THE PROPOSED PROTEA SOLAR POWER PLANT NEAR VRYBURG, NORTH WEST PROVINCE

VISUAL IMPACT ASSESSMENT

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1. INTRODUCTION

1.1. EIA Inclusion

This visual impact assessment (VIA) forms part of the overall environmental impact assessment (EIA) process that is being undertaken for the Proposed Protea Solar Power Plant near Vryburg in the North West Province. The EIA process is being undertaken by Environamics Environmental Consultants, on behalf of Protea Solar Plant (RF) (Pty) Ltd.

1.2. EIA Regulations

The EIA Regulations, 2014 (GN. R.982) published in terms of the National Environmental Management Act (Act No. 107 of 1998) determine that an environmental authorisation is required for certain listed activities, which might have detrimental impacts on the environment. The following activities have been identified with special reference to the proposed development and are listed in the EIA Regulations:

- Activity 11(i) (GN.R. 983): *"The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."*
- Activity 1 (GN.R. 984): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more..."*
- Activity 15 (GN.R. 984): *"The clearance of an area of 20 hectare or more of indigenous vegetation..."*
- Activity 4 (GN.R. 985): "*The development of a road wider than 4 metres with a reserve less than 13.5 metres (e) in North West (i) outside urban areas, in (ee) critical biodiversity areas as identified in bioregional plans..."*
- Activity 12 (GN.R. 985): "*The clearance of an area of 300 square metres or more of indigenous vegetation…(a) in North West (ii) within critical biodiversity areas identified in bioregional plans."*
- Activity 28 (ii) (GN.R. 983): *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation*

on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."

1.3. Project Background

Protea Solar Power Plant (RF) (Pty) Ltd. is proposing to develop an 115MW photovoltaic (PV) solar energy near Vryburg situated in the Naledi Local Municipality in the North West Province. The project will be known as the proposed Protea Solar Power Plant near Vryburg, North West Province.

The purpose of the proposed PV energy facility will be to evacuate the generated power into the Eskom Holdings SOC Ltd (Eskom) electricity grid. If successful, Protea Solar Power Plant (RF) (Pty) Ltd. will be remunerated on a per kilowatt hour generated basis by Eskom in terms of a 20 year Power Purchase Agreement. Protea Solar Power Plant (RF) (Pty) Ltd. will be required to apply for a generation license from the National Energy Regulator of South Africa (NERSA). Depending on the economic conditions following the lapse of this period, the facility can either be decommissioned or the power purchase agreement may be renegotiated and extended.

1.4. Project Description and Location

Table 1: General site information

Description of affected farm portion	Remaining Extent of the Farm Hartsboom 734, HN Registration Division, Province of the North-West, measuring 2035,9834 (two thousand and thirty deed seven comma nine eight three four) hectares, Title Deed No.: 258/2000 Coordinates: 27° 05' 30.52" S 24° 43' 34.74" E
Type of technology	Photovoltaic solar facility
Structure Height	Panels ~3.5m, buildings ~4m, and power lines ~32m
Surface area to be covered	Approximately 204 hectares.
Laydown area dimensions	Approximately 204 hectares.

Structure orientation	The panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.
Generation capacity	Approximately 115MW

The activity entails the development of a photovoltaic solar energy facility and associated infrastructure on the Remaining Extent of the Farm Hartsboom 734, HN Registration Division, Province of the North-West, measuring 2035,9834 (two thousand and thirty deed seven comma nine eight three four) hectares, Title Deed No.: 258/2000. The proposed development is located in the North West Province, in the northern central interior of South Africa. The site is located approximately 11km south of the town of Vryburg (**Map 1: Locality Map**).

The project entails the generation of approximately 115MW electrical power through photovoltaic (PV) panels. The total footprint of the project will be approximately 204 hectares, although the EIA and VIA covered an area of approximately 240 hectares to make provision for any deviations, extra features or unforeseen circumstances. The key components of the proposed project are described below:

- PV Panel Array - To produce 115MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple panels will be required to form the solar PV arrays which will comprise the PV facility. Due to the fact that this project only requires 204 hectares of land, there is scope to avoid major environmental constraints through the final design of the facility. The PV panels will be tilted at a northern angle in order to capture the most sun.

- Wiring to Central Inverters - Sections of the PV array will be wired to central inverters. The inverter is a pulse width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency.

- Connection to the grid - Connecting the array to the electrical grid requires transformation of the low voltage from 480V to a medium voltage of for example 11kV, 22kV or 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is 480V and this is fed into step up transformers to 132kV. An onsite substation will be required on the site to step the voltage up to 132kV, after which the power will be evacuated into the national grid via the mookodi-Magopeka 132kV transmission line located adjacent to the eastern border of the site. As Protea Solar Power Plant (RF) (Pty) Ltd. has not yet received a cost estimate letter from Eskom the exact scope of the grid connection might differ. **Refer to Figure 1 for a mapped visual presentation of a similar line. Please note that the design might differ.**

- Supporting Infrastructure - A control facility with basic services such as water and electricity will be constructed on the site and will have an approximate footprint 400m². Other supporting infrastructure includes voltage and current regulators, and protection circuitry.

- Roads – Ready access already exist from the N18 national road. However an internal site road network to provide access to the solar field and associated infrastructure will be required. All site roads will require a width of approximately 4m.

- Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm.

1.5. The nature of Visual Impact

What is visual impact?

Something that is produced by an agency, cause, result, or consequence that is perceivable by the sense of sight. Visual impact:

- Is subjective to the visual receptors.

- Can be beneficial to a certain geographical area.

- Can be adverse to a certain geographical area.

Sensitive Geographical Areas

Geographical areas can be sensitive properties that are evaluated for the potential for adverse visual impact. The sensitivity of a certain geographical area is the degree to which a particular area can accommodate change. An example of a sensitive geographical area would be when scenic quality was influential in its being. In other words, a geographical area is not sensitive to visual impact if visual aspects of its feeling and setting are not part of what makes it eligible.

When does a project have an adverse visual impact to a certain geographical area?

When the proximity of the proposed project impairs aesthetic features or attributes of that area in a substantially visual way such that features or attributes are considered important contributing elements to the value of the resource.

1.6. Guidelines

Various guidelines for visual impact assessments are available, but with a very common approach. This assessment will be undertaken in accordance with:

- Government of the Western Cape – Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (2005). This is the only local guideline which could be found during research.
- Texas Department of Transportation - Standard Operating Procedure for Visual Impact Assessments (2012).
- The Landscape Institute with the Institute of Environmental Management and Assessment – Guidelines for Landscape and Visual Impact Assessments, Second Edition (2002).

  Together these documents provide a basis for the level of approach of a visual impact assessment.

1.7. Terms of Reference

The proposed TOR for this visual impact assessment is as follows:

- Conduct a desktop review of available information that can support and inform the specialist study;
- Describe the receiving environment and the visual absorption for the proposed project;
- Conduct a field survey to determine the actual or practical extent of potential visibility of the proposed development;
- Conduct a photographic survey of the landscape surrounding the development;
- Identify issues and potential visual impacts for the proposed project, to be considered in combination with any additional relevant issues that may be raised through the public consultation process;
- Identify possible cumulative impacts related to the visual aspects for the proposed project;
- Assess the potential impacts, both positive and negative, associated with the proposed project for the construction, operation and decommissioning phases;
- Identify management actions to avoid or reduce negative visual impacts; and to enhance positive benefits of the project; and
- Use mapping and photo-montage techniques as appropriate.

1.8. Assessment Methodology

Table 2 of this VIA report will be utilised as the rating system. This rating system is recommended by Environamics Environmental Consultants.

Table 2: Rating System

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.

3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects 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 (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component and the quality, use, integrity

		and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
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. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.
The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

1.9. Project team and experience

The project team will consist of one individual, Johan Botha.

Johan Botha graduated with an Honours degree in 2010 from the North West University in the field of Environmental Sciences specialising in Geography and Environmental Management. He also has a bachelor's degree in Education Sciences. He has been involved in various Eskom construction projects throughout the Northern Cape Province including expansions and construction of substations and power lines. He has also been involved in various projects regarding solar plants. He has acquired the necessary skills to compile a Visual Impact Assessment report with the associated maps.

Map 1: Locality Map

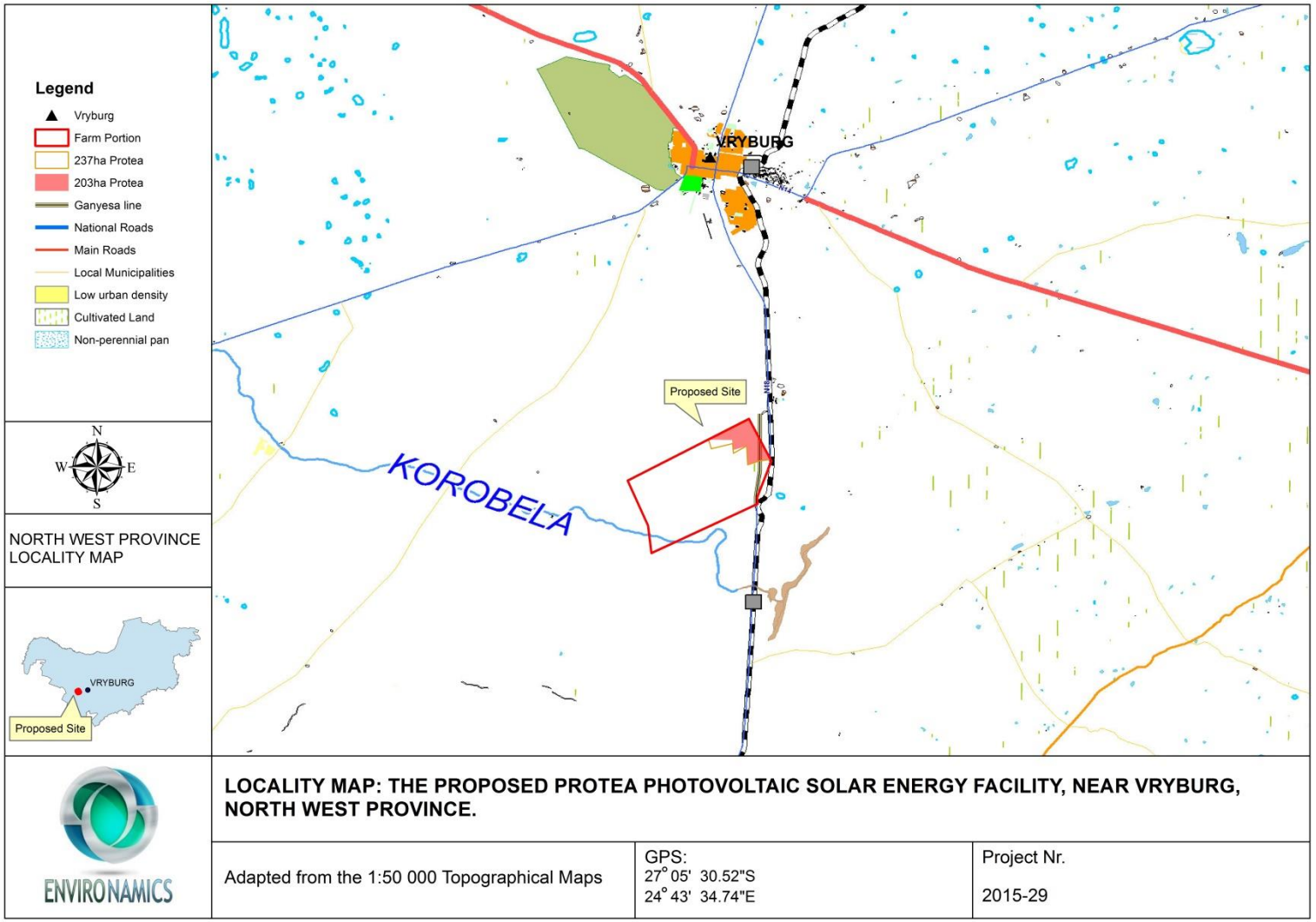
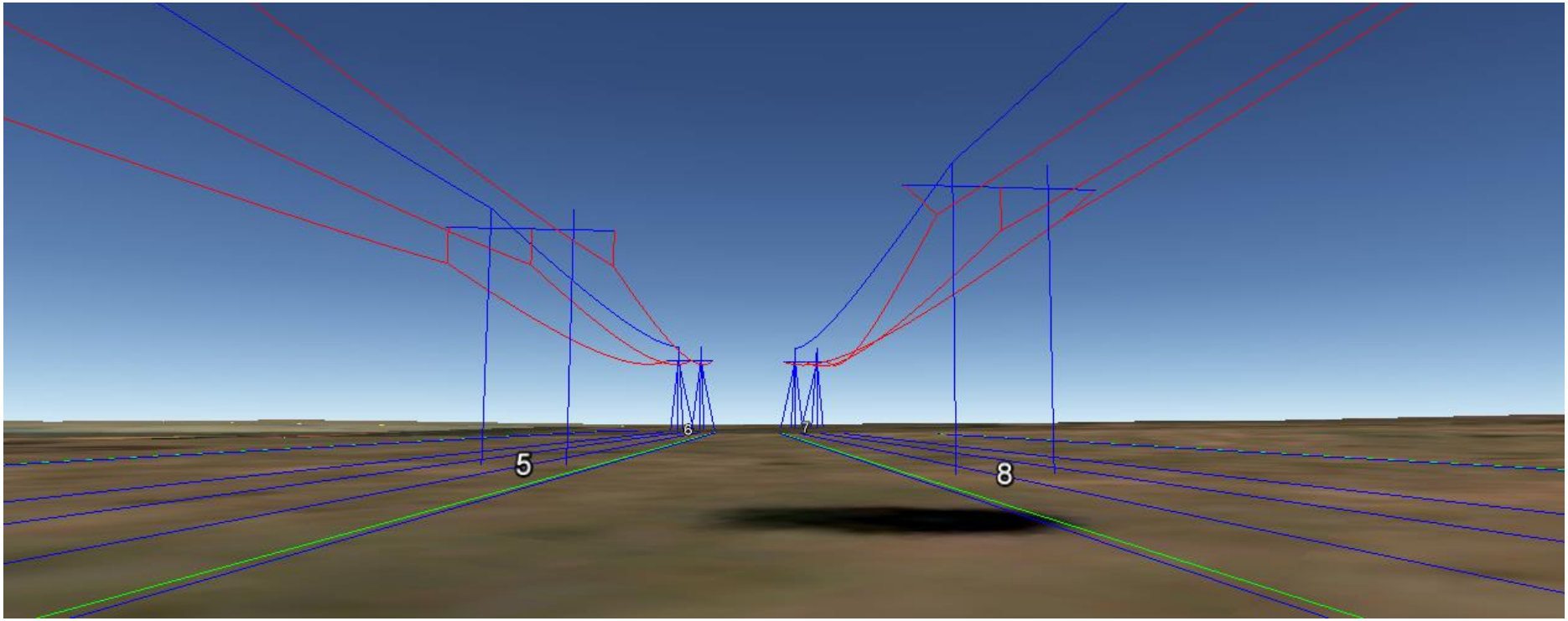


Figure 1: Mapped visual presentation of 132kV evacuation lines



2. EXISTING LANDSCAPE

It is possible that landscape change due to the proposed development could impact the character of an important landscape area.

Importance can be derived from specific features that can relate to urban or rural settings. They might include key natural, historic or culturally significant elements. Importance might also relate to landscapes that are uncommon or under threat from development.

Generally the most significant natural areas are afforded a degree of legal protection such as National Parks and Reserves; however, they might also have local significance and not be protected.

This section describes the types of landscape that may be impacted, indicating the likely degree of sensitivity and describes how the landscape areas are likely to be impacted.

2.1. Landscape Character

Landscape character is a composite of a number of influencing factors including:

- Landform and drainage.
- Nature and density of development.
- Vegetation patterns.

2.1.1. Landform and drainage

The proposed development is not located in close proximity to any major rivers or dams. A non-perennial river, the Korobela, is located on the property but approximately 5km south west from the proposed development. The site drains to the south and to the west towards the Korobela River.

The proposed development is located in an area with relatively low significance in elevation. The site is located at an above mean sea level (amsl) of approximately 1213m at the highest elevation and at an amsl of 1189m at the lowest elevation. The town of Vryburg's lowest

elevation is approximately 1193m amsl and 1231m amsl at the highest elevation. **Refer to Figures 2 & 3 for cross section profiles.**

The landform and drainage described above is unlikely to limit visibility. Areas within 5km from the proposed development might have a clear view without taking existing screening into account.

2.1.2. Nature and density of development

Development within the study area can be divided into the following types:

- **Industrial development** includes existing Eskom power infrastructure like substations and power lines (in close proximity to site) as well as Vryburg's industrial zone located approximately 11km north from site. Eskom infrastructure includes:
    - Mookodi Substation located 6km north from site.
    - 132kV power line from Mookodi Substation running through the property.
- **Urban development** includes the town of Vryburg situated approximately 11km north from the proposed development. As part of Vryburg, low cost housing residential areas are also situated close by. Huhudi is located approximately 8.5km to the north and an unknown low cost housing residential area located approximately 10km north west from site.
- **Agricultural development** is the main development type surrounding the proposed development. The site is located in an area mainly used for livestock grazing and, very limited and small scale irrigated cropland.
- **Service development** includes:
    - The N14 national road located approximately 11km north west from site.
    - The D944 gravel road approximately 7km north west from site.
    - The N18 national road adjacent to site.
    - Other roads leading to Vryburg and streets inside Vryburg.
    - The R34 provincial road approximately 10.5km north east from site.
    - Vryburg Airport 9km north from site.
    - Cape to Cairo railway line on the opposite side of the N18 (+-50m from site).

- The Tiger Kloof Educational Institution (primary and secondary school) approximately 1.2km north east from site.
- Other services within Vryburg.

- **Tourism development** includes accommodation facilities in Vryburg, game farms in the area and Du Plessis Park / Vryburg Nature Reserve located 12km north from site.

2.1.3. Vegetation patterns

The site is located within the Eastern Kalahari Bushveld Bioregion which forms part of the bigger Savanna Biome. It is characterized by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground the vegetation may be referred to as Shrubveld. A major factor delimiting the biome is the lack of sufficient rainfall which prevents the upper tree layer from dominating, coupled with fires and grazing, which keep the grass layer dominant. Summer rainfall is essential for grass dominance, which, with its fine material, fuels near-annual fires. In fact, almost all species are adapted to survive fires, usually with less than 10% of plants, both in the grass and tree layer, killed by fire. Even with severe burning, most species can re-sprout from the stem bases. The grass layer is dominated by C 4-type grasses, which are at an advantage where the growing season is hot. But where rainfall has a stronger winter component, C 3-type grasses dominate.

The shrub-tree layer may vary from 1 to 20 m in height, but in the Bushveld typically varies from 3 to 7 m. The dominant protected tree species in the area of the proposed development is the Camel thorn tree (*Vachellia erioloba)*. The following vegetation is also obvious but nor extensive:

- Small plantations of alien trees associated with small community settlements and farmsteads. This includes Eucalyptus tree plantations which were mainly introduced as a mean of providing shade and barricading against wind.
- Occasional groups of ornamental vegetation associated with farmsteads and towns or cities.

2.2. Landscape Character Assessment Summary

The industrial development is likely to be sensitive to the proposed development. Eskom staff doing maintenance work on the power lines will be most sensitive to the development due to the close proximity of the lines to site. Vryburg's industrial zone is 11km to the north with a high level of existing screening between the zone and proposed development. The

town of Vryburg is a clear screening mechanism between the industrial zone and the proposed development.

The main town of Vryburg is located within a basin like landform and 11km from the proposed development, thus limited visibility. Huhudi, one of Vryburg's low cost residential areas will be the most sensitive area of Vryburg. It is located approximately 8km from the proposed development with an amsl of approximately 1206m.

Regarding service development, the N18 national road, the Cape to Cairo railway line and Tiger Kloof Educational Institution will be most sensitive to the proposed development due to close proximity to site.

The majority of the affected area falls within the agricultural development area. A small amount of nearby farmsteads will be affected for the duration of the construction period and the lifespan of the development.

Figures 4 to 8 are part of the photographic record showing the landscape and existing screening.

Figure 2: Cross Section Profile taken from north (Vryburg) to south

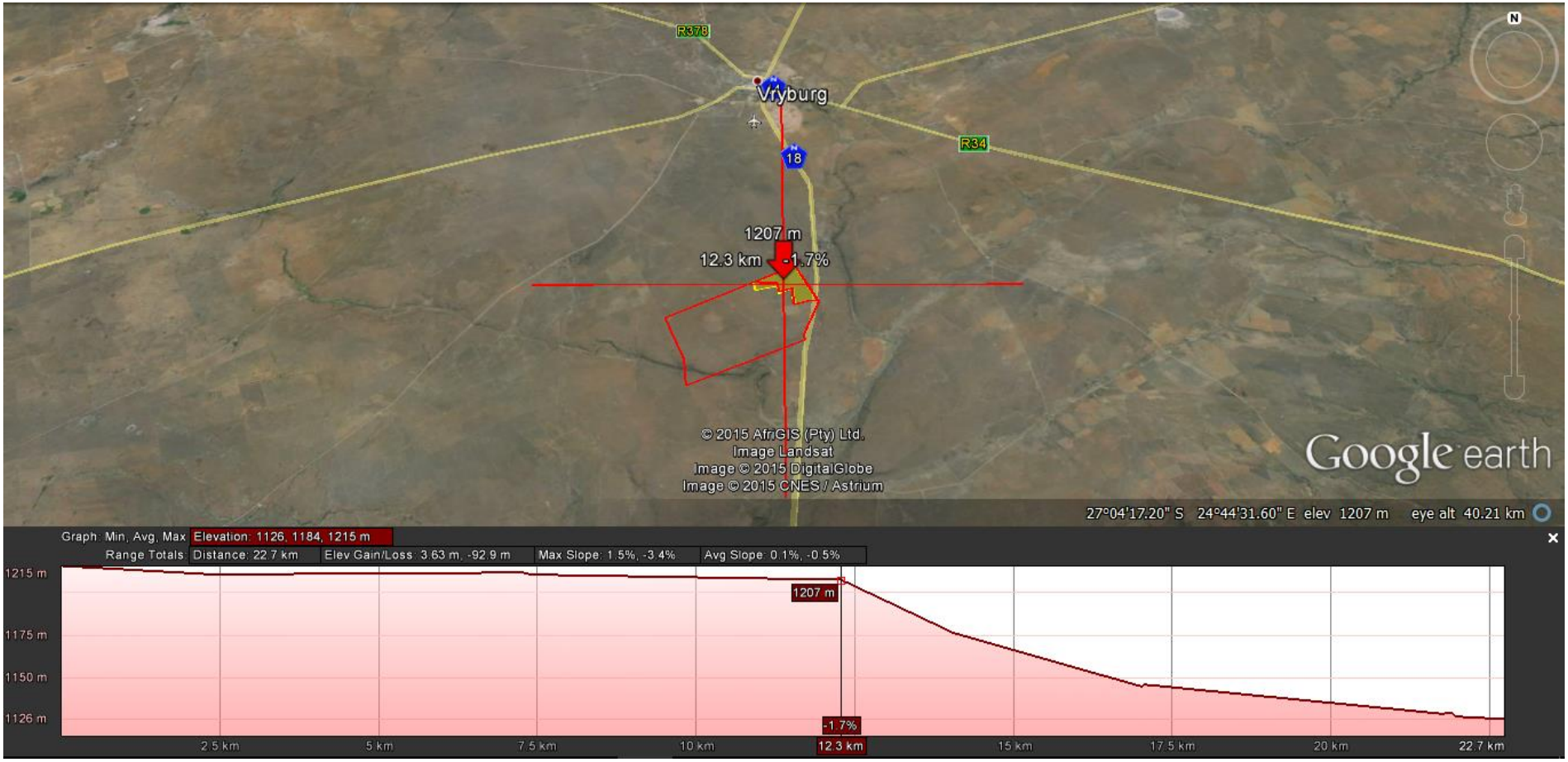


Figure 3: Cross Section Profile taken from east to west

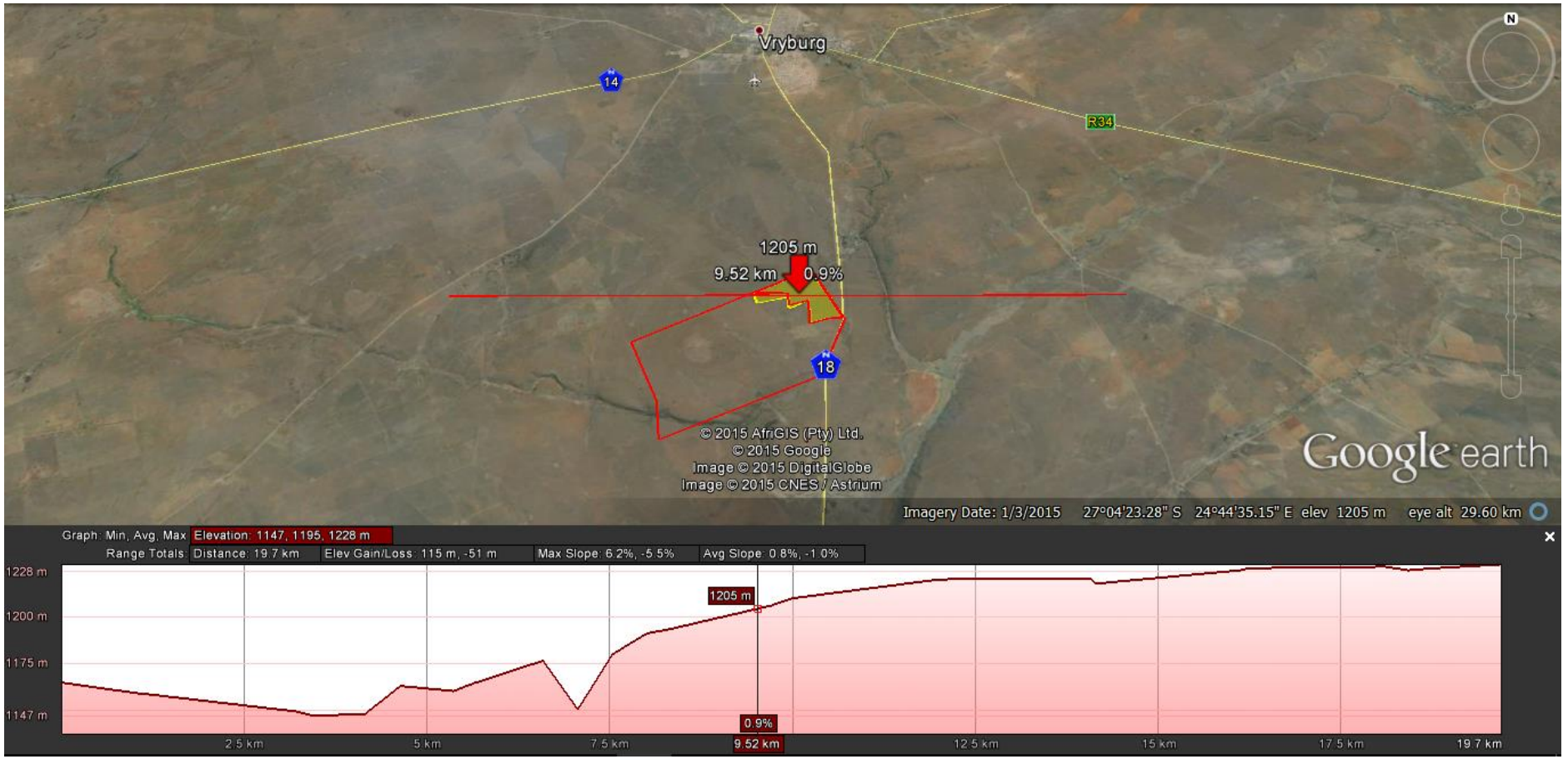


Figure 4: View towards N18 national road and Vryburg

Figure 5: View from the N18 towards proposed development

Figure 6: View from inside proposed development towards Vryburg

Figure 7: View from Tiger Kloof Educational Institution towards proposed development

Figure 8: View from Huhudi towards proposed development

3. VISUAL RECEPTORS

Visual Receptors can be defined as: "Individuals, groups or communities who are subject to the visual influence of a particular project."

3.1. Identified Visual Receptors

This section is intended to highlight possible Receptors within the landscape which due to use could be sensitive to landscape change. They include:

- **Area Receptors** which include the town of Vryburg and associated residential areas.
- **Linear Receptors** which include:
    - The N14 national road.
    - The N18 national road.
    - The R34 provincial road.
    - The D944 gravel road.
    - The Cape to Cairo railway line.
    - Power lines.
- **Point Receptors** which include:
    - Small groups of farmsteads that are generally associated with and located within the agricultural landscape that surrounds the proposed development.
    - Vryburg Airport.
    - Mookodi Substation.
    - Tiger Kloof Educational Institution.

Refer to **Map 2: Zone of Theoretical Visibility (ZTV)**. This map indicates all areas that are in direct line of site from the proposed development up to a distance of 20km.

3.2. Likely significance of sensitive receptors

Uses such as guest houses or recreational areas are likely to rely on pleasant visual aspects as part of marketing campaigns and the overall positive client/tourist experience, thus important to maintain a pleasant visual attraction. Game farms in the area rely on the Camel thorn tree that forms part of the "Kalahari Experience" during hunting season. The Camel thorn tree forms part of the "image" of the Kalahari and thus an important aspect.

Table 3: Assessment Criteria referring to Map 2, ZTV map

Radius	Impact Magnitude
0-5km	High
5-10km	Medium-High
10-15km	Medium-Low
15-20km	Low

The assessment indicates;

- The town of Vryburg and associated residential areas fall within the 10-15km ZTV zone, thus unlikely to be impacted by the proposed development.
  Magnitude: Medium-Low
- The N14 national road. This road falls within the 10-15km ZTV zone, thus unlikely to be impacted by the proposed development.
  Magnitude: Medium-Low
- The N18 national road. This road falls within the 0-5km ZTV zone, thus likely to be impacted by the proposed development.
  Magnitude: High
- The D944 gravel road. This road falls within the 5-10km ZTV zone, thus likely to be impacted by the proposed development.
  Magnitude: Medium-High
- The R34 provincial road. This road falls within the 10-15km ZTV zone, thus unlikely to be impacted by the proposed development.
  Magnitude: Medium-Low
- Vryburg Airport. The airport falls within the 5-10km ZTV zone, thus likely to be impacted by the proposed development.
  Magnitude: Medium-High
- The Cape to Cairo railway line. The railway line falls within the 0-5km ZTV zone, thus likely to be impacted by the proposed development.
  Magnitude: High

- Mookodi Substation. The Substation falls within the 5-10km ZTV zone, thus likely to be impacted by the proposed development.

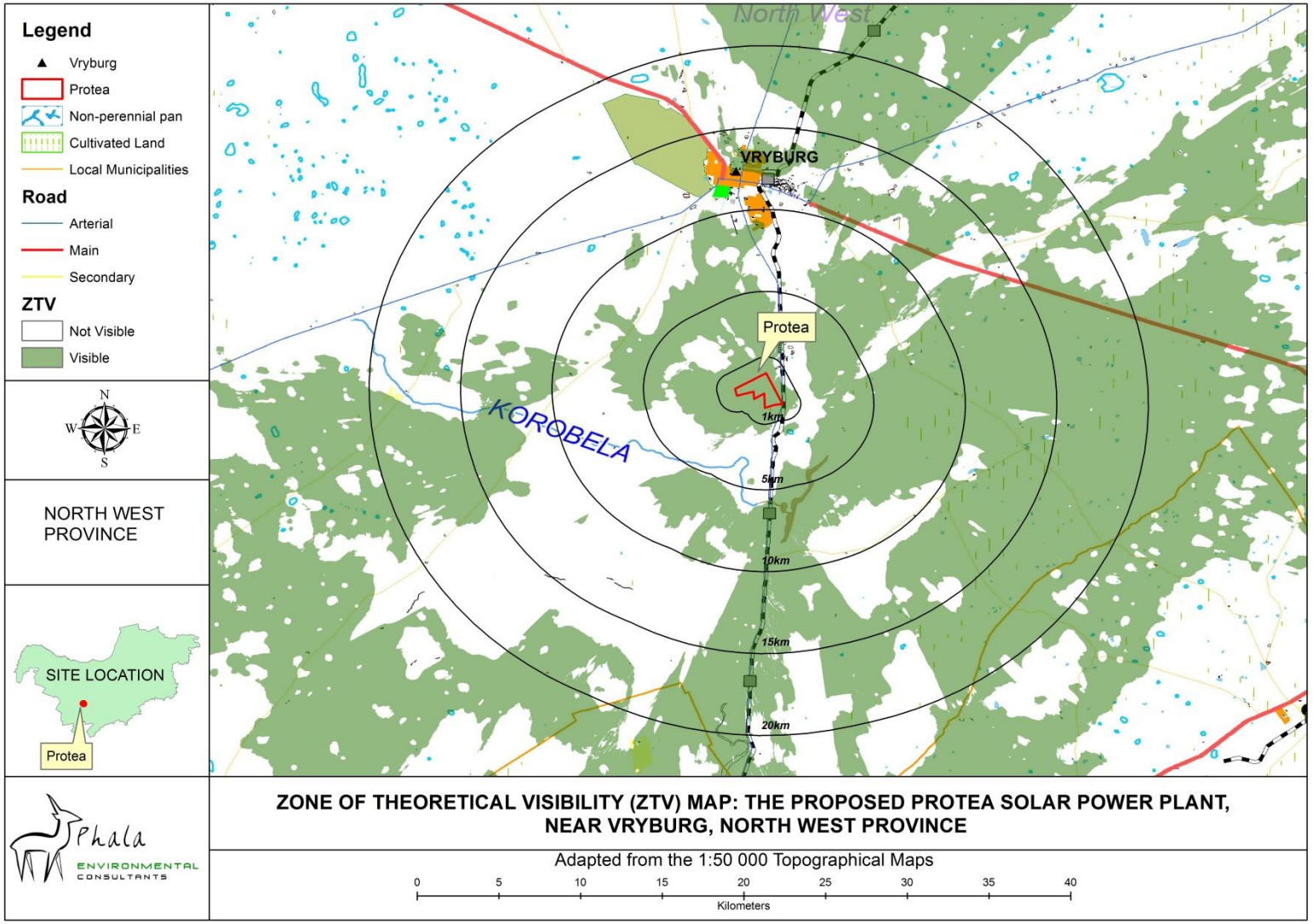
  Magnitude: Medium-High
- There are a number of nearby farmsteads identified which are likely to be impacted by the proposed development. Nine of these farmsteads fall within the 0-5km ZTV zone.

  Magnitude: High
- Eskom power lines. One of these power lines falls within the 0-5km ZTV zone, thus likely to be impacted by the proposed development.

  Magnitude: High

Please note that during the ZTV assessment, no existing screening was part of the assessment.

Map 2: Zone of Theoretical Visibility (ZTV)



4. SIGNIFICANCE OF IMPACTS ON VIEWERS

This section includes the assessment of the visual impact during the ***Construction Phase***, ***Operational Phase*** and ***Decommissioning Phase***. The rating system reflected in section 1.8 of this VIA report will be utilised to determine the significance of the impacts.

Similar proposed developments in the area which might have a negative effect on the cumulative impact include:

- The proposed Alpha Solar Power Plant near Vryburg, North West Province.
- The proposed Meerkat Solar Power Plant near Vryburg, North West Province.
- The proposed Sonbesie Solar Power Plant near Vryburg, North West Province.
- The proposed Khubu Solar Power Plant near Vryburg, North West Province.
- The proposed Gamma Solar Power Plant near Vryburg, North West Province.
- Three PV Solar Energy facilities on the farm Klondike - AMDA Developments.
- Waterloo Solar Park with a capacity of 75MW near Vryburg, North West Province (14/12/16/3/3/2/308).
- The proposed Carocraft Solar Park near Vryburg, North West Province (14/12/16/3/3/2/374).
- Construction of the 75MW Photovoltaic facility and associated infrastructure in Naledi (14/12/16/3/3/2/390).
- The proposed Tiger Kloof Solar Photovoltaic energy facility near Vryburg, North West Province (14/12/16/3/3/2/535).
- The proposed Keren Energy Bosh Pan Solar Plant, Northern Cape Province (14/12/16/3/3/1/563).
- The proposed renewable energy generation project. Carocraft Solar Park in North West Province (14/12/16/3/3/2/699).
- The proposed Renewable Energy Generation Project rem farm Elda, North West (14/12/16/3/3/2/750).

- The proposed Renewable Energy Project on Farm Doornbult 29 and Doornbult 33, North West (14/12/16/3/3/2/751).

4.1. Construction Phase

Table 4: Significance of visual impacts during construction phase

Visual intrusion	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Positive
Geographical Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Medium (2)
Reversibility	Barely reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	High cumulative impact (4). The construction of the PV facility may increase the cumulative visual impact together with farming activities, Eskom power infrastructure and the 16 proposed solar power facilities in the area. Construction plant and equipment will be an eyesore on the roads and in Vryburg. Dust from all proposed projects will be seen from quite a distance due to the level landscape and amount of dust generated from such construction projects.	
Formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.		
Significance	**Negative medium (30)**	**Negative low (28)**
Can impacts be mitigated?	Yes, mitigation is possible. Dust generation will be the main factor/problem during the construction phase. Due to the rather level terrain, mitigation measures will only solve the problem to a certain extent. Measures include: • Dust suppression will play an important role to minimise the visibility of dust. • Contractors must avoid using roads not relevant to the project. • Contractors should try using public roads not used that often by the residents of	

	Vryburg. • Construction vehicles must limit traveling on surrounding roads and in Vryburg during peak hours when possible. • New road construction must be avoided if possible. • Good housekeeping should be implemented. • Proper rehabilitation of disturbed areas after construction. • Risk assessments relating to fire hazards, "No Smoking" signs and the implementation of smoking areas. • Proper fire fighting equipment should be available on site. Not only fire extinguishers but also equipment like a water truck which can store large amounts of water. • Partial screening is possible by adding indigenous flora.

4.2. Operational Phase

Table 5: Significance of visual impacts during operational phase

Visual intrusion	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Geographical Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Barely reversible (3)	Barely reversible (3)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	High cumulative impact (4). The operation of the plant may increase the cumulative visual impact together with farming activities, existing Eskom power infrastructure and the 16 proposed solar power facilities in the area.	
Formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.		
Significance	**Negative medium (34)**	**Negative medium (34)**

Can impacts be mitigated?	Yes, but due to the rather level terrain mitigation measures will only solve the problem to a certain extent. Measures include: • Dust suppression will play an important role to minimise the visibility of dust. • Operators must avoid using roads not relevant to the project. • Contractors and operators should try using public roads not used that often by the residents of Vryburg. • Good housekeeping should be implemented. • Risk assessments relating to fire hazards, "No Smoking" signs and the implementation of smoking areas. • Proper fire fighting equipment should be available on site. Not only fire extinguishers but also equipment like a water truck which can store large amounts of water. • Partial screening is possible by adding and maintaining indigenous flora.

4.3. Decommissioning Phase

Table 6: Significance of visual impact during decommissioning phase

Visual intrusion	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Positive
Geographical Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Medium (2)
Reversibility	Barely reversible (3)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	High cumulative impact (4). The decommissioning of the plant may increase the cumulative visual impact together with farming activities, Eskom power infrastructure and the 16 proposed solar power facilities in the area. Dust and housekeeping will be the main factors to	

	take into account. Dust from commissioning can be seen from quite a distance due to the level landscape.	
Formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.		
Significance	**Negative medium (30)**	**Negative low (28)**
Can impacts be mitigated?	Yes, mitigation is possible. Dust generation and housekeeping will be the main factors/problems during the decommissioning phase. Due to the rather level terrain, mitigation measures will only solve the problem to a certain extent. Measures include: • Dust suppression will play an important role to minimise the visibility of dust. • Contractors must avoid using roads not relevant to the project. • Contractors should try using public roads not used that often by the residents of Vryburg. • New road construction must be avoided if possible. • Construction vehicles must limit traveling on surrounding roads and in Vryburg during peak hours when possible. • Good housekeeping should be implemented. • Proper rehabilitation of disturbed areas after decommissioning. • Risk assessments relating to fire hazards, "No Smoking" signs and the implementation of smoking areas. • Proper fire fighting equipment should be available on site. Not only fire extinguishers but also equipment like a water truck which can store large amounts of water.	

5. CONCLUSION

Referring to the assessment score in **Section 4** of this VIA report, the post mitigation impact is a "*Negative Low"* impact during the construction and decommissioning phases and *"Negative Medium"* during the operational phase. People travelling on the N18, the Tiger Kloof Educational Institution and travellers on the Cape to Cairo railway line will be the most sensitive to the proposed development due to close proximity.

The cumulative impact will play an important role. It is impossible at this stage to determine which of the proposed solar power projects, listed in Section 4 of this report, will receive preferred bidder status. This aspect will determine the cumulative impact.

In terms of possible landscape degradation, the landscape does appear to have existing screening up to a certain level. Camel thorn trees are sparsely scattered surrounding the proposed development. Rural areas are clearly defined particularly from a distance and it is assumed that the majority of people would prefer rural views over views of heavy industrial development.

What mitigation measures are concerned, a search and rescue programme for Camel thorn trees and other protected trees should be implemented. This will be effective mainly for smaller trees. The smaller trees can be relocated to areas around the proposed development where existing screening is minimal. The unnecessary destruction of existing trees should also be avoided where possible. Other indigenous flora can also be added for screening purposes. Contractors and operators should also avoid using public roads during daytime peak times where possible due to the population numbers in and around Vryburg, thus avoiding traffic and people.

Taking into account all positive factors of such a development including economic factors, social factors and sustainability factors, the visual impact of this proposed development will be insignificant and is suggested that the development commence, from a visual impact point of view.

6. REFERENCES

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