MUTSHO POWER (PTY) LTD

PROPOSED ESTABLISHMENT OF MUTSHO SOLAR PV 3 POWER PROJECT NEAR MAKHADO, LIMPOPO PROVINCE

LANDSCAPE & VISUAL IMPACT ASSESSMENT REPORT

AUGUST 2022

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1 INTRODUCTION

1.1 GENERAL

This Landscape and Visual Impact Assessment (LVIA) Report forms part of the Environmental Impact Assessment that is being undertaken for the proposed establishment of a cluster of up to four Solar PV Energy Facilities (collectively known as the Mutsho PV Cluster) and associated infrastructures by Savannah Environmental (Pty) Ltd on behalf of Mutsho Power (Pty) Ltd.

In terms of the amended National Environmental Management Act (NEMA) Act No. 107 of 1998, the proposed development requires environmental authorisation. A key impact to be assessed comprises the visual impact that the facility will have on surrounding areas.

1.2 PROJECT LOCATION

The property that has been identified for the development of the proposed projects is:

Farm Name:	Farm Number:	SG21-Digit Code	Area
Vrienden	589	T0MS00000000058900000	1 285.3ha

The abovementioned property is indicated on the Site location Plan **(Map 1)**.

1.3 BACKGROUND OF SPECIALIST

Jon Marshall qualified as a Landscape Architect in 1978. He has also had extensive experience of environmental impact assessment processes in South Africa. He has been involved in Visual Impact Assessment over a period of more than 30 years. He has developed the necessary computer skills to prepare viewshed analysis and three dimensional modelling to illustrate impact assessments. He has undertaken landscape and visual impact assessments for major buildings, industrial developments, mining, infrastructure projects and numerous renewable energy projects.

A brief Curriculum Vitae outlining relevant projects is included as **Appendix I.**

1.4 THE NATURE OF VISUAL IMPACT

Visual impacts may relate to a general change in the character of an area or in the change in a specific view for a person or group of people.

Visual impacts can be positive or negative and a degree of subjectivity is required in deciding this point. The approach of any visual assessment should, as objectively as possible, describe a landscape and as far as is possible reflect the likely majority view regarding positive / negative aspect of an impact. This can be difficult particularly in South Africa due to different values and cultures associated with various sectors of the population. For example, poorer and particularly rural based sectors of the population are possibly more concerned with the productive nature of a landscape than its appearance, whereas the wealthier sectors might be more concerned with scenic value particularly as it is associated with property values. If possible the values and opinions of all impacted sectors of the community should be considered.

General change to a landscape might have greater or lesser significance subject to;

a) Numbers of people that might use the landscape,
b) The use of the landscape,
c) The level of protection afforded the landscape,
d) The rarity of the landscape.

In terms of change to a specific view this might be defined as either visual intrusion or visual obstruction.

a) Visual intrusion is a change in a view of a landscape that reduces the quality of the view. This can be a highly subjective judgement, subjectivity has been removed as far as is possible in this assessment by classifying the landscape character of each area and providing a description of the change in the landscape that will occur due to the proposed development.
b) Visual obstruction is the blocking of views or foreshortening of views. This can generally be measured in terms of extent.

More often than not such an impact will be a combination of intrusion and obstruction. Obstruction can be measured in terms of the extent of an existing view that is screened by a development. However, judging intrusion requires a degree of subjectivity. It is however possible to relate this judgement to the manner in which proposed change would impact on the use or enjoyment of an area which again requires an understanding or local values.

1.5 BRIEF AND RELEVANT GUIDELINES

The brief is to assess the landscape and visual impact of the proposed project.

The requirement for this was highlighted in the DFFE Screening Tool Report which indicated that a Landscape and Visual Impact Assessment was required. This report indicates that a site sensitivity verification must be undertaken in accordance with Government Notice No. 320 included in Government Gazette 43110 of the 20th March 2020. This document fulfils these requirements.

In addition to the above, this document complies with Appendix 6 of the EIA Regulations which lists requirements of Specialist Reports, see schedule below.

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	1
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Separate document.
c) an indication of the scope of, and the purpose for which, the report was prepared;	1
(cA) an indication of the quality and age of base data used for the specialist report;	1
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	7
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	1

e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	1, 7
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	6
g) an identification of any areas to be avoided, including buffers;	6
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Map 6
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	1
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;	6
k) any mitigation measures for inclusion in the EMPr;	6
l) any conditions for inclusion in the environmental authorisation;	None
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Appendix IV
n) a reasoned opinion- i. whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	7
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	None
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	-
q) any other information requested by the competent authority.	-
2) Where a government notice *gazetted* by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	1

Work is to be undertaken in accordance with the following guideline documents;

a. The Government of the Western Cape Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (Western Cape Guideline), which is the only local relevant guideline, setting various levels of assessment subject to the nature of the proposed development and surrounding landscape (**Appendix II**), and

b. The Landscape Institute and Institute of Environmental Management and Assessment (UK) Guidelines for Landscape and Visual Impact Assessment which provides detail of international best practice (UK Guidelines).

Together, these documents provide a basis for the level and approach of a VIA as well as the necessary tools for assessment and making an assessment legible to stakeholders.

1.7 LIMITATIONS AND ASSUMPTIONS

A site visit was undertaken on the 14th and 15th August 2022.

The timing of photography was planned to ensure that the sun was as far as possible behind the photographer to ensure that as much detail as possible was recorded in the photographs.

GIS data sets used in the assessment are either available on line to the public or have been sourced from relevant government departments.

Photographs were taken with a Canon EOS M50 camera fitted with a 22mm lens.

The following GIS data sets were used in undertaking and presenting the assessments:

DATA SET	SOURCE	YEAR
South Africa Protected Areas Database (SAPAD)	Department of Environmental Affairs	2021
SRTM Worldwide Elevation Data	CIAT-CCAFS	2018
World Imagery	ESRI	2009 (updated 2021)
Renewable Energy EIA Applications	Department of Environmental Affairs	February 2021
REDZ Database	Department of Environmental Affairs	2016 and 2020
SA NLC (National Land Cover)	Department of Environmental Affairs	2018
1:50,000 raster mapping	Chief Directorate National Geo-Spatial Information of South Africa	Unknown
South African rivers in drainage region ALL	Department of Water Affairs	2012
Limpopo Cadastral	Chief Surveyor-General, Department of Rural Development and Land Reform	August 2021 (last updated)
Update of vegm2009	South African National Biodiversity Institute	2015
South Africa /Lesotho Roads	Open Street Map	2014

Visibility of the proposed facilities has been assessed using the Global Mapper Viewshed tool.

The majority of data sets have been used for assessment context. This has largely been sourced from government departments. Whilst this has been mainly mapped at national scale it was found to be largely sufficient to provide context for the assessments. Where additional detail was required, such as the location of local roads and homesteads, this was mapped on site and / or captured from online mapping.

The visibility assessments were based on terrain data that has been derived from satellite imagery (STRM Worldwide Elevation Data). This data was originally prepared by NASA and is freely available on the CIAT-CCAFS website (http://www.cgiar-csi.org). This data has been ground truthed using a GPS as well as online mapping. This is the key data on which the definition of possible affected landscapes and receptors was based and is considered sufficient for this purpose.

Calculation of visibility is based purely on the Digital Elevation Model and does not take into account the screening potential of vegetation or other development.

29° 50' 00" E

22° 40' 00" S

Railway

R525

N1

N10

0.0 km 2.0 km 4.0 km 6.0 km

LEGEND

PROPERTY BOUNDARY

ENVIRONMENTAL PLANNING AND DESIGN

MAP 1: SITE LOCATION
MUTSHO SOLAR
LIMPOPO PROVINCE

33 ASKEW GROVE, DURBAN, 4001
Tel: 083 703 2995
Email: jon@enviroconsult.co.za
Date: 15/10/2021

2. PROJECT DESCRIPTION

2.1 OVERVIEW OF SOLAR PV TECHNOLOGY

Solar energy facilities, such as those which utilise PV technology use the energy from the sun to generate electricity through a process known as the **Photovoltaic Effect**. Generating electricity using the Photovoltaic Effect is achieved through the use of the following components:

Photovoltaic Modules

PV cells are made of crystalline silicon, the commercially predominant PV technology, that includes materials such as polycrystalline and monocrystalline silicon or thin film modules manufactured from a chemical ink compound. PV cells are arranged in multiples / arrays and placed behind a protective glass sheet to form a PV module (Solar Panel). Each PV cell is positively charged on one side and negatively charged on the opposite side, with electrical conductors attached to either side to form a circuit. This circuit captures the released electrons in the form of an electric current (i.e. Direct Current (DC)). When sunlight hits the PV panels free electrons are released and flow through the panels to produce direct electrical (DC) current.

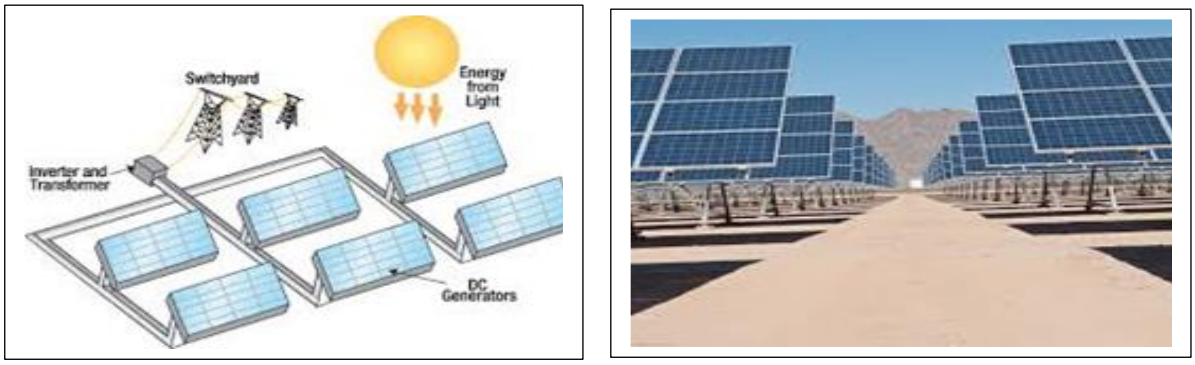


Figure 1: Overview of a typical/generic PV cell, module, and array/panel, noting that the photograph on the right appears to depict a single axis tracking mount, but it is not clear from the angle of the photograph. Whether these depict mono- or bi- facial modules is also unclear (pveducation.com).

Inverters

Inverters are used to convert electricity produced by the PV panels from Direct Current (DC) into Alternating Current (AC), to enable the facility to be connected to the national electricity grid. In order to connect a large solar facility such as the one being proposed to the national electricity grid, numerous inverters will be arranged in several arrays to collect, and convert power produced by the facility.

Support Structures

PV panels will be fixed to a support structure. PV panels can either utilise fixed / static support structures, or alternatively they can utilise single or double axis tracking support structures. PV panels which utilise fixed / static support structures are set at an angle (fixed-tilt PV system) so as to optimise the amount of solar irradiation. With fixed / static support structures the angle of

the PV panel is dependent on the latitude of the proposed development, and may be adjusted to optimise for summer and winter solar radiation characteristics. PV panels which utilise tracking support structures track the movement of the sun throughout the day so as to receive the maximum amount of solar irradiation.

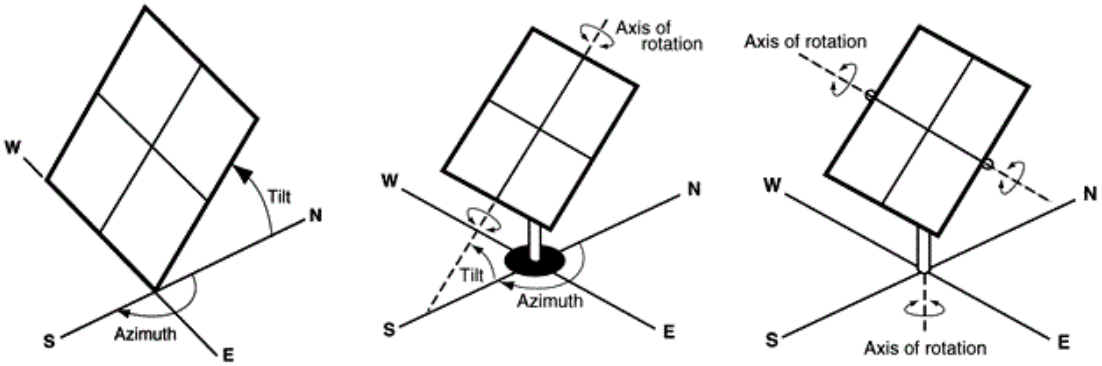


Figure 2: Overview of different PV tracking systems (from left to right: fixed-tilt, single-axis tracking, and double-axis tracking (Source: pveducation.com)).

PV panels are designed to operate continuously for more than 20 years and with low maintenance.

2.2 PROJECT DETAIL

The applicant has provided the following detail regarding the project.

Project Element	**Mutsho Solar PV3**
Contracted capacity	100MW
Technology	Solar PV - Horizontal single axis tracking
Substation upgrade (IPP Portion) size and capacity	*Capacity*: 33/132kV *Footprint*:130mx100m There will be a single substation location for the entire 4 x 100MW project. The onsite substation will be completely constructed as part of phase 1 but only equipped for the first 100MW. When such a time comes that the next 100 MW is constructed, the existing substation will be equipped for the additional 100MW generation capacity (i.e., additional transformers, extending the busbars, etc.). This approach will be followed as each 100MW is added.
Battery Energy Storage System (BESS) upgrade	*Capacity:* 80MWh *Footprint:* 100mx100m In a similar manner to the onsite substation, one BESS will be constructed for the entire 400MW project. The BESS will be added in a phased approach as required. Each project phase may or may not require a BESS, depending on the Power Purchase Agreement requirements.

Project Element	Mutsho Solar PV3
Access roads (internal)	Internal gravel roads of up to 5km in length and 4.5m in width will be required to access the PV panels and the onsite substation.
Other associated infrastructure	Inverters and transformers; cabling between the project components; laydown areas; guardhouses; site offices; warehouses; and water storage tanks at the admin block for human consumption.

On Site Electrical Infrastructure Compound:
An on-site electrical infrastructure compound typically comprises of a substation and associated infrastructure and could include additional collector infrastructure and / or a Battery Energy Storage System (BESS).

The on-site substation will serve as a collection point for the AC current from each inverter and includes step-up infrastructure (internal reticulation would be at 11/22kV, which would be stepped up by the sub-station to up to 132kV for evacuation into the grid network / proposed collector sub-station) and typically it would be a maximum of 8m in height.

The need for a BESS stems from the fact that electricity is only produced by the Renewable Energy Facility while the sun is shining, while the peak demand may not necessarily occur during the daytime. Therefore, the storage of electricity and supply thereof during peak-demand will mean that the facility is more efficient, reliable and electricity supply more constant.

The BESS will store and integrate a greater amount of renewable energy from the Solar PV Facilities into the electricity grid. This will assist with the objective to generate electricity by means of renewable energy to feed into the National Grid via relevant available procurement programs applicable at the time.

The Substation and BESS will be developed as part of Phase 1 and will be upgraded as necessary to manage the power produced by each successive phase. In terms of visual issues this project is likely to require an additional transformer and Busbar to be installed in the substation and an additional battery installation on the BESS.

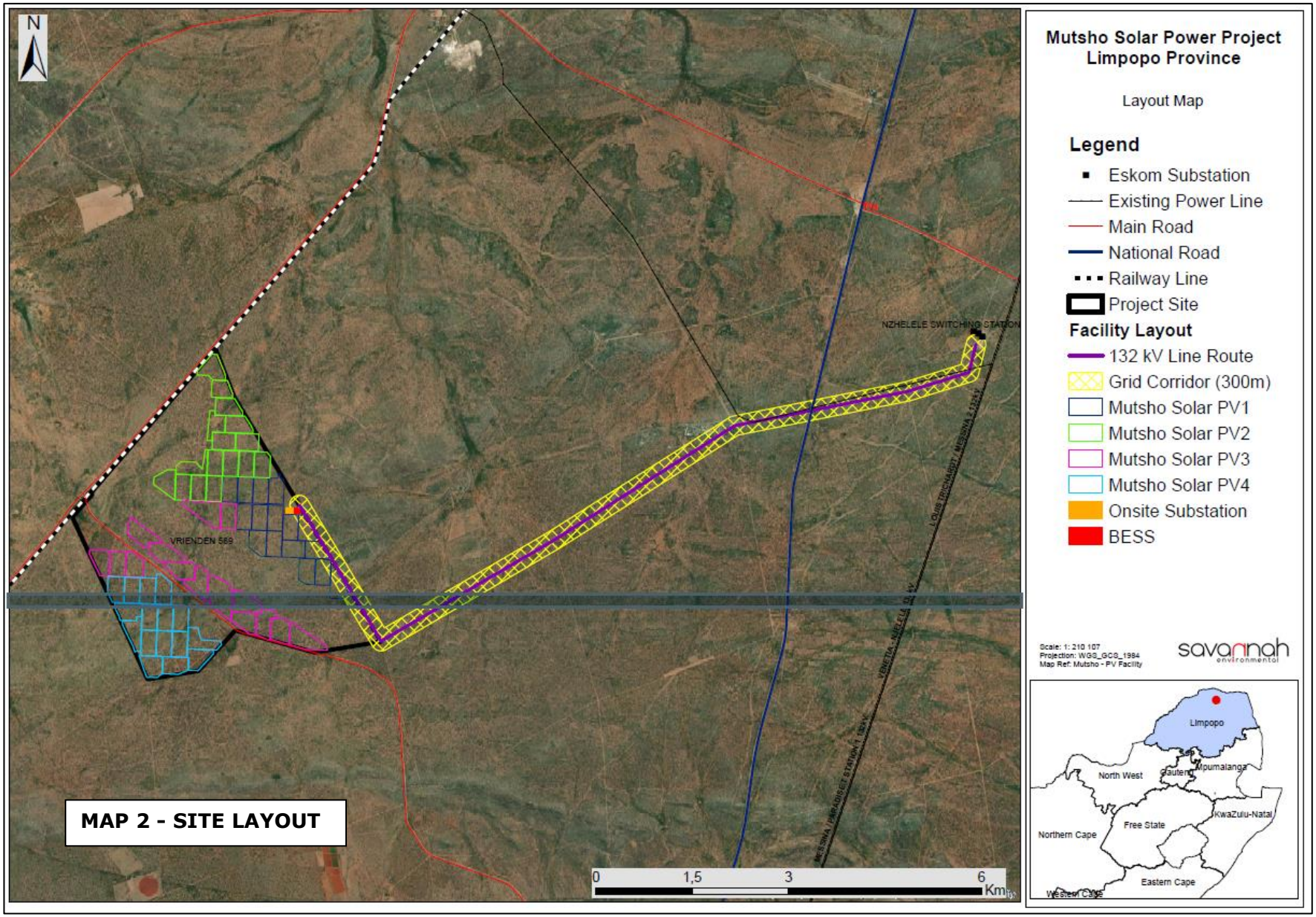
PLATE 1, BUS BARS ARE THE HIGHEST SUBSTATION ELEMENTS IN PICTURE

Plate 2 - Typical Battery Energy Storage System

2.3 PROJECT ASSUMPTIONS

The following assumptions have been made in order to indicate the maximum extent of the landscape that the project might affect:

- The solar array and BESS will be in the order of 5.5m high or lower:
- The main equipment within the on-site substation will be in the order of 8m high.


N
NZHELELE SWITCHING STATION
VRIENDEN 589
MAP 2 - SITE LAYOUT
0
1,5
3
6
Km
Mutsho Solar Power Project
Limpopo Province
Layout Map
Legend
Eskom Substation
Existing Power Line
Main Road
National Road
Railway Line
Project Site
Facility Layout
132 kV Line Route
Grid Corridor (300m)
Mutsho Solar PV1
Mutsho Solar PV2
Mutsho Solar PV3
Mutsho Solar PV4
Onsite Substation
BESS
Scale: 1: 210 107
Projection: WGS_GCS_1984
Map Ref: Mutsho - PV Facility
savannah environmental
Limpopo
North West
Gauteng
Mpumalanga
KwaZulu-Natal
Free State
Northern Cape
Eastern Cape
Western Cape

3. DESCRIPTION OF RECEIVING ENVIRONMENT AND RECEPTORS

It is possible that landscape change due to the proposed development could impact the character of the surrounding landscape. Landscape character can be derived from specific features relating to the urban or rural setting and may include key natural, historic or culturally significant elements. Importance might also relate to landscapes that are uncommon or under threat from development.

This section will;

- describe the types of landscapes that may be impacted
- indicate likely degree of sensitivity
- describe how the landscape areas are likely to be impacted

3.1 LANDSCAPE CHARACTER

Landscape character is defined as "a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another"[1].

Landscape character has been defined using a desk top assessment using existing data sets and aerial photography as well as from knowledge of the area.

The affected area has a strong rural character, interspersed with agriculture and industrial activities particularly mining, and settlement.

Landscape Character is a composite of a number of influencing factors including;

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

3.1.1 Landform and Drainage

Refer to Map 3 for analysis of the landform and drainage.

The proposed site is located within an area of undulating topography.

The Limpopo River is the main regional drainage feature. As this river forms the border between the Republic of South Africa and Zimbabwe. The Limpopo River at its closest is in excess of 50km from the proposed site.

The rugged Soutpansberg lies approximately 22km to the south and east of the proposed site forming the southern edge of the Limpopo Valley.

A cross section of the landform ranges in elevation between approximately 680m amsl at the Limpopo River to the north and 1400m amsl at the top of the

[1] UK Guidelines

Soutpansberg to the south. By comparison the proposed project site has current levels between 690-730m amsl.

The Landform and Drainage Map (Map 5) indicates that the generally undulating landform is created by a series of water courses within minor valleys that gradually fall towards the Limpopo River. The landform to the north of the site slopes gently towards the Sand River for approximately 11.5km and to the south it falls gently for approximately 13km towards the Mutamba River.

Within the undulating landform, there are a number of koppies and secondary ridgelines that rise up to 130m above the surrounding landform. There are numerous minor koppies to the north of the site as well as two major koppies close and to the south and one major koppie to the north in the vicinity of Mopane. These koppies are likely to provide a degree of screening. They also provide a degree of enclosure forming near continuous valley sides that run in a south-west to north-east direction.

3.1.2 Landcover

Refer to Map 4 for analysis of Landcover.

Landcover within the study area can be divided into the following types;

- **Urban development** includes the settlements of Musina which is approximately 41km to the north east and Makhado (Louis Trichardt) which is approximately 40km south of the proposed site. Both settlements have both well-established middle and upper income housing areas and more recent low cost housing areas.

  There is also a band of well-established settlements approximately 25km to the south of the proposed site that extends to the east within the Soutpandberg. These settlements include Makusha, Mudimeli, Manyii, Musekwa and Makhado.

  Mopane is a small village that is located approximately 6.5km to the north-east of the proposed site. This small settlement is located on a minor ridgeline. From the southern edge, views over the landscape towards the proposed site are possible. However, vegetation within the settlement is relatively dense and will screen views.

- **Natural areas** are the main land cover type surrounding the proposed development. From the site visit these areas appear to be largely used for game and low intensity cattle grazing. This activity has resulted in the majority of the area retaining a relatively natural appearance. A proportion of landowners also appear to have diversified into tourism as is evident from the number of bush lodges in the area.

  Within the natural areas there are also a large number of farmsteads that are likely to include; farm sheds, farm houses and workers accommodation. It is also likely that a proportion of these are used as guest houses.

  There are a number of protected areas in the region, the closest of which include the Averal Private Nature Reserve which is approximately 11.5km to

the north-east. Within protected areas vegetation is likely to be relatively dense and more pristine than surrounding areas due to conservation management.

In terms of visual implications, natural areas are likely to provide a significant amount of screening for the development particularly, where thicket and woody vegetation extends above head height.

- **Cultivation** occurs within the natural areas and is focused around the Sand River at Waterpoort approximately 15km to the south west of the proposed site. There are also isolated areas of clearing in the vicinity of the proposed site.

  Cultivated areas are likely to be relatively open, providing opportunities for long distance views across the surrounding landscape.

- **Degraded areas** are evident largely on the edges of settlement. This probably stems from grazing and clearing for cultivation.

- **Industrial development** within the area is relatively sparse; however, there is a mine site (Syerfontein) in the vicinity of Mopane which is approximately 6km to the north east of the proposed site. This facility includes extensive dumps and over burden stockpiles which are likely to have a similar appearance and scale as the dumps and stockpiles that are associated with the proposed development.

3.1.3 Vegetation Patterns

The extent of natural vegetation and agricultural areas is indicated on Map 3. The main natural vegetation types as defined by Mucina and Rutherford[2] in the vicinity of the site can be divided into:

a) Musina Mopane Bushveld;
b) Limpopo Ridge Bushveld; and
c) Soutpansberg Mountain Bushveld.

In addition, the following are also evident;

d) Ornamental vegetation; and
e) Arable crops

Musina Mopane Bushveld is the most dominant vegetation type surrounding the proposed site and extending to the Limpopo River in the north and the Soutpansberg in the south. According to Mucina and Rutherford, this vegetation type occurs on the undulating plains from around Baines Drift and Alldays in the west, remaining north of the Soutpansberg and south of the Limpopo River. It is comprised of open woodland to moderately closed shrubveld.

Limpopo Ridge Bushveld occurs on and around the minor ridgelines and koppies to the north and south of the proposed site. This vegetation type is a moderately open savanna with a poorly developed ground layer.

[2] Vegetation types of South Africa (including Prince Edward and Marion Islands), Lesotho and Swaziland, 2006

Whilst botanically, these vegetation types are different, in visual terms they are all comprised of a matrix of herbaceous / grasses and small trees and shrubs. Areas with greater water retention close to water courses and pans have a greater proportion of shrub and tree vegetation whereas dryer areas have a greater proportion of grass and herbaceous vegetation cover.

Trees and tall shrubs within the bushveld matrix generally extend to above head height in most areas and they have a significant screening effect for all but the shortest views.

Ornamental garden vegetation and street trees appear to be relatively dense within Mopane. This vegetation is likely to restrict views from within the settlement.

Arable cropping occurs close to the Sand River to the south west of the site and in isolated areas throughout the study area. Where this occurs, generally the natural vegetation, including tree cover, has been cleared over a wide area which could open up long distance views from these areas; however, they are generally outside the Approximate Limit of Visibility.

3.2 LANDSCAPE CHARACTER AREAS & VISUAL ABSORPTION CAPACITY

Landscape Character Areas (LCAs) are defined as "single unique areas which are the discrete geographical areas of a particular landscape type"[3].

Visual Absorption Capacity (VAC) is defined as the landscape's ability to absorb physical changes without transformation in its visual character and quality. Where elements that contrast with existing landscape character are proposed, VAC is dependent on elements such as landform, vegetation and other development to provide screening of a new element. The scale and texture of a landscape is also critical in providing VAC, for example; a new large scale industrial development located within a rural small scale field pattern is likely to be all the more obvious due to its scale.

The affected landscape can be broadly divided into the following LCAs that are largely defined by landform.

- **Undulating Plains Landscape Character Area** which is comprised of the undulating plains to the north of the Soutpansberg and south of the Limpopo River. It is largely covered with semi-natural bushveld. The area is generally used for low intensity grazing. There also appears to be a significant eco-tourism secondary bias to the land use.

  The bushveld and in particular the taller shrubs and trees that extend above head height provide significant VAC screening for all but the closest elements. It is only likely that major elements will be obvious when the viewer is located in an elevated area above the natural vegetation or when a road alignment or a clearing enables vistas that extend further than the viewer's immediate vicinity.

[3] Landscape Institute & Institute of Environmental Management and Assessment

- **Soutpansberg Landscape Character Area** which is comprised of the Soutpansberg mountain range to the south and east of the proposed site. The mountain slopes are vegetated but much of the valley floors are developed. The dominant element is the landform which provides a high degree of VAC within this LCA.

- **Limpopo Valley Ridgelines Landscape Character Area** which is comprised of the narrow ridgelines and koppies that run through the plain to the north and south of the proposed site. The ridgelines are generally covered with natural bushveld. This LCA provides a moderate degree of VAC. It will limit visibility of the development within the surrounding undulating plain. However people located on the ridgelines and Koppies may have a panoramic view over the plains below them.

This landscape analysis was ground truthed during the site visit. It should be noted that the landform is the main character defining factor.

The LCAs as indicated generally coincide with vegetation types which are largely dictated by topography. These LCAs will be further verified during the site visit.

The landscape analysis is indicated on **Map 5**

3.3 LANDSCAPE QUALITY AND IMPORTANCE

3.3.1 Undulating Plains Landscape Character Area.

The importance of this LCA lies both with its agricultural and tourism roles. It is both important for its productivity as well as its natural aesthetics which support ecotourism activities.

Due to topography and the natural vegetation cover which results in a high VAC, it is likely that there is capacity for limited development to occur without compromising these natural aesthetics as experienced by the majority of people.

3.3.2 Soutpansberg Landscape Character Area

This is undoubtedly the most dramatic LCA. The contrast between the wide undulating plains to the north and the rugged mountains with narrow valleys provides a dramatic and memorable scene that underpins and provides potential for tourism related activities in the region. It is also critical to regional landscape character.

3.3.3 Valley Ridgelines Landscape Character Area

This LCA provides high points within the undulating plain. It punctuates the area with points of focus within what would otherwise be a relatively featureless landscape. It provides opportunities for over views of the plains. It also breaks up and provides separation and identity to the surrounding LCA. The natural aesthetics of this area are important particularly for eco-tourism activities.

From a visual perspective, the most important LCAs are therefore the Soutpansberg and the Limpopo Valley Ridgelines. These are the two characteristics that provide the regional and local landscape with identity. Any

development that reduces or changes the existing natural ruggedness of these LCAs is likely to have broader negative visual implications.

The contrast between the Undulating Plains and the rugged upland areas is also critical, however, due to the extent of the plains and the degree of VAC that is likely to be provided by its natural vegetative cover, it is likely that a degree of development can occur before the landscape change as experienced by most stakeholders and undermining the regional and local landscape character.

3.4 VISUAL RECEPTORS

3.4.1 Definition

Visual Receptors are defined as "individuals and / or defined groups of people who have the potential to be affected by the proposal"[4].

Certain areas are also sensitive due to an existing use. The nature of an outlook is generally more critical to areas that are associated with recreation, tourism and in areas where outlook is critical to land values.

3.4.2 Visual receptors

This section is intended to highlight receptors within the landscape which due to use could be sensitive to landscape change. They include;

Area Receptors:

- Settlement Areas, particularly Mopane which is the closest settlement to the proposed development; and
- A number of Protected Areas to the north and east of the proposed site area. The closest include the Averal Private Nature Reserve;

Linear Receptors:

Linear receptors generally include routes through the area. Because there is such a focus on eco-tourism activities, both major and minor routes are important. It might be argued that minor un-surfaced roads are more important than major surfaced roads as they are likely to provide access to the eco-tourism attractions. Major routes include:

- The N1 which is the main regional arterial route that carries traffic from the Zimbabwe border crossing at Beitbridge and Gauteng. At its closest the N1 runs approximately 6km from the proposed site;
- Regional roads including the R525, the R572, the R508 and the R523. The closest regional road is the R525 which at its closest is approximately 10km from the proposed site; and
- Local Roads that are largely un-surfaced. A number of local roads run in close proximity to the proposed site area, including one that runs immediately to the north and west of the site adjacent to a railway line and one that runs through the southern section of the Farm Vrienden linking directly to the N1.

In addition to roads, there is a railway line that runs to the north and west of the site. This section of the railway is likely to be largely carrying freight between Zimbabwe and South Africa. Passenger services in South Africa

[4] Landscape Institute & Institute of Environmental Management and Assessment

currently terminate at Messina and commence on the Zimbabwe side of the border at Beitbridge so it is likely to carry passengers. Research indicates that no major tourist trains such as the Blue Train use this route. The importance of the railway as a receptor is therefore likely to be relatively low.

Point Receptors,
More than 40 point receptors have been identified from mapping and aerial photography within the approximate visual limit of the proposed development. These include;

- Individual buildings that are likely to be mainly rural homesteads and farms. It is likely that a proportion of these include tourist lodges and accommodation;
- Small groups of dwellings that are likely to include small settlement areas and larger farm establishments which may also include tourist bush camps; and
- Game Lodges including;
    - The Command Game Lodge which is located adjacent to the southern boundary of the property; and
    - The Bujstaan Game Lodge that is located approximately 6.6km due east of the property.

The main receptors that have been identified are indicated on Map 4 which indicates the Landscape Character Areas.

LANDSCAPE CHARACTER AREAS

UNDULATING PLAINS LCA

VALLEY RIDGELINE LCA

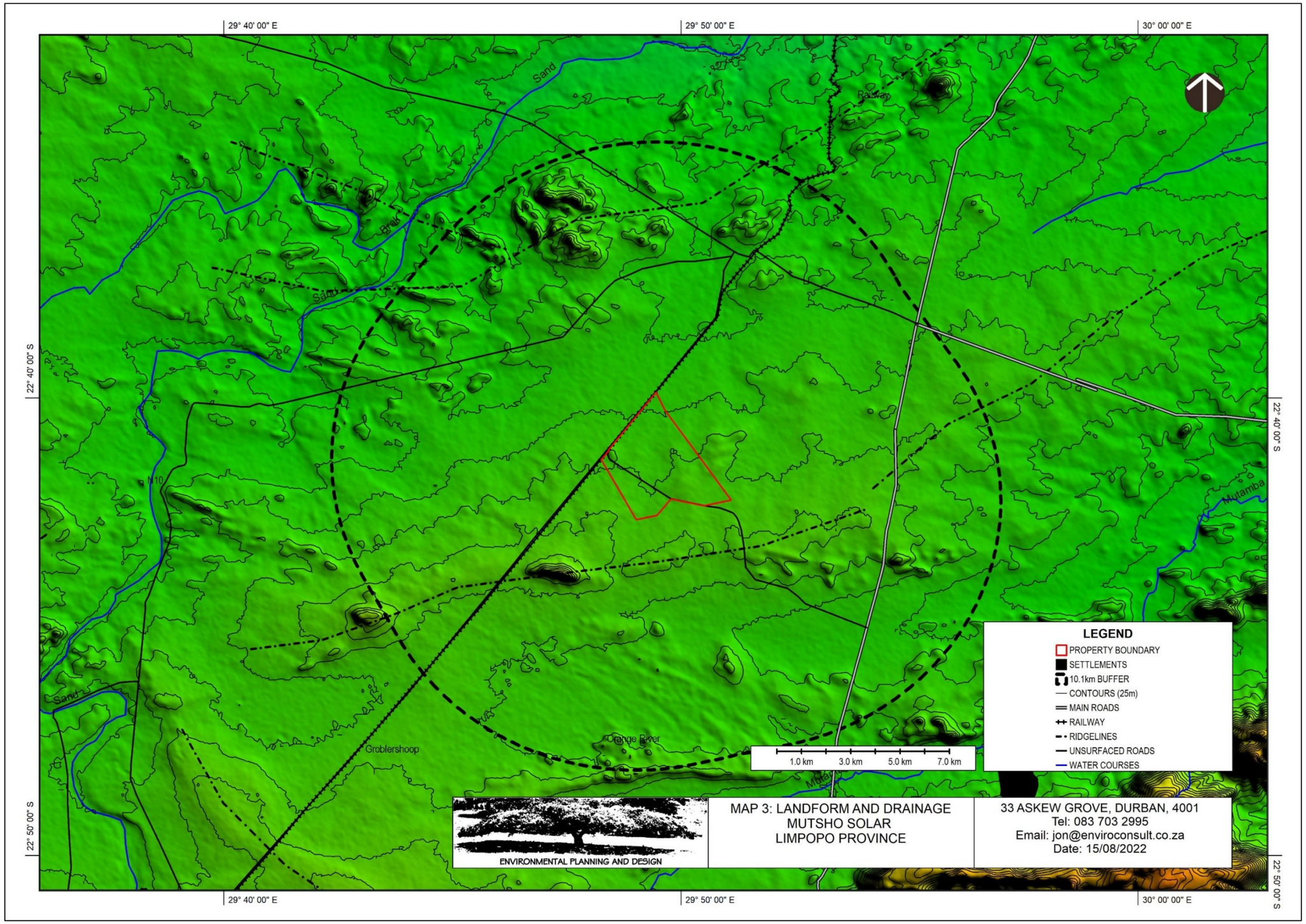
SOUTPANSBERG LCA

POSSIBLE VISUAL RECEPTORS

AREA RECEPTORS

POINT RECEPTORS

LINEAR RECEPTORS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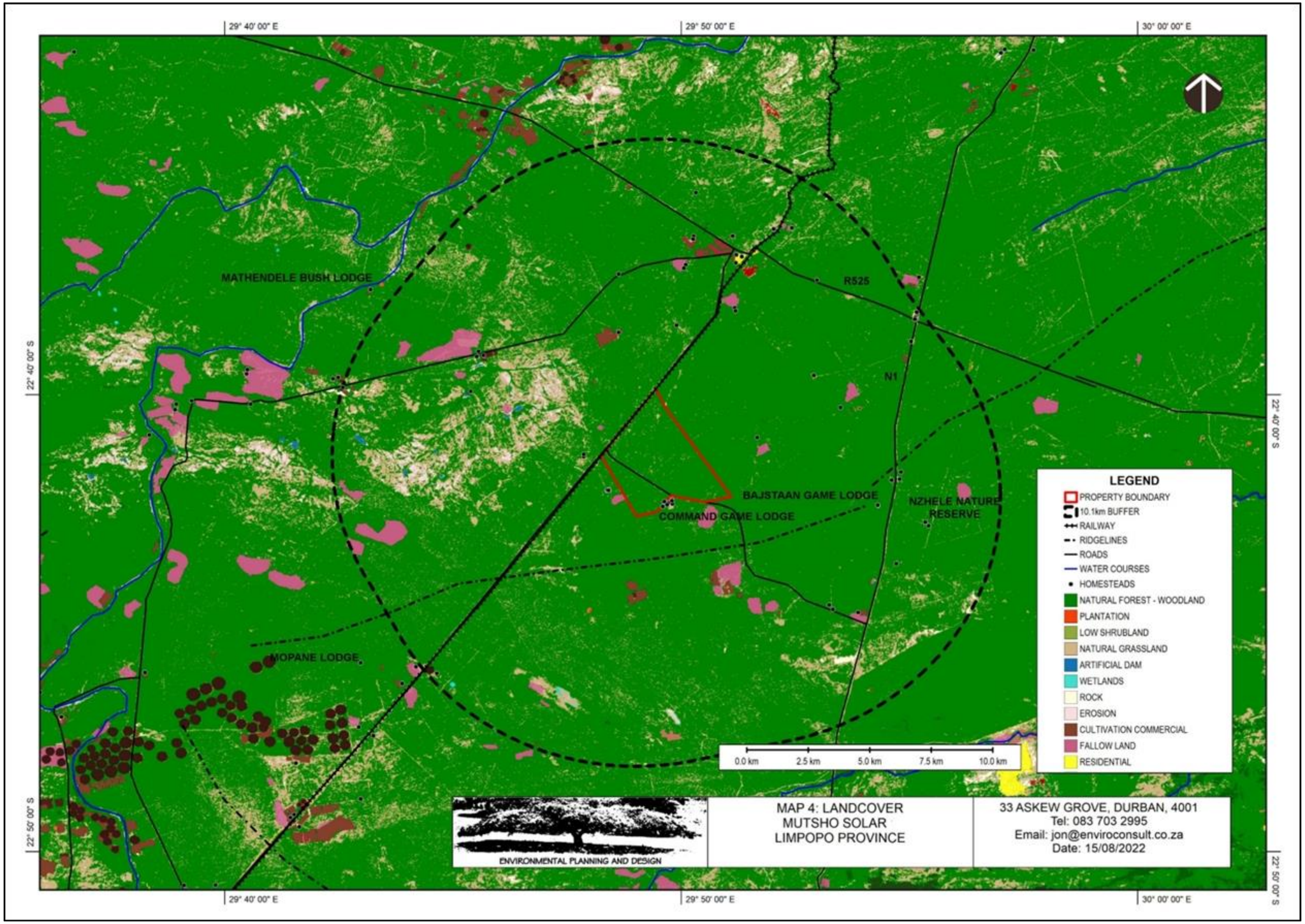
29° 50' 00" E
30° 00' 00" E
22° 40' 00" S
22° 50' 00" S
Sand
Railway
Grail
Sand
N10
Mutamba
Sand
Groblershoop
Orange River
Mutamba
1.0 km
3.0 km
5.0 km
7.0 km
LEGEND
PROPERTY BOUNDARY
SETTLEMENTS
10.1km BUFFER
CONTOURS (25m)
MAIN ROADS
RAILWAY
RIDGELINES
UNSURFACED ROADS
WATER COURSES
ENVIRONMENTAL PLANNING AND DESIGN
MAP 3: LANDFORM AND DRAINAGE
MUTSHO SOLAR
LIMPOPO PROVINCE
33 ASKEW GROVE, DURBAN, 4001
Tel: 083 703 2995
Email: jon@enviroconsult.co.za
Date: 15/08/2022


29° 40' 00" E
29° 50' 00" E
30° 00' 00" E
22° 40' 00" S
22° 50' 00" S
MATHENDELE BUSH LODGE
R525
N1
BAJSTAAN GAME LODGE
COMMAND GAME LODGE
NZHELE NATURE RESERVE
MOPANE LODGE
LEGEND
PROPERTY BOUNDARY
10.1km BUFFER
RAILWAY
RIDGELINES
ROADS
WATER COURSES
HOMESTEADS
NATURAL FOREST - WOODLAND
PLANTATION
LOW SHRUBLAND
NATURAL GRASSLAND
ARTIFICIAL DAM
WETLANDS
ROCK
EROSION
CULTIVATION COMMERCIAL
FALLOW LAND
RESIDENTIAL
0.0 km
2.5 km
5.0 km
7.5 km
10.0 km
ENVIRONMENTAL PLANNING AND DESIGN
MAP 4: LANDCOVER
MUTSHO SOLAR
LIMPOPO PROVINCE
33 ASKEW GROVE, DURBAN, 4001
Tel: 083 703 2995
Email: jon@enviroconsult.co.za
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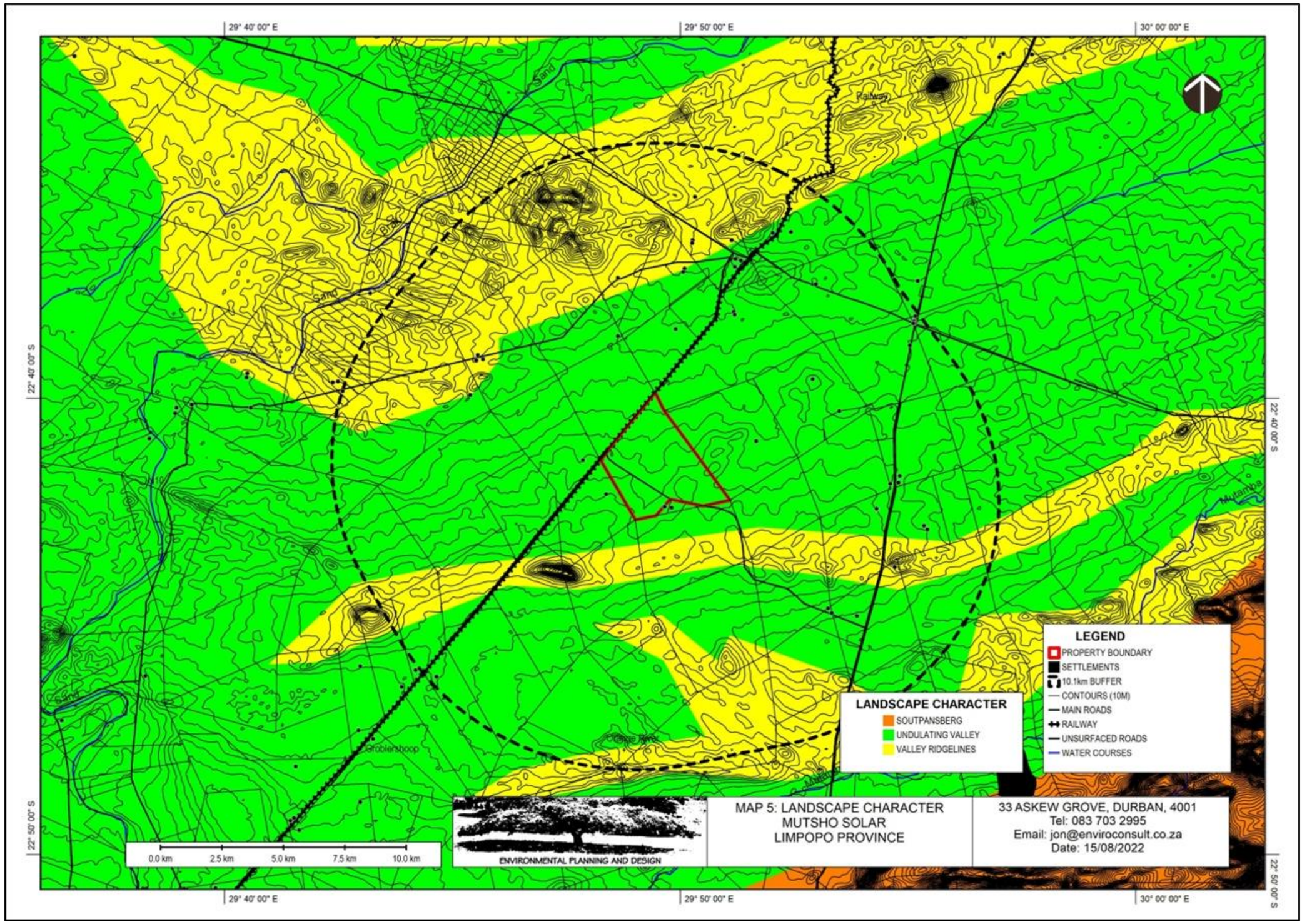
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22° 40' 00" S
22° 50' 00" S
Sand
Railway
Mutambo
Groblershoop
LEGEND
PROPERTY BOUNDARY
SETTLEMENTS
10.1km BUFFER
CONTOURS (10M)
MAIN ROADS
RAILWAY
UNSURFACED ROADS
WATER COURSES
LANDSCAPE CHARACTER
SOUTPANSBERG
UNDULATING VALLEY
VALLEY RIDGELINES
0.0 km
2.5 km
5.0 km
7.5 km
10.0 km
ENVIRONMENTAL PLANNING AND DESIGN
MAP 5: LANDSCAPE CHARACTER
MUTSHO SOLAR
LIMPOPO PROVINCE
33 ASKEW GROVE, DURBAN, 4001
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4 THE NATURE OF POTENTIAL VISUAL IMPACTS

4.1 NATURE OF LIKELY VIEWS OF THE DEVELOPMENT

During the construction phase, it is expected that traffic will be slightly increased as trucks will be required to transport materials and equipment such as PV panels and frames to the site.

Site preparation will generally include the following activities:

- vegetation clearance – removal or cutting of any vegetation if present (bush cutting);
- levelling and grading of areas where the array will be sited would normally occur, the assessment indicates that the land is relatively flat so only minor grading should be required;
- levelling of hard-standing areas, e.g. for temporary laydown and storage areas, as indicated above only minor grading is likely to be necessary;
- erection of site fencing;
- construction of a temporary construction camp which could occur within a lay down area within the overall site.

These activities are only likely to be visible from the immediate vicinity of the site.

As the site is developed, concrete bases will be constructed (if required), the support structures will then be assembled and PV panels attached, ancillary structures and minor buildings will also be constructed.

The development will therefore appear on a progressive basis in the landscape, however once the concrete bases are constructed, the structures are likely to be assembled rapidly.

The construction of the proposed on-site substations will follow a similar pattern.

Construction of the proposed facility is likely to take up to approximately 16 months, the start date of which, is dependent upon award of a bid/procurement. Construction activities could take place concurrently for multiple facilities.

By the end of the construction process, the array will be assembled and minor buildings constructed and the full visual impact of the project will be experienced.

The operational phase (25 years) is highly unlikely to result in any significant additional impact. It is possible however, that work crews will be visible from time to time undertaking maintenance within the facility.

The main visible elements therefore are likely to include:

1. The solar array, including minor buildings and structures located within a fence line with an associated on-site electrical infrastructure compound that is slightly taller than surrounding elements;
2. The proposed on-site substation; and
3. Operational and security lighting at night.

4.1.1 The likely Nature of Views of the Proposed Solar Array

A tracking array is likely to appear as a continuous structure in the landscape from the direction in which it is aligned.

The nature of the impact is also likely to vary with location and elevation;

- If the array is located on a hillside or if it is viewed from a higher level, the rows of PV units are likely to visually combine and will be read as a single unit. From a distance this results in a PV array having a similar appearance as a large industrial structure when viewed from above. It should be noted that the proposed project will not be viewed from a higher elevation and so this type of view will not apply;

- From the direction in which it is aligned (tracking array - NE, N, NW) and if the project is viewed from a similar level, the front row of PV units will be seen in elevation. This is likely to result in the project being seen as a continuous dark line in the landscape possibly with slightly higher elements such as the on-site electrical infrastructure compound extending above the line. How prominent the dark line is, is likely to be dependent on the distance of the viewer from the project as well as the extent to which the view of the elevation is broken by other elements such as vegetation and landform.

- From the south, east and west the dark face of the PV units is not obvious and subject to the colour of the undersides of the units, the supporting structures are likely to become more apparent. With distance however, the shadow cast by the structures is likely to be more obvious and the facility will probably appear much as the northern face, a long dark structure.

- If the landscape does not have significant Visual Absorption Capacity (VAC), because of the contrast in colour with the surrounding landscape, the array could be visible to the limit of visibility. Subject to the colour and reflectivity of the underside of the PV units and supporting structure, it is possible that a similar level of impact could also be experienced from the south, east and west. It should be noted that the VAC of the landscape surrounding the proposed development is largely dependent on minor ridgelines.

- Mitigation or screening of views is possible at least from close views. This can be achieved either by earthwork berms by planting or by a combination of both. From a distance and particularly from elevated viewpoints as views over screening may be possible and excessively tall screening is likely to be less feasible as it is likely to cast shadow over the PV units.

- In addition to the way that a solar array may change a landscape, the nuisance factor associated with resulting glare is often raised by stakeholders on similar projects. PV units, however, are designed to absorb as much energy as possible and are designed not to reflect light. This issue is generally more likely to be associated with a focussed array which tracks the sun's path during the day and uses reflective surfaces to focus energy onto receptors or with affixed array. It is therefore not expected that this will be a significant issue with a tracking array such as the one proposed.

Due to relatively dense and consistent vegetation cover, the landscape has relatively high VAC which is likely to mean that the proposed array will be largely screened from surrounding areas.

Where it is visible however, because the site and surrounding area is relatively flat. the array is likely to be largely viewed either in elevation or at an acute depressed view from minor valleys.

A new solar array has been developed adjacent to Upington Airport. This array has been developed in two sections on either side of the airport runway. It is probably somewhat smaller than the subject project, covering approximately 25ha and the longest edge of the array being approximately 500m long. The PV panels are mounted on fixed frames approximately 2m high. Despite obvious differences compared with the proposed project, it does illustrate the effect of distance in mitigating the visibility of the solid line of solar panels.

Plate 2 indicates the location of the existing array at Upington Airport. **Plates 3, 4 and 5**, illustrate how the array is seen from distances of approximately 700m, 1500m and 5000m respectively.

The following effects are noted:

- From 700m the array is clearly visible. For the same effect relative to a 3.5m high array, this distance will be approximately 875m.
- From 1500m, the array is visible but even with the minimal vegetation providing screening at the airport, the dark line of panels is starting to blend into the background. The array is visible but might be missed by a casual viewer. For the same effect relative to a 3.5m high array, this distance will be approximately 2625m.
- From 5000m, the line of panels is indistinguishable from the horizon. For the same effect relative to a 3.5m high array, this distance will be approximately 8750m.

A single axis tracking system could slightly increase the height of structures particularly during late afternoon and early morning when the units are tilted to their fullest extent.

This provides an indication of potential levels of impact relative to the height and distance of the viewer from the facility

Plate 2, Existing solar arrays at Upington Airport as seen from the air

Plate 3, Existing array seen in a flat landscape from approximately 700m. The array is clearly visible.

Plate 4, Existing array seen in a flat landscape from approximately 1500m. The array is visible but even with the minimal vegetation providing screening at the airport, the dark line of panels is starting to blend into the background. The array is clearly visible but might be missed by a casual viewer who was not aware of its existence.

Plate 5, **Existing array seen in a flat landscape from approximately 5000m**. The line of panels is barely distinguishable. The viewer would have to know where to look to be able to differentiate the array from surrounding landscape features.

4.1.2 The likely Nature of Views of the Proposed On-Site Substation

On-site substations are likely to have elements up to 10m[5] high (bus bars). These will be viewed as an isolated higher section of the development.

The upper sections of these elements are comprised of steel lattice structures. They are therefore likely to be relatively transparent.

4.1.3 Glare from the PV array

A common misconception about solar photovoltaic (PV) panels is that they inherently cause or create glare, posing a nuisance to neighbours. While in certain situations the glass surfaces of solar PV systems can produce glint (a momentary flash of bright light) and glare (a reflection of bright light for a longer duration).

Light absorption, rather than reflection, is central to the function of a solar PV panel to absorb solar radiation and convert it to electricity. Solar PV panels are constructed of dark-coloured (usually blue or black) materials and are covered with anti-reflective coatings. Modern PV panels reflect as little as two percent of incoming sunlight, about the same as water and less than soil. Some of the concern and misconception is likely due to the confusion between solar PV systems and concentrated solar power (CSP) systems. CSP systems typically use an array

[5] This is likely to be the highest structure, the majority of structures will be lower.

of mirrors to reflect sunlight to heat water or other fluids to create steam that turns an electric generator[6].

Glare experienced at ground level generally occurs when the sun is low in the sky and the angle of incidence is such that light is reflected rather than refracted through the panel surface. The risk of this occurring is therefore highest during early morning and late afternoon.

In South Africa affected areas during the early morning will generally vary from the west of the array during summer months to the north west of the array during winter months when the rising sun is further north.

Affected areas during the late afternoon will generally vary from the east of an array during summer months to the north east of an array during winter months.

Because glare is reflected light from an inclined panel, it will generally affect areas above the level of the panel surface.

Plate 6 - Glare experienced in the Control Tower at Boston Regional Airport from an adjacent PV array

The extent and height of existing vegetation within and around the proposed site could provide a large degree of screening which should also minimise the potential impact of glint and glare. There are also no significant receptors in the area that could be affected such as major roads or aircraft runways. The N1 is approximately 6km from the array and the intervening area is covered with relatively dense bush and so is highly unlikely to be affected.

[6] US Department of Energy

4.1.4 Security Lighting

The facility will be lit by security lights to a level sufficient to ensure that security cameras can operate at night. This could result in the facility being obvious at night from surrounding areas.

4.1.5 Site Access Road

The existing gravel access road will be utilised for access. It is therefore unlikely that there will be any additional impact. Minor roads in a relatively flat landscape are generally only visible from the immediately surrounding area. They could be visible from a distance due to traffic using the road. However, the existing road runs through relatively dense forest and so traffic is likely to be largely screened.

5 LANDSCAPE AND VISUAL SENSITIVITY

The review of the proposed project indicates that the following issues need to be considered during site planning and assessment.

The most sensitive receptors are likely to include:

a) Protected areas:
b) The N1 which carries a large proportion of tourism related traffic that could be sensitive to views over industrial development;
c) The R525 which is likely to carry a proportion of traffic visiting game farms and reserves that could be sensitive to views over industrial development;
d) Local unsurfaced roads including the road that runs through the project property which is likely to carry a proportion of traffic visiting game farms and reserves that could be sensitive to views over industrial development; and
e) Local homesteads, particularly those that have tourism uses such as the Command Game Lodge that is located immediately adjacent to the proposed development.

Due to distance, formally protected areas are highly unlikely to be affected.

Due to the likely degree of screening by existing vegetation, the preservation of key landscape characteristics does not appear to be a significant issue.

5.1 NO GO AREAS

The directly affected landscape is neither protected nor is it rare so from a landscape perspective there are no no-go areas.

5.2 DEVELOPMENT SENSITIVITY

Sensitivity to development relates to:

- Guiding development away from areas of the site that would make it most obvious to surrounding sensitive receptors.

Highly Sensitivity Areas include:

- Areas immediately surrounding homesteads development of which is likely to significantly change the character of views for residents and guests. A 500m buffer is proposed which should be sufficient to ensure that development does not totally dominate views. It is possible that receptors (owners /residents / guests) have no concern regarding the development of these areas, in which case the sensitivity rating will reduce;

Medium Sensitivity Areas include:

- Corridors beside the roads that could be affected. Due to distance, the main roads that run through the area are unlikely to be significantly impacted. As indicated in previously, given that local unsurfaced roads are likely to provide access to local lodges, these also have tourism importance;

Low Sensitivity Areas include:

- All other areas of the proposed site.

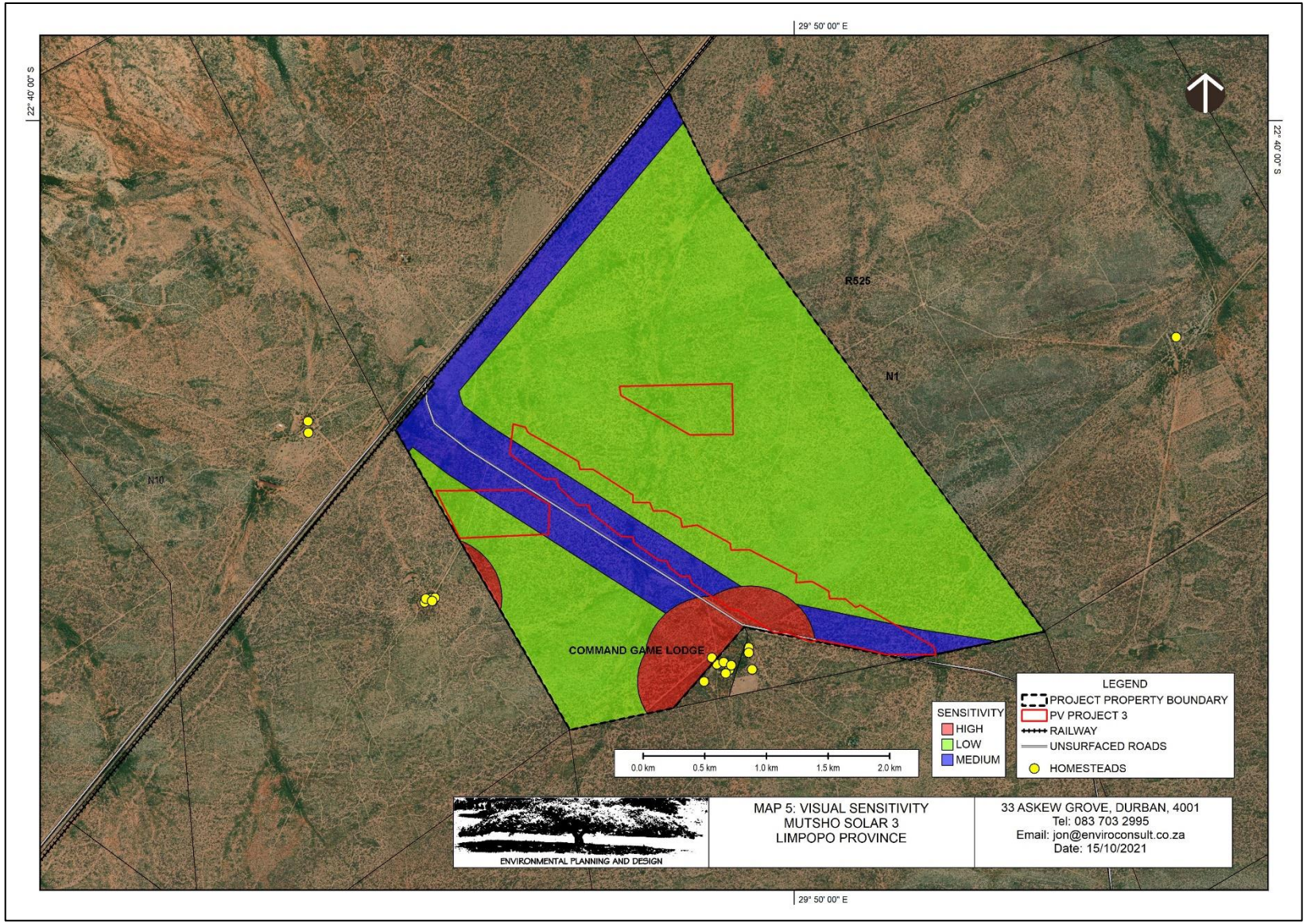
Overlaying the footprint of the proposed project onto the Sensitivity Map (Map 6), it is obvious that the project largely falls within zones of medium and high sensitivity beside the unsurfaced road that runs through the property and close to the cluster of homesteads to the south west. This is likely to mean that there is potential for this project to impact on these receptors.

SENSITIVE RECEPTORS

Plate 7, View looking south from the un-surfaced road across the railway track to the forest vegetation within the site

Plate 8, Entrance to the Command Game Farm from the unsurfaced road running through the site

Plate 9, N1 Highway that carries a large proportion of tourism related traffic


29° 50' 00" E
22° 40' 00" S
R525
N1
N10
COMMAND GAME LODGE
0.0 km
0.5 km
1.0 km
1.5 km
2.0 km
SENSITIVITY
HIGH
LOW
MEDIUM
LEGEND
PROJECT PROPERTY BOUNDARY
PV PROJECT 3
RAILWAY
UNSURFACED ROADS
HOMESTEADS
ENVIRONMENTAL PLANNING AND DESIGN
MAP 5: VISUAL SENSITIVITY
MUTSHO SOLAR 3
LIMPOPO PROVINCE
33 ASKEW GROVE, DURBAN, 4001
Tel: 083 703 2995
Email: jon@enviroconsult.co.za
Date: 15/10/2021

6 VISIBILITY AND THE LIKELY NATURE OF VIEWS OF THE PROPOSED DEVELOPMENT

6.1 THE EXTENT OF POSSIBLE IMPACTS

The bulk of the proposed project is comprised of the array of PV panels. It has been assumed that these are up to 3.5m high.

The majority of other elements including the inverters and buildings will be located amongst the array and will be of a similar or lower height.

The tallest elements are likely to be the transformers associated with the on-site substation. These will be solid elements and could be in the order of 8m high. Other electrical infrastructure such as the bus bars to which the power lines will connect may be taller but these will be largely comprised of lattice structures that are likely to be relatively transparent.

The development can therefore be described as generally being comprised of elements of a similar height but with an isolated taller element.

In order to provide an indication of the likely limit of visibility, a universally accepted navigational formula has been used to calculate the likely distance that the proposed structures might be visible over (**Appendix III**). This indicates that in a flat landscape the proposed structures may be visible for the following distances;

Approximate limit of Visibility (ALV)

ELEMENT	APPROXIMATE LIMIT OF VISIBILITY
Solar PV panels up to 3.5m high	6.7 kilometres
Substation 8m high	10.1 kilometres

In reality these distances could be reduced by:

- Weather conditions that limit visibility. This could include hazy conditions during fine weather as well as mist and rain; and
- Scale and colour of individual elements making it difficult to differentiate structures from the background.
- The fact that as a viewer approaches the ALV only a small portion of the development will be visible to the extent that it is likely to be indiscernible to the human eye.

The ALV for the transformers is indicated on the LCA mapping in order to indicate the study area.

The ALV for the transformers and the solar PV panels are indicated on the visibility mapping for those elements.

The lay down area is largely a temporary facility for use during construction. The extent of views of the lay down area are difficult to assess. It is likely that equipment stored in this area will be of similar height or lower than the proposed PV array. For this reason it is assumed that equipment stockpiled will be visible or will be incorporated into views of the array. It is

possible however that from time to time activity and / or the use of large equipment may make it more obvious.

A smaller lay down area will be required during the operational phase of the project. Again it is assumed that equipment stored here for maintenance operations will be of a similar scale and will have an ALV similar to the PV array.

6.2 ZONES OF THEORETICAL VISIBILITY

Zones of Theoretical Visibility (ZTV) are defined as "a map usually digitally produced showing areas of land within which a development is theoretically visible"[7].

ZTVs of the proposed development have been assessed using GIS.

The detailed location of the proposed array has been provided by the developer **(Map 3)**. In order to generate the ZTV for the proposed array, it has been assumed that entire area of the array will be set at a uniform maximum height of 3.5m. Points have been set at each change in direction of the array boundary, an additional point at the centre of the array and a high points in the development footprint all with 3.5m offsets for generation of the ZTV.

Similar methodology was adopted for the onsite substation for which a 8m offset has been used to produce the ZTV.

Whilst the ZTV has been calculated from terrain data only, existing vegetation could have a modifying effect on the areas indicated.

The ZTV analysis is indicated on the following maps:

- **Map 7** indicates the ZTV for the proposed PV array and internal infrastructure;
- **Map 8** indicates the ZTV the on-site substation.

6.2.1 General Visibility

The assessment indicates that the proposed project may be visible to the following areas;

i. The proposed array and the substation and BESS upgrade[8] are likely to be visible over similar areas although the substation upgrade is likely to be visible slightly further to the north and south;
ii. Views of the proposed array and the substation upgrade will be constrained to the north east and south west by minor ridgelines with the development likely to be most visible to the north where it may be visible for up to 7km;
iii. The project will not be visible from protected areas;
iv. The project will not be visible from the N1 or the R525;
v. The project may be visible from approximately 10.5km of the railway as well as the unsurfaced road that runs parallel to it;
vi. The project may be visible from approximately 5.4km of the unsurfaced road that runs through the affected property

[7] UK Guidelines

[8] Visual implications of the substation and BESS upgrade are likely to include the addition of a second bus bar and a third battery bank.

vii. The ZTV analysis indicates that the proposed project could be visible from thirteen homesteads within 2km.

6.2.2 Specific considerations regarding the nature of impacts

Views from local unsurfaced roads

The ZTV analysis indicates that the only local roads from which there is potential for any significant impact are the road that runs on the opposite side of the railway line and the road that runs through the affected property. Both these roads are at a similar level as the site. Existing vegetation currently prevents views into the site. The retention of a sufficient band of this vegetation will effectively screen the development.

Plate 10, View looking through existing vegetation beside the unsurfaced road within the site towards the proposed project

Note: existing vegetation will effectively screen the project from the road.

Views from Main roads

Views of the proposed project will not be possible from either the N1 or R525.

Plate 11, View looking towards the proposed site from the R525
Note: No views of the project will be possible from this road.

Views from Adjacent Settlements and Homesteads

The ZTV indicates that a number of homesteads could be affected by views of the proposed development. However, no views of the project will be visible from Mopane

In reality however, existing vegetation is likely to largely screen the majority of views.

The closest homestead is the Command Game Farm. This facility advertises hunting and game viewing so views over surrounding areas are largely restricted by vegetation.

Plate 12, View looking to the south from the southern edge of Mopane
Note: existing trees screen views towards the proposed site.

Plate 13, View looking to the south from the unsurfaced road exiting the southern edge of Mopane
Note: Existing trees on the right side of the image screen views towards the proposed site.

Plate 14, View looking through the entrance of Command Game Farm
Note: Dense forest is likely to screen views towards the proposed project.

Plate 15, Oblique aerial view of Command Game Farm extracted from their facebook page
Note: Dense forest surrounding the lodge, views through this vegetation towards the proposed project are unlikely to be possible.

Glare

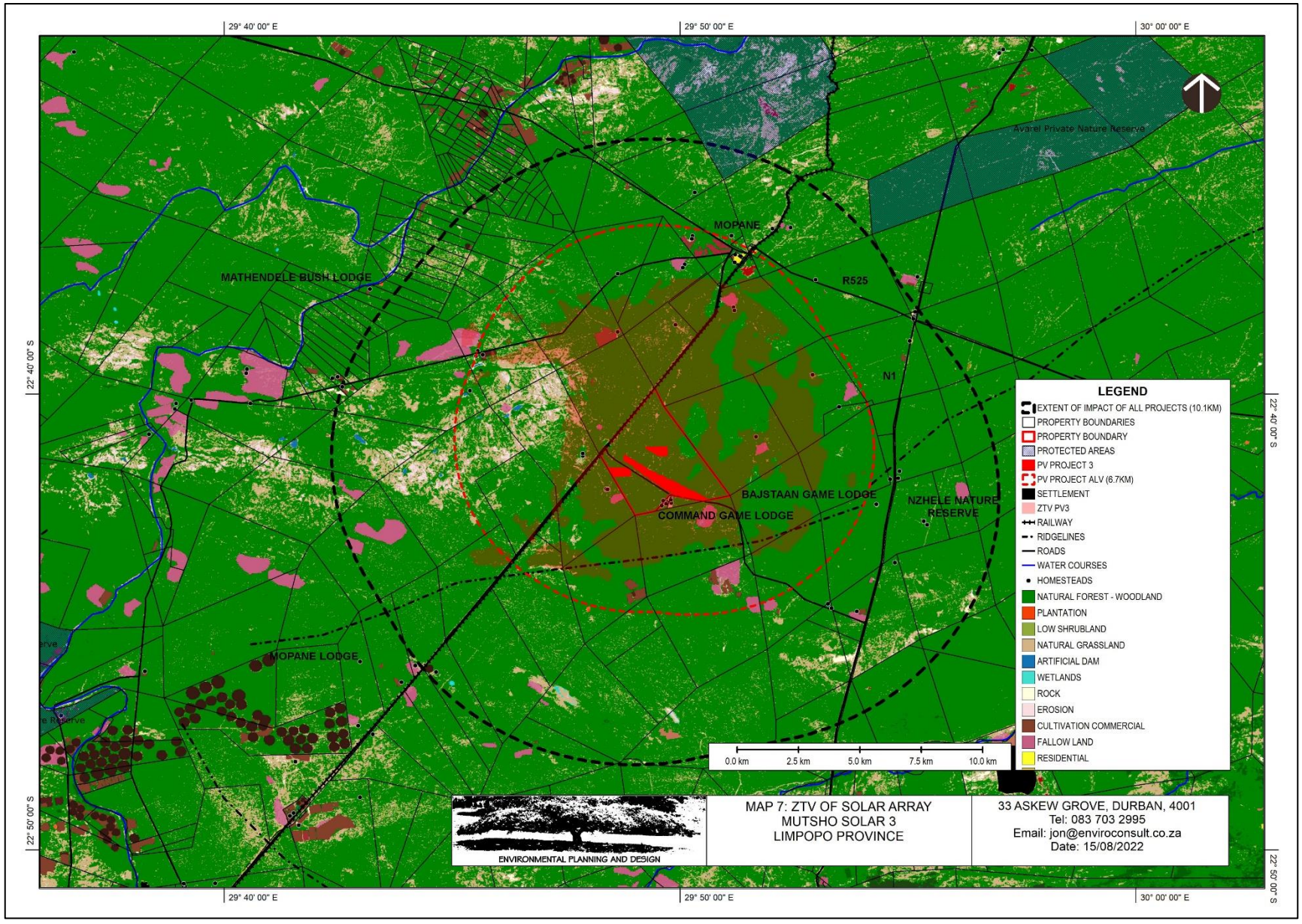
Areas that could be affected by glare include:

- The unsurfaced road that runs parallel and adjacent to the railway; and
- The unsurfaced road that runs through the property.

Due to the extent of existing vegetation surrounding the proposed array, it is highly unlikely that glare will be problematic. However if clearing of vegetation without consideration of glare should be undertaken then its possible that the situation could change. The most likely areas that could be affected are the adjacent local roads.

Cumulative Impacts

In terms of cumulative issues, there is only one other solar project that has been authorised within 30km of the proposed Mutsho projects. The ABC Priska Solar project is located approximately 12.2km to the south-west of Mutsho. It is a 75MW solar PV project similar in nature to the proposed Mutsho projects, refer to Map 9.


29° 40' 00" E
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30° 00' 00" E
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Avarel Private Nature Reserve
MOPANE
MATHENDELE BUSH LODGE
R525
N1
BAJSTAAN GAME LODGE
COMMAND GAME LODGE
NZHELE NATURE RESERVE
MOPANE LODGE
LEGEND
EXTENT OF IMPACT OF ALL PROJECTS (10.1KM)
PROPERTY BOUNDARIES
PROPERTY BOUNDARY
PROTECTED AREAS
PV PROJECT 3
PV PROJECT ALV (6.7KM)
SETTLEMENT
ZTV PV3
RAILWAY
RIDGELINES
ROADS
WATER COURSES
HOMESTEADS
NATURAL FOREST - WOODLAND
PLANTATION
LOW SHRUBLAND
NATURAL GRASSLAND
ARTIFICIAL DAM
WETLANDS
ROCK
EROSION
CULTIVATION COMMERCIAL
FALLOW LAND
RESIDENTIAL
0.0 km
2.5 km
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7.5 km
10.0 km
ENVIRONMENTAL PLANNING AND DESIGN
MAP 7: ZTV OF SOLAR ARRAY
MUTSHO SOLAR 3
LIMPOPO PROVINCE
33 ASKEW GROVE, DURBAN, 4001
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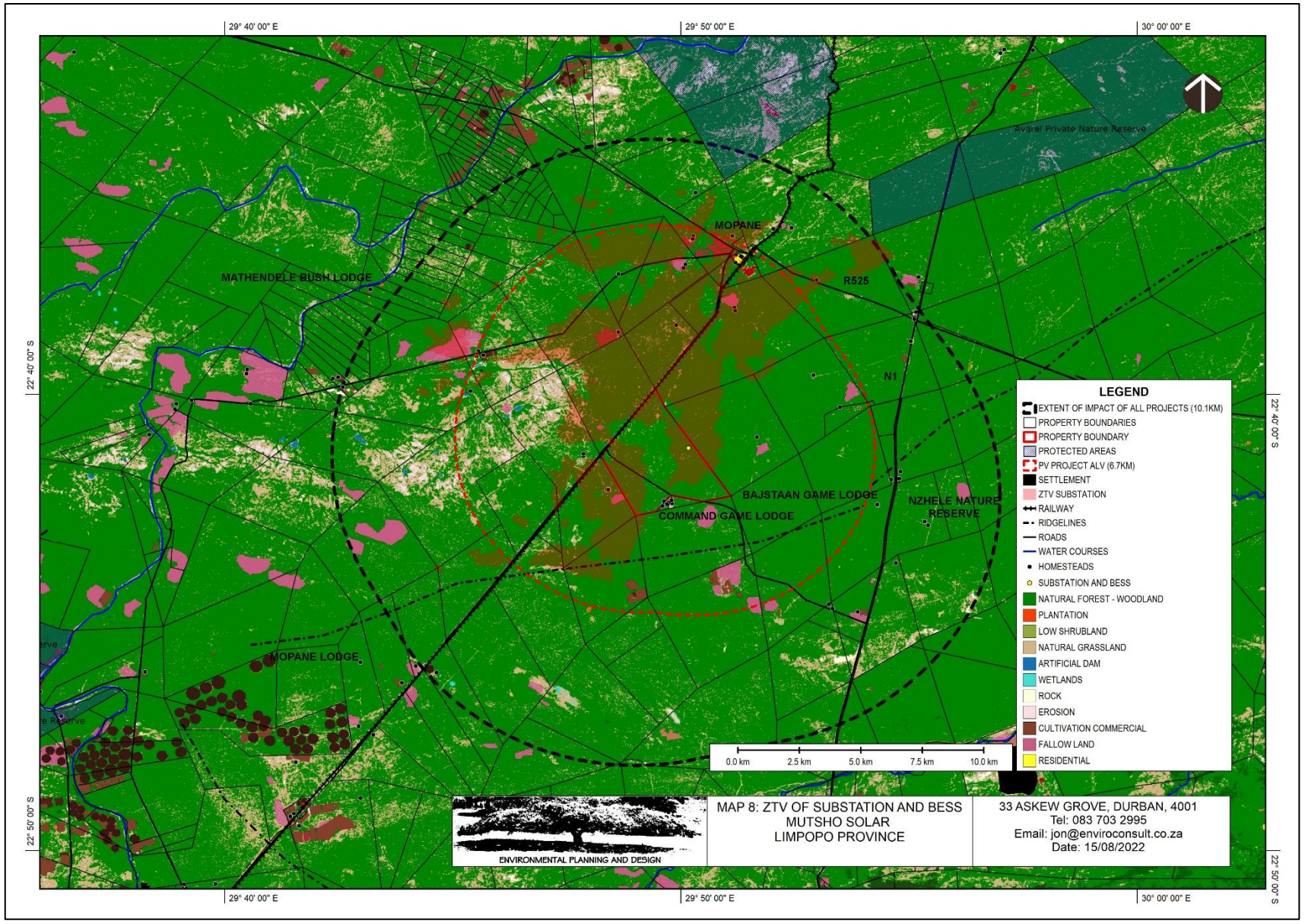
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Avarel Private Nature Reserve
MOPANE
MATHENDELE BUSH LODGE
R525
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BAJSTAAN GAME LODGE
COMMAND GAME LODGE
NZHELE NATURE RESERVE
MOPANE LODGE
LEGEND
EXTENT OF IMPACT OF ALL PROJECTS (10.1KM)
PROPERTY BOUNDARIES
PROPERTY BOUNDARY
PROTECTED AREAS
PV PROJECT ALV (6.7KM)
SETTLEMENT
ZTV SUBSTATION
RAILWAY
RIDGELINES
ROADS
WATER COURSES
HOMESTEADS
SUBSTATION AND BESS
NATURAL FOREST - WOODLAND
PLANTATION
LOW SHRUBLAND
NATURAL GRASSLAND
ARTIFICIAL DAM
WETLANDS
ROCK
EROSION
CULTIVATION COMMERCIAL
FALLOW LAND
RESIDENTIAL
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ENVIRONMENTAL PLANNING AND DESIGN
MAP 8: ZTV OF SUBSTATION AND BESS
MUTSHO SOLAR
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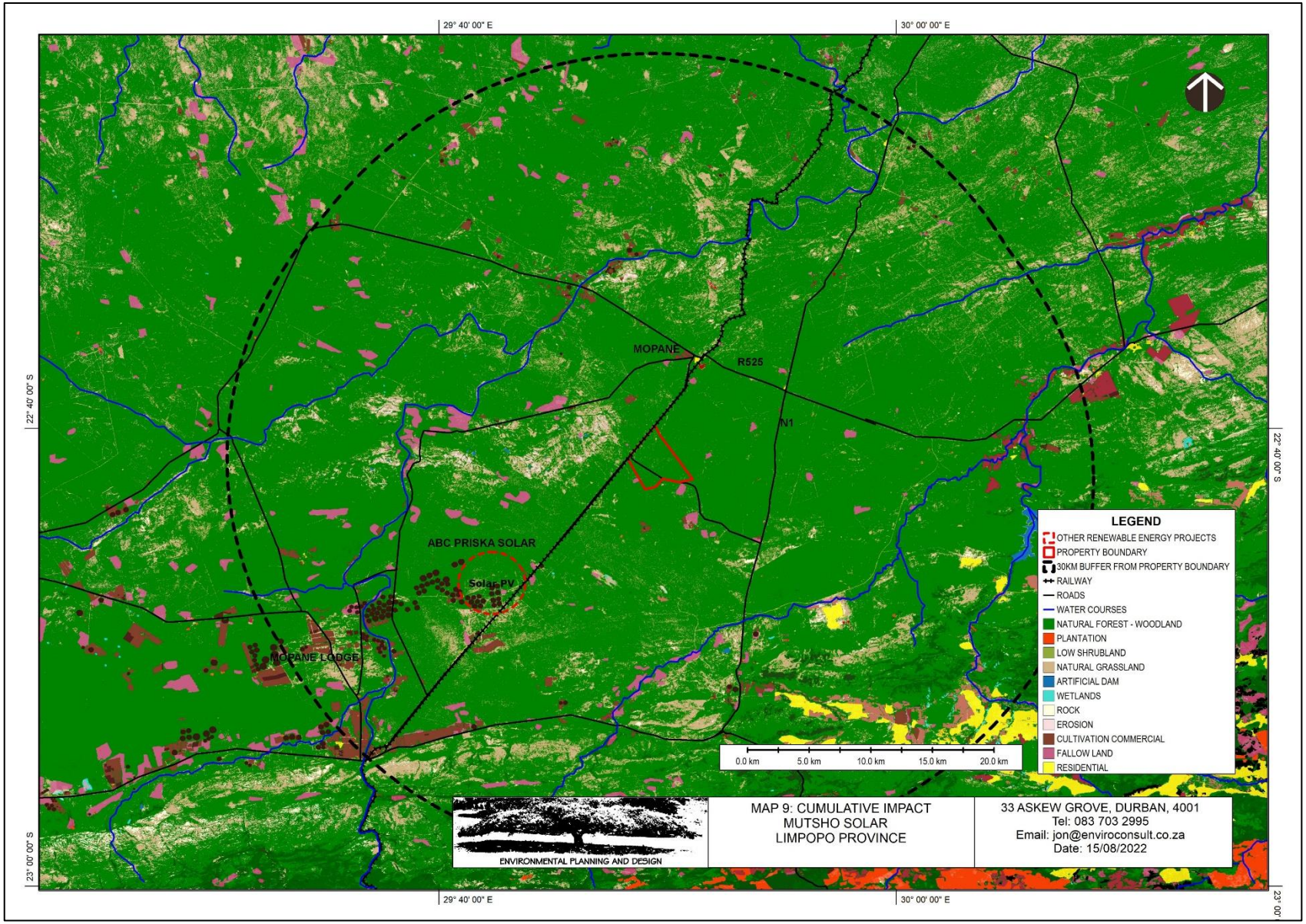
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MOPANE
R525
N1
ABC PRISKA SOLAR
Solar PV
MOPANE LODGE
LEGEND
OTHER RENEWABLE ENERGY PROJECTS
PROPERTY BOUNDARY
30KM BUFFER FROM PROPERTY BOUNDARY
RAILWAY
ROADS
WATER COURSES
NATURAL FOREST - WOODLAND
PLANTATION
LOW SHRUBLAND
NATURAL GRASSLAND
ARTIFICIAL DAM
WETLANDS
ROCK
EROSION
CULTIVATION COMMERCIAL
FALLOW LAND
RESIDENTIAL
0.0 km
5.0 km
10.0 km
15.0 km
20.0 km
ENVIRONMENTAL PLANNING AND DESIGN
MAP 9: CUMULATIVE IMPACT
MUTSHO SOLAR
LIMPOPO PROVINCE
33 ASKEW GROVE, DURBAN, 4001
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Date: 15/08/2022

7 VISUAL IMPACT ASSESSMENT

7.1 ASSESSMENT METHODOLOGY

The previous section of the report identified specific areas where visual impacts may occur. This section will quantify these impacts in their respective geographical locations and in terms of the identified issues.

The methodology for the assessment of potential visual impacts includes:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
    - local extending only as far as the development site area – assigned a score of 1;
    - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
    - will have an impact on the region – assigned a score of 3;
    - will have an impact on a national scale – assigned a score of 4; or
    - will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
    - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
    - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
    - medium-term (5–15 years) – assigned a score of 3;
    - long term (> 15 years) - assigned a score of 4; or
    - permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
    - 0 is small and will have no effect on the environment;
    - 2 is minor and will not result in an impact on processes;
    - 4 is low and will cause a slight impact on processes;
    - 6 is moderate and will result in processes continuing but in a modified way;
    - 8 is high (processes are altered to the extent that they temporarily cease); and
    - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
    - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
    - Assigned a score of 2 is improbable (some possibility, but low likelihood);
    - Assigned a score of 3 is probable (distinct possibility);
    - Assigned a score of 4 is highly probable (most likely); and
    - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- The **status**, which will be described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.

- The *degree* to which the impact can be *mitigated.*
- The **significance** is determined by combining the criteria in the following formula:
    - S=(E+D+M)P; where S = Significance weighting, E = Extent, D = Duration, M = Magnitude, P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

7.2 ASSESSMENT

The following assessment focuses firstly on general landscape change that will occur due to the proposed development which provides context for the assessment of impacts on identified sensitive receptors.

It should be noted that the impacts identified will all gradually increase from the current situation to the impact level indicated during the construction phase, be consistent at the impact levels indicated during the operational phase and decrease again from the levels indicated to close to the current situation during the decommissioning phase.

Cumulative impacts are detailed in Appendix IV. A synopsis of the assessment of cumulative impacts is included in the assessment tables below.

7.2.1 Industrialisation of the surrounding Rural Landscape (Landscape Impact)

Nature of impact:

The proposed development could negatively impact on the character of the Undulating Plain LCA which is largely a natural landscape which may be an important tourism resource.

Due to the extent of forest and the gently undulating plain with rocky ridgelines the affected landscape has a relatively cohesive natural character that is valuable for local tourism activities.

Because of the density of vegetation This main impact relates to industrialisation of the rural landscape surrounding the proposed site. This will occur if views of the proposed solar array and associated infrastructure become visible and obvious from areas that are currently natural in character.

Given the VAC of the existing landscape, major impacts are likely to be limited to roads and homesteads in the immediate vicinity of the proposed development. There is also likely to be a small impact potentially extending to the limit of visibility of the tallest elements associated with the development.

	Without mitigation	**With mitigation**
Extent	Site and Immediate Surroundings **(2)**	Site and Immediate Surroundings **(2)**

Duration	Long Term **(4)**	Long Term **(4)**
Magnitude	Low **(4)**	Small **(0)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Medium **(30)**	Low **(12)**
Status	If the development is visible from adjacent local roads it is likely that a proportion of receptors will see the proposed development in a negative light. **Negative**	If the proposed development is not visible from local roads then receptors are unlikely to think of the proposed development in a negative light. **Neutral**
Reversibility	High	High
Irreplaceable loss	The landscape character of the proposed site is relatively common within the region. It would also be possible to dismantle the proposed project and rehabilitate the site. Whilst this is unlikely in the short to medium term it does mean that **there will therefore be no irreplaceable loss.**	**No irreplaceable loss.**
Can impacts be mitigated?	**Yes**	

Mitigation / Management:

Planning:

- Plan to maintain the height of structures as low as possible;
- Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;
- Plan to maintain and augment a buffer of existing forest around the development sufficient to screen views from adjacent local roads and prevent glare issues .

Construction:

- Minimise disturbance and loss of existing vegetation;
- Undertake rehabilitation of disturbed areas;
- Undertake screen planting;

Operations:

- Monitor rehabilitated areas and implement remedial actions (monthly until establishment, thereafter at the middle and end of every growing season);

- Minimise disturbance and maintain existing vegetation as far as is possible both within and surrounding the development area; and

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site;
- Return all possible areas to their original state; and
- Monitor rehabilitated areas post-decommissioning and implement remedial actions.

Cumulative Impacts:

There is one other solar PV project within 30km (ABC Prieska). This other project is located within or close to an area that is cultivated.

The Mutsho projects are located within an area of natural forest that will be cleared. Whilst the ABC Prieska site has not been visited, it seems possible that it will not result in removal of forest.

The proposed project appears likely to be the only one that will result in change of a natural landscape that is relatively typical in the region.

The cumulative impact was therefore assessed as low and the cumulative contribution low.

Residual Risks:

The residual risk relates to loss of natural landscape being obvious on decommissioning of the proposed project. In order to minimise this impact, it is critical that existing natural landscape areas in and around the development are maintained and protected and that effective rehabilitation is undertaken during and after construction as well as on closure of the plant.

7.2.2 Impact of the Proposed Development on Identified Sensitive Receptors

Potential visual impacts on sensitive receptors that have been identified through scoping and the site visit include:

a) The proposed development could be visible from tourist routes in the area. These include the N1, the R525 and local roads that may be used for access to lodges and private reserves / game farms that might be utilised for tourism.
b) The proposed development could impact on views from trains as they pass close to the proposed development. A proportion of these trains are likely to carry passengers although it is understood that major tourism related trains do not utilise this route.
c) The proposed development could impact negatively on settlements in the area. However, it is likely that distance and local vegetation will mitigate these impacts.
d) The proposed development could impact negatively on local point receptors. These are likely to be comprised largely of homesteads but it is also highly likely that a number of these have been developed for tourism purposes.

These issues will be considered in the context of the Landscape Character Areas, visual effects identified and possible cumulative influence of other possible infrastructure projects that are planned in the vicinity.

It should be noted that the VAC of the surrounding landscape is relatively high and is provided mainly by the gently undulating landform which generally limits possible overviews of the development area and by natural vegetation which has a major screening effect in a relatively flat landscape.

From the site visit, it was found that the ZTV analysis is an accurate indicator of where views of the development may be possible from. Possible views are significantly limited by the VAC of the landscape.

a) The proposed development could be visible from and impact negatively on tourist routes in the area

Nature of impact:

The proposed project will not be visible from either the N1 or the R525. It will, however be visible from both the unsurfaced roads that run through the affected property and adjacent to the railway to the north.

Currently, these views are largely screened by existing vegetation.

	Without mitigation	**With mitigation**
Extent	Local Roads Local **(2)**	Local Roads Local **(2)**
Duration	Local Roads Long term **(4)**	Local Roads Long term **(4)**
Magnitude	Local Roads High **(8)**	Local Roads Minor **(2)**
Probability	Local Roads Definite **(5)**	Local Roads Probable **(3)**
Significance	Local Roads High **(70)**	Local Roads Low **(24)**
Status	Local Roads **Negative**	Local Roads If sufficient forest is retained / augmented to screen the project from local roads it is unlikely that they will be considered as having a negative impact. **Negative / Neutral**

Reversibility	High	High
Irreplaceable loss	**No irreplaceable loss**	**No irreplaceable loss.**
Can impacts be mitigated?	**Yes**	

Mitigation / Management:

Planning:

- Plan to maintain the height of structures as low as possible;
- Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;
- Plan to maintain and augment a buffer of existing forest around the development sufficient to screen views from adjacent local roads.

Construction:

- Minimise disturbance and loss of existing vegetation;
- Undertake rehabilitation of disturbed areas;
- Undertake screen planting;

Operations:

- Monitor rehabilitated areas and implement remedial actions (monthly until establishment, thereafter at the middle and end of every growing season);
- Minimise disturbance and maintain existing vegetation as far as is possible both within and surrounding the development area; and

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site;
- Return all possible areas to their original state; and
- Monitor rehabilitated areas post-decommissioning and implement remedial actions.

Cumulative Impacts:

There is one other solar PV project within 30km (ABC Prieska). This other project is located within or close to an area that is cultivated.

The proposed project appears only likely to impact on local roads and with appropriate mitigation this will be negated.

It appears unlikely that ABC Prieska will have a significant impact on tourism routes.

The cumulative impact was therefore assessed as low and the cumulative contribution low.

Residual Risks:

The residual risk relates to loss of rural landscape being obvious on decommissioning of the proposed project. In order to minimise this impact, it is critical that existing natural landscape areas in and around the development are maintained and protected and that effective rehabilitation is undertaken during and after construction as well as on closure of the plant.

b) The proposed development could impact on tourist's views from trains

Nature of impact:

The proposed development is likely to be highly obvious from trains as they pass through the area. However because the railway is not likely to carry any significant number of tourists, the probability of impacts is relatively low.

	Without mitigation	**With mitigation**
Extent	Local **(2)**	Local **(2)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Moderate **(6)**	Low **(4)**
Probability	Improbable **(2)**	Improbable **(2)**
Significance	Low **(24)**	Low **(20)**
Status	**Neutral**	**Neutral**
Reversibility	High	High
Irreplaceable loss	**No irreplaceable loss.**	**No irreplaceable loss.**
Can impacts be mitigated?	**Yes**	

Mitigation / Management:

Planning:

- Plan to maintain the height of structures as low as possible;
- Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;
- Plan to maintain and augment a buffer of existing forest around the development sufficient to screen views from adjacent railway.

Construction:

- Minimise disturbance and loss of existing vegetation;
- Undertake rehabilitation of disturbed areas;
- Undertake screen planting;

Operations:

- Monitor rehabilitated areas and implement remedial actions (monthly until establishment, thereafter at the middle and end of every growing season);
- Minimise disturbance and maintain existing vegetation as far as is possible both within and surrounding the development area; and

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site;
- Return all possible areas to their original state; and
- Monitor rehabilitated areas post-decommissioning and implement remedial actions.

Cumulative Impacts:

There is one other solar PV project within 30km (ABC Prieska). This other project is also located close to the railway at a distance of approximately 12.5km to the south of the Mutsho projects. Whilst they could both be visible from the train, they will not be viewed at the same time.

The cumulative impact was therefore assessed as low and the cumulative contribution low

Residual Risks:

The residual risk relates to loss of rural landscape being obvious on decommissioning of the proposed project. In order to minimise this impact, it is critical that existing natural landscape areas in and around the development are maintained and protected and that effective rehabilitation is undertaken during and after construction as well as on closure of the plant.

c) Industrialisation of Views from Protected Areas

Nature of impact:

The assessment has indicated that the development will not be visible from protected areas. Therefore there will be no impact.

d) The proposed development could impact negatively on settlements

Nature of impact:

The proposed project will not be visible from Mopane which is the closest settlement. Therefore there will be no impact.

e) Industrialisation of Views from Homesteads and recreational / local tourism facilities

Nature of impact:

Homesteads and recreational / local tourism facilities are assessed together because both are point receptors and it is likely that some farms in the area have a secondary or primary tourism use.

Due to the high level of VAC of the landscape, the majority of properties that are indicated as being affected by the ZTV analysis and within the approximate limit of visibility of the various elements are unlikely to be affected.

The closest is likely to be Command Game Farm and Lodge the entrance of which is immediately adjacent and to the west of the proposed project site.

	Without mitigation	**With mitigation**
Extent	Local **(2)**	Local **(2)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Moderate **(7)**	Small **(0)**
Probability	Probable **(3)**	Very Improbable **(1)**
Significance	Medium **(39)**	Low **(6)**
Status	It is likely that the closest residents and business owners that are affected will see the development in a negative light. **Negative**	**Neutral**
Irreplaceable loss	**No irreplaceable loss**	**No irreplaceable loss**
Can impacts be mitigated?	**Yes**	

Mitigation / Management:

Planning:

- Plan to maintain the height of structures as low as possible;
- Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;
- Plan to maintain and augment a buffer of existing forest around the development sufficient to screen views from adjacent railway.

Construction:

- Minimise disturbance and loss of existing vegetation;
- Undertake rehabilitation of disturbed areas;
- Undertake screen planting;

Operations:

- Monitor rehabilitated areas and implement remedial actions (monthly until establishment, thereafter at the middle and end of every growing season);

- Minimise disturbance and maintain existing vegetation as far as is possible both within and surrounding the development area; and

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site;
- Return all possible areas to their original state; and
- Monitor rehabilitated areas post-decommissioning and implement remedial actions.

Cumulative Impacts:

No cumulative impact as affected homesteads will not be affected by other solar PV projects.

Residual Risks:

The residual risk relates to loss of rural landscape being obvious on decommissioning of the proposed project. In order to minimise this impact, it is critical that existing natural landscape areas in and around the development are maintained and protected and that effective rehabilitation is undertaken during and after construction as well as on closure of the plant.

f) Lighting impacts

Nature of impact:

The area is currently relatively dark at night with relatively low level light sources generally being located at each local homestead and at each house within the settlement of Mopane.

Lighting on the project is likely to include;

- Operational lighting will be required at buildings;
- Floodlighting could be required for key operational areas including the sub-station. This may be required to ensure that maintenance work can be undertaken during hours of darkness; and
- Security lighting is likely to be required. This may be high mast lighting or boundary lighting along the fence line.

The largest risk of nuisance is likely to be associated with flood lit areas, boundary security lighting and high mast lighting.

Receptors at greatest risk of impact includes the closest homesteads.

	Without mitigation	**With mitigation**
Extent	Site and immediate surroundings **(2)**	Site and immediate surroundings **(2)**

Duration	Long term **(4)**	Long term **(4)**
Magnitude	Low **(4)**	Minor to Small, **(1)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Medium **(30)**	Low **(14)**
Status	Night time lighting affecting homesteads particularly those involved with tourism is likely to be considered as a negative impact. **Negative**	If lights are visible but are at the same level as other homesteads then lighting is unlikely to be considered as a negative impact. **Neutral**
Reversibility	High	High
Irreplaceable loss	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	Yes	

Mitigation / Management:

High lighting levels can be mitigated by:

a) Minimising lighting of the facility as far as possible;
b) The use of sensors to ensure that when there is no one present, lighting automatically switches off;
c) Careful choice of external fittings to ensure that light is focused on relevant areas and does not spill into un-necessary areas; and
d) Shielding of all external lights.

Security / Maintenance lighting can be mitigated by:

e) The use of infra-red technology for security purposes;
f) Ensuring that maintenance is scheduled for daylight hours where possible;
g) Where maintenance may be required during the hours of darkness lighting should only be activated only for the areas required;
h) Ensure that all lighting is focused on the area of interest and that light spill is minimised; and
i) Using light shields to minimise light spill.

Cumulative Impact:

There are no other similar projects that are likely to contribute to cumulative lighting levels.

Residual Risks:

No residual risk has been identified.

g) Glare

Nature of impact:

Due to distance and the fact that the project is significantly higher, the N1 is highly unlikely to be affected by glare created by the proposed array.

It is possible that adjacent un-surfaced roads could be affected by glare. However, these roads are low speed and are not highly trafficked.

If a sufficient buffer of forest vegetation remains between the roads and the proposed array this will screen any potential glare

	Without mitigation	**With mitigation**
Extent	Site and immediate surroundings **(2)**	Site and immediate surroundings **(2)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Low **(4)**	Small, **(0)**
Probability	Improbable **(2)**	Highly Improbable **(1)**
Significance	Medium **(20)**	Low **(6)**
Status	**Negative**	**Neutral**
Reversibility	High	High
Irreplaceable loss	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	Yes	

Mitigation / Management:

Planning:

- Minimise disturbance of the surrounding landscape and maintain existing vegetation around the development;
- Plan to maintain and augment a buffer of existing forest around the development sufficient to screen views from adjacent railway.

Construction:

- Minimise disturbance and loss of existing vegetation;
- Undertake rehabilitation of disturbed areas;
- Undertake screen planting;

Operations:

- Monitor rehabilitated areas and implement remedial actions (monthly until establishment, thereafter at the middle and end of every growing season);
- Minimise disturbance and maintain existing vegetation as far as is possible both within and surrounding the development area; and
- Trackers can be programmed to prevent reflection towards affected sections of roads.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site;
- Return all possible areas to their original state; and

j) Monitor rehabilitated areas post-decommissioning and implement remedial actions.

Cumulative Impact:

There are no other similar projects that are likely to contribute to cumulative lighting levels.

Residual Risks:

No residual risk has been identified.

8 IMPACT STATEMENT

8.1 GENERAL

The assessment indicates that the landscape surrounding the proposed project is largely natural in character. Whist there is an existing mine approximately 6km to the north of the proposed project, its visual impacts are limited by topography and existing natural vegetation which provides a large degree of screening.

The proposed project will add another large-scale industrial element to this relatively natural landscape. Whilst the surrounding landscape may have a large degree of Visual Absorption Capacity (VAC) which is likely to result in the proposed project being largely screened from all but the closest areas.

8.2 LANDSCAPE CHARACTER AND IMPORTANCE

The analysis highlights that the landscape is comprised of three main character types:

8.2.1 Undulating Plains Landscape Character Area.

The importance of this LCA lies both with its agricultural and tourism role. It is both important for its productivity as well as its natural aesthetics which support ecotourism activities.

Due to topography and the natural vegetation cover which results in a high level of Visual Absorption Capacity, it is likely that there is capacity for limited development to occur without compromising these natural aesthetics as experienced by the majority of stakeholders.

8.2.2 Soutpansberg Landscape Character Area

This is undoubtedly the most dramatic LCA. The contrast between the wide undulating plains to the north and the rugged mountains provides a dramatic and memorable scene that underpins and provides potential for tourism related activities in the region. It is also critical to regional landscape character.

8.2.3 Valley Ridgelines Landscape Character Area

This LCA provides high points within the undulating plain. It punctuates the area with points of focus within what would otherwise be a relatively featureless landform. It also breaks up and provides separation and identity to the surrounding LCA. The natural aesthetics of this area are important particularly for eco-tourism activities.

From a visual perspective, the most important LCAs are therefore the Soutpansberg and the lower Valley Ridgelines. These are the two characteristics that provide the regional and local landscape with identity. Any development that reduces or changes the existing natural ruggedness of these LCAs is likely to have broader negative visual implications.

The contrast between the Undulating Plains and the rugged upland areas is also critical, however, due to the extent of the plains and the degree of VAC that is likely to be provided by its natural vegetative cover, it is likely that a degree of development can occur before the landscape change as experienced by most stakeholders undermines the regional and local character.

8.3 VISUAL RECEPTORS

Area Receptors include:

- Settlement Areas, particularly Mopane which is the closest settlement to the proposed development.

Linear Receptors generally include routes through the area. Because there is such a focus on eco-tourism activities, both major and minor routes are important. It might be argued that minor un-surfaced roads are more important than major surfaced roads as they are likely to provide access to the eco-tourism attractions. Major routes include:

- The N1 which is the main regional arterial route that carries traffic from the Zimbabwe border crossing at Beitbridge and Gauteng. At its closest the N1 runs approximately 6km from the proposed site;
- Regional roads including the R525 which is the closest regional road approximately 10km from the proposed site; and
- Local Roads that are largely un-surfaced. A number of local roads run in close proximity to the proposed site area including one that runs through the property that makes up the site area.

Point Receptors which include;

- Individual buildings that are likely to be mainly rural homesteads and farms. It is likely that a proportion of these include tourist lodges and accommodation; and
- Small groups of dwelling that are likely to include small settlement areas and larger farm establishments which may also include tourist bush camps.

8.4 AREAS AND NATURE OF VISUAL IMPACT

Possible visual receptors that have been identified include:

a) The proposed development could negatively impact on the character of the Undulating Plain LCA which is largely a natural landscape which may be an important tourism resource;
b) The proposed development could be visible from tourist routes in the area. These include the N1, the R525 and local roads that may be used for access to lodges and private reserves / game farms that might be utilised for tourism;
c) The proposed development could impact on views from trains as they pass close to the proposed development. A proportion of these trains are likely to carry passengers although it is understood that major tourism related trains do not utilise this route;
d) The proposed development could impact negatively on the formally protected areas;
e) The proposed development could impact negatively on settlement. However, it is likely that distance and local vegetation will mitigate these impacts;
f) The proposed development could impact negatively on local point receptors. These are likely to be comprised largely of homesteads but it is also highly likely that a number of these have been developed for tourism purposes;
g) Lighting impacts: and
h) Glare impacts.

a) Industrialisation of the surrounding Rural Landscape

The contrast between the undulating natural plain and the Soutpansberg range approximately 30km to the south of the proposed development has been highlighted as a characteristic that provides an important regional identity. The distance between the proposed development and the Soutpansberg will be sufficient buffer to ensure that this regional importance is not placed at risk.

This main impact relates to industrialisation of the rural landscape surrounding the proposed site. This will occur if views of the proposed solar project and associated infrastructure become visible and obvious from areas that are currently natural in character.

The local impact was assessed as a medium negative impact without and a low neutral impact with mitigation.

b) **The proposed development could be visible from and impact negatively on tourist routes in the area**

The N1 and the R525 are the main tourist routes that run through the area, the ZTV analysis indicates that these routes will not be affected.

A number of local, un-surfaced roads run through the area close to the project. These are also important for local tourism activities.

Views of the proposed development from the majority of these roads are likely to be limited largely due to existing natural vegetation. Two roads (Mopane / Waterpoort and Vrienden / N1) run adjacent to and through the proposed site respectively. The proposed project could be visible from both roads.

This possible impact on local roads was assessed as a high negative impact without mitigation and a low negative / neutral impact with mitigation.

c) The proposed development could impact on tourist's views from trains

The proposed development is likely to be highly obvious from trains as they pass through the area. However, because the railway is not likely to carry any significant number of tourists, the probability of impacts is relatively low.

The impact with and without mitigation was assessed as a low, neutral impact.

d) **Industrialisation of Views from Protected Areas**

The assessment has indicated that the development will not be visible from protected areas and so there will be no visual impact.

e) The proposed development could impact negatively on settlements

The ZTV analysis indicates that the only settlement that could be affected is Mopane. However, existing vegetation effectively screens the project from this area.

The impact was assessed as a low neutral impact both with and without mitigation.

f) Industrialisation of Views from Homesteads and recreational / local tourism facilities

Due to the high level of VAC of the landscape, the majority of properties that are indicated as being affected by the ZTV analysis and within the approximate limit of visibility of the various elements are unlikely to be affected.

The closest is likely to be Command Game Farm and Lodge which is immediately adjacent to the project property. There is also a homestead close to the western edge of the proposed project that could be affected. The assessment indicates that without mitigation, the impact on this and other adjacent properties could be negative with medium significance. With mitigation however, the impact is likely to be neutral with low significance.

g) Lighting Impacts

The area is currently relatively dark at night with relatively low level light sources generally being located at each local homestead, at each house within the settlement of Mopane.

Lighting on the project is likely to include;

- Operational lighting will be required at buildings;
- Floodlighting is likely to be required for key operational areas including the sub-station. This may be required to ensure that maintenance work can be undertaken during hours of darkness; and
- Security lighting is likely to be required. This may be high mast lighting or boundary lighting along the fence line.

The largest risk of nuisance is likely to be associated with flood lit areas, boundary security lighting and high mast lighting.

Receptors at greatest risk of impact include The closest homesteads.

The impact was assessed as a medium negative impact without mitigation and a low neutral impact with mitigation.

h) Glare Impacts

Glare is only likely to affect the immediately adjacent unsurfaced local roads.

The possible impact was assessed as a medium negative impact without mitigation and a low neutral impact with mitigation.

8.5 CUMULATIVE IMPACT

There is only one other authorised solar PV project within 30km of the proposed Mutsho projects. The potential for cumulative impacts associated with solar projects is therefore low.

8.6 MITIGATION POTENTIAL

Mitigation largely revolves around maintaining and augmenting existing natural forest to screen views of the development from adjacent homesteads and roads as well as the settlement of Mopane. Keeping the heights of structures as low as possible will also help in this regard.

Ensuring the longevity of this mitigation measure through appropriate protection and management is also important.

8.7 CONCLUSION

The assessment has confirmed that there are no major landscape and visual impacts that will preclude development.

However there are a number of localised impacts that could be experienced by residents of a small number of homesteads and users of local unsurfaced roads. If these are addressed through the mitigation measures indicated, there is no reason from a landscape and visual impact perspective why this project should not be authorised.

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APPENDIX I

ASSESSOR'S CURRICULUM VITAE

ENVIRONMENTAL PLANNING AND DESIGN

Name	JONATHAN MARSHALL
Nationality	British
Year of Birth	1956
Specialisation	Landscape Architecture / Landscape & Visual Impact Assessment / Environmental Planning / Environmental Impact Assessment.
Qualifications	
Education	Diploma in Landscape Architecture, Gloucestershire College of Art and Design, UK (1979) Environmental Law, University of KZN (1997)
Professional	Registered Professional Landscape Architect (SACLAP) Chartered Member of the Landscape Institute (UK)
Languages	English- Speaking - Excellent - Reading - Excellent - Writing - Excellent
Contact Details	Post: 13 Askew Grove Glenwood Durban 4001 Cell: +27 83 7032995

General

Jon qualified as a Landscape Architect (Dip LA) at Cheltenham (UK) in 1979. He has been a chartered member of the Landscape Institute UK since 1986. He is also a Registered Landscape Architect and has had extensive experience of Environmental Assessment within South Africa.

During the early part of his career (1981 - 1990) He worked with Clouston (now RPS) in Hong Kong and Australia. During this period he was called on to undertake visual impact assessment (VIA) input to numerous environmental assessment processes for major infrastructure projects. This work was generally based on photography with line drawing superimposed to illustrate the extent of development visible.

He has worked in the United Kingdom (1990 - 1995) for major supermarket chains including Sainsbury's and prepared CAD based visual impact assessments for public enquiries for new store development. He also prepared the VIA input to the environmental statement for the Cardiff Bay Barrage for consideration by the UK Parliament in the passing of the Barrage Act (1993).

His more recent LVIA work (1995 to present) includes a combination of CAD and GIS based work for a new international airport to the north of Durban, new heavy industrial operations, overhead electrical transmission lines, mining operations in West Africa and numerous commercial and residential developments.

VIA work undertaken during the last twelve months includes wind energy projects, numerous solar plant projects and electrical infrastructure.

Select List of Landscape & Visual Impact Assessment Projects

- **Coega Power Ship** – Landscape and Visual Impact Assessment for the proposed Coega Power Ship project in the Eastern Cape Province.
- **Saldanha Power Ship** - Landscape and Visual Impact Assessment for the proposed Coega Power Ship project in the Western Cape Province.
- **Modderfontein Wind Energy Facility** - Landscape and Visual Impact Assessment for a proposed amendment to the layout and wind turbine specification of a previously authorised project near Beaufort West.
- **Western Cape Wind Energy Facility** – Due diligence assessment for a proposed wind energy facility near Swellendam in the Western Cape Province.
- **Hyperion Thermal Generation Facility** - Landscape and Visual Impact Assessment for a proposed gas powered power generation plant near Kathu in the Northern Cape Province.
- **Beachfront House on ERF 766 Scarborough -** Landscape and Visual Impact Assessment for a proposed development of beachfront house on the edge of the Table Mountain National Park in Scarbourough, Western Cape Province.
- **Springs Special Economic Zone -** Landscape and Visual Impact Assessment for the proposed Springs SEZ in the Gauteng Province.
- **Makapanstad Agri- Hub –** Landscape and Visual Impact Assessment for proposed Agri-Hub development at Makapanstad in the North West Province for the Department of Rural Development and Land Reform.
- **Madikwe Sky Bubble -** Landscape and Visual Impact Assessment for proposed development of up-market accommodation at the Molori concession within the Madikwe Game Reserve.
- **Hartebeest Wind Energy Facility** – Landscape and Visual Impact Assessment Addendum Report for the proposed upgrading of turbine specifications for an authorised WEF near Mo0rreesburg in the Western Cape Province for a private client.
- **Selati Railway Bridge** - Landscape and Visual Impact Assessment for proposed development of up-market accommodation on a railway bridge at Skukuza in the Kruger Park.
- **Kangala Mine Extension -** Landscape and Visual Impact Assessment for a proposed extension to the Kangala Mine in Mpumalanga for Universal Coal.
- **Khunab Solar Developments** – Landscape and Visual Impact Assessment for four proposed solar PV projects near Upington in the Northern Cape Province for a private client.
- **Sirius Solar Developments** – Landscape and Visual Impact Assessment for four proposed solar PV projects near Upington in the Northern Cape Province for Sola Future Energy.
- **Aggeneys Solar Developments** – Landscape and Visual Impact Assessment for two proposed solar PV projects near Aggeneys in the Northern Cape Province for a private client.
- **Hyperion Solar Developments** – Landscape and Visual Impact Assessment for four proposed solar PV projects near Kathu in the Northern Cape Province for Building Energy South Africa.
- **Eskom Combined Cycle Power Plant** - Landscape and Visual Impact Assessment for proposed gas power plant in Richards Bay, KwaZulu Natal Province.
- **N2 Wild Coast Toll Road, Mineral Sources and Auxiliary Roads – L**VIA for the Pondoland Section of this project for the South African National Roads Agency.
- **Mpushini Park Ashburton –** LVIA for a proposed amendment to an authorised development plan which included residential, office park and light industrial uses to logistics and warehousing.
- **Moedeng PV Solar Project -** LVIA for a solar project near Vryburg in the North West Province for a private client.
- **Establishment of Upmarket Tourism Accommodation on the Selati Bridge, Kruger National Park**

– Assessment of visual implications of providing tourism accommodation in 12 railway carriages on an existing railway bridge at the Skukuza Rest Camp in the Kruger Park.

- **Jozini TX Transmission Tower** – Assessment of visual implications of a proposed MTN transmission tower on the Lebombo ridgeline overlooking the Pongolapoort Nature reserve and dam.
- **Bhangazi Lake Development** – LVIA for a proposed tourism development within the iSimangaliso Wetlend Park World Heritage Site.
- **Palesa Power Station** - LVIA for a new 600MW power station near Kwamhlanga in Mpumalanga for a private client.
- **Heuningklip PV Solar Project** – LVIA for a solar project in the Western Cape Province for a private client.
- **Kruispad PV Solar Project** – LVIA for a solar project in the Western Cape Province for a private client.
- **Doornfontein PV Solar Project** – LVIA for a solar project in the Western Cape Province for a private client.
- **Olifantshoek Power Line and Substation** – LVIA for a new 10MVA 132/11kV substation and 31km powerline, Northern Cape Province, for Eskom.
- **Noupoort Concentrating Solar Plants -** Scoping and LVIAs for two proposed parabolic trough projects.
- **Drakensberg Cable Car –** Preliminary LVIA and draft terms of reference as part of the feasibility study.
- **Paulputs Concentrating Solar Plant (tower technology)** – LVIA for a new CSP project near Pofadder in the Northern Cape.
- **Ilanga Concentrating Solar Plants 1, 2, 3, 4 & 5** – Scoping and LVIAs for the proposed extension of five authorised CSP projects including parabolic trough and tower technology within the Karoshoek Solar Valley near Upington in the Northern Cape.
- **Ilanga Concentrating Solar Plants 1, 2, 3, 4 & 5 Shared Infrastructure** –LVIA for the necessary shared infrastructure including power lines, substation, water pipeline and roads for these projects.
- **Ilanga Concentrating Solar Plants 7, 8 & 9** - Scoping and LVIAs for three new CSP projects including parabolic trough and tower technology within the Karoshoek Solar Valley near Upington in the Northern Cape.
- **Sol Invictus Solar Plants** - Scoping and LVIAs for three new Solar PV projects near Pofadder in the Northern Cape.
- **Gunstfontein Wind Energy Facility** – Scoping and LVIA for a proposed WEF near Sutherland in the Northern Cape.
- **Moorreeesburg Wind Energy Facility** – LVIA for a proposed WEF near Moorreeesburg in the Western Cape.
- **Semonkong Wind Energy Facility** - LVIA for a proposed WEF near Semonkong in Southern Lesotho.
- **Great Karoo Wind Energy Facility** – Addendum report to the Visual Impact Assessment Report for amendment to this authorised WEF that is located near Sutherland in the Northern Cape. Proposed amendments included layout as well as rotor diameter.
- **Perdekraal East Power Line** – LVIA for a proposed power line to evacuate power from a wind energy facility near Sutherland in the Northern Cape.
- **Tshivhaso Power Station** – Scoping and LVIA for a proposed new power station near Lephalale in Limpopo Province.
- **Saldanha Eskom Strengthening** – Scoping and LVIA for the upgrading of strategic Eskom infrastructure near Saldanha in the Western Cape.
- **Eskom Lethabo PV Installation** - Scoping and LVIA for the development of a solar PV plant within Eskom's Lethabo Power Station in the Free State.

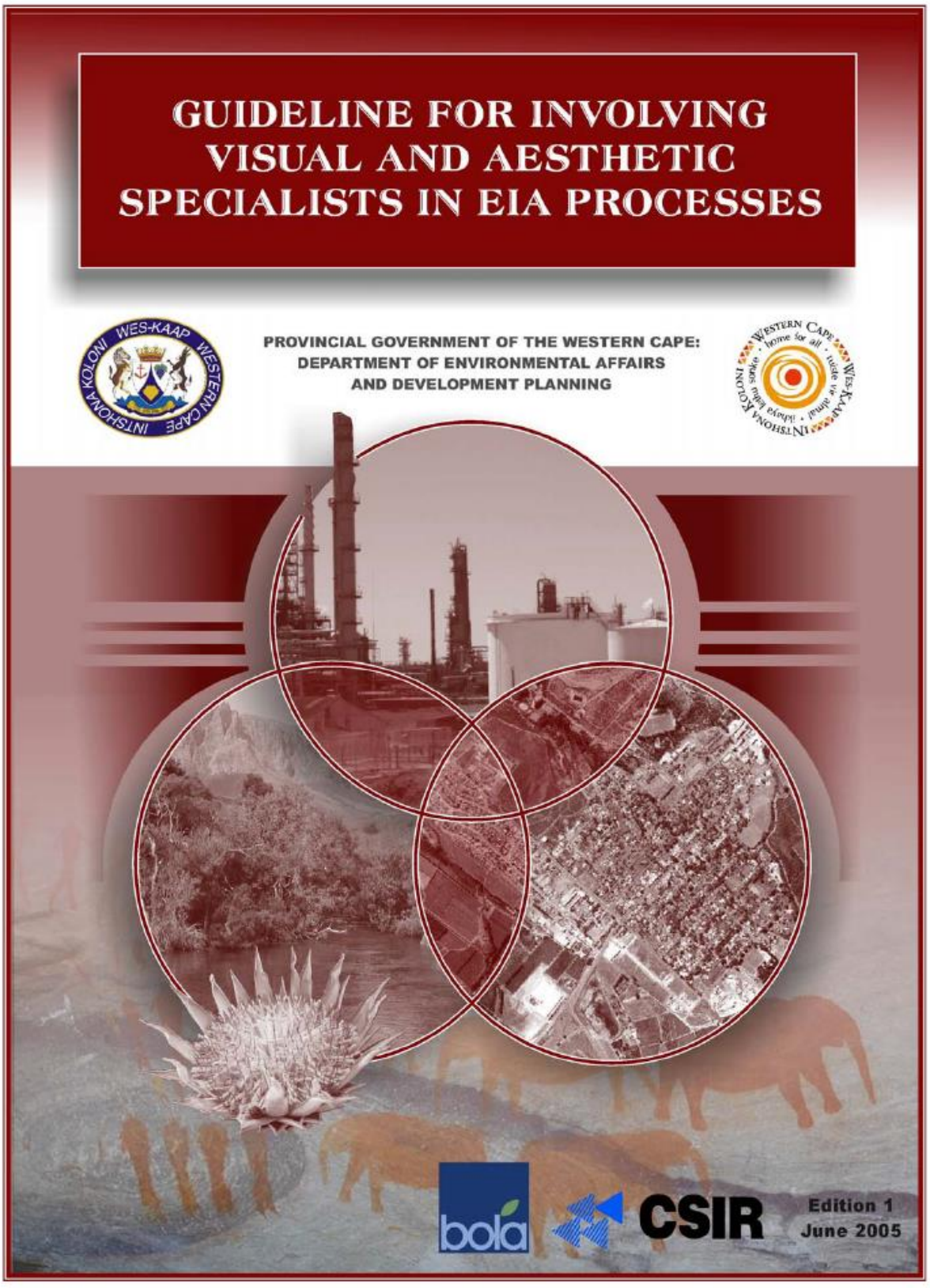
- **Eskom Tuthuka PV Installation** - Scoping and LVIA for the development of a solar PV plant within Eskom's Thutuka Power Station in Mpumalanga.
- **Eskom Majuba PV Installation** - Scoping and LVIA for the development of a solar PV plant within Eskom's Majuba Power Station in Mpumalanga.
- **Golden Valley Power Line** - LVIA for a proposed power line to evacuate power from a wind energy facility near Cookhouse in the Eastern Cape.
- **Mpophomeni Shopping Centre** – LVIA for a proposed new shopping centre close to the southern shore of Midmar Dam in KwaZulu Natal.
- **Rheeboksfontein Power Line** - Addendum report to the Visual Impact Assessment Report for amendment to this authorised power line alignment located near Darling in the Western Cape.
- **Woodhouse Solar Plants** – Scoping and LVIA for two proposed solar PV projects near Vryburg in the North West Province.
- **AngloGold Ashanti, Dokyiwa (Ghana)** – LVIA for proposed new Tailings Storage Facility at a mine site working with SGS as part of their EIA team.
- **Gateway Shopping Centre Extension (Durban)** – LVIA for a proposed shopping centre extension in Umhlanga, Durban.
- **Kouroussa Gold Mine (Guinea)** – LVIA for a proposed new mine in Guinea working with SGS as part of their EIA team.
- **Mampon Gold Mine (Ghana)** - LVIA for a proposed new mine in Ghana working with SGS as part of their EIA team.
- **Telkom Towers** – LVIAs for numerous Telkom masts in KwaZulu Natal.
- **Eskom Isundu Substation** – LVIA for a proposed major new Eskom substation near Pietermaritzburg in KwaZulu Natal.
- **Eskom St Faiths Power Line and Substation** – LVIA for a major new substation and associated power lines near Port Shepstone in KwaZulu Natal.
- **Eskom Ficksburg Power Line** – LVIA for a proposed new power line between Ficksburg and Cocolan in the Free State.
- **Eskom Matubatuba to St Lucia Power Line** – LVIA for a proposed new power line between Mtubatuba and St Lucia in KwaZulu Natal.
- **Dube Trade Port, Durban International Airport** – Landscape & Visual Impact Assessment.
- **Sibaya Precinct Plan** – LVIA as part of Environmental Impact Assessment for a major new development area to the north of Durban.
- **Umdloti Housing** – LVIA as part of Environmental Impact Assessment for a residential development beside the Umdloti Lagoon to the north of Durban.
- **Tata Steel Ferrochrome Smelter** - LVIA of proposed new Ferrochrome Smelter in Richards Bay as part of EIA undertaken by the CSIR.
- **Durban Solid Waste Large Landfill Sites –** LVIAs of proposed development sites to the North and South of the Durban Metropolitan Area. The project utilised 3d computer visualisation techniques.
- **Hillside Aluminium Smelter, Richards Bay -** LVIA of proposed extension of the existing smelter. The project utilised 3d computer visualisation techniques.
- **Estuaries of KwaZulu Natal Phase 1 –** Visual character assessment and GIS mapping as part of a review of the condition and development capacity of eight estuary landscapes for the Town and Regional Planning Commission. The project was extended to include all estuaries in KwaZulu Natal.
- **Signage Assessments** – Numerous impact assessments for proposed signage developments for Blast Media.

- **Signage Strategy** – Preparation of an environmental strategy report for a national advertising campaign on National Roads for Visual Image Placements.
- **Zeekoegatt, Durban** - EDP acted as advisor to the Province of KwaZulu Natal in an appeal brought about by a developer to extend a light industrial development within a 60 metre building line from the National N3 Highway.
- **La Lucia Mall Extension** - LVIA using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed extension to shopping mall for public consultation exercise.
- **Redhill Industrial Development** - LVIA assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed new industrial area for public consultation exercise.
- **Avondale Reservoir** - LVIA using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed hilltop reservoir as part of Environmental Impact Assessment for Umgeni Water.
- **Hammersdale Reservoir** - LVIA using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed hilltop reservoir as part of Environmental Impact Assessment for Umgeni Water.
- **Southgate Industrial Park, Durban** - LVIA and Landscape Design for AECI.
- **Sainsbury's Bryn Rhos** - Computer Aided Landscape & Visual Impact Assessment/ Planning Application for the development of a new store within the Green Wedge North of Swansea.
- **Ynyston Farm Access** - Computer Aided Landscape & Impact Assessment of visual intrusion of access road to proposed development of Cardiff for the Land Authority for Wales.
- **Cardiff Bay Barrage** – Preparation of the Visual Impact Statement for inclusion in the Impact Statement for debate by parliament (UK) prior to the passing of the Cardiff Bay Barrage Bill.
- **A470, Cefn Coed to Pentrebach** - Preparation of landscape frameworks for the assessment of the impact of the proposed alignment on the landscape for The Welsh Office.
- **Sparkford to Illchester Bye Pass** - The preparation of the landscape framework and the draft landscape plan for the Department of Transport.
- **Green Island Reclamation Study** - Visual Impact Assessment of building massing, Urban Design Guidelines and Masterplanning for a New Town extension to Hong Kong Island.
- **Route 3** - Visual Impact Assessment for alternative road alignments between Hong Kong Island and the Chinese Border.
- **China Border Link** - Visual Impact Assessment and initial Landscape Design for a new border crossing at Lok Ma Chau.
- **Route 81, Aberdeen Tunnel to Stanley** - Visual Impact Assessment for alternative highway alignments on the South side of Hong Kong Island.

APPENDIX II

GUIDELINES FOR INVOLVING VISUAL AND AESTHETIC SPECIALISTS IN EIA PROCESSES

(Preface, Summary and Contents for full document go to the Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning web site, http://eadp.westerncape.gov.za/your-resource-library/policies-guidelines)


GUIDELINE FOR INVOLVING VISUAL AND AESTHETIC SPECIALISTS IN EIA PROCESSES
PROVINCIAL GOVERNMENT OF THE WESTERN CAPE:
DEPARTMENT OF ENVIRONMENTAL AFFAIRS
AND DEVELOPMENT PLANNING
bola
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June 2005

GUIDELINE FOR INVOLVING VISUAL AND AESTHETIC SPECIALISTS IN EIA PROCESSES

Edition 1

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Stakeholders engaged in the guideline development process:

These guidelines were developed through a consultative process and have benefited from the inputs and comments provided by a wide range of individuals and organizations actively working to improve EIA practice. Thanks are due to all who took the time to engage in the guideline development process.

In particular, thanks are due to Jan Glazewski (University of Cape Town), Keith Wiseman (City of Cape Town), Paul Britton (SANPARKS), Graham Young (University of Pretoria), Lisa Parkes (Ninham Shand) and Paul Claassen (Environomics) for providing useful information and in-depth comments.

Finalisation of report figures and formatting:

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PREFACE

The purpose of an Environmental Impact Assessment (EIA) is to provide decision-makers (be they government authorities, the project proponent or financial institutions) with adequate and appropriate information about the potential positive and negative impacts of a proposed development and associated management actions in order to make an informed decision whether or not to approve, proceed with or finance the development.

For EIA processes to retain their role and usefulness in supporting decision-making, the involvement of specialists in EIA needs to be improved in order to:

- Add greater value to project planning and design;
- Adequately evaluate reasonable alternatives;
- Accurately predict and assess potential project benefits and negative impacts;
- Provide practical recommendations for avoiding or adequately managing negative impacts and enhancing benefits;
- Supply enough relevant information at the most appropriate stage of the EIA process to address adequately the key issues and concerns, and effectively inform decision-making in support of sustainable development.

It is important to note that not all EIA processes require specialist input; broadly speaking, specialist involvement is needed when the environment could be significantly affected by the proposed activity, where that environment is valued by or important to society, and/or where there is insufficient information to determine whether or not unavoidable impacts would be significant.

The purpose of this series of guidelines is to improve the efficiency, effectiveness and quality of specialist involvement in EIA processes. The guidelines aim to improve the capacity of roleplayers to anticipate, request, plan, review and discuss specialist involvement in EIA processes. Specifically, they aim to improve the capacity of EIA practitioners to draft appropriate terms of reference for specialist input and assist all roleplayers in evaluating whether or not specialist input to the EIA process is appropriate for the type of development and environmental context. Furthermore, they aim to ensure that specialist inputs support the development of effective, practical Environmental Management Plans where projects are authorised to proceed (refer to *Guideline for Environmental Management Plans*).

The guidelines draw on best practice in EIA in general, and within specialist fields of expertise in particular, to address the following issues related to the timing, scope and quality of specialist input. The terms "specialist involvement" and "input" have been used in preference to "specialist assessment" and "studies" to indicate that the scope of specialists' contribution (if required) depends on the nature of the project, the environmental context and the amount of available information and does not always entail detailed studies or assessment of impacts.

The guidelines draw on best practice in EIA in general, and within specialist fields of expertise in particular, to address the following issues related to the timing, scope and quality of specialist input. The terms "specialist involvement" and "input" have been used in preference to "specialist

assessment" and "studies" to indicate that the scope of specialists' contribution depends on the nature of the project, the environmental context and the amount of available information.

	ISSUES
TIMING	▪ When should specialists be involved in the EIA process; i.e. at what stage in the EIA process should specialists be involved (if at all) and what triggers the need for their input?
SCOPE	▪ Which aspects must be addressed through specialist involvement; i.e. what is the purpose and scope of specialist involvement? ▪ What are appropriate approaches that specialists can employ? ▪ What qualifications, skills and experience are required?
QUALITY	▪ What triggers the review of specialist studies by different roleplayers? ▪ What are the review criteria against which specialist inputs can be evaluated to ensure that they meet minimum requirements, are reasonable, objective and professionally sound?

The following guidelines form part of this first series of guidelines for involving specialists in EIA processes:

- Guideline for determining the scope of specialist involvement in EIA processes
- Guideline for the review of specialist input in EIA processes
- Guideline for involving biodiversity specialists in EIA processes
- Guideline for involving hydrogeologists in EIA processes
- Guideline for involving visual and aesthetic specialists in EIA processes
- Guideline for involving heritage specialists in EIA processes
- Guideline for involving economists in EIA processes

The *Guideline for determining the scope of specialist involvement in EIA processes* and the *Guideline for the review of specialist input in EIA processes* provide generic guidance applicable to any specialist input to the EIA process and clarify the roles and responsibilities of the different roleplayers involved in the scoping and review of specialist input. It is recommended that these two guidelines are read first to introduce the generic concepts underpinning the guidelines which are focused on specific specialist disciplines.

Who is the target audience for these guidelines?

The guidelines are directed at authorities, EIA practitioners, specialists, proponents, financial institutions and other interested and affected parties involved in EIA processes. Although the guidelines have been developed with specific reference to the Western Cape province of South Africa, their core elements are more widely applicable.

What type of environmental assessment processes and developments are these guidelines applicable to?

The guidelines have been developed to support project-level EIA processes regardless of whether they are used during the early project planning phase to inform planning and design decisions (i.e. during pre-application planning) or as part of a legally defined EIA process to obtain statutory approval for a proposed project (i.e. during screening, scoping and/or impact assessment). Where specialist input may be required the guidelines promote early, focused and appropriate involvement of specialists in EIA processes in order to encourage proactive consideration of potentially significant impacts, so that negative impacts may be avoided or

effectively managed and benefits enhanced through due consideration of alternatives and changes to the project.

The guidelines aim to be applicable to a range of types and scales of development, as well as different biophysical, social, economic and governance contexts.

What will these guidelines not do?

In order to retain their relevance in the context of changing legislation, the guidelines promote the principles of EIA best practice without being tied to specific legislated national or provincial EIA terms and requirements. They therefore do not clarify the specific administrative, procedural or reporting requirements and timeframes for applications to obtain statutory approval. They should, therefore, be read in conjunction with the applicable legislation, regulations and procedural guidelines to ensure that mandatory requirements are met.

It is widely recognized that no amount of theoretical information on how best to plan and coordinate specialist inputs, or to provide or review specialist input, can replace the value of practical experience of coordinating, being responsible for and/or reviewing specialist inputs. Only such experience can develop sound judgment on such issues as the level of detail needed or expected from specialists to inform decision-makers adequately. For this reason, the guidelines should not be viewed as prescriptive and inflexible documents. Their intention is to provide best practice guidance to improve the quality of specialist input.

Furthermore, the guidelines do not intend to create experts out of non-specialists. Although the guidelines outline broad approaches that are available to the specialist discipline (e.g. field survey, desktop review, consultation, modeling), specific methods (e.g. the type of model or sampling technique to be used) cannot be prescribed. The guidelines should therefore not be used indiscriminately without due consideration of the particular context and circumstances within which an EIA is undertaken, as this influences both the approach and the methods available and used by specialists.

How are these guidelines structured?

The specialist guidelines have been structured to make them user-friendly. They are divided into six parts, as follows:

- **Part A**: Background;
- **Part B**: Triggers and key issues potentially requiring specialist input;
- **Part C**: Planning and coordination of specialist inputs (drawing up terms of reference);
- **Part D**: Providing specialist input;
- **Part E**: Review of specialist input; and
- **Part F**: References.

Part A provides grounding in the specialist subject matter for all users. It is expected that authorities and peer reviewers will make most use of Parts B and E; EIA practitioners and project proponents Parts B, C and E; specialists Part C and D; and other stakeholders Parts B, D and E. Part F gives useful sources of information for those who wish to explore the specialist topic.

SUMMARY

This guideline document, which deals with specialist visual input into the EIA process, is organised into a sequence of interleading sections. These follow a logical order covering the following:

- the background and context for specialist visual input;
- the triggers and issues that determine the need for visual input;
- the type of skills and scope of visual inputs required in the EIA process;
- the methodology, along with information and steps required for visual input;
- finally, the review or evaluation of the visual assessment process.

Part A is concerned with defining the visual and aesthetic component of the environment, and with principles and concepts relating to the visual assessment process. The importance of the process being logical, holistic, transparent and consistent is stressed in order for the input to be useful and credible.

The legal and planning context within which visual assessments take place indicate that there are already a number of laws and bylaws that protect visual and scenic resources. These resources within the Western Cape context have importance for the economy of the region, along with the proclaimed World Heritage Sites in the Province.

The role and timing of specialist visual inputs into the EIA process are outlined, with the emphasis being on timely, and on appropriate level of input, from the early planning stage of a project, through to detailed mitigation measures and management controls at the implementation stage.

Part B deals with typical factors that trigger the need for specialist visual input to a particular project. These factors typically relate to:

(a) the nature of the receiving environment, in particular its visual sensitivity or protection status;
(b) the nature of the project, in particular the scale or intensity of the project, which would result in change to the landscape or townscape.

The correlation between these two aspects are shown in a table, in order to determine the varying levels of visual impact that can be expected, i.e. from little or no impact, to very high visual impact potential.

Part C deals with the choice of an appropriate visual specialist, and the preparation of the terms of reference (TOR) for the visual input. Three types of visual assessment are put forward, each requiring different expertise, namely:

Type A: assessments involving large areas of natural or rural landscape;
Type B: assessments involving local areas of mainly built environment;
Type C: assessments involving smaller scale sites with buildings, or groups of buildings.

The scope of the visual input would in summary relate to the following:

- the issues raised during the scoping process;
- the time and space boundaries, i.e. the extent or zone of visual influence;

- the types of development alternatives that are to be considered;
- the variables and scenarios that could affect the visual assessment;
- the inclusion of direct, indirect and cumulative effects.

Approaches to the visual input relate to the level of potential impact and range from minimal specialist input, to a full visual impact assessment (VIA). A list of the typical components of a visual assessment is given, and the integration with other studies forming part of the EIA process is discussed.

Part D provides guidance for specialist visual input, and on the information required by specialists. Notes on predicting potential visual impacts are given, along with suggested criteria for describing and rating visual impacts. The assessment of the overall significance of impacts, as well as thresholds of significance are discussed.

Further aspects that need to be considered by visual specialists in EIA processes include:

- affected parties who stand to benefit or lose,
- risks and uncertainties related to the project,
- assumptions that have been made, and their justification,
- levels of confidence in providing the visual input or assessment,
- management actions that can be employed to avoid or mitigate adverse effects and enhance benefits, and
- the best practicable environental option from the perspective of the visual issues and impacts.

Finally, pointers for the effective communication of the findings are given.

Part E lists specific evaluation criteria for reviewing visual input by a specialist, where this becomes necessary. Further guidance on this is given in the document on *Guideline for the review of specialist input in EIA processes.*

CONTENTS

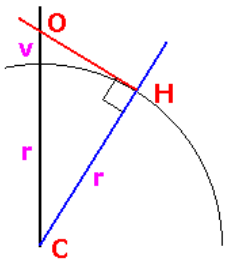
APPENDIX III

FORMULA FOR DERIVING THE APPROXIMATE VISUAL HORIZON

The Mathematics behind this Calculation

This calculation should be taken as a guide only as it assumes the earth is a perfect ball 6378137 metres radius. It also assumes the horizon you are looking at is at sea level. A triangle is formed with the centre of the earth (C) as one point, the horizon point (H) is a right angle and the observer (O) the third corner. Using Pythagoras's theorem we can calculate the distance from the observer to the horizon (OH) knowing CH is the earth's radius (r) and CO is the earth's radius (r) plus observer's height (v) above sea level.

Sitting in a hotel room 10m above sea level a boat on the horizon will be 11.3km away. The reverse is also true, whilst rowing across the Atlantic, the very top of a mountain range 400m high could be seen on your horizon at a distance of 71.4 km assuming the air was clear enough.



APPENDIX IV

CUMULATIVE IMPACT ASSESSMENT

CUMULATIVE IMPACTS OF MUTSHO PROJECTS AND OTHER EXISTING / PROPOSED RENEWABLE ENERGY PROJECTS

1) General cumulative change the in the character and sense of place of the landscape setting (Landscape Change).

Nature:
There is one other renewable energy / solar PV project within 30km (ABC Prieska). This other project is located within or close to an area that is cultivated.

The Mutsho projects are located within an area of natural forest that will be cleared. Whilst the ABC Prieska site has not been visited, it seems possible that it will not result in removal of forest.

The proposed project appears likely to be the only one that will result in change of a natural landscape that is relatively typical in the region.

The cumulative impact was therefore assessed as low and the cumulative contribution low.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Site and immediate surroundings, **(2)**	Site and immediate surroundings, **(2)**
Duration	Long term, **(4)**	Long term, **(4)**
Magnitude	Small **(0)**	Small **(0)**
Probability	Improbable, **(2)**	Improbable, **(2)**
Significance	**Low, (12)**	**Low, (12)**
Status (positive or negative)	**Neutral**	**Neutral**
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	**Yes**	Yes
Mitigation: As recommended project mitigation		

2) The cumulative impact on views from tourist routes including main roads and local roads.

Nature:
There is one other solar PV project within 30km (ABC Prieska). This other project is located within or close to an area that is cultivated.

The proposed project appears only likely to impact on local roads and with appropriate mitigation this will be negated.

It appears unlikely that ABC Prieska will have a significant impact on tourism routes.

The cumulative impact was therefore assessed as low and the cumulative contribution low.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**

Extent	Local Roads Local **(2)**	Local Roads Region, **(3)**
Duration	Local Roads Long term **(4)**	Local Roads Long term **(4)**
Magnitude	Local Roads Minor **(2)**	Local Roads Small to minor, **(1)**
Probability	Local Roads Improbable **(2)**	Local Roads Improbable, **(2)**
Significance	Local Roads Low **(16)**	Local Roads Low, **(16)**
Status (positive or negative)	Local Roads If sufficient forest is retained / augmented to screen the project from local roads it is unlikely that they will be considered as having a negative impact. **Neutral**	Local Roads Neutral
Reversibility	High	Low
Irreplaceable loss of resources?	**No irreplaceable loss.**	No irreplaceable loss.
Can impacts be mitigated?	**Yes**	Unknown
Mitigation: Mitigation as project requirements		

3) The cumulative impact on views on tourist's view from trains.

There is one other solar PV project within 30km (ABC Prieska). This other project is also located close to the railway at a distance of approximately 12.5km to the south of the Mutsho projects. Whilst they could both be visible from the train, they will not be viewed at the same time.

The cumulative impact was therefore assessed as low and the cumulative contribution low

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local **(2)**	Local **(2)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Low **(4)**	Low **(4)**
Probability	Improbable **(2)**	Improbable **(2)**
Significance	Low **(20)**	Low **(20)**
Status (positive or negative)	**Neutral**	**Neutral**
Reversibility	High	High
Irreplaceable loss of resources?	**No irreplaceable loss.**	**No irreplaceable loss.**
Can impacts be mitigated?	**Yes**	Unknown
Mitigation: Mitigation as project requirements		

4 Cumulative impact on local homesteads and recreational / local tourism facilities

Nature:
Homesteads and recreational / local tourism facilities are assessed together because both are point receptors and it is likely that some farms in the area have a secondary or primary tourism use
There are no cumulative impacts as affected homesteads will not be affected by other solar PV projects.

5 Cumulative impact on Protected Areas

There are no cumulative impacts as protected areas will not be affected by the project.

6 Glare Impacts

Nature:
The impact of glare arising from the proposed project is unlikely.

It is possible that glare associated with other proposed projects could impact on the roads. Given that mitigation of possible impacts should be relatively simple to achieve, it is assumed that levels of impact from other projects will also be minor.

The overall cumulative impact is assessed as having a low significance. The contribution of the proposed project to this cumulative impact is assessed as low.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Site and immediate surroundings, **(2)**	Region **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Small, **(0)**	Small **(0)**
Probability	Very Improbable, **(1)**	Improbable **(2)**
Significance	Low **(6)**	Low **(14)**
Status (positive or negative)	neutral	negative
Reversibility	High	High
Irreplaceable loss of resources?	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	Yes	Unknown

Mitigation: Should glare prove problematic screening might be utilised or should a tracking system, the trackers can be programmed to prevent reflection towards affected sections of roads.

7 Lighting Impacts

Nature: There is potential for security lighting and operational lighting associated with other solar energy projects to impact significantly on the area but with mitigation the contribution of this project to possible cumulative impacts is likely to be of low significance.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Site and immediate surroundings **(2)**	Region **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Small to minor **(1)**	Minor **(2)**
Probability	Improbable **(2)**	Improbable **(2)**
Significance	Low **(14)**	Low **(18)**
Status (positive or negative)	Neutral	negative
Reversibility	High	High
Irreplaceable loss of resources?	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	Yes	Unknown
Mitigation: As project mitigation.		

APPENDIX V

ENVIRONMENTAL MANAGEMENT PLAN

Project component/s	Mutsho 3 PV, Construction, Operation and Decommissioning		
Potential Impact	Change in Landscape Character and the nature of stakeholder views: • Change in character and sense of place of the landscape setting; • Changing the nature of views from homesteads; • Changing the nature of views from local roads; • Changing the nature of views from the railway; • Glare affecting local roads; and • Lighting impacts.		
Activity/risk source	• The proposed array and substation may be obvious from local homesteads, roads and the railway; • Vegetation clearance and lack of rehabilitation during construction and decommissioning making the development more obvious particularly from a distance; • The development industrialising the outlook for stakeholders; and • Security lighting exacerbating light pollution;		
Mitigation: Target/Objective	• Plan platforms and earthworks to blend into surrounding natural contours. • Maintain a minimum 25m buffer of natural forest on the northern property edge adjacent to the railway and on the western site edge between the property boundary and the proposed array. • Maintain a 25m buffer of natural forest vegetation on either side of the unsurfaced road that runs through the property. • Minimise and reinstate vegetation loss. • Maintain and augment exiting surrounding natural vegetation in order to prevent glare and screen views of the development from local roads and homesteads and maintain continuity with the surrounding natural landscape. • Remove structures and rehabilitate site to its natural condition on decommissioning. • Ensuring that under normal conditions, lighting appears similar to existing agricultural homesteads.		
Mitigation: Action/control		**Responsibility** Contractor (C) Environmental Officer (EO) Environmental Liaison Officer (ELO)	**Timeframe** Construction Phase (C) Operational Phase (O) Decommissioning Phase (D)
Minimise disturbance and maintain existing vegetation as far as is possible both within and surrounding the development area.		C, EO C, EO	C C

Maintain a minimum 25m wide band of natural forest adjacent to the western property edge adjacent to the railway, on the western site edge adjacent to the proposed array and on either side of the unsurfaced road that runs through the property.	C, EO	C
Reinstate any areas of vegetation that have been disturbed during construction.	C, EO	D
Maintain and augment vegetation within the area surrounding the development.	C, EO	C, D
Rehabilitate disturbed areas to their natural state on decommissioning.	C, EO	D
Monitor rehabilitated areas post-construction and post-decommissioning and implement remedial actions.	C, EO	D
Remove all temporary works.	C, EO	D
Remove infrastructure not required for the post-decommissioning use of the site.	C, EO	C, EO
Plan lighting to utilise infra-red security systems or motion sensor triggered security lighting	EO	EO
Design / modify layout to keep PV panels as low as possible	EO	EO

Performance Indicators	Visibility of the PV array from adjacent local roads and railway. Vegetation presence and density. Visibility of the development from surrounding areas. Presence of unnecessary infrastructure. Lighting appearing similar to existing farmsteads under normal conditions
Monitoring	Evaluate visibility from local roads and railway. Evaluate vegetation before, during and after construction. Evaluate vegetation growth and reinstatement during decommissioning and for a year thereafter. Evaluate lighting impacts. Evaluate glare impacts on local roads. Take regular time-line photographic evidence.

	Responsibility: EO and ELO. Prepare regular reports.