

The study area for the visual impact assessment encompasses a geographical area of 341km² (the extent of the full page maps displayed in this report) and includes a minimum 3km buffer zone (area of potential visual influence) from the power line alignment.

The study area includes the town of Kroonstad, a number of homesteads or farm residences, the Kroonstad Municipal Substation, existing distribution and transmission power lines, and sections of the N1 national, the R34 arterial and R713 main roads.

Anticipated issues related to the potential visual impact of the proposed Grid Connection Infrastructure include the following:

- The visibility of the infrastructure to, and potential visual impact on, observers travelling along the arterial or secondary roads within the study area.

- The visibility of the infrastructure to, and visual impact on residents of homesteads within the study area.

- The potential visual impact of the infrastructure on the visual character or sense of place of the region.

- The potential visual impact of the infrastructure on tourist routes or tourist destinations (if present).

- The visual absorption capacity of the natural vegetation (if applicable).

- Potential cumulative visual impacts (or consolidation of visual impacts), with specific reference to the location of the proposed infrastructure within an area with existing power line infrastructure.

- Potential visual impacts associated with the construction phase.

- The potential to mitigate visual impacts and inform the design process.

It is envisaged that the issues listed above may constitute a visual impact at a local and/or potentially at a regional scale.

4. RELEVANT LEGISLATION AND GUIDELINES

The following legislation and guidelines have been considered in the preparation of this report:

- The Environmental Impact Assessment Regulations, 2014 (as amended);
- Guideline on Generic Terms of Reference for EAPS and Project Schedules (DEADP, Provincial Government of the Western Cape, 2011).

5. THE AFFECTED ENVIRONMENT

The project is proposed on a site on the remaining extent of the farm Vrede 1152 and Portion 1 of the farm Uitval 1104, located approximately 11.5km from the Kroonstad central business district (at the closest). These farms have a surface area of 538ha, but the identified development area (project site) is approximately 279ha. The ultimate development footprint, including the PV modules, internal roads, buildings and other associated infrastructure will be approximately 195ha (i.e. 70% of the development area assessed in this visual assessment). The footprint of the battery storage area will be 2ha and the on-site substation 1ha.

The entire proposed Solar PV Facility project is located in a rural area, currently zoned as agriculture, at a distance of approximately 9km from the Kroonstad Municipal 132/66kV Substation (at the closest).

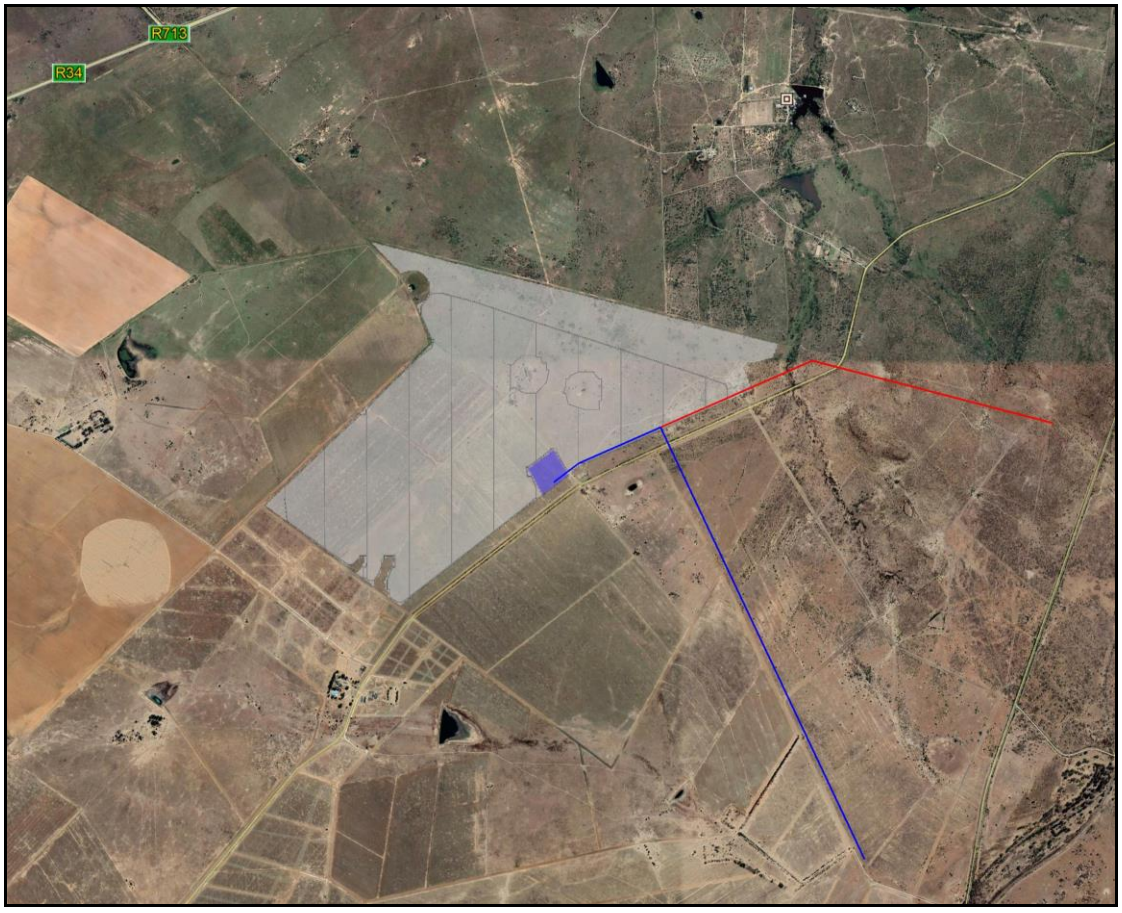


Figure 4: Aerial overview of the power line alternatives and substation locations. (Red Alternative 1 and blue Alternative 2).

Topography, hydrology and vegetation

The study area occurs on land that ranges in elevation from 1,318m (in the north) to 1,459m in the south. The proposed development site itself is located at an average elevation of 1,423m above sea level. The general slope of the study area is even (flat), although the site traverses across a weak ridge that spans in a south-easterly to north-westerly direction. The region is generally referred to as the *Highveld* with the terrain morphology described as *plains* and *slightly irregular undulating plains and hills*.

The Vals River is the only perennial river within the study area. There are a number of non-perennial streams of which the *Blomspruit* is the most prominent. This stream and a number of other smaller streams in closer proximity to the project site feed into the Vals River, north of the site. Further to the aforementioned drainage lines the most prominent hydrological features are the man-made farm dams occurring throughout the study area.

The natural land cover within the study area is predominantly grassland interspersed with open woodland, with wetlands in the lower lying reaches of the drainage lines mentioned above. The site itself is a combination of natural grassland and woodland (eastern section), and old farm lands to the west. Large tracts of the study area have been transformed by dryland agriculture (primarily maize farming) as well as irrigated crop farming (crop circles).

The entire study area is located in the *Dry Highveld Grassland Bioregion* and the dominant vegetation type is described as *Central Free State Grassland*. The most

transformed part of the study area, to the south-west, is known as *Vaal-Vet Sandy Grassland.*

Refer to **Maps 1** and **2** for the topography and land cover maps of the study area.

Land use and settlement patterns

The study area has a rural and predominantly natural character and the main land use activity, outside of the Kroonstad city limits, is maize farming. The region is similarly sparsely populated outside of the Kroonstad urban centre, with a population density of less than ten people per km^2. Farm residences, or homesteads, dot the landscape at an irregular interval. These homesteads are generally located at great distances from each other (i.e. more than 2.5km apart).

The development area is easily accessible from the N1 national road via the R34 arterial road, the Hennenman road and the S172 secondary (gravel) road.

The only protected area in the study area borders the proposed development area to the north. This is the Boslaagte Private Nature Reserve (farm Oshoek 47) that includes the Lechwe Lodge. This is the only tourist facility or destination identified within the study area (excluding Kroonstad itself). This lodge functions as a venue that can accommodate up to 300 people and provides overnight lodging.

In spite of the rural and natural character of the study area, there is a large number of overhead power lines associated with the Kroonstad Municipal Substation. These include:

- Kroonstad Municipal/Theseus 1 132kV
- Serfontein Traction/Virginia Terminal 1 88kV
- Kroonstad Municipal/Kroonstad SW Station 1 132kV

The former two power lines traverse east of the proposed project site at a distance of approximately 1.5km (at the closest).

Other than these power lines there is also a railway line crossing the study area to the industrial area west of the Kroonstad CBD.

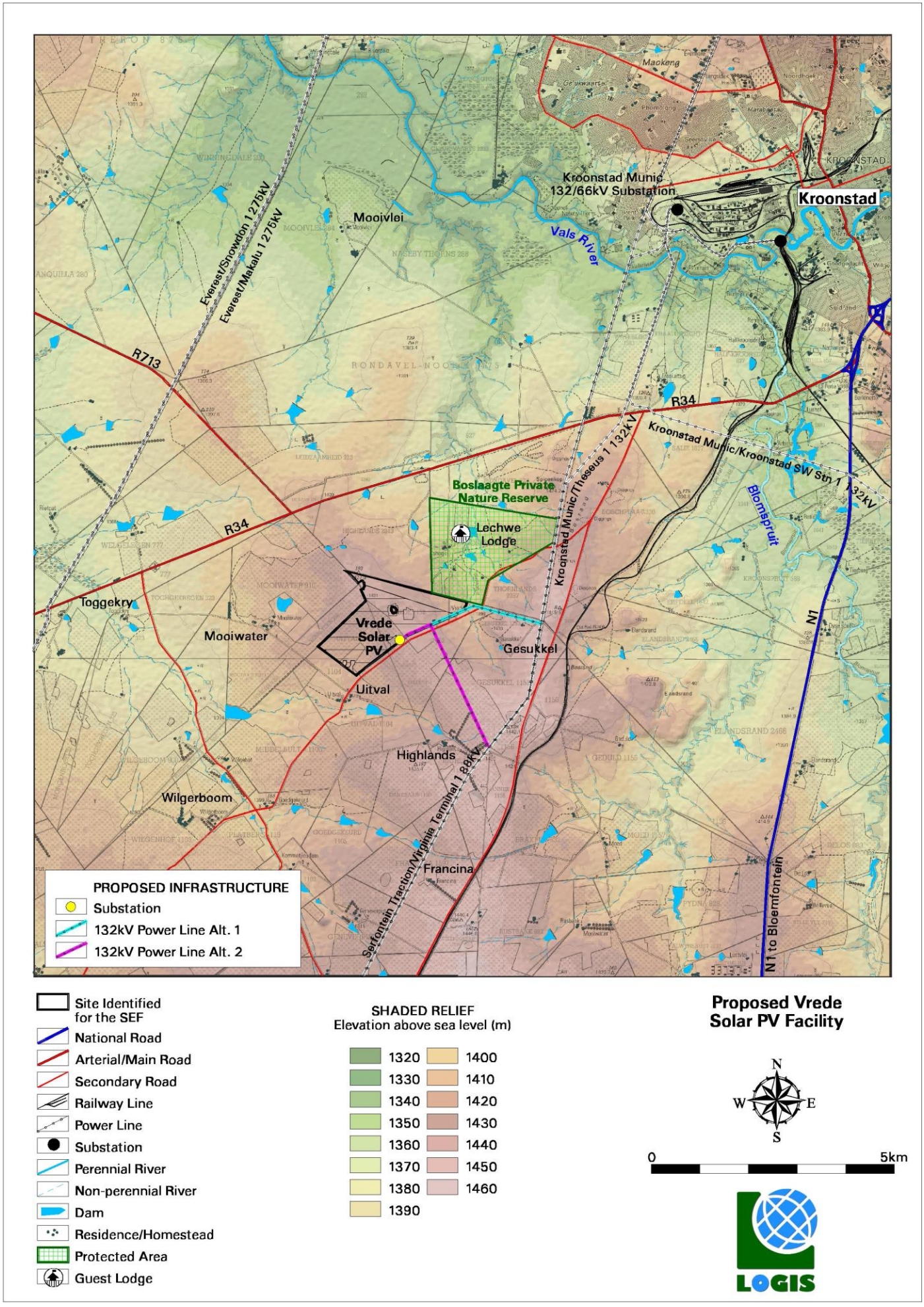
The photographs below aid in describing the general environment within the study area and surrounding the proposed Vrede Solar PV Facility[2].

[2] Sources: DEAT (ENPAT Free State), NBI (Vegetation Map of South Africa, Lesotho and Swaziland), NLC2018 (ARC/CSIR), REEA_OR_2020_Q2 and SAPAD2019-20 (DEA).

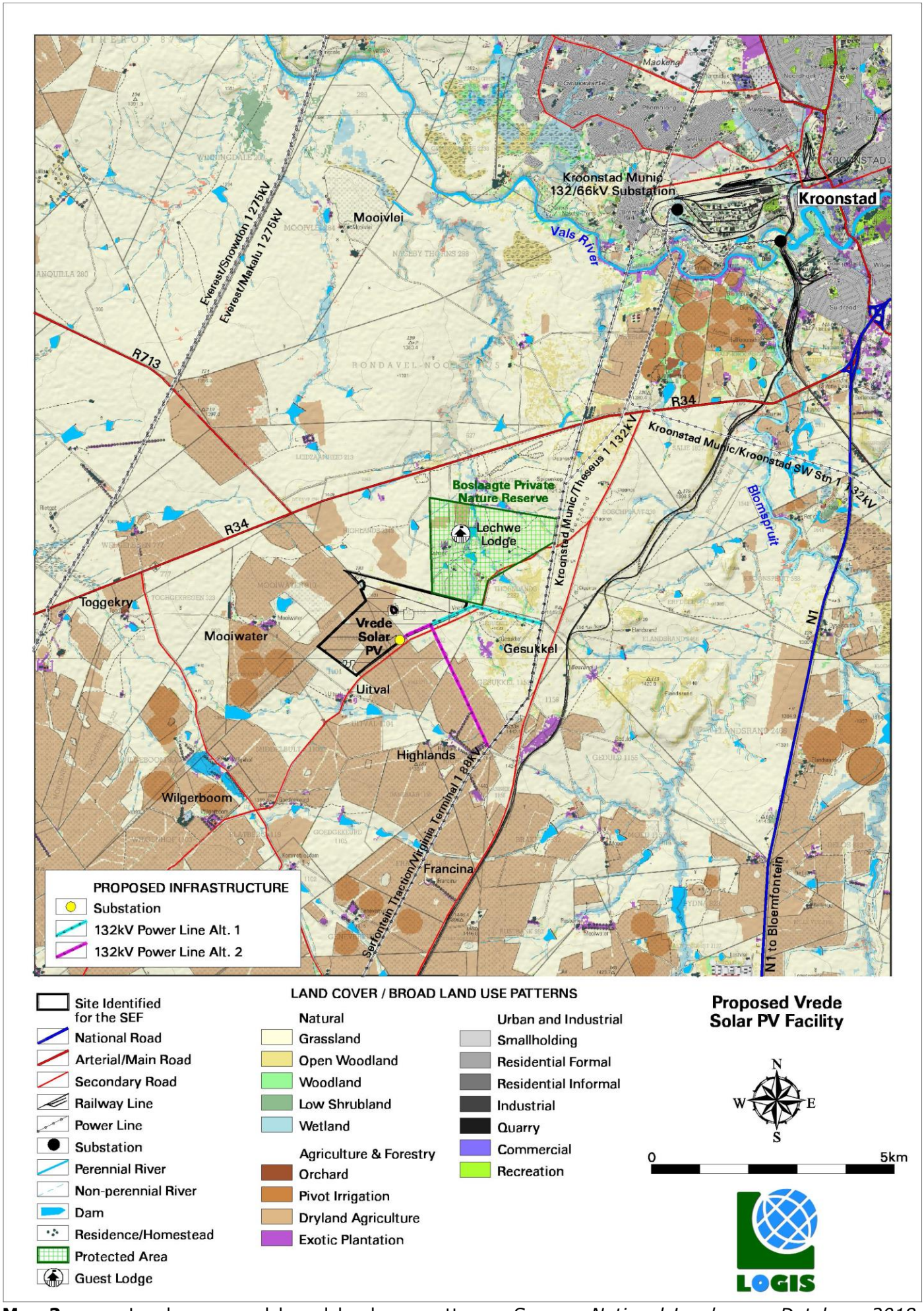
Figure 5: The project site as seen from the S172 secondary road.

Figure 6: Lechwe Lodge. (*Photo*: *Jan Venter*).

Figure 7: Access road to the Vrede development area.



Map 1: Shaded relief map of the study area.



Map 2: Land cover and broad land use patterns. *Source*: *National Land-cover Database 2018.*

6. RESULTS

6.1. Potential visual exposure

The proposed power line alternatives are indicated on **Figure 4** and discussed in the previous section of the report.

The potential visual exposure (visibility) of the Grid Connection Infrastructure is shown on **Maps 3** and **4**. The visibility analyses were undertaken along the power line alignments at an offset of 32m above average ground level (i.e. the approximate height of the Grid Connection Infrastructure), for a distance of 3km from the infrastructure. The viewshed analysis was restricted to a 3km radius due to the fact that visibility beyond this distance is expected to be negligible/highly unlikely for the relatively constrained vertical dimensions of this type of power line (i.e. a 132kV power line) and substation.

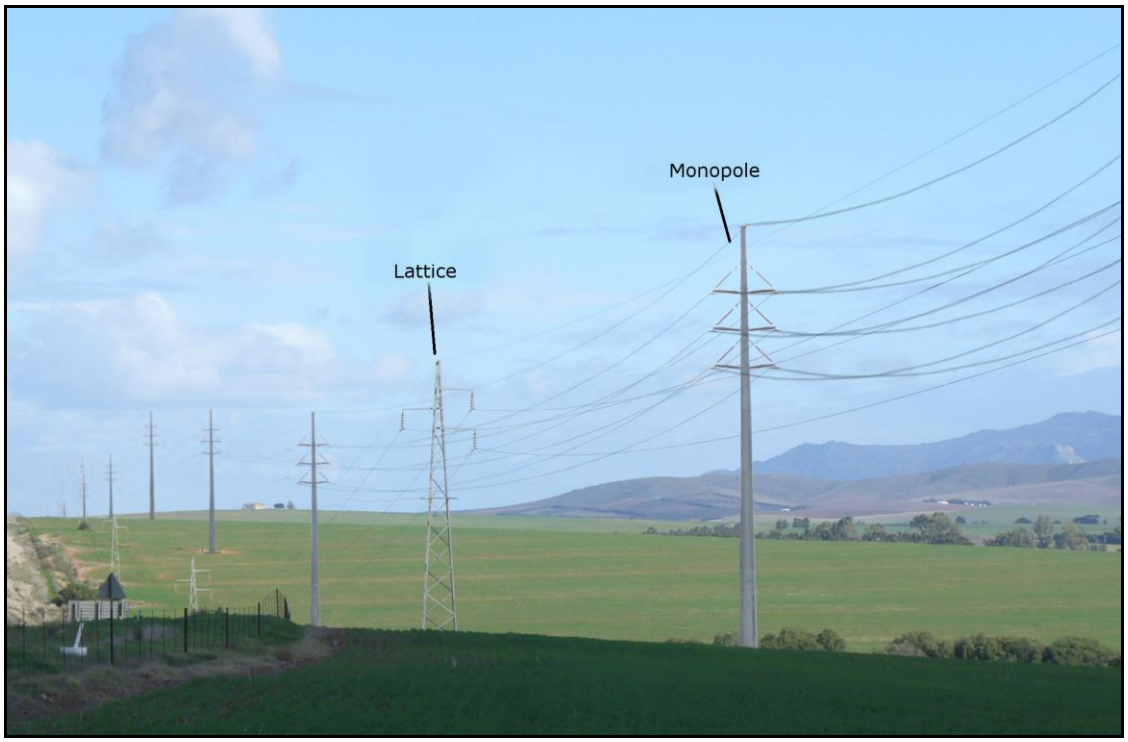


Figure 8: Examples of 132kV overhead power lines.

It is expected that the power line (both alternatives) may theoretically be visible within the 3km visual corridor and potentially highly visible within a 500m radius of the power line structures due to the generally flat terrain it traverses. Beyond 500m the visibility becomes more scattered due to the undulating nature of the topography. The power line structures are unlikely to be visible beyond a 3km radius of the structures.

Although the majority of the exposed areas fall within vacant open space, generally devoid of observers or potential sensitive visual receptors, specific receptors sites are discussed per alternative below.

Power Line Alternative 1

The power line may be exposed to observers travelling along the S172 secondary road where it crosses this road. It is not expected to be visible from any

homesteads, but the power line may be visible from the southern section of the Boslaagte Nature Reserve, and potentially from residences within this reserve. This is due to the location of the infrastructure immediately adjacent to the nature reserve.

Power Line Alternative 2

The power line may be exposed to observers travelling along the S172 secondary road where it crosses this road. It may further be visible from the Highlands and Uitval homesteads from respectively 760m and 2.1km.

6.2. Potential cumulative visual exposure

Cumulative visual impacts can be defined as the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments. In this case the 'development' would be a new 132kV power line as seen in conjunction with the existing power line infrastructure in close proximity.

Cumulative visual impacts may be:

- Combined, where several power lines are within the observer's arc of vision at the same time;
- Successive, where the observer has to turn his or her head to see the various structures of a power line; and
- Sequential, when the observer has to move to another viewpoint to see different power line structures, or different views of the same power line (such as when travelling along a route).

The visual impact assessor is required (by the competent authority) to identify and quantify the cumulative visual impacts and to propose potential mitigating measures. This is often problematic as most regulatory bodies do not have specific rules, regulations or standards for completing a cumulative visual assessment, nor do they offer meaningful guidance regarding appropriate assessment methods. There are also not any authoritative thresholds or restrictions related to the capacity of certain landscapes to absorb the cumulative visual impacts of the power line infrastructure.

To complicate matters even further, cumulative visual impact is not just the sum of the impacts of two developments. The combined effect of both may be much greater than the sum of the two individual effects, or even less.

The cumulative impact of the proposed Grid Connection Infrastructure on the landscape and visual amenity is a product of:

- The distance between the power lines;
- The distance over which the structures are visible;
- The overall character of the landscape and its sensitivity to the structures;
- The siting and design of the power line, switching station or substation; and
- The way in which the landscape is experienced.

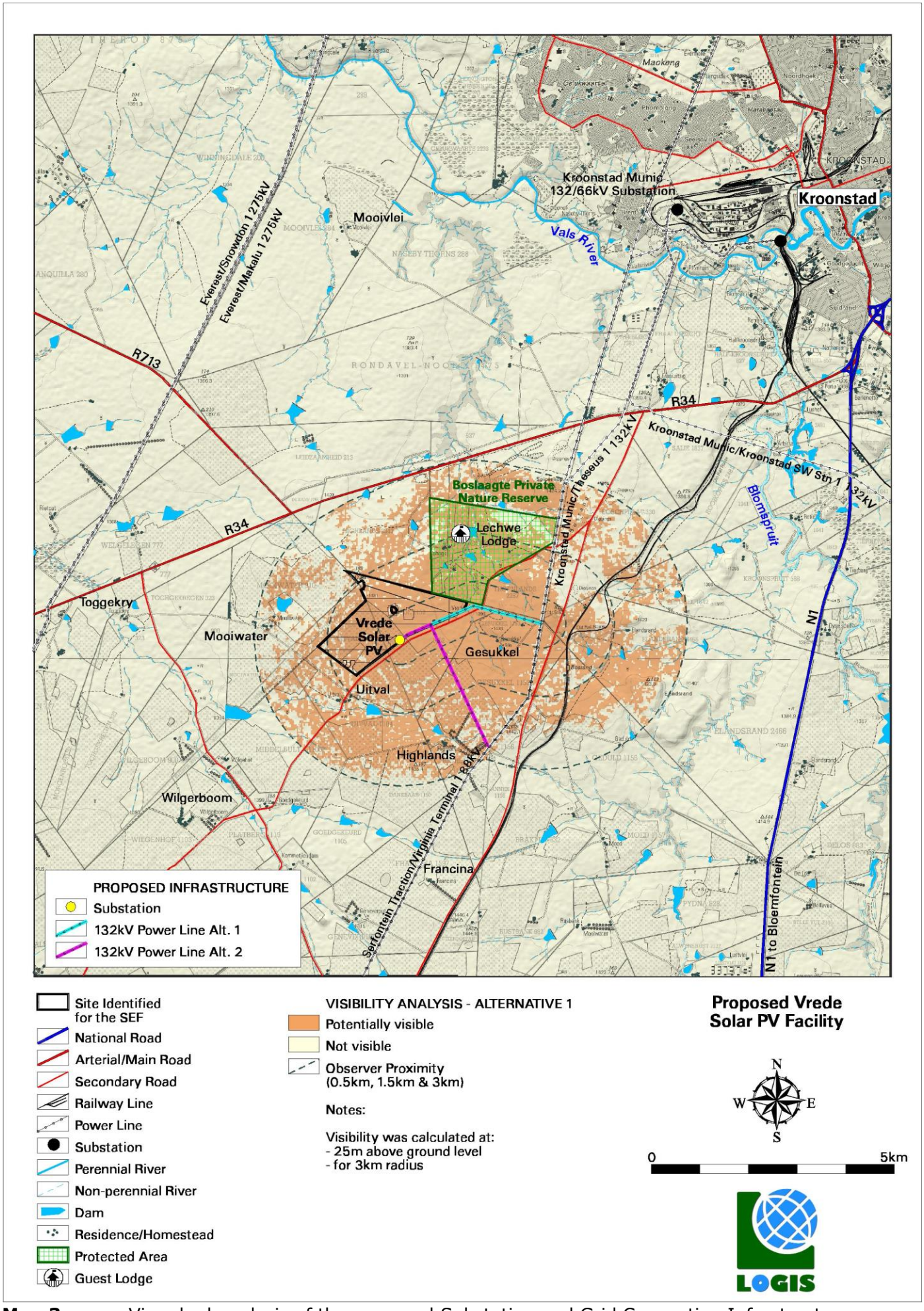
The specialist is required to conclude if the proposed 'development' will result in any unacceptable loss of visual resource considering all the industrial infrastructure proposed in the area.

Results

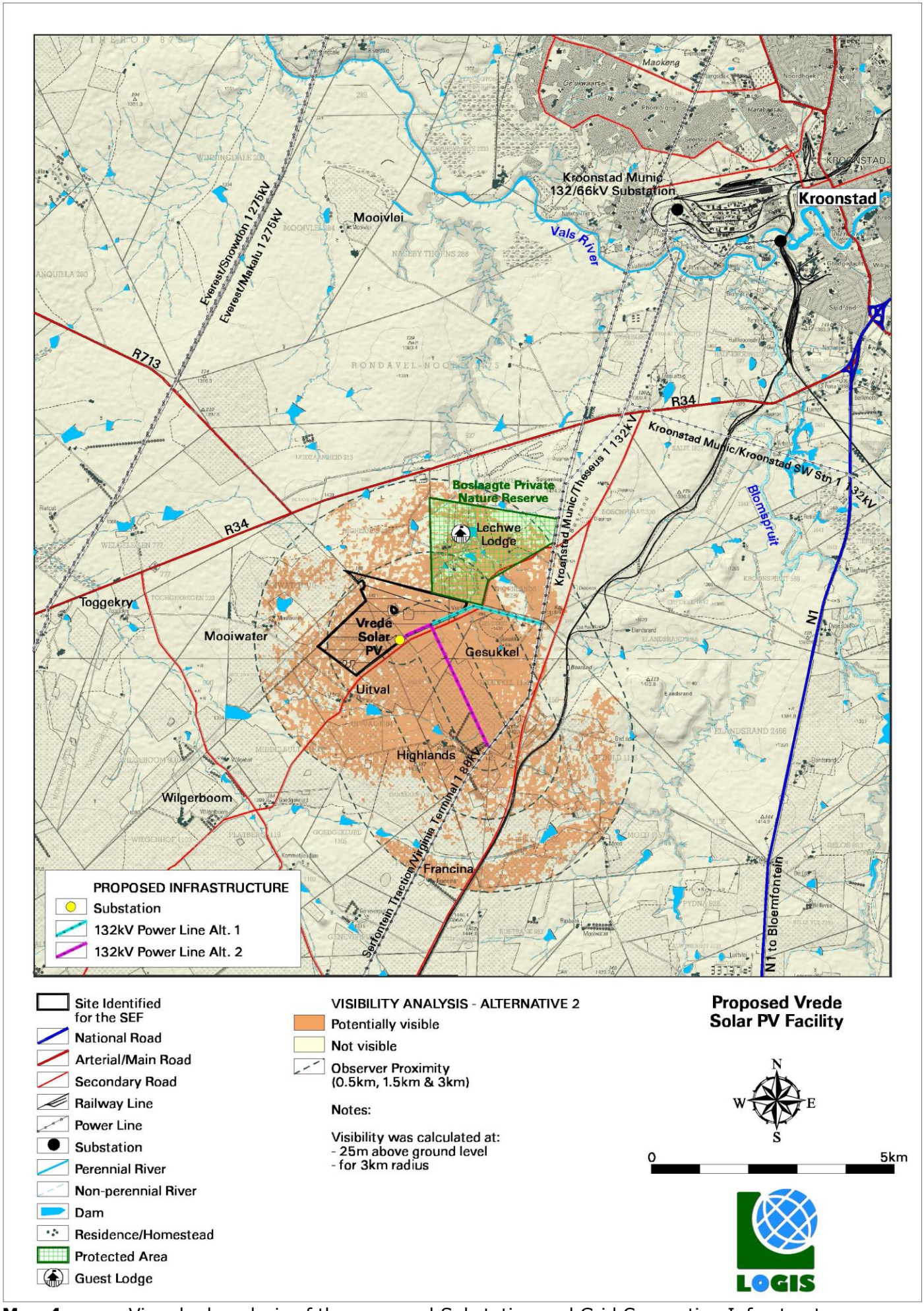
Both of the proposed power line alternatives are located in close proximity to the Traction to Virginia Terminal 1 88kV and Kroonstad Municipal to Theseus 1 132kV power lines. It is therefore preferable to link into an existing 132kV power line, rather than to construct a new power line that traverses all the way from the Vrede Solar PV Facility to the Kroonstad Municipal Substation.

Conclusion

The fact that only a relatively short power line needs to be constructed between the on-site substation and the Kroonstad Municipal to Theseus 1 132kV power line, instead of constructing an approximately 10km long power line, is considered to reduce the potential cumulative visual impact of power line infrastructure within the region. This is relevant for both alternatives. Even though Alternative 1 is shorter, Alternative 2 will also suffice in reducing potential cumulative visual impacts.



Map 3: Viewshed analysis of the proposed Substation and Grid Connection Infrastructure – Alternative 1.



Map 4: Viewshed analysis of the proposed Substation and Grid Connection Infrastructure – Alternative 2.

6.3. Visual distance / observer proximity to the Grid Connection Infrastructure

The proximity radii are based on the anticipated visual experience of the observer over varying distances. The distances are adjusted upwards for larger power line structures (e.g. 400kV) and downwards for smaller power lines (e.g. 132kV) due to variations in height. This methodology was developed in the absence of any known and/or accepted standards for South African power line infrastructure.

The proximity radii (calculated from the power lines) are indicated on **Map 5**, and include the following:

- 0 – 0.5km - Short distance view where the structures would dominate the frame of vision and constitute a very high visual prominence.
- 0.5 – 1.5km - Medium distance views where the structures would be easily and comfortably visible and constitute a high visual prominence.
- 1.5 - 3km - Medium to longer distance view where the structures would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence.
- Greater than 3km - Long distance view where the structures may still be visible though not as easily recognisable. This zone constitutes a low visual prominence for the power lines.

The visual distance theory and the observer's proximity to the 132kV power line and substation are closely related, and especially relevant, when considered from areas with a high viewer incidence and a potentially negative visual perception of the proposed infrastructure.

6.4. Viewer incidence / viewer perception

The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers or if the visual perception of the structure is favourable to all the observers, there would be no visual impact.

It is necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed grid connection infrastructure. It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer: regularity of sighting, cultural background, state of mind, purpose of sighting, etc. which would create a myriad of options.

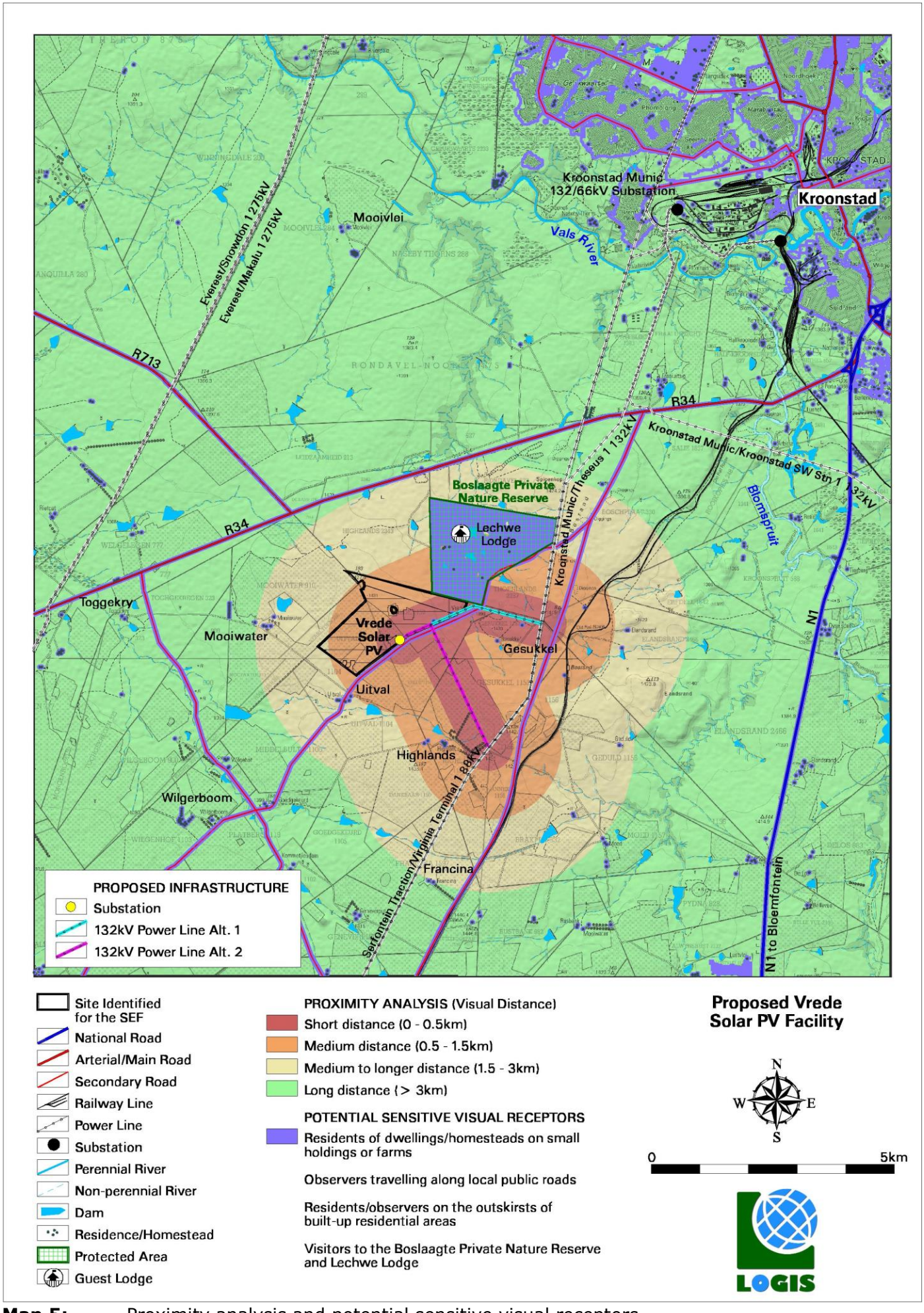
Viewer incidence is calculated to be the highest along the arterial and secondary roads within the study area. Travellers using these roads may be negatively impacted upon by visual exposure to the Grid Connection Infrastructure.

Additional sensitive visual receptors are located at the farm residences (homesteads) throughout the study area. It is expected that the viewer’s perception, unless the observer is associated with (or supportive of) the solar energy facility and associated infrastructure, would generally be negative.

Due to the generally remote location of the proposed Grid Connection Infrastructure, there are only a few potential sensitive visual receptors located within a 3km radius of the proposed infrastructure. These are residents of, or visitors to:

- The Boslaagte Nature Reserve
- Highlands
- Uitval

Refer to **Map 5**.



Map 5: Proximity analysis and potential sensitive visual receptors.

6.5. Visual absorption capacity

The broader study area is located within the Dry Highveld Grassland Bioregion characterised by predominantly large open plains with grassland and bare soil in places, but also sections with woodland. Where natural grassland occurs, the Visual Absorption Capacity (VAC) will be low, especially due to the low occurrence of urban development and the low height of the vegetation cover. This is illustrated in **Figure 9** below, where the grassland section to the left has a low VAC, i.e. long distance views are possible.

Where woodland is present the VAC is high (e.g. to the right of the photograph) obstructing long distance views and largely shielding the observer from the PV facility structures. The study area therefore has a combined low and high VAC. This prompts the importance of retaining the natural vegetation, especially woodland, surrounding the development footprint in order to insure maximum shielding of the PV facility structures from potential sensitive visual receptors.

Figure 9: Grassland (low VAC) and woodland (high VAC) within the study area.

6.6. Visual impact index

The combined results of the visual exposure, viewer incidence/perception and visual distance of the proposed Grid Connection Infrastructure culminate in a visual impact index. Here the weighted impact and the likely areas of impact have been indicated as a visual impact index. Values have been assigned for each potential visual impact per data category and merged in order to calculate the visual impact index.

The criteria (previously discussed in this report) which inform the visual impact index are:

- Visibility or visual exposure of the structures
- Observer proximity or visual distance from the structures
- The presence of sensitive visual receptors
- The perceived negative perception or objections to the structures (if applicable)
- The visual absorption capacity of the vegetation cover or built structures (if applicable)

An area with short distance visual exposure to the proposed Grid Connection Infrastructure, a high viewer incidence and a potentially negative perception would therefore have a higher value (greater impact) on the index. This helps in

focussing the attention to the critical areas of potential impact and determining the potential **magnitude** of the visual impact.

The index indicates that **potentially sensitive visual receptors** within a 0.5km radius of the Grid Connection Infrastructure may experience visual impacts of **high** magnitude. The magnitude of visual impact on sensitive visual receptors subsequently subsides with distance to; **moderate** within a 0.5 – 1km radius (where/if sensitive receptors are present) and **low** within a 1 – 3km radius (where/if sensitive receptors are present). Receptors beyond 3km are expected to have a **very low** potential visual impact.

The visual impact indexes and potentially affected sensitive visual receptors are indicated on **Maps 6** and **7**.

Magnitude of the potential visual impact

Power Line Alternative 1

The Grid Connection Infrastructure may have a visual impact of **high** magnitude on the following observers:

Residents of/or visitors to:

- The southern section of the Boslaagte Nature Reserve

Observers travelling along the:

- S172 secondary road where the power line crosses the road

No visual impact of **moderate** magnitude is envisaged for this alternative.

Power Line Alternative 2

The Grid Connection Infrastructure may have a visual impact of **high** magnitude on the following observers:

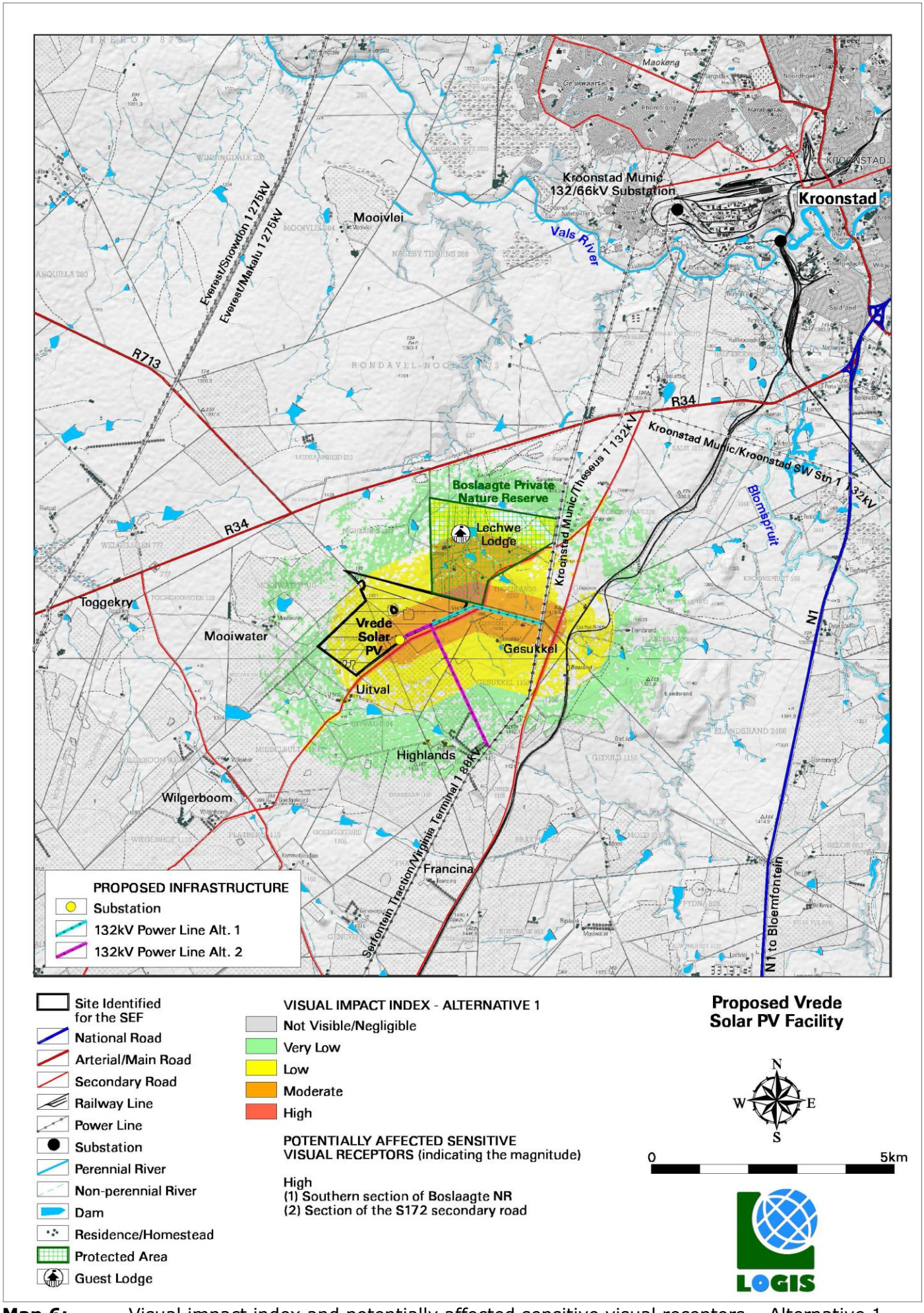
Observers travelling along the:

- S172 secondary road where the power line crosses the road

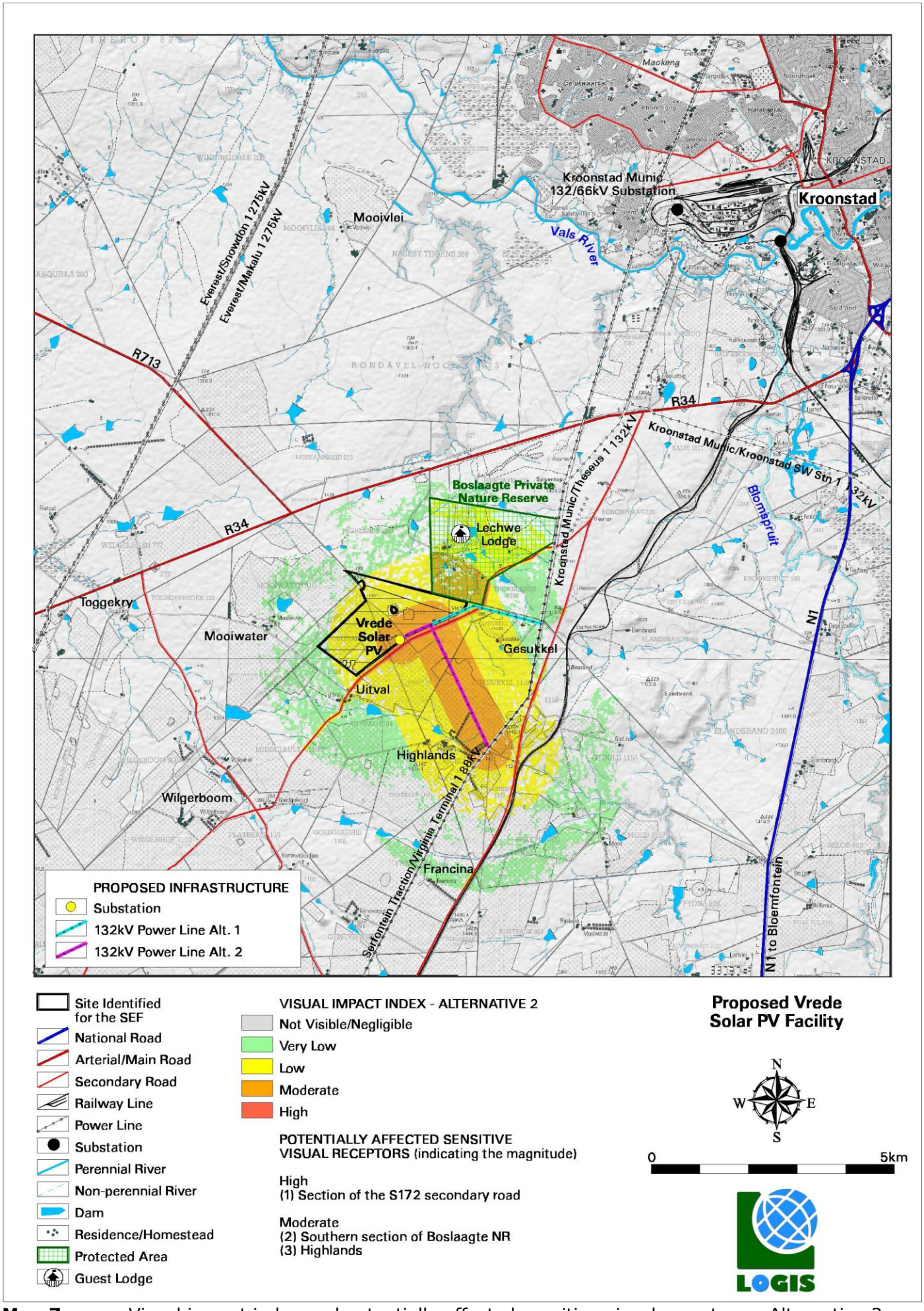
The Grid Connection Infrastructure may have a visual impact of **moderate** magnitude on the following observers:

Residents of/or visitors to:

- The southern section of the Boslaagte Nature Reserve
- Highlands



Map 6: Visual impact index and potentially affected sensitive visual receptors – Alternative 1.



Map 7: Visual impact index and potentially affected sensitive visual receptors – Alternative 2.

6.7. Visual impact assessment: impact rating methodology

The previous section of the report identified specific areas where likely visual impacts would occur. This section will attempt to quantify these potential visual impacts in their respective geographical locations and in terms of the identified issues (see **Section 3:** SCOPE OF WORK) related to the visual impact.

The methodology for the assessment of potential visual impacts states the **nature** of the potential visual impact (e.g. the visual impact on users of major roads in the vicinity of the proposed power line alignment) and includes a table quantifying the potential visual impact according to the following criteria:

- **Extent** - site only (very low = 1), local (low = 2), regional (medium = 3), national (high = 4) or international (very high = 5)[3].
- **Duration** - very short (0-1 yrs. = 1), short (2-5 yrs. = 2), medium (5-15 yrs. = 3), long (>15 yrs. = 4), and permanent (= 5).
- **Magnitude** - None (= 0), minor (= 2), low (= 4), medium/moderate (= 6), high (= 8) and very high (= 10)[4].
- **Probability** – very improbable (= 1), improbable (= 2), probable (= 3), highly probable (= 4) and definite (= 5).
- **Status** (positive, negative or neutral).
- **Reversibility** - reversible (= 1), recoverable (= 3) and irreversible (= 5).
- **Significance** - low, medium or high.

The **significance** of the potential visual impact is equal to the **consequence** multiplied by the **probability** of the impact occurring, where the consequence is determined by the sum of the individual scores for magnitude, duration and extent (i.e. **significance = consequence (magnitude + duration + extent) x probability**).

The significance weighting for each potential visual impact (as calculated above) is as follows:

- <30 points: Low (where the impact would not have a direct influence on the decision to develop in the area)
- 31-60 points: Medium/moderate (where the impact could influence the decision to develop in the area)
- >60: High (where the impact must have an influence on the decision to develop in the area)

[3] Local = within 0.5km of the power line. Regional = between 0.5 - 3km from the power line.

[4] This value is read from the visual impact index. Where more than one value is applicable, the higher of these will be used as a worst case scenario.

6.8. Visual impact assessment

The primary visual impacts of the Proposed Grid Connection Infrastructure for the Vrede Solar PV Facility are assessed as follows:

6.8.1. Construction impacts

Potential visual impact of construction activities on sensitive visual receptors in close proximity to the proposed Grid Connection Infrastructure.

During construction, there may be an increase in heavy vehicles utilising the roads to the power line that may cause, at the very least, a visual nuisance to other road users and landowners in the area.

Construction activities may potentially result in a **low** (significance ratings = 16 and 20) temporary visual impact both before and after mitigation.

Table 2: Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed Grid Connection Infrastructure.

Nature of Impact: Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed Grid Connection Infrastructure.		
	Alt. 1	***Alt. 2***
Extent	Local **(2)**	Local **(2)**
Duration	Short term **(2)**	Short term **(2)**
Magnitude	Moderate **(6)**	Moderate **(6)**
Probability	Improbable **(2)**	Improbable **(2)**
Significance	Low **(20)**	Low **(20)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation: Planning: ➢ Retain and maintain natural vegetation immediately adjacent to the development footprint/servitude. Construction: ➢ Ensure that vegetation is not unnecessarily removed during the construction phase. ➢ Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible. ➢ Restrict the activities and movement of construction workers and vehicles to the immediate construction area and existing access roads. ➢ Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities. ➢ Reduce and control construction dust using appropriate and effective dust suppression techniques as and when required (i.e. whenever dust becomes apparent). ➢ Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts. ➢ Rehabilitate all disturbed areas immediately after the completion of construction works.
Residual impacts: None, provided rehabilitation works are carried out as specified.

6.8.2. Potential visual impact on sensitive visual receptors located within a 0.5km radius of the Grid Connection Infrastructure during the operation phase

Power Line Alternative 1 (including the substation) may have a visual impact of **moderate** significance (rating = 42) as this alternative will be located immediately adjacent to the Boslaagte Nature Reserve.

Power Line Alternative 2 is expected to have a **low** visual impact (significance rating = 28) on observers within a 0.5km radius of the power line structures.

No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice. The table below illustrates this impact assessment.

Table 3: Visual impact on observers in close proximity to the proposed grid connection infrastructure.

Nature of Impact: Visual impact on observers travelling along the roads and residents at homesteads in close proximity to the power line structures		
	Alt. 1	***Alt. 2***
Extent	Local **(2)**	Local **(2)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	High **(8)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(42)**	Low **(28)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No

Can impacts be mitigated?	No
Mitigation / Management: Planning: ➢ Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. Operations: ➢ Maintain the general appearance of the infrastructure. Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use. ➢ Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.	
Residual impacts: The visual impact will be removed after decommissioning, provided the power line infrastructure is removed. Failing this, the visual impact will remain.	

6.8.3. Potential visual impact on sensitive visual receptors within the region (0.5 – 3km radius) during the operation of the grid infrastructure

The 132kV power line (including substation) will have a **low** visual impact (significance rating = 22) on observers traveling along the roads and residents of homesteads within a 0.5 - 3km radius of the Grid Connection Infrastructure.

No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice. The table below illustrates this impact assessment.

Table 4: Visual impact of the proposed Grid Connection Infrastructure within the region.

Nature of Impact: Visual impact on observers travelling along the roads and residents at homesteads within a 0.5 – 3km radius of the Grid Connection Infrastructure.		
	Alt. 1	***Alt. 2***
Extent	Regional **(3)**	Regional **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Low **(4)**	Low **(4)**
Probability	Improbable **(2)**	Improbable **(2)**
Significance	Low **(22)**	Low **(22)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation / Management: Planning: ➢ Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. Operations: ➢ Maintain the general appearance of the servitude as a whole. Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use. ➢ Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.		

Residual impacts: The visual impact will be removed after decommissioning, provided that the Grid Connection Infrastructure is removed. Failing this, the visual impact will remain.

6.9. Visual impact assessment: secondary impacts

The potential visual impact of the proposed Grid Connection Infrastructure on the sense of place of the region.

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria, specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.), plays a significant role.

An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

The greater environment has a mixed rural and natural character, with dryland agriculture to the south. There are existing power lines and railway lines east of the proposed infrastructure, but otherwise very limited development.

The anticipated visual impact of the proposed Grid Connection Infrastructure on the regional visual quality, and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of **low** significance.

Table 5: The potential impact on the sense of place of the region.

Nature of Impact: The potential impact of the development of the proposed Grid Connection Infrastructure on the sense of place of the region.		
	Alt. 1	***Alt. 2***
Extent	Regional **(3)**	Regional **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Low **(4)**	Low **(4)**
Probability	Improbable **(2)**	Improbable **(2)**
Significance	Low **(22)**	Low **(22)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures: Planning: ➢ Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. Operations: ➢ Maintain the general appearance of the servitude as a whole. Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use. ➢ Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.		

Residual impacts: The visual impact will be removed after decommissioning, provided the Grid Connection Infrastructure is removed. Failing this, the visual impact will remain.

The potential cumulative visual impact of the proposed Grid Connection Infrastructure on the visual quality of the landscape.

The construction of the Grid Connection Infrastructure for the Vrede Solar PV Facility (Alternative 1) may increase the cumulative visual impact of industrial type infrastructure within the region to some degree, especially at the Boslaagte Nature Reserve.

The anticipated cumulative visual impact of the Power Line Alternative 1 is expected to be of **moderate** significance (significance rating = 45). This is considered to be acceptable from a visual impact perspective.

Table 6: The potential cumulative visual impact on the visual quality of the landscape – Alternative 1.

Nature of Impact: The potential cumulative visual impact of the grid infrastructure on the visual quality of the landscape.		
	Overall impact of the Alternative 1 considered in isolation (with mitigation)	***Cumulative impact of the project and other projects within the area (with mitigation)***
Extent	Local **(2)**	Regional **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	High **(8)**
Probability	Probable **(3)**	Probable **(3)**
Significance	Moderate **(42)**	Moderate **(45)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures: <u>Planning:</u> ➢ Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. <u>Operations:</u> ➢ Maintain the general appearance of the servitude as a whole. <u>Decommissioning:</u> ➢ Remove infrastructure not required for the post-decommissioning use. ➢ Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.		
Residual impacts: The visual impact will be removed after decommissioning, provided the grid infrastructure is removed. Failing this, the visual impact will remain.		

The anticipated cumulative visual impact of the Power Line Alternative 2 is expected to be of **moderate** significance (significance rating = 39). This is considered to be acceptable from a visual impact perspective.

Table 7: The potential cumulative visual impact on the visual quality of the landscape – Alternative 2.

Nature of Impact: The potential cumulative visual impact of the grid infrastructure on the visual quality of the landscape.		
	Overall impact of the Alternative 2 considered in isolation (with mitigation)	***Cumulative impact of the project and other projects within the area (with mitigation)***
Extent	Local **(2)**	Regional **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	Moderate **(6)**
Probability	Improbable **(2)**	Probable **(3)**
Significance	Low **(28)**	Moderate **(39)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures: Planning: ➢ Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. Operations: ➢ Maintain the general appearance of the servitude as a whole. Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use. ➢ Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.		
Residual impacts: The visual impact will be removed after decommissioning, provided the grid infrastructure is removed. Failing this, the visual impact will remain.		

6.10. The potential to mitigate visual impacts

The primary visual impact, namely the appearance of the proposed Grid Connection Infrastructure is not possible to mitigate. The functional design of the structures cannot be changed in order to reduce visual impacts.

Secondary impacts anticipated as a result of the proposed Grid Connection Infrastructure (i.e. visual character and sense of place) are also not possible to mitigate.

The following mitigation is, however possible:

- Retain/re-establish and maintain natural vegetation in all areas immediately adjacent to the development footprint/servitude. This measure will help to soften the appearance of the Grid Connection Infrastructure within its context.

- Mitigation of visual impacts associated with the construction phase, albeit temporary, would entail proper planning, management and rehabilitation of the construction site. Recommended mitigation measures include the following:

- Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
- Plan the placement of laydown areas and any potential temporary construction camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction area and existing access roads.
- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
- Reduce and control construction dust through the use of appropriate and effective dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
- Restrict construction activities to daylight hours as far as possible, in order to negate or reduce the visual impacts associated with lighting.
- Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist must be consulted to assist or give input into rehabilitation specifications.

- During operation, the maintenance of the Grid Connection Infrastructure will ensure that the infrastructure does not degrade, therefore aggravating visual impact.

- Roads must be maintained to forego erosion and to suppress dust, and rehabilitated areas must be monitored for rehabilitation failure. Remedial actions must be implemented as a when required.

- Once the Grid Connection Infrastructure has exhausted its life span, all associated infrastructure not required for the post rehabilitation use of the site/servitude should be removed and all disturbed areas appropriately rehabilitated. An ecologist should be consulted to give input into rehabilitation specifications.

- All rehabilitated areas should be monitored for at least a year following decommissioning, and remedial actions implemented as and when required.

Good practice requires that the mitigation of both primary and secondary visual impacts, as listed above, be implemented and maintained on an ongoing basis.

7. CONCLUSION AND RECOMMENDATIONS

The construction and operation of the proposed Grid Connection Infrastructure for the Vrede Solar PV Facility may have a visual impact on the study area, especially within (but not restricted to) a 0.5km radius of the power line and substation. The visual impact will differ amongst places, depending on the distance from the power line.

Overall, the significance of the visual impacts is expected to range from **moderate** to **low** as a result of the existing power line infrastructure present within the receiving environment. No visual impacts of a high significance are expected to occur.

Both of the accessed alternatives are considered acceptable from a visual impact perspective. However, **Alternative 2** scored lower impact significance ratings than Alternative 1 and is therefore the preferred alternative from a visual impact perspective. Alternative 2 will also place the substation and power line infrastructure further away from the Boslaagte Nature Reserve, potentially mitigating visual impacts from this reserve.

A number of mitigation measures have been proposed (**Section 6.10.**). Regardless of whether or not mitigation measures will reduce the significance of the anticipated visual impacts, they are considered to be good practice and should all be implemented and maintained throughout the construction, operation and decommissioning phases of the proposed Grid Connection Infrastructure.

If mitigation is implemented as recommended, it is concluded that the significance of most of the anticipated visual impacts will remain at or be managed to acceptable levels. As such, the Grid Connection Infrastructure for the Vrede Solar PV Facility is considered to be acceptable from a visual impact perspective.

8. IMPACT STATEMENT

The findings of the Visual Impact Assessment undertaken for the proposed Grid Connection Infrastructure for the Vrede Solar PV Facility indicates that the visual environment surrounding the power line and substation, especially within a 0.5km radius, may be visually impacted upon for the anticipated operational lifespan of the grid connection infrastructure.

This impact is applicable to the proposed Grid Connection Infrastructure and to the potential cumulative visual impact of the power line in association with existing power line infrastructure within the region.

The following is a summary of impacts remaining, assuming mitigation as recommended is exercised:

- During the construction, there may be an increase in heavy vehicles utilising the roads to the power line that may cause, at the very least, a visual nuisance to other road users and landowners in the area. Construction activities may potentially result in a **low** temporary visual impact after mitigation **(both alternatives).**

- **Power Line Alternatives 2** is expected to have a **low** visual impact on observers within a 0.5km radius of the power line structures.

- **Alternative 1** may have a visual impact of **moderate** significance on observers within a 0.5km radius as this alternative will be located immediately adjacent to the Boslaagte Nature Reserve.

- The Grid Connection Infrastructure **(both alternatives)** is expected to have a **low** visual impact on observers traveling along the roads and residents of homesteads within the region (within a 0.5 - 3km radius of the structures).

- The anticipated visual impact of the proposed Grid Connection Infrastructure on the regional visual quality, and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of **low** significance **(both alternatives)**

- The anticipated cumulative visual impact of the proposed Grid Connection Infrastructure is expected to be of **moderate** significance, which is considered to be acceptable from a visual perspective. **Power Line Alternative 2** has a marginally lower significance rating and is therefore favoured from a cumulative visual impact perspective.

The anticipated visual impacts listed above (i.e. post mitigation impacts) range from **moderate** to **low** significance. No visual impacts of a high significance are expected to occur. Anticipated visual impacts on sensitive visual receptors in close proximity to the power line are not considered to be fatal flaws for the proposed project.

Considering all factors, it is recommended that the development of the Grid Connection Infrastructure as proposed be supported; subject to the implementation of the recommended mitigation measures (**Section 6.10.**) and management programme (**Section 9.**).

Both of the accessed alternatives are considered acceptable from a visual impact perspective. However, **Power Line Alternative 2** is marginally preferred as its impact significance ratings were lower than those of Alternatives 1.

9. MANAGEMENT PROGRAMME

The following management plan tables aim to summarise the key findings of the visual impact report and suggest possible management actions in order to mitigate the potential visual impacts. Refer to the tables below.

Table 8: Management Programme: Planning.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the planning of the proposed Grid Connection Infrastructure.		
Project component/s	The Vrede Solar PV Facility 132kV power line and substation.	
Potential Impact	Primary visual impact due to the presence of the Grid Connection Infrastructure in the landscape.	
Activity/risk source	The viewing of the Grid Connection Infrastructure by observers near the infrastructure as well as within the region.	
Mitigation: Target/Objective	Optimal planning of infrastructure so as to minimise visual impact.	
Mitigation: Action/control	Responsibility	Timeframe
Implement an environmentally responsive planning approach for the development of roads and infrastructure to limit cut and fill requirements. Plan with due cognisance of the topography.	Project proponent / design consultant	Planning phase.
Consolidate infrastructure and make use of already disturbed sites rather than natural areas, as far as practically feasible.	Project proponent / design consultant	Planning phase.
Performance Indicator	No visible degradation of access roads and other associated infrastructure from surrounding areas.	
Monitoring	Not applicable.	

Table 9: Management Programme: Construction.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the construction of the proposed Grid Connection Infrastructure.		
Project component/s	Construction activities associated with the development of the 132kV power line and substation.	
Potential Impact	Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing.	
Activity/risk source	The viewing of general construction activities by observers near the development areas.	
Mitigation: Target/Objective	Minimal visual intrusion by construction activities and intact vegetation cover outside of immediate works areas.	
Mitigation: Action/control	Responsibility	Timeframe
Ensure that vegetation is not unnecessarily cleared or removed during the construction period.	Project proponent / contractor	Early in the construction phase.
Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.	Project proponent / contractor	Early in and throughout the construction phase.
Restrict the activities and movement of construction workers and vehicles to the immediate construction area and existing access roads.	Project proponent / contractor	Throughout the construction phase.
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Project proponent / contractor	Throughout the construction phase.
Reduce and control construction dust	Project proponent /	Throughout the

through the use of appropriate and effective dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	contractor	construction phase.
Restrict construction activities to daylight hours, as far as possible, in order to negate or reduce the visual impacts associated with lighting.	Project proponent / contractor	Throughout the construction phase.
Rehabilitate all disturbed areas, construction areas, servitudes etc. immediately after the completion of construction works. If necessary, consult an ecologist to give input into rehabilitation specifications.	Project proponent / contractor	Throughout and at the end of the construction phase.
Performance Indicator	Vegetation cover within the servitudes and in the vicinity of the Grid Connection Infrastructure has been maintained as far as possible and disturbed areas have been rehabilitated with no evidence of erosion.	
Monitoring	Monitoring of vegetation clearing during construction. Monitoring of rehabilitated areas post construction.	

Table 10: Management Programme: Operation.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the operation of the proposed Grid Connection Infrastructure.		
Project component/s	The Vrede Solar PV Facility 132kV power line and substation.	
Potential Impact	Visual impact of vegetation rehabilitation failure.	
Activity/risk source	The viewing of the above mentioned by observers near the infrastructure.	
Mitigation: Target/Objective	Well-rehabilitated and maintained servitudes.	
Mitigation: Action/control	Responsibility	Timeframe
Maintain roads to forego erosion and to suppress dust.	Project proponent / operator	Throughout the operation phase.
Monitor rehabilitated areas, and implement remedial action as and when required.	Project proponent / operator	Throughout the operation phase.
Performance Indicator	Intact vegetation within servitudes and in the vicinity of the infrastructure.	
Monitoring	Monitoring of rehabilitated areas.	

Table 11: Management Programme: Decommissioning.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the decommissioning of the proposed Grid Connection Infrastructure.		
Project component/s	The Vrede Solar PV Facility 132kV power line and substation.	
Potential Impact	Visual impact of residual visual scarring and vegetation rehabilitation failure.	
Activity/risk source	The viewing of the residual scarring and vegetation rehabilitation failure by observers along or near the areas where the Grid Connection Infrastructure was constructed.	
Mitigation: Target/Objective	Rehabilitated vegetation in all disturbed areas.	
Mitigation: Action/control	Responsibility	Timeframe
Remove infrastructure not required for the post-decommissioning use of the site/servitude.	Project proponent / operator	During the decommissioning phase.

Rehabilitate access roads and servitudes not required for the post-decommissioning use of the sites. If necessary, consult an ecologist to give input into rehabilitation specifications.	Project proponent / operator	During the decommissioning phase.
Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required.	Project proponent / operator	Post decommissioning.
Performance Indicator	Intact vegetation along and in the vicinity of the servitude.	
Monitoring	If rehabilitation is successful then no further monitoring is required.	

10. REFERENCES/DATA SOURCES

Chief Directorate National Geo-Spatial Information, varying dates. *1:50 000 Topographical Maps and Data.*

CSIR, 2017. *Delineation of the first draft focus areas for Phase 2 of the Wind and Solar PV Strategic Environmental Assessment.*

CSIR, 2015. *The Strategic Environmental Assessment for wind and solar photovoltaic energy in South Africa.*

DEA, 2014. *National Land-cover Database 2018 (NLC2018).*

DEA, 2019. *South African Protected Areas Database (SAPAD_OR_2019_Q4).*

DEA, 2020. *South African Renewable Energy EIA Application Database (REEA_OR_2020_Q3).*

DEA&DP, 2011. Provincial Government of the Western Cape. *Guideline on Generic Terms of Reference for EAPS and Project Schedules.*

Department of Environmental Affairs and Tourism (DEA&T), 2001. *Environmental Potential Atlas (ENPAT) for the Free State Province.*

NASA, 2018. *Earth Observing System Data and Information System (EOSDIS).*

National Botanical Institute (NBI), 2004. *Vegetation Map of South Africa, Lesotho and Swaziland (Unpublished Beta Version 3.0)*

Oberholzer, B. (2005). *Guideline for involving visual and aesthetic specialists in EIA processes: Edition 1.*

The Environmental Impact Assessment Amendment Regulations. In Government Gazette Nr. 33306, 18 June 2010.