VISUAL IMPACT ASSESSMENT FOR THE PROPOSED LANGSIDE SOLAR ENERGY FACILITY, EASTERN CAPE, SOUTH AFRICA

PREPARED BY:

Nuleaf Planning and Environmental (Pty) Ltd

PREPARED FOR:

Impower

DATE:

December 2023

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Report number:	01

DECLARATION

I, **Bryony van Niekerk**, as an independent consultant, compiled this Visual Impact Assessment and declare that it correctly reflects the findings made at the time of the report's compilation. I further declare that I, act as an independent consultant in terms of the following:

- Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act107 of 1998);
- Undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act,1998 (Act 107 of 1998);
- Based on the information provided to me by the project proponent, and in addition to information obtained during the course of this study, will present the results and conclusion within the associated document to the best of my professional judgement.

_____

Bryony van Niekerk
Environmental Assessment Practitioner
BSc Hons. EMA
EAPASA Reg no: 2019/655

1. INTRODUCTION

1.1. QUALIFICATION AND EXPERIENCE OF THE PROFESSIONAL TEAM

Nuleaf Planning and Environmental (Pty) Ltd, specialising in Visual Impact Assessments, undertook the visual assessment for the proposed development.

The team undertaking the visual assessment has extensive practical knowledge in spatial analysis, environmental modelling and digital mapping, and applies this knowledge in various scientific fields and disciplines. The expertise of these practitioners is often utilised in Environmental Impact Assessments, State of the Environment Reports, Biodiversity Plans and Environmental Management Plans.

The visual assessment team is familiar with the "*Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes*" (Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning) and utilises the principles and recommendations stated therein to successfully undertake visual impact assessments. Although the guidelines have been developed with specific reference to the Western Cape Province of South Africa, the core elements are more widely applicable.

Nuleaf Planning and Environmental have been appointed as an independent specialist consultant to undertake the visual impact assessment. Neither the author nor Nuleaf Planning and Environmental will benefit from the outcome of the project decision-making.

1.2. LEGAL FRAMEWORK

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

- **The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA):** This report is in line with Appendix 6 of NEMA: Environmental Impact Assessment (EIA) Regulations (2014, as amended) which details the minimum requirements a specialist report must contain for an Environmental Impact Assessment.
- **Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (DEADP, Provincial Government of the Western Cape, 2005):** This guideline was developed for use in the Western Cape, however in the absence of the development of any other guideline, this provides input for the preparation of visual specialist input into EIA processes. The guideline documents the requirements for visual impact assessment, typical issues that trigger the need for specialist visual input, the scope and extent of a visual assessment, information required, as well as the assessment ad reporting of visual impacts and management actions.
- **Screening Tool as per Regulation 16 (1)(v) of the Environmental Impact Assessment Regulations, 2014 as amended:** a Screening report was generated for this proposed project, whereby a visual impact assessment was identified as one of the specialist studies that would be required.

1.3. INFORMATION BASE

This assessment was based on information from the following sources:

- Topographical maps and GIS generated data were sourced from the Surveyor General, Surveys and Mapping in Mowbray, Cape Town;
- Chief Directorate National (CDN) Geo-Spatial Information, varying dates. *1:50 000 Topographical Maps and Data.*
- DFFE, 2018/2020. *National Land-cover Database 2018/2020 (NLC2018/2020).*
- DFFE, 2022. *South African Protected Areas Database (SAPAD_OR_2022_Q2).*
- JAXA, 2021. Earth Observation Research Centre. *ALOS Global Digital Surface Model (AW3D30).*
- Google Earth Pro. *Up to date and recent satellite images.*
- Professional judgement based on experience gained from similar projects;
- Literature research on similar projects;
- Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA

Quality of the above information bases are rated as Good.

1.4. ASSUMPTIONS AND LIMITATIONS

This report has been prepared by Nuleaf on behalf, and at the request, of Cape EAPrac to provide them with an independent specialist assessment and review. Unless otherwise agreed by Nuleaf in writing, Nuleaf does not accept responsibility or legal liability to any person other than the NALA for the contents of, or any omissions from, this report.

To prepare this report, Nuleaf utilised only the documents and information provided by Cape EAPrac or any third parties directed to provide information and documents by Cape EAPrac. Nuleaf has not consulted any other documents or information in relation to this Report, except where otherwise indicated. The findings, recommendations and conclusions given in this report are based on the author's best scientific and professional knowledge, as well as, the available information. This report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken. Nuleaf and its staff reserve the right to modify aspects of the report including the recommendations if and when new information may become available from on-going research or further work in this field, or pertaining to this investigation.

Although Nuleaf exercises due care and diligence in rendering services and preparing documents, Nuleaf accepts no liability, and Cape EAPrac, by receiving this document, indemnifies Nuleaf and its directors, managers, agents and employees against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with the services rendered, directly or indirectly by the use of the information contained in this document.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If this report is used as part of a main report, the report in its entirety must be included as an appendix or a separate section to the main report.

This assessment was undertaken during the planning stage of the project and is based on information available at that time. It is assumed that all information regarding the project details provided by Cape EAPrac and the Applicant is correct and relevant to the proposed project. This Visual Impact Assessment and all associated mapping has been undertaken according to the worst-case scenario.

1.5. LEVEL OF CONFIDENCE

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

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

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

These values are applied as follows:

Table 1: Level of confidence

[1] Adapted from Oberholzer (2005).

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

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

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

1.6. EIA REQUIREMENTS FOR SPECILAIST REPORTS

Appendix 6 of the 2014 NEMA EIA Regulations, as amended, stipulates and prescribes the content of the Specialist Reports. Table 2 below details these requirements and refers the reader to relevant pages where specific information can be found for ease of reference:

Table 2: EIA Specialist requirements

EIA Regulations, 2014 Requirements, as amended	Page Reference
(a) Details of-	
(i) The specialist who prepared the report	Section 1.1
(ii) Expertise of that specialist to compile a specialist report including a CV	Section 1.1.
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	Page 5
(c) An indication of the scope of, and purpose for which, the report was prepared	Section 4
(cA) an indication of the quality and age of base data used for the specialist report	Section 1.3
(cB) a description of the existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 5, Section 6.5 and Section 8
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 2
(e) A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 2
(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 alternative	Section 8
(g) An identification of any areas to be avoided, including buffers	Section 6, Map 3
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Map 3
(i) A description of any assumptions made and any uncertainties or gaps in knowledge	Section 1.4
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Section 7
(k) Any mitigation measures for inclusion in the EMPr	Section 8.4

(l) Any conditions for inclusion in the EA	Section 8.4
(m) Any monitoring requirements for inclusion in the EMPr or EA	Section 10
(n) A reasoned opinion-	
(i) Whether the proposed activity or portions thereof should be authorized	Section 9 and 10
(iA) regarding the acceptability of the proposed activity	
(ii) If the opinion is that the proposed activity or portions thereof should be authorized, any avoidance, management and mitigation measures that should be included in the EMPr and where applicable, the closure plan	Section 8.4 and Section 10
(o) A description of any consultation process that was undertaken during the course of preparing the specialist report	N/A
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto	N/A
(q) Any other information requested by the competent authority	N/A

2. METHODOLOGY

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

The approach utilised to identify potential issues related to the visual impact included the following activities:

- Undertaking a site visit;
- The creation of a detailed digital terrain model (DTM) of the potentially affected environment;
- The sourcing of relevant spatial data. This includes cadastral features, vegetation types, land use activities, topographical features, site placement, etc.;
- The identification of sensitive environments upon which the proposed solar PV facility could have a potential visual impact;
- The creation of viewshed analyses from the proposed affected area in order to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analyses take into account the dimensions of the proposed structures.

This report (visual impact assessment) sets out to identify and quantify the possible visual impacts related to the proposed Langside SEF and Associated Infrastructure, as well as, offer potential mitigation measures, where required. The methodology as described below has been followed for the assessment of visual impact.

UNDERTAKE A SITE VISIT

A site visit was undertaken in order to verify the results of the spatial analyses and to identify any additional site-specific issues that may need to be addressed in the VIA report. It should be noted that, from a visual perspective, the different seasons do not influence the results of the impact assessment, and as such regardless of the timing of the site visit, the level of confidence for the assessment and findings is high. A photographic survey was made of the site and surrounding potentially affected area from several selected viewpoints. The site visit was undertaken on the 20 October 2022.

DETERMINE THE POTENTIAL VISUAL EXPOSURE

The visibility or visual exposure of any development is the point of departure for the visual impact assessment. It stands to reason that if the proposed development were not visible, no impact would occur. Viewshed analyses of the proposed development indicates the potential visibility.

The viewshed analyses of the proposed facility and the related infrastructure are based on a 30m SRTM digital terrain model of the study area.

The first step in determining the visual impact of the proposed facility is to identify the areas from which the structures would be visible. The type of structures, the dimensions, the extent of operations and their support infrastructure are taken into account.

DETERMINE THE VISUAL DISTANCE AND OBSERVER PROXIMITY

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

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

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

DETERMINE VIEWER INCIDENCE, PERCEPTION AND SENSITIVITY

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

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

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

DETERMINE THE VISUAL ABSORPTION CAPACITY (VAC)

This is the capacity of the receiving environment to absorb the potential visual impact of the proposed development. The digital terrain model utilised in the calculation of the visual exposure of the development does not incorporate the potential visual absorption capacity (VAC) of the natural vegetation of the region. It is therefore necessary to determine the VAC by means of the interpretation of the vegetation cover and other landscape characteristics.

CALCULATE THE VISUAL IMPACT INDEX OF THE PROPOSED DEVELOPMENT

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

DETERMINE THE IMPACT SIGNIFICANCE

The potential visual impacts identified and described are quantified in their respective geographical locations in order to determine the significance of the anticipated impact. Significance is determined as a function of extent, duration, magnitude and probability.

FORMULATION OF MITIGATION MEASURES

Recommendation of mitigation measures (if possible) to avoid or minimise potential negative visual impacts of the proposed development, for inclusion in the EMPr and authorisation conditions.

REPORTING AND MAP DISPLAY

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

3. PROJECT DESCRIPTION

Impower (Pty) Ltd is proposing to develop a 30MW solar PV facility and associated infrastructure within Portion 7 of Farm No. 198 Langside in the Eastern Cape of South Africa.

The proposed development will comprise the following:

- Solar photovoltaic (PV) technology (monofacial or bifacial) with fixed, single or double axis tracking mounting structures Inverters and transformers;
- Laydown area;
- Access and Internal road network;
- Auxiliary buildings (33kV switch room, gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Facility (IPP) substation;
- Inverter-station, transformers and internal electrical reticulation (underground cabling);
- Rainwater Tanks; and
- Perimeter fencing and security infrastructure.

Figure 1: Photovoltaic (PV) solar panels (Photo: SunPower Solar Power Plant-Prieska)

Figure 2: Aerial view of PV arrays (Photo: Scatec South Africa)

Figure 3: Aerial view of a BESS (Photo: Power Engineering International)

Figure 4: Close up view of a BESS (Photo: Greenbiz.com)

4. SCOPE OF WORK

The scope of work for this assessment includes the determination of the potential visual impacts in terms of nature, extent, duration, magnitude, probability and significance of the construction and operation of the proposed Langside SEF. Mitigation measures are recommended where appropriate. Anticipated issues related to the potential visual impact of the proposed infrastructure include the following:

- Potential visual impacts associated with the construction phase on observers in close proximity to the proposed infrastructure.
- The potential visual impact on sensitive visual receptors in close proximity to the proposed infrastructure.
- The potential visual impact on sensitive visual receptors in the region.
- The potential visual impact of the proposed infrastructure on the visual quality of the landscape and sense of place of the region.
- The potential cumulative visual impact of the proposed infrastructure.
- Potential residual visual impacts after the decommissioning of the proposed infrastructure.
- The potential to mitigate visual impacts and inform the design process.

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

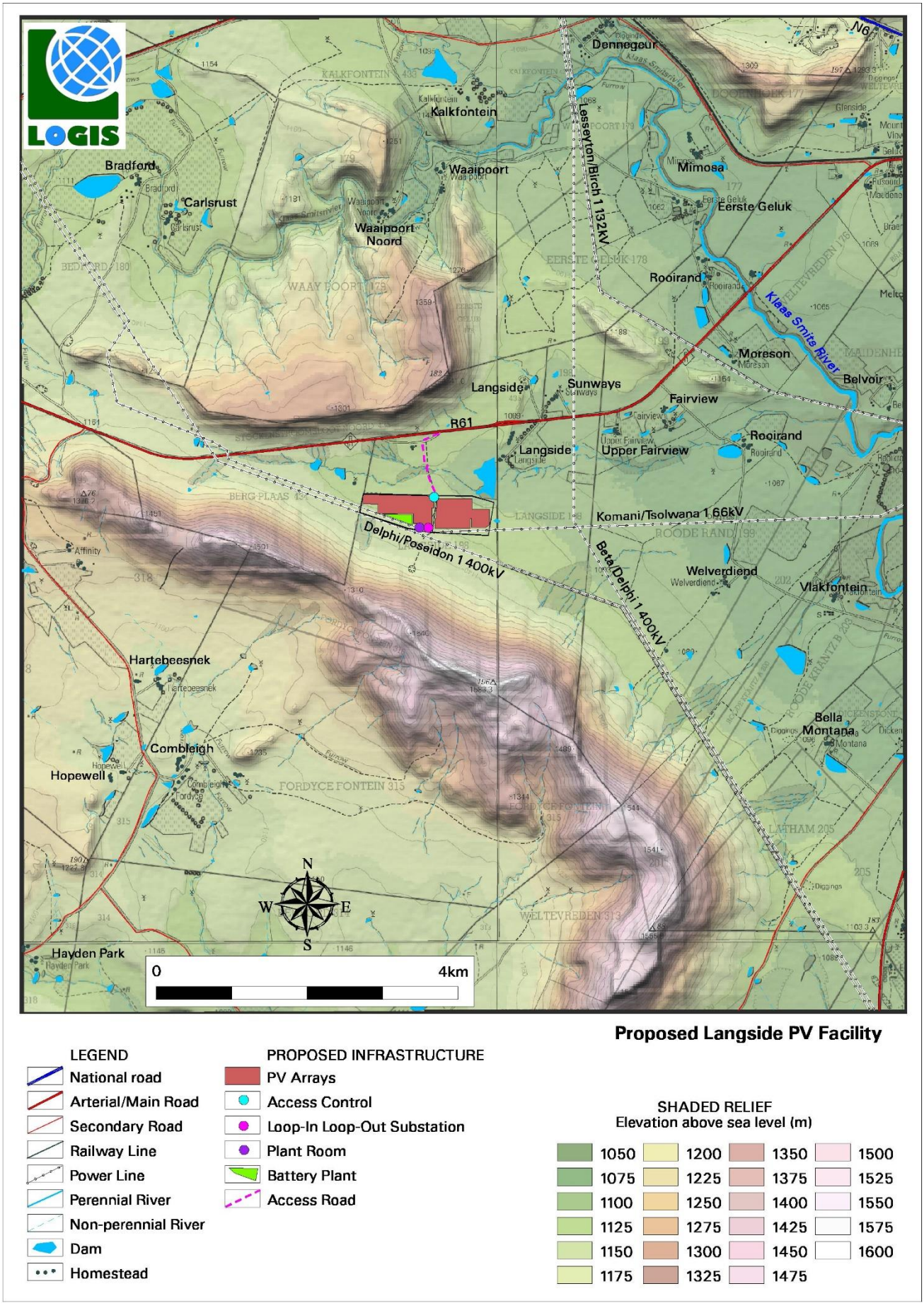
5. THE AFFECTED ENVIRONMENT

Regionally, the proposed site for the Langside solar energy facility is located approximately 12 km south west of Queenstown and 14 km north east of Thornhill in the Eastern Cape Province.

The study area occurs on land that ranges in elevation from 1067m above sea level (a.s.l.) on the flat plains to 1583 m a.s.l. on the hills located to the north and south of the proposed site. Refer to **Map 1**.

The flat plains are situated within the Queenstown Thornveld while Tarkastad Montane Shrubland vegetation can be found on the hills within the study area.

Figure 5: Hills to the south of the proposed site

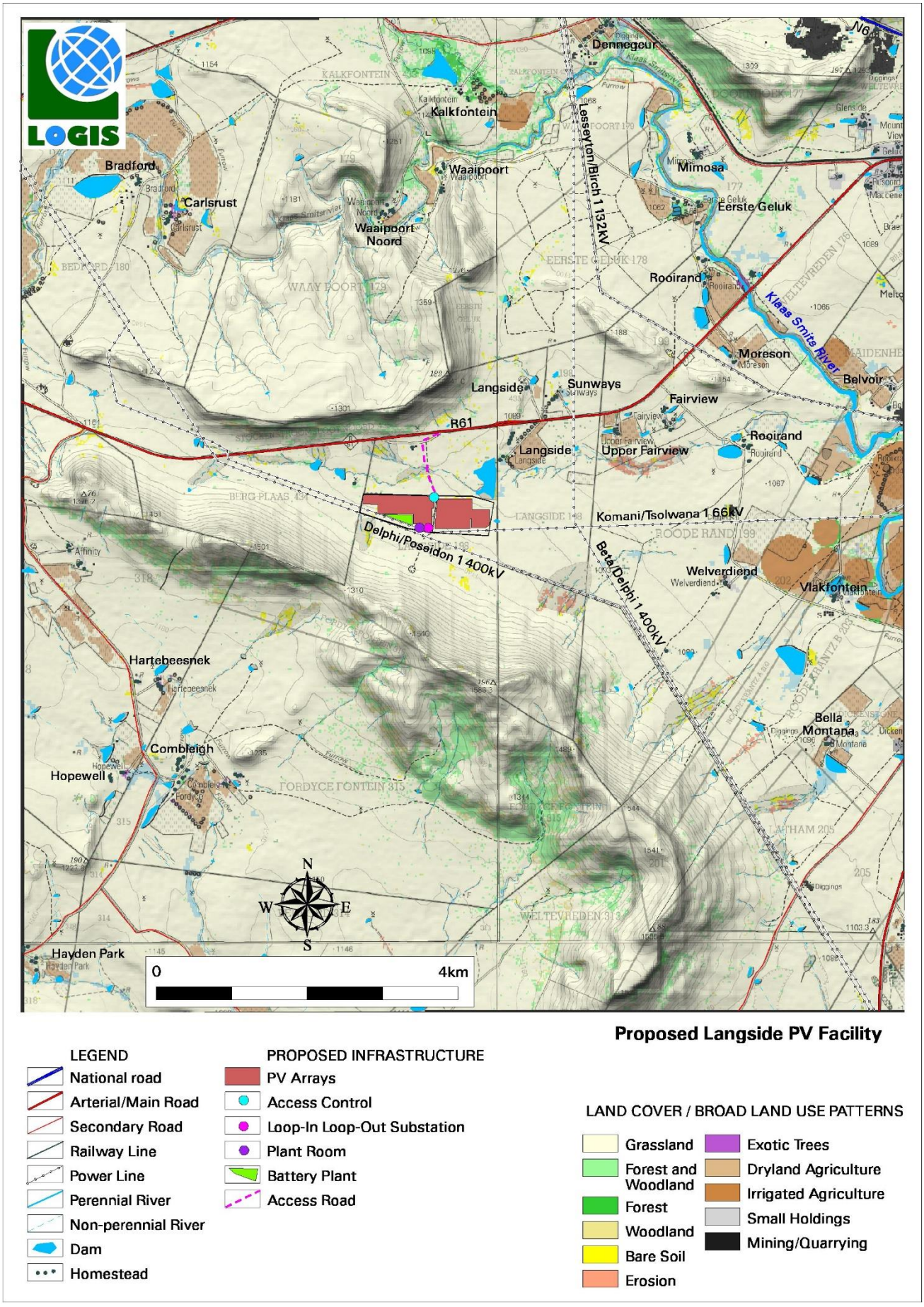


Map 1: Shaded relief map of the study area

Figure 6: Hill to the north of the proposed site

Land cover consists primarily of grassland interspersed with forest and woodland on the southern slopes of the mountains. Additionally, both dryland and irrigated agriculture can be found throughout the study area, particularly along watercourses such as the Klaas Smits River. Refer to Error! Reference source not found..

The Klaas Smits River, part of the Great Kei River, is located in the north and north eastern portion of the study area and flows from the north to the south east. There are also many farm dams present within the study area.



Map 2: Land cover and broad land use patterns within the study area

Figure 7: Grassland vegetation

The study area is sparsely populated outside of the Queenstown urban area (i.e. 22 people per km^2 within the district municipality). A number of fairly isolated homesteads occur throughout the study area which include the following:

- Hartebeesnek
- Combleigh
- Hopewell
- Bella montana
- Vlakfontein
- Welverdiend
- Langside
- Upper Fairview
- Fairfiew
- Rooirand
- Moreson
- Waaipoort
- Carlsrust
- Kalkfontein

It is uncertain whether all of the potentially affected farmsteads are inhabited or not. It stands to reason that the farmsteads that are not currently inhabited will not be visually impacted upon at present. These farmsteads do, however retain the potential to be affected visually should they ever become inhabited again in the future. For this reason, the author of this document operates under the assumption that they are all inhabited.

Figure 8: Examples of home/farmsteads found within close proximity to the site

Figure 9: Homestead located within close proximity to the proposed site

The R61 is the main arterial road that bisects the study area. The R61 is a regional connector leading to Queenstown in the north east and Tarkastad and Cradock to the west. The R61 also connects with the N6, a national road that leads to East London. There are also a limited number of secondary roads across the study area.

Figure 10: View of the R61 looking west

Industrial infrastructure within the study area includes a railway line and the Raumix Queenstown quarry located in the north eastern portion, as well as a significant network of power lines extending north to south and east to west. Some of these include:

- Delphi/Poseidon 1 400 kV
- Beta/Delphi 1 400 kV
- Komani/Tsolwana 1 66 kV
- Lesseyton/Birch 1 132 kV

Delhi/Poseidon 1 400 kV and Komani/Tsolwana 1 66 kV are located adjacent to the proposed site and run along the southern boundary.

Figure 11: Electrical grid infrastructure found adjacent to the proposed site

Further to this, the entire proposed Langside SEF site is located within the Stormberg Renewable Energy Development Zone (REDZ). Refer to **Figure 13** for the regional locality of the site in relation to the Stormberg REDZ. REDZ are described as:

"areas where large scale wind and solar PV energy facilities can be developed in terms of SIP 8 and in a manner that limits significant negative impacts on the environment, while yielding the highest possible socio-economic benefits to the country."[2]

[2] Source: https://redzs.csir.co.za

Figure 12: Reginal locality of the proposed Langside SEF in relation to the Stormberg REDZ

There are no formally protected or conservation areas present within the study area, but the greater environment has a vast, undeveloped and rugged character. Settlements, where these occur, are very limited in extent and domestic in scale.

The greater environment with its wide open, undeveloped landscapes is considered to have a high visual quality.

6. SITE SENSITIVITY VERIFICATION

6.1. SENSITIVITIES IDENTIFIED BY THE NATIONAL WEB-BASED ENVIRONMENTAL SCREENING TOOL

No specific mention to visual impact sensitivity was made in the DFFE screening tool with regards to the Proposed Langside SEF.

6.2. RESULTS

Proximity to roads

Roads, especially scenic routes (i.e. R545) are considered potential sensitive receptors whereby the travellers may be negatively impacted on by the exposure to the proposed Solar PV Infrastructure. In order to avoid encroachment of the infrastructure on public roads (especially in natural, rural and scenic areas), and thereby reducing the potential visual impact on road users and tourists, the following buffers are recommended:

- National / Arterial and Main Roads - 500m buffer

The Solar PV Facility footprint is not located within the 500 m roads buffer of the R61.

Proximity to inhabited residences (homesteads), settlements and towns

Residences (homesteads), settlements, and towns are considered potential sensitive receptors whereby the residents may be negatively impacted on by the exposure to Solar PV Facility. A 500m meter buffer zone is recommended to reduce general observer proximity to infrastructure and avoid potential glint and glare issues associated with Solar PV facility.

No homesteads are located within 500 m from the proposed Solar PV Facility.

Major rivers, water bodies, perennial rivers and wetlands with scenic value

Rivers, dams, wetlands and pans often serve as visual features and provide visual relief in an arid landscape. As such, it is recommended that development along these features is avoided drainage by applying visual buffers of 250m.

The Solar PV Facility is located within the 250 m buffer associated with a dam.

Steep slopes, prominent hills, ridges and skylines

Elevated terrain (hills, ridges and mountains) are considered to be scenic topographical features, generally more exposed than areas with even or level slopes (e.g. plains). As such it is recommended that no infrastructure is placed on this features or on slopes of more than 1:4.

The proposed site is not located on any steep slopes or prominent hills/mountains/ridges.

Refer to **Map 3.**

In order to determine the overall visual sensitivity of the proposed sites in the absence of any mitigation, the following matrix was utilized:

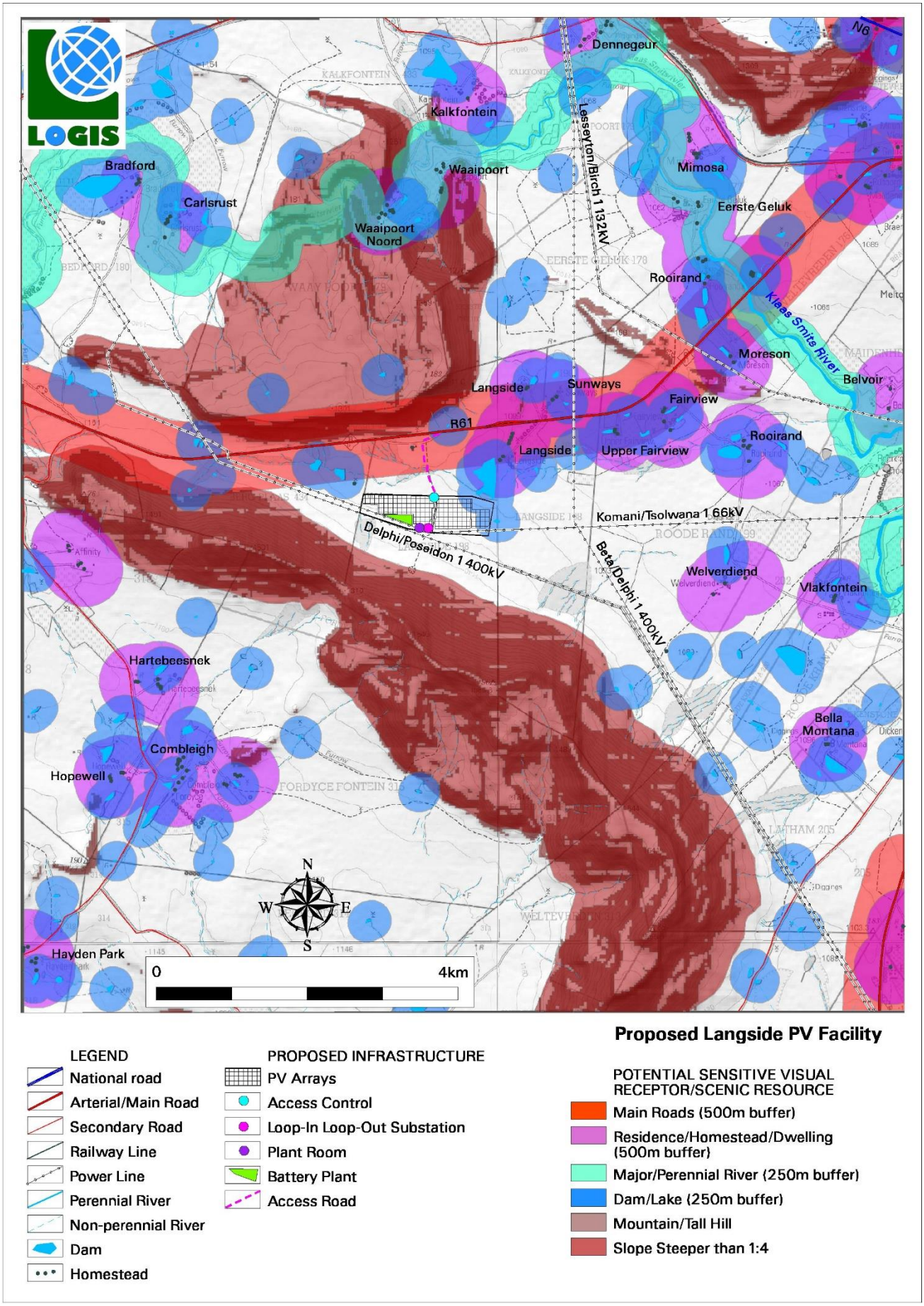
Table 3: Matrix to determine overall visual sensitivity for the proposed Langside SEF

Sensitive Receptor	Very High Sensitivity (4)	High Sensitivity (3)	Moderate Sensitivity (2)	Low Sensitivity (1)
Topographic features incl mountain ridges	Within 250 m	Within 250- 500 m	Within 500m – 1 Km	>1 Km
Steep slopes	Slopes with more than 1:4	Slopes between 1:4 and 1:10	-	-
Major rivers, water bodies, perennial rivers and wetlands with scenic value	Within 250 m	Within 250- 500 m	Within 500 m – 1 Km	>1 Km

Coastal zone	Within 1 Km	Within 1-2 Km	Within 2-3 Km	>3 Km
Protected area: National Parks	Within 2 Km	Within 2-4 Km	Within 4-6 Km	>6 Km
Protected areas: Nature Reserves	Within 1 Km	Within 1-2 Km	Within 2-3 Km	>3 Km
Private reserves and game farms	Within 500 m	Within 500m- 1 Km	Within 1-2 Km	>2 Km
Cultural landscape	On the site itself	Within 500 m	Within 500 m – 1 Km	>1 Km
Heritage Sites Grades I, ii and iii	On the site itself	Within 500 m	Within 500 m – 1 Km	>1 Km
Towns and Villages	Within 500 m	Within 500m- 1 Km	Within 1-2 Km	>2 Km
Home/farmsteads	Within 500 m	Within 500m- 1 Km	Within 1-2 Km	>2 Km
National Roads	Within 500 m	Within 500m- 1 Km	Within 1-2 Km	>2 Km
Provincial/arterial roads	Within 1 Km	Within 1-3 Km	Within 3-6 Km	>6 Km
Scenic routes	Within 500 m	Within 500m- 1 Km	Within 1-2 Km	>2 Km
Passenger rail lines	Within 250 m	Within 250 – 500 m	Within 500 m – 1 Km	>1 Km
Located with Renewable energy development zone	No	-	-	Yes- Stormberg Wind REDZ
VAC	Low VAC	Moderate VAC	High VAC	Very High VAC
Visual Quality	Natural environment intact with no built infrastructure	Natural environment intact with limited built infrastructure	Natural environment somewhat intact with fair amount of built infrastructure	Built infrastructure is dominant with little to no natural environment remaining
Presence of existing infrastructure	Absent	Very low densities	Present in moderate quantities	High densities
Total	**Moderate (36)**			

Overall visual sensitivity rating:

- Low (0-19)
- Moderate (20-38)
- High (39-57)
- Very High (58-76)



Map 3: Sensitivity buffer map

7. VIEWSHED ANALYSIS

7.1. VISUAL DISTANCE AND OBSERVER PROXIMITY

Nuleaf Planning and Environmental determined proximity offsets based on the anticipated visual experience of the observer over varying distances. In general, the severity of the visual impact on visual receptors decreases with increased distance from the proposed infrastructure. Therefore, in order to refine the visual exposure of the facilities on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for the Solar energy facility. Proximity offsets for the proposed development footprint are thus established in order to indicate the scale and viewing distance of the facility and to determine the prominence of the structures in relation to their environment.

These proximity offsets are based on the anticipated visual experience of the observer over varying distances. The distances are adjusted upwards for larger facilities and downwards for smaller facilities (i.e. depending on the size and nature of the proposed infrastructure). This rationale was developed in the absence of any known and/or acceptable standards in South Africa. Therefore, for the purpose of this study, proximity offsets have been calculated from the expected boundary of the site, as indicated on **Map 4** and as follows:

- 0 – 1km. Short distance view where the facilities would dominate the frame of vision and constitute a very high visual prominence.
- 1 - 3km. Short to medium distance view where the structures would be easily and comfortably visible and constitute a high to moderate visual prominence.
- 3 - 6km. Medium to long distance view where the facilities would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a moderate visual prominence.
- >6km. Long distance view of the facilities where the structures are not expected to be immediately visible and not easily recognisable. This zone constitutes a lower visual prominence for the facility.

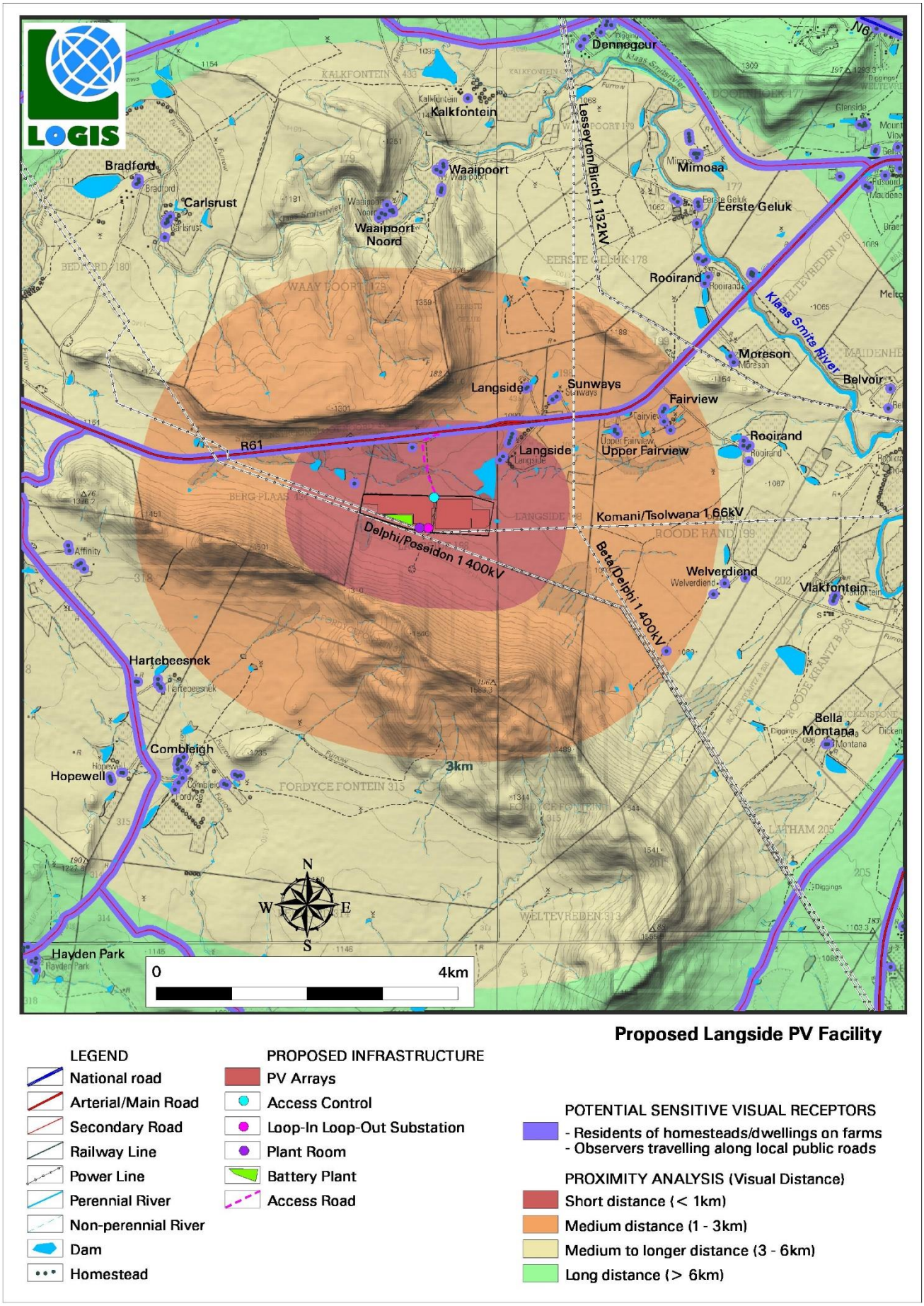
7.2. VIEWER INCIDENCE, PERCEPTION AND SENSITIVITY

It is necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed PV facility. Refer to **Map 4** for potential sensitive visual receptors within a 1km, 3km and 6km radius of the proposed Langside SEF.

Homesteads / farmsteads, by virtue of their visually exposed nature, are considered to be sensitive visual receptors. Viewer incidence is calculated to be the highest for the homesteads within the areas closest to the proposed development. Second to these are the users along the various arterial and secondary roads within the study area. Commuters and possible tourists using these roads may be negatively impacted upon by visual exposure to the proposed infrastructure.

Residential receptors in natural contexts are more sensitive than those in more built-up contexts, due to the absence of visual clutter in these undeveloped and undisturbed areas. Receptors within built-up areas are less sensitive to potential visual impact due to the presence of structures, infrastructure and general visual clutter. Those dwelling on the periphery may be more aware of visual intrusion and may thus be considered somewhat more sensitive.

No specific report can be made on viewer perception regarding the proposed Langside SEF, as no reported stakeholder feedback has been received by the specialist from the EAP. However, considering the wide open spaces of the landscape, it is expected that any potential visual impact would be viewed in a negative light. Therefore, overall viewer perception of receptors within the study area will be assumed to be mostly negative.



Map 4: Potential sensitive visual receptors and proximity analysis for the proposed PV facility

7.3. **VISUAL ABSORPTION CAPACITY**

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

The study area land cover is primarily grassland which is defined as an area dominated by nearly continuous grasses often devoid of taller plants such as trees.

The VAC would also be high where the environment can readily absorb the development in terms of texture, colour, form and light / shade characteristics. On the other hand, the VAC for a development contrasting markedly with one or more of the characteristics of the environment would be low. The scale and form of the PV structures mean that it is unlikely that the environment will visually absorb them in terms of texture, colour, form and light/shade characteristics.

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

Overall, the Visual Absorption Capacity (VAC) of the receiving environment is low to moderate by virtue of the limited height (or absence) of the vegetation. Within this area the VAC of vegetation will not be taken into account, thus assuming a worst-case scenario in the impact assessment.

7.4. **POTENTIAL VISUAL EXPOSURE**

The result of the viewshed analyses for the proposed Langside SEF are shown on **Map 5** below. The visibility analyses (or viewsheds) for the proposed development was calculated from a representative number of vantage points within the development footprint at an offset of 4m above ground level. This was done in order to determine the general visual exposure (visibility) of the area under investigation, simulating the maximum height of the proposed structures (PV panels, inverters and BESS) associated with the facility.

Map 5 indicates areas from which the proposed facility could potentially be visible, as well as, proximity offsets (1 km, 3 km and 6 km) from the proposed development area. Typically, structures of this height (i.e. 5 m) may be visible from up to 6 km away. In this respect, the anticipated Zone of Visual Influence for this facility as calculated from the development footprint (i.e. determined from the edge of the proposed development areas) has been indicated at 6 km. The extent of visual exposure within this zone is expected to be very high.

The following is of relevance regarding the anticipated visual exposure:

- < 1km - Short distance

  The proposed facility will have a large core area of potential visual exposure on the project site itself, and within a 1km radius thereof.

  Potential sensitive visual receptors within this visually exposed zone include observers travelling along the R61 regional road to the north as well as residents of the Langside Farm/homestead.

- 1 - 3km - Medium distance

  Potential visual exposure becomes quite reduced in the medium distance (i.e. between 1 and 3 km), with visual exposure being confined between the two (2) hills located to the north and south of the proposed site.

  Sensitive visual receptors comprise users of the R61 regional road, as well as, residents of the Upper Fairview, Fairview, Langside and Sunways farm/homesteads located to the north east.

- 3 - 6km- Medium to long distance

  In the longer distance (i.e. between 3 and 6 km offset), the extent of potential visual exposure is significantly reduced with small pockets of visually exposed areas to the east and west.

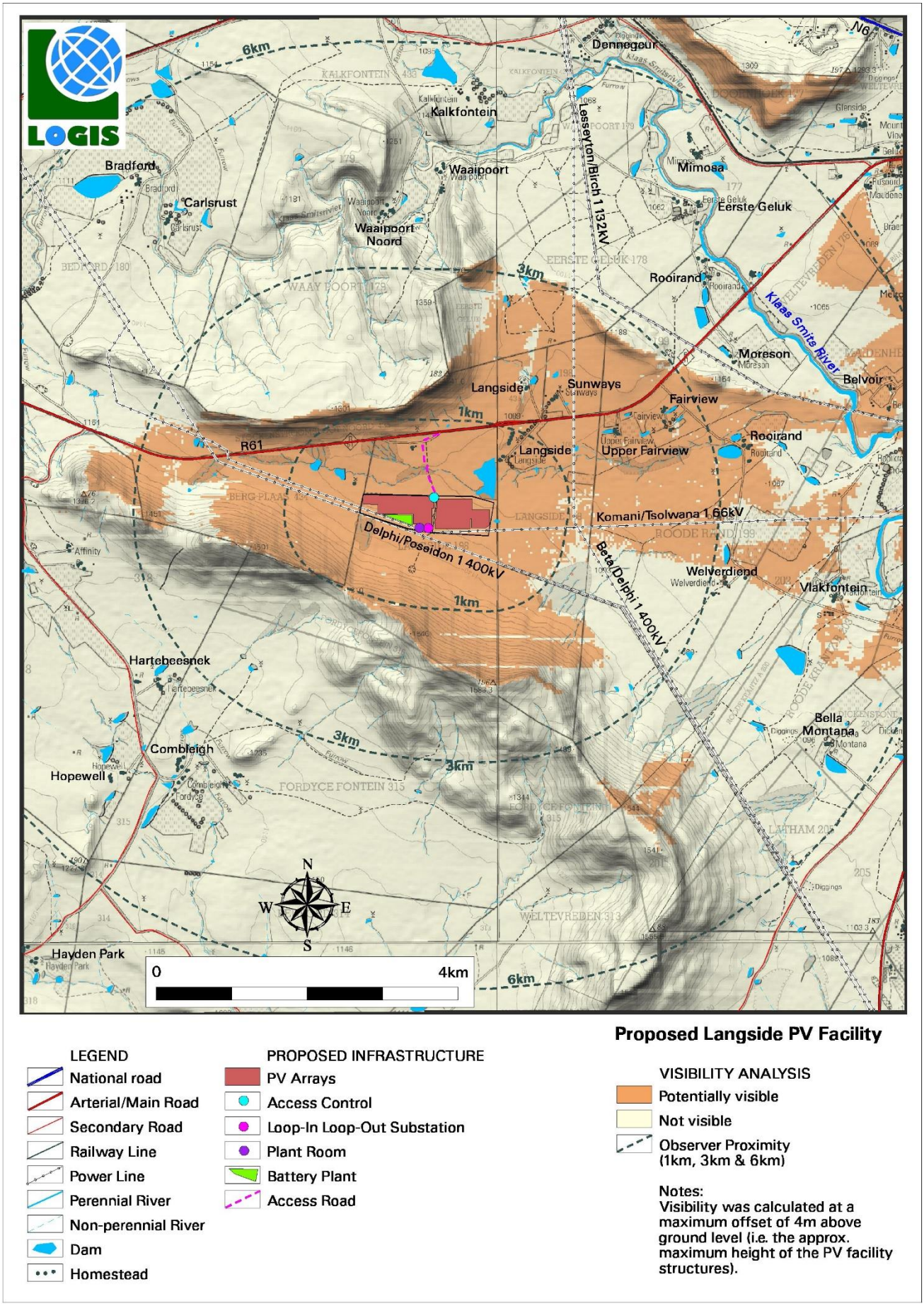
  Sensitive visual receptors include residents of the Welverdiend, Rooirand, Belvoir and Vlakfontein farm and homesteads.

- > 6km – Long distance

  At distances exceeding 6km the intensity of visual exposure is expected to be very low and highly unlikely due to the distance between the object (development) and the observer. Sensitive visual receptors are not likely to be visually exposed to the proposed facility.

In general, due to the scattered and lower population density of the study area and the confined potential viewshed owing to the topography and landscape, the proposed Langside SEF may constitute a moderate visual prominence, potentially resulting in a moderate visual impact.

However, it must be noted that some of the sensitive visual receptors of farm and homesteads listed above who could be affected visually by the proposed Langside SEF are in fact located on properties involved.



Map 5: Potential visibility analysis for the Proposed Solar PV Facility

7.5. **POTENTIAL CUMULATIVE VISUAL EXPOSURE**

Cumulative visual impacts can be defined as the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments. In this case, the 'development' would be a Solar PV Facility and Associated Infrastructure as seen in conjunction with the existing built infrastructure in close proximity.

Cumulative visual impacts may be:

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

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

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

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

The approach for this assessment includes all renewable energy projects within 30 km that have received an EA, as well as the proposed project. The information was collected from the National DFFE Renewable Energy EIA Application (REEA) database, 2023 Quarter 3.

This is the most accurate and up-to-date data available to the project team. There may be some projects with "in-process" applications for which data is not yet publicly available. The REEA database contains land parcels, and not the footprints. In most cases the actual development footprint of the nearby Renewable Energy developments could not be easily quantified or accessed spatially. Hence the land parcels considered, are larger than the land the PV will occupy. It is important to note that the existence of an approved EA does not directly equate to actual development of the project. For these reasons this data tends towards a worst-case scenario.

The author is not aware of any additional PV plants (existing or planned) within the study area. The REEA database also does not indicate that there are any proposed PV Facilities within 30km of the proposed facility.

Considering the above, the potential cumulative visual impact is considered to be low and within acceptable limits.

However, it should be noted that the proposed Langside SEF is located within the Stormberg REDZ. REDZ concentrate renewable energy facilities within identified zones in an effort to prevent the scattered proliferation of renewable energy generation infrastructure beyond the REDZ and throughout the greater region. Therefore, it can be anticipated that in the future more renewable energy generation infrastructure may be proposed and constructed within the general area, thereby contributing to the cumulative impact.

7.6. **VISUAL IMPACT INDEX**

The combined results of visual exposure, viewer incidence / perception and visual distance of the proposed infrastructure are displayed on **Map 6**. Here the weighted impact and the likely areas of impact and potential sensitive visual receptors have been indicated as a visual impact index.

Values have been assigned for each potential visual impact per data category and merged in order to calculate the visual impact index. An area with a short distance, a high viewer incidence and a predominantly negative perception would therefore have a higher value (greater impact) on the index. This helps in focusing attention on the critical areas of potential impact when evaluating the issues related to the visual impact.

The index indicates that **potentially sensitive visual receptors**[3] within a 1km radius of the proposed facility may experience a **very high** visual impact. The magnitude of visual impact on sensitive visual receptors subsequently subsides with distance to; **high** within a 1–3km radius (where/if sensitive receptors are present) and **moderate** within a 3–6km radius (where/if sensitive receptors are present). Receptors beyond 6km are expected to have a **low** potential visual impact.

The visual impact index for the proposed Langside SEF is further described as follows:

- The visual impact index map indicates a core zone of **high** visual impact within 1km of the proposed development.

  Sensitive visual receptors within this zone comprise the residents of Langside, as well as, and observers travelling along the R61 arterial road located to the north of the proposed site.

  The above receptors are likely to experience **very high** visual impact.

- Visual impact is prominently **moderate** between 1km and 3km of the proposed development. Sensitive visual receptors within this zone comprise the residents of the following homesteads:

  - Langside
  - Sunways
  - Upper Fairview
  - Fairview

  As well as observers travelling along the R61 arterial road and secondary roads.

  These receptors are likely to experience a **high** visual impact.

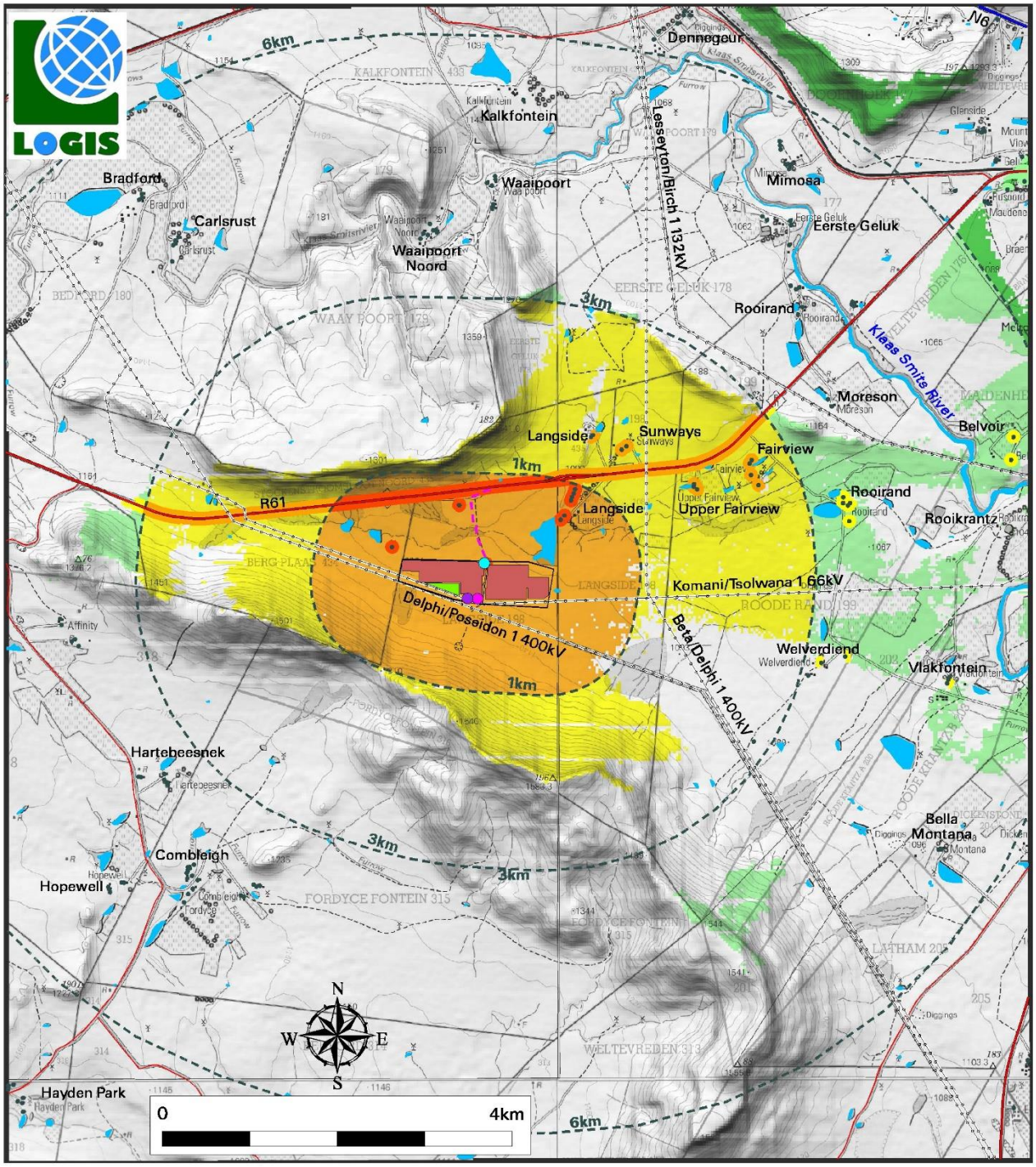
- Visual impact is prominently **low** between 3km and 6km of the proposed development. Sensitive visual receptors within this zone comprise the residents of the following homesteads:

  - Rooirand
  - Belvoir
  - Potentially Welverdiend
  - Potentially Vlakfontein

  These receptors are likely to experience a **moderate** visual impact.

- Beyond the 6km of the proposed development, the extent of potential visual impact is somewhat reduced, and the magnitude is predominantly **very low**. Sensitive visual receptors within this zone are likely to experience a **low** visual impact.

[3] The names indicated on the map and listed below here are of the homestead or farm dwelling as indicated on the SA 1: 50 000 topographical maps and do not refer to the registered farm name. Should a homestead / residence / institution not be listed in terms of the SA 1: 50 000 topographical maps, then it is assumed that the impacts will be similar to the other identified residences within the same proximity radii.



Proposed Langside PV Facility

LIKELY AREAS OF POTENTIAL VISUAL IMPACT & POTENTIAL SENSITIVE VISUAL RECEPTORS (Indicating the potential magnitude)

VERY HIGH (< 1km)
Langside
A section of the R61 Arterial Road

HIGH (1 - 3km)
Langside
Sunways
Upper Fairview
Fairview

MODERATE (3 - 6km)
Rooirand
Belvoir
Potentially Welverdiend
Potentially Vlakfontein

VISUAL IMPACT INDEX
- Not Visible/Negligible
- Very Low
- Low
- Moderate
- High
- Very High

Map 6: Visual impact index for the proposed Langside Solar PV Facility

8. VISUAL IMPACT ASSESSMENT

8.1. METHODOLOGY

The previous section of the report identified specific areas where likely visual impacts would occur. This section will attempt to quantify these potential visual impacts in their respective geographical locations and in terms of the identified issues related to the visual impact.

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

Extent – The distance the visual impact extends from the proposed development and to what extent it will have the highest impact. In the case of this type of development, the extent of the visual impact is most likely to have a higher impact on receptors closer to the development and decrease as the distance increases.

- (1) Very low: long-distance > 6km
- (2) Low: medium to long distance between 3 – 6km
- (3) Medium: short distance between 1 – 3km
- (4) High: very short distance < 1km
- (5) Very high: *Site*-specific, within the development site only

Duration - The timeframe over which the effects of the impact will be felt.

- (1) Very short: 0-1 years
- (2) Short: 2-5 years
- (3) Medium: 5-15 years
- (4) Long: >15 years
- (5) Permanent

Magnitude - The severity or size of the impact. This value is read off the Visual Impact Index maps. Where more than one value is applicable, the higher of these will be used as a worst-case scenario.

- (0) None
- (2) Minor
- (4) Low
- (6) Moderate
- (8) High
- (10) Very High

Probability - The likelihood of the impact actually occurring.

- (1) Very improbable: Less than 20% sure of the likelihood of an impact occurring
- (2) Improbable: 20-40% sure of the likelihood of an impact occurring
- (3) Probable: 40-60% sure of the likelihood of an impact occurring
- (4) Highly probable: 60-80% sure of the likelihood of that impact occurring
- (5) Definite: More than 80% sure of the likelihood of that impact occurring

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

- ***(0-12) Negligible:***
  Where the impact would have no direct influence on the decision to develop in the area. The impact would be of a very low order. In the case of negative impacts, almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap, and simple.
- ***(13-30) Low:***
  Where the impact would have a very limited direct influence on the decision to develop in the area. The impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and / or remedial activity would be either easily achieved or little would be required, or both.
- ***(31-60) Moderate:***
  Where the impact could influence the decision to develop in the area. The impact would be real but not substantial. In the case of negative impacts, mitigation and / or remedial activity would be both feasible and fairly easily possible.

- ***(61-80) High:***
  Where the impact must have an influence on the decision to develop in the area. The impacts are of a substantial order. In the case of negative impacts, mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these.
- ***(81-100) Very High:***
  Where the impact will definitely have an influence on the decision to develop in the area. The impacts are of the highest order possible. In the case of negative impacts, there would be no possible mitigation and / or remedial activity possible.

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

Status – The perception of Interested and Affected Parties towards the proposed development.
- Positive
- Negative
- Neutral

Reversibility – The possibility of visual recovery of the impact following the decommissioning of the proposed development
- (1) Reversible
- (3) Recoverable
- (5) Irreversible

8.2. DIRECT IMPACTS

The direct visual impacts of the proposed Langside SEF are assessed as follows:

8.2.1. CONSTRUCTION PHASE IMPACTS

During the construction period it is expected that any visual impact of concern on sensitive visual receptors within the study area will be temporary and limited to a short-term period (0-2 years). The below direct construction visual impacts of the proposed Langside SEF are assessed as follows:

8.2.1.1. POTENTIAL VISUAL IMPACT OF CONSTRUCTION ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY (WITHIN 1KM) TO THE PROPOSED DEVELOPMENT

During the construction period, there will be an increase in heavy vehicles utilising the roads to the construction sites that may cause, at the very least, a visual nuisance to other road users and landowners (as identified in Section 7.6) in the area within 1km. Additionally, stripping of the vegetation and the resultant dust of the construction activities, as well as construction equipment (i.e. cranes), temporary laydown areas, construction camps, etc. may also be visible at the site, resulting in a visual impact occurring during construction.

< 1km on residents of towns and homesteads

Construction activities may potentially result in a **high** (significance rating = 64) temporary visual impact, that may be mitigated to **moderate** (significance rating = 36) on residents of Langside homestead located within 1km of the proposed PV Facility. Refer to Table 4.

A mitigating factor in this scenario is the low number of receptors within the receiving environment.

Table 4: Visual impact of construction on residents of towns and homesteads within 1km of the proposed PV facility.

Nature of Impact: Visual impact of construction activities on residents of towns and homesteads within 1km of the proposed PV facility.		
	Without mitigation	***With mitigation***
Extent	Very Short distance **(4)**	Very Short distance **(4)**
Duration	Short term **(2)**	Short term **(2)**

Magnitude	Very high **(10)**	Moderate **(6)**
Probability	Highly Probable **(4)**	Probable **(3)**
Significance	High **(64)**	Moderate **(36)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: Planning: ➢ Retain and maintain natural vegetation in all areas outside of the development footprint, but within the project site. ➢ Consult adjacent landowners (if present) in order to inform them of the development and to identify any (valid) visual impact concerns. Construction: ➢ Ensure that vegetation is not unnecessarily removed during the construction period. ➢ Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) where possible. ➢ Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. ➢ Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities. ➢ Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent). ➢ Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts. ➢ Rehabilitate all disturbed areas immediately after the completion of construction works.		
Residual impacts: None, provided that rehabilitation works are carried out as required.		

< 1km on observers travelling along various roads

Additionally, it is expected that construction activities may potentially result in a **moderate** (significance rating = 48) temporary visual impact, that may be mitigated to a slightly lower **moderate** (significance rating = 36) on observers travelling along the various roads within 1km to the proposed PV Facility. Refer to Table 5.

A mitigating factor in the above scenario is that observers travelling along the various roads (i.e. R61) will only experience a visual impact for a brief period of time. This reduces the probability of this impact occurring.

Table 5: Visual impact of construction on observers travelling along the various roads within 1km to the proposed PV facility.

Nature of Impact: Visual impact of construction activities on observers travelling along the various roads within 1km to the proposed PV facility.		
	Without mitigation	***With mitigation***
Extent	Very Short distance **(4)**	Very Short **distance (4)**
Duration	Short term **(2)**	Short term **(2)**
Magnitude	Very high **(10)**	Moderate **(6)**
Probability	Probable **(3)**	Probable **(3)**
Significance	Moderate **(48)**	Moderate **(36)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

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

8.2.2. OPERATIONAL PHASE IMPACTS

During the operational phase of the proposed Langside SEF, it is generally accepted that the Solar PV panels associated with the proposed facility will constitute the largest visual impact of concern on sensitive visual receptors within the study area as a result of their nature and scale in relation to other proposed infrastructure that may be located on the site. The below direct operational visual impacts of the proposed Langside SEF are assessed as follows:

8.2.2.1. POTENTIAL OPERATIONAL VISUAL IMPACTS ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY (WITHIN 1KM) TO THE PROPOSED DEVELOPMENT

< 1km on residents of towns and homesteads

The operation of the proposed PV facility is expected to have a **high** visual impact (significance rating = 72) pre-mitigation and a **moderate** visual impact (significance rating = 42) post mitigation on residents at the Langside homestead (as per Section 7.6) within a 1km radius of the PV Facility. Refer to Table 6.

A mitigating factor in this scenario is the low number of receptors within the receiving environment.

Mitigation of this impact is possible and both specific measures as well as general "best practice" measures are recommended in order to reduce/mitigate the potential visual impact. The table below illustrates this impact assessment.

Table 6: Visual impact on residents at homesteads, towns, and visitors/tourists within 1km to the PV facility.

Nature of Impact: Visual impact on residents at homesteads, towns, and visitors/tourists within 1km to the PV facility.		
	Without mitigation	***With mitigation***
Extent	Very Short distance **(4)**	Very Short distance **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Very high **(10)**	Moderate **(6)**
Probability	Highly Probable **(4)**	Probable **(3)**
Significance	High **(72)**	Moderate **(42)**
Status (positive, neutral, or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Generic best practise mitigation/management measures: Planning: ➢ Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. ➢ Consult adjacent landowners (if present) in order to inform them of the development and to identify any (valid) visual impact concerns. Operations: ➢ Maintain the general appearance of the facility as a whole. ➢ Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible. ➢ Investigate the potential to screen affected receptor sites (if applicable and located within 1km of the facility) with planted vegetation cover.
Residual impacts: The visual impact will be removed after decommissioning, provided the facility infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

< 1km on observers travelling along various roads

Additionally, the operation of the proposed PV facility is expected to have a **moderate** visual impact (significance rating = 54) pre-mitigation and a slightly lower **moderate** visual impact (significance rating = 42) post mitigation on observers travelling along the various roads (as per Section 7.6) within a 1km radius of the PV Facility. Refer to Table 7.

It should be noted that Phase 1 may have a slightly higher impact significance on the secondary road as it runs along the southern boundary.

A mitigating factor in the above scenario is that observers travelling along the various roads (i.e.R61) will only experience a visual impact for a brief period of time. This reduces the probability of this impact occurring.

Mitigation of this impact is possible and both specific measures as well as general "best practice" measures are recommended in order to reduce/mitigate the potential visual impact. The tables below illustrates this impact assessment.

Table 7: Visual impact on observers travelling along the various roads within 1km to the proposed PV facility.

Nature of Impact: Visual impact on observers travelling along the various roads within 1km to the proposed PV facility.		
	Without mitigation	***With mitigation***
Extent	Very Short distance **(4)**	Very Short distance **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Very high **(10)**	Moderate **(6)**
Probability	Probable **(3)**	Probable **(3)**
Significance	Moderate **(54)**	Moderate **(42)**
Status (positive, neutral, or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Generic best practise mitigation/management measures: Planning: ➢ Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. ➢ Consult adjacent landowners (if present) in order to inform them of the development and to identify any (valid) visual impact concerns. Operations: ➢ Maintain the general appearance of the facility as a whole. ➢ Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible. ➢ Investigate the potential to screen affected receptor sites (if applicable and located within 1km of the facility) with planted vegetation cover.		
Residual impacts: The visual impact will be removed after decommissioning, provided the facility infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.		

8.2.2.2. POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS WITHIN THE LOCAL AREA (BETWEEN 1 – 3KM) SURROUNDING THE PROPOSED DEVELOPMENT

The operation of the proposed PV facility could have a **moderate** visual impact both pre and post mitigation (60 mitigated to 39) on residents/visitors to the homesteads and observers travelling along the R61 and secondary roads (as per Section 7.6) within 1 – 3km radius of the Proposed Solar PV Facility.

Mitigation of this impact is possible and both specific measures as well as general "best practice" measures are recommended in order to reduce/mitigate the potential visual impact. The table below illustrates this impact assessment.

Table 8: Impact table summarising the significance of visual impacts of the proposed infrastructure on sensitive visual receptors within the local area (between 1 - 3km)

Nature of Impact: Visual impact on residents of homesteads to the local area (between 1 - 3km offset) surrounding the proposed development.		
	No mitigation	***Mitigation considered***
Extent	Short distance **(3)**	Short distance **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	Moderate **(6)**
Probability	Highly probable **(4)**	Probable **(3)**
Significance	Moderate **(60)**	Moderate **(39)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation potential	Achievable	
Mitigation / Management: Site development & Operation: ➢ Retain / re-establish and maintain large trees, natural features and noteworthy natural vegetation in all areas outside of the activity footprint. ➢ Retain natural pockets (wetland, river and other sensitive vegetation zones) as buffers within the property and along the perimeter. ➢ Dust suppression techniques should be in place at all times during the site development and operational phases, while keeping in mind water conservation. ➢ Access roads will require an effective dust suppression management programme, such as regular wetting and/or the use of non-polluting chemicals that will retain moisture in the road surface. ➢ Keeping infrastructure at minimum heights. ➢ Introducing landscaping measures such as vegetating berms. ➢ Avoid the use of highly reflective material. ➢ Metal surfaces, where they occur, should be painted in natural soft colours that would blend in with the environment. ➢ Maintain the general appearance of the site as a whole. Lighting ➢ Lighting should be kept to a minimum wherever possible. ➢ Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the activity – this is especially relevant where the edge of the activity is exposed to residential properties. ➢ Wherever possible, lights should be directed downwards to avoid illuminating the sky. ➢ Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on movement. Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use of the site. ➢ Rehabilitate all areas as per the rehabilitation plan undertaken. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions as required.		
Residual impacts: The visual impact will be removed after decommissioning, provided the buildings and ancillary infrastructure are removed. Failing this, the visual impact will remain.		

8.2.2.3. POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS WITHIN THE DISTRICT (BETWEEN 3 – 6KM) SURROUNDING THE PROPOSED DEVELOPMENT

The operational facility could have a **moderate** visual impact both before (significance rating = 36) and a **low** visual impact after mitigation (significance rating = 20) on possible visual sensitive receptors (as outlined in Section 7.6) within 3 – 6km radius of the facility.

Mitigation of this impact is possible and both specific measures as well as general "best practice" measures are recommended in order to reduce/mitigate the potential visual impact. The table below illustrates this impact assessment.

Table 9: Impact table summarising the significance of visual impacts of the proposed infrastructure on sensitive visual receptors within the district (between 3 - 6km offset)

Nature of Impact: Visual impact on sensitive receptors in the district (between 3 - 6km offset) surrounding the proposed development.		
	No mitigation	***Mitigation considered***
Extent	Medium distance **(2)**	Medium distance **(2)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Moderate **(6)**	Low **(4)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(36)**	Low **(20)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation potential	Achievable	
Mitigation / Management: Site development & Operation: ➢ Retain / re-establish and maintain large trees, natural features and noteworthy natural vegetation in all areas outside of the activity footprint. ➢ Retain natural pockets (wetland, river and other sensitive vegetation zones) as buffers within the property and along the perimeter. ➢ Dust suppression techniques should be in place at all times during the site development and operational phases, while keeping in mind water conservation. ➢ Access roads will require an effective dust suppression management programme, such as regular wetting and/or the use of non-polluting chemicals that will retain moisture in the road surface. ➢ Keeping infrastructure at minimum heights. ➢ Introducing landscaping measures such as vegetating berms. ➢ Avoid the use of highly reflective material. ➢ Metal surfaces, where they occur, should be painted in natural soft colours that would blend in with the environment. ➢ Maintain the general appearance of the site as a whole. Lighting ➢ Lighting should be kept to a minimum wherever possible. ➢ Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the activity – this is especially relevant where the edge of the activity is exposed to residential properties. ➢ Wherever possible, lights should be directed downwards to avoid illuminating the sky. ➢ Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on movement. Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use of the site. ➢ Rehabilitate all areas as per the rehabilitation plan undertaken. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions as required.		
Residual impacts: The visual impact will be removed after decommissioning, provided the buildings and ancillary infrastructure are removed. Failing this, the visual impact will remain.		

8.2.2.4. POTENTIAL VISUAL IMPACT OF OPERATIONAL, SAFETY AND SECURITY LIGHTING OF THE FACILITY AT NIGHT

The area immediately surrounding the proposed facility has a relatively low incidence of receptors and light sources, so light trespass and glare from the security and after-hours operational lighting for the facility will have some significance for visual receptors in the study area

Lighting impacts relate to the effects of glare and sky glow. The source of glare light is unshielded luminaries which emit light in all directions and which are visible over long distances.

Sky glow is the condition where the night sky is illuminated when light reflects off particles in the atmosphere such as moisture, dust or smog. The sky glow intensifies with the increase in the number of light sources. Each new light source,

especially upwardly directed lighting, contribute to the increase in sky glow. It is possible that the PV facility may contribute to the effect of sky glow within the environment which is currently moderately developed.

Mitigation of direct lighting impacts and sky glow entails the pro-active design, planning and specification of lighting for the facility. The correct specification and placement of lighting and light fixtures for the facility and the ancillary infrastructure (e.g. workshop and storage facilities) will go far to contain rather than spread the light.

This anticipated lighting impact is likely to be of **moderate** significance, and may be mitigated to **low** especially within 0-3km radius of the facility.

Table 10: Impact table summarising the significance of visual impact of lighting at night on visual receptors in close to proximity to the proposed facility

Nature of Impact: Visual impact of lighting at night on sensitive visual receptors in the region		
	No mitigation	***Mitigation considered***
Extent	Short/medium **(3)**	Short/medium **(3)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	Moderate **(6)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(45)**	Low **(26)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation potential	Achievable	
Mitigation: <u>Planning & operation</u>: ➢ Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). ➢ Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights. ➢ Make use of minimum lumen or wattage in fixtures. ➢ Make use of down-lighters, or shielded fixtures. ➢ Make use of Low-Pressure Sodium lighting or other types of low impact lighting. ➢ Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.		
Cumulative impacts: The expected lighting impacts of the PV Facility will be in conjunction with the existing sky-glow as a result of existing development within the region. It is not expected that the additional lightning at night will contribute to a local and regional increase in lighting impact.		
Residual impacts: The visual impact will be removed after decommissioning, provided the buildings and ancillary infrastructure are removed. Failing this, the visual impact will remain.		

8.2.2.5. SOLAR GLINT AND GLARE POTENTIAL VISUAL IMPACT OF SOLAR GLINT AND GLARE ON STATIC GROUND-BASED RECEPTORS (RESIDENTS OF HOMESTEADS), AS WELL AS A VISUAL DISTRACTION AND POSSIBLE AIR/ROAD TRAVEL HAZARD

Glint and glare occurs when the sun reflects off surfaces with specular (mirror-like) properties. Examples of these include glass windows, water bodies and potentially some solar energy generation technologies (e.g. parabolic troughs and CSP heliostats). Glint is generally of shorter duration and is described as “a momentary flash of bright light”, whilst glare is the reflection of bright light for a longer duration.

The visual impact of glint and glare relates to the potential it has to negatively affect sensitive visual receptors in relatively close proximity to the source (e.g. residents of homesteads and users of the roads), or aviation safety risk for pilots (especially where the source interferes with the approach angle to the runway). The Federal Aviation Administration (FAA) of the United States of America have researched glare as a hazard for aviation pilots on final approach and prescribes specific glint and glare studies for solar energy facilities in close proximity to aerodromes (airports, airfields, military airbases, etc.).

It is generally possible to mitigate the potential glint and glare impacts through the design and careful placement of the infrastructure on static ground-based receptors and users of the roads. The following is recommended to be undertaken to aid in mitigating potential glint and glare:

- Use anti-reflective panels and dull polishing on structures. PV panels are designed to generate electricity by absorbing the rays of the sun and are therefore constructed of dark-coloured materials, and are covered by anti-reflective coatings. Indications are that as little as 2% of the incoming sunlight is reflected from the surface of modern PV panels especially where the incidence angle (angle of incoming light) is smaller i.e. the panel is facing the sun directly. This is particularly true for tracker arrays that are designed to track the sun and keep the incidence angle as low as possible.[4]
- It is recommended to avoid using deeply textured glass, as research has indicated that employing smooth or lightly textured glass, effectively mitigates any glint and glare impacts.
- Adjust tilt angles of the panels if glint and glare issues become evident, where possible.
- Provide significant screening around the development site. Significant screening' with respect to visibility of reflecting solar panels implies that the observer's view is impeded to the extent that the presence of the solar panels cannot be easily discerned at first glance. [5] Refer to Figure 14 below for an illustration as to what is meant by 'sufficient screening'. This can be achieved through the application of one or a combination of the following methods:
    - Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the boundary of the entire development footprint.
    - Construct and plant a vegetated berm
    - Should no existing vegetation be present in certain areas or should it be insufficient in height to provide sufficient screening in certain areas, then it is recommended that vegetated berms be constructed and planted. This vegetated berm is required to consist of the following:
        - Plant species that are preferably locally endemic but at a minimum at least indigenous.
        - A combination of plant species of various height variations (i.e. low shrubs to tall trees) to ensure sufficient coverage exceeding the expected panel heights.
        - Evergreen species to ensure coverage through all seasons of the year, especially winter.
- Should the construction and planting of a vegetated screen not be possible then it is recommended that a wall be constructed exceeding the height of the panels.
- Reduce the mounting height of the panels to as low as possible to ensure that the screening measures recommended above are possible to implement.

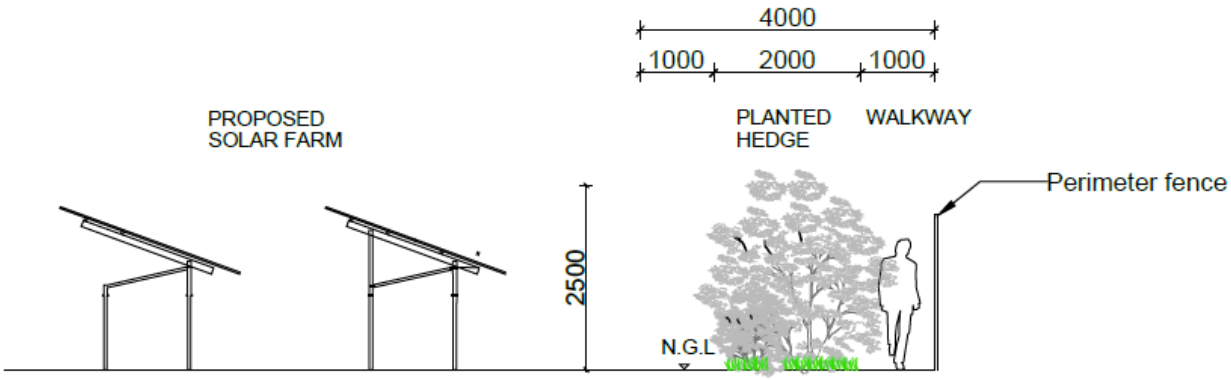


Figure 13: Example of how vegetation screening may be implemented

[4] Sources: Blue Oak Energy, FAA and Meister Consultants Group.

[5] Sources: PagerPower 2023.

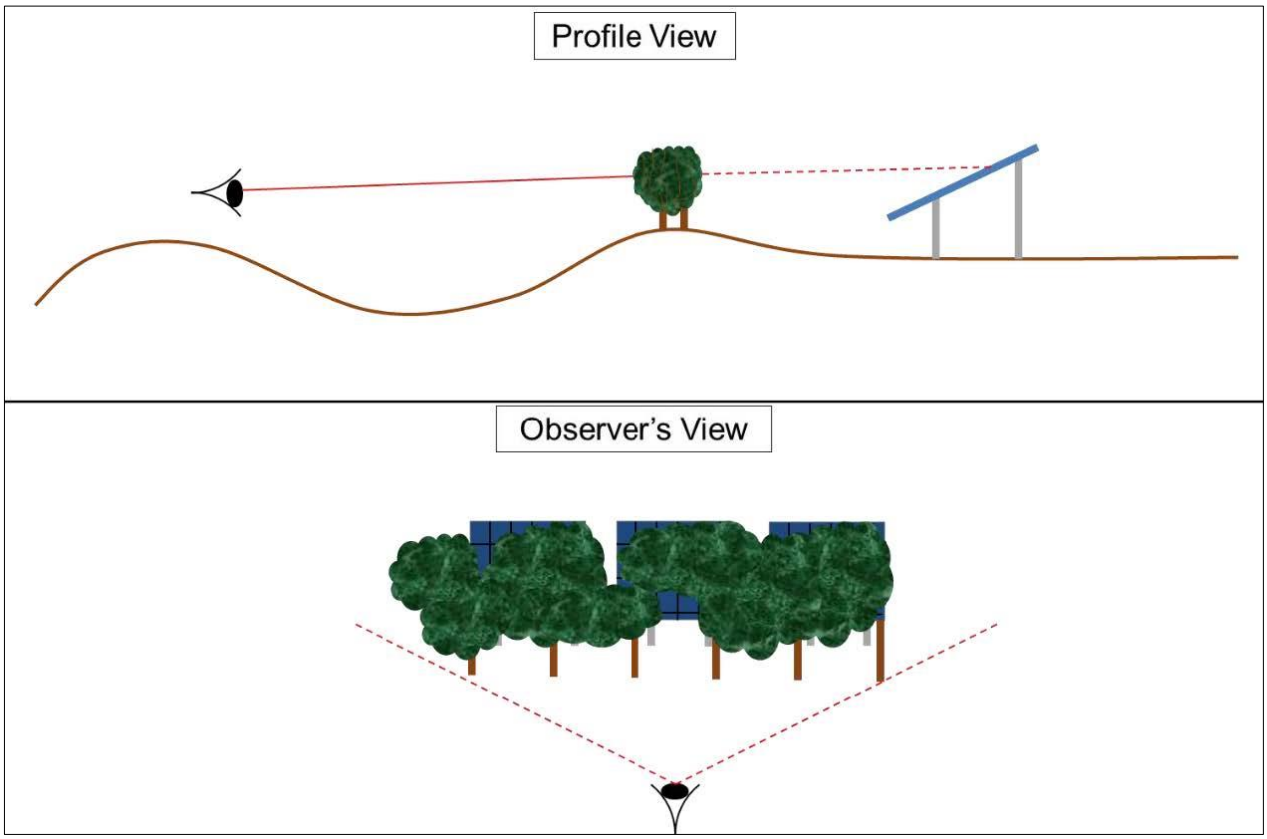


Figure 14: Illustration of 'significant screening'[6]

Glint and Glare on road users

There is one (1) major road within a 1km radius of the proposed PV facility, namely the R61. This approximate distance is recommended as a threshold within which the visual impact of glint and glare (if there is visual line of sight from the road) may influence road users.[7]

The potential visual impact related to solar glint and glare as a road travel hazard is therefore expected to be of **moderate** significance (rating = 54), and may be mitigated to **low** (rating = 28) for users of the R61.

Of note is that should all the recommended mitigation measure as outlined above not be implemented and sufficient screening not be achieved, then a significance rating of low will not be attained and it is expected that a the visual impact will remain moderate, potentially even high.

Table 11: Impact table summarising the significance of the visual impact of solar glint and glare as a visual distraction to users of the roads

Nature of Impact: The visual impact of solar glint and glare as a visual distraction and possible road travel hazard		
	Without mitigation	***With mitigation***
Extent	Very short distance **(4)**	Very short distance **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Very High **(10)**	Moderate **(6)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(54)**	Low **(28)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

[6] Sources: PagerPower 2023.
[7] December 2020, Solar Photovoltaic Glint and Glare Guidance Third Edition.

Mitigation: Planning & operation: ➢ Use anti-reflective panels and dull polishing on structures, where possible and industry standard. ➢ It is recommended to avoid using deeply textured glass, as research has indicated that employing smooth or lightly textured glass, effectively mitigates any glint and glare impacts. ➢ Adjust tilt angles of the panels if glint and glare issues become evident, where possible. ➢ Provide significant screening around the development site. This can be achieved through the application of one or a combination of the following methods: o Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the boundary of the entire development footprint. o Construct and plant a vegetated berm o Should no existing vegetation be present in certain areas or should it be insufficient in height to provide sufficient screening in certain areas, then it is recommended that vegetated berms be constructed and planted. This vegetated berm is required to consist of the following: ▪ Plant species that are preferably locally endemic but at a minimum at least indigenous. ▪ A combination of plant species of various height variations (i.e. low shrubs to tall trees) to ensure sufficient coverage exceeding the expected panel heights. ▪ Evergreen species to ensure coverage through all seasons of the year, especially winter. ➢ Should the construction and planting of a vegetated screen not be possible then it is recommended that a wall be constructed exceeding the height of the panels. ➢ Reduce the mounting height of the panels to as low as possible to ensure that the screening measures recommended above are possible to implement ➢ Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint. ➢ Adjust tilt angles of the panels if glint and glare issues become evident, where possible. ➢ If specific sensitive visual receptors are identified during operation, investigate screening at the receptor site, where possible. ➢ Recommended that a Glint and Glare Assessment be undertaken if the airstrip noted on PV Site B will be retained and used during the operational phase of the development.
Residual impacts: The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Glint and Glare as an air hazard

The South African Civil Aviation Authority (CAA) mandates that a glint and glare assessment be conducted for any solar project within three kilometres of an aerodrome and located on the extended centreline of a runway, as outlined in Obstacle Notice 3/2020.

No aerodromes are located within 3 km of the proposed PV facility.

Glint and Glare on Static Ground-Based Receptors

A few residences are located within a 1km radius of the proposed PV facility, as identified in Section 7.6, The potential visual impact related to solar glint and glare on static ground-based receptors is therefore expected to be of a **high** visual impact (significance rating = 64) which may be mitigated to **moderate** (significance rating = 42).

Mitigation of this impact is possible and both specific measures as well as general "best practice" measures are recommended in order to reduce/mitigate the potential visual impact. The table below illustrates this impact assessment.

Table 12: Impact table summarising the significance of the visual impact of solar glint and glare on static ground receptors

Nature of Impact: The visual impact of solar glint and glare on residents of homesteads within 1km of the PV facility		
	Without mitigation	***With mitigation***
Extent	Very short distance **(4)**	Very short distance **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	Moderate **(6)**
Probability	Highly Probable **(4)**	Probable **(3)**
Significance	High **(64)**	Moderate **(42)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No

Can impacts be mitigated?	Yes
Mitigation: Planning & operation: ➢ Use anti-reflective panels and dull polishing on structures, where possible and industry standard. ➢ It is recommended to avoid using deeply textured glass, as research has indicated that employing smooth or lightly textured glass, effectively mitigates any glint and glare impacts. ➢ Adjust tilt angles of the panels if glint and glare issues become evident, where possible. ➢ Provide significant screening around the development site. This can be achieved through the application of one or a combination of the following methods: o Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the boundary of the entire development footprint. o Construct and plant a vegetated berm o Should no existing vegetation be present in certain areas or should it be insufficient in height to provide sufficient screening in certain areas, then it is recommended that vegetated berms be constructed and planted. This vegetated berm is required to consist of the following: ▪ Plant species that are preferably locally endemic but at a minimum at least indigenous. ▪ A combination of plant species of various height variations (i.e. low shrubs to tall trees) to ensure sufficient coverage exceeding the expected panel heights. ▪ Evergreen species to ensure coverage through all seasons of the year, especially winter. ➢ Should the construction and planting of a vegetated screen not be possible then it is recommended that a wall be constructed exceeding the height of the panels. ➢ Reduce the mounting height of the panels to as low as possible to ensure that the screening measures recommended above are possible to implement ➢ Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint. ➢ Adjust tilt angles of the panels if glint and glare issues become evident, where possible. ➢ If specific sensitive visual receptors are identified during operation, investigate screening at the receptor site, where possible. ➢ Recommended that a Glint and Glare Assessment be undertaken if the airstrip noted on PV Site B will be retained and used during the operational phase of the development.	
Residual impacts: The visual impact will be removed after decommissioning, provided the PV facility infrastructure is removed. Failing this, the visual impact will remain.	

8.2.2.6. ANCILLARY INFRASTRUCTURE

On-site ancillary infrastructure associated with the PV Facility includes a BESS, access roads, onsite substation, etc. No dedicated viewshed analyses have been generated for the ancillary infrastructure, as the range of visual exposure will fall within that of the Solar PV Facility.

The anticipated visual impact resulting from this infrastructure is likely to be of **low** significance both before (significance rating = 28) and after mitigation (significance rating = 24).

Table 13: Visual impact of the ancillary infrastructure

Nature of Impact: Visual impact of the ancillary infrastructure on observers in close proximity to the structures.		
	Without mitigation	***With mitigation***
Extent	Very Short distance **(4)**	Very Short distance **(4)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	Moderate **(6)**	Low **(4)**
Probability	Improbable **(2)**	Improbable **(2)**
Significance	Low **(28)**	Low **(24)**
Status (positive, neutral, or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Generic best practise mitigation/management measures: Planning: ➢ Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. Operations: ➢ Maintain the general appearance of the facility as a whole. ➢ Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible. ➢ Investigate the potential to screen affected receptor sites (if applicable and located within 1km of the facility) with planted vegetation cover.
Residual impacts: The visual impact will be removed after decommissioning, provided the ancillary infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

8.2.2.7. DECOMMISSIONING IMPACTS

During decommissioning there may be a noticeable increase in heavy vehicles utilising the roads to the site that may cause, at the very least, a visual nuisance to other road users and landowners in closer proximity (< 1 km) to the decommissioning activities.

Decommissioning activities may potentially result in a **moderate** temporary visual impact both pre and post mitigation.

A mitigating factor in this scenario is the low number of receptors within the receiving environment.

Table 14: Visual impact of decommissioning activities on sensitive visual receptors in close proximity to the proposed facility

Nature of Impact: Visual impact of decommissioning on sensitive visual receptors in close proximity (< 1km) to the proposed development		
	No mitigation	***Mitigation considered***
Extent	Very short **(4)**	Very short **(4)**
Duration	Very short term **(1)**	Very short term **(1)**
Magnitude	Very High **(10)**	Moderate **(6)**
Probability	Highly Probable **(4)**	Probable **(3)**
Significance	Moderate **(60)**	Moderate **(33)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation potential	Achievable	
Mitigation / Management: Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use of the site. ➢ Rehabilitate all areas as per the rehabilitation plan undertaken. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions as required.		
Residual impacts: None, provided that rehabilitation works are carried out as specified.		

8.3. INDIRECT IMPACTS

The indirect visual impacts of the proposed Langside SEF are assessed as follows:

8.3.1. OPERATIONAL PHASE

8.3.1.1. POTENTIAL VISUAL IMPACT OF FACILITY OPERATIONS ON THE VISUAL CHARACTER OF THE LANDSCAPE AND SENSE OF PLACE OF THE REGION

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

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

In general, the landscape character of the greater study area and site itself presents as largely natural in character with wide open spaces, and rolling hills with a limited amount of built infrastructure. As such, the entire study area is considered sensitive to visual impacts.

The anticipated significance of the visual impacts on the sense of place within the region (i.e. beyond a 6km radius of the development and within the greater region) is expected to be of **moderate** significance post mitigation.

Table 15: Impact table summarising the significance of visual impacts of facility operations on landscape character and sense of place within the region

Nature of Impact: Visual impact of the proposed development on the visual quality of the landscape and sense of place of the region		
	No mitigation	***Mitigation considered***
Extent	Long distance **(1)**	Long distance **(1)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(10)**	Moderate **(6)**
Probability	Highly probable **(4)**	Probable **(3)**
Significance	Moderate **(60)**	Moderate **(33)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation potential	Very Difficult	
Mitigation / Management: Planning: ➢ Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint. ➢ Plan ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised. ➢ Use existing roads wherever possible. Where new roads are required to be constructed, these should be planned carefully, taking due cognisance of the local topography. Roads should be laid out along the contour wherever possible, and should never traverse slopes at 90 degrees. Construction of roads should be undertaken properly, with adequate drainage structures in place to forego potential erosion problems. Construction: ➢ Rehabilitate all construction areas. ➢ Ensure that vegetation is not cleared unnecessarily to make way for infrastructure. Operations: ➢ Maintain the general appearance of the facility as a whole. ➢ Monitor rehabilitated areas, and implement remedial action as and when required. Decommissioning: ➢ Remove infrastructure not required for the post-decommissioning use of the site. ➢ Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications. ➢ Monitor rehabilitated areas post-decommissioning and implement remedial actions.		
Residual impacts: The visual impact will be removed after decommissioning, provided the buildings and ancillary infrastructure are removed. Failing this, the visual impact will remain.		

8.3.1.2. POTENTIAL CUMULATIVE VISUAL IMPACT WITHIN THE REGION

The proposed Langside SEF is located within a REDZ, in an area where no other PV facilities have been authorized within 30km of the site.

The anticipated cumulative visual impact of the proposed Solar PV Facility is expected to be of **low** significance.

Table 16: Impact table summarising the significance of the cumulative visual impact on sensitive visual receptors within the region

Nature of Impact: The potential cumulative visual impact of the proposed facility together with the other existing built structures on sensitive visual receptors within the region		
	Overall impact of the proposed project considered in isolation	***Cumulative impact of the project and other projects in the area***
Extent	Region **(1)**	Region **(1)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	High **(8)**
Probability	Probable **(3)**	Improbable **(2)**
Significance	Moderate **(39)**	Low **(26)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation potential	Very Difficult	
Mitigation / Management: Not Applicable		
Residual impacts: The visual impact will be removed after decommissioning, provided the buildings and ancillary infrastructure are removed. Failing this, the visual impact will remain.		

8.4. THE POTENTIAL TO MITIGATE VISUAL IMPACTS

The primary visual impact, namely the layout and appearance of the proposed Langside SEF is not possible to mitigate. The functional design of the facility cannot be changed in order to reduce visual impacts. The following mitigation is however possible:

- Consult adjacent landowners (if present) in order to inform them of the development and to identify any (valid) visual impact concerns.
- It is recommended that vegetation cover (i.e. either natural or cultivated) immediately adjacent to the development footprint be maintained, both during construction and operation of the proposed facility. This will minimise visual impact as a result of cleared areas and areas denuded of vegetation.
- Plan buildings in such a way and in such a location that clearing of vegetation is minimised. Consolidate buildings as much as possible and make use of already disturbed areas rather than pristine sites wherever possible.
- Use existing roads wherever possible. Where new roads are required to be constructed, these should be planned carefully, taking due cognisance of the local topography. Roads should be laid out along the contour wherever possible and should never traverse slopes at 90 degrees. Construction of roads should be undertaken properly, with adequate drainage structures in place to forego potential erosion problems.

Glint and glare impact mitigation measures include the following:

- Use anti-reflective panels and dull polishing on structures.
- It is recommended to avoid using deeply textured glass, as research has indicated that employing smooth or lightly textured glass, effectively mitigates any glint and glare impacts.
- Adjust tilt angles of the panels if glint and glare issues become evident, where possible.
- Provide significant screening around the development site. Significant screening' with respect to visibility of reflecting solar panels implies that the observer's view is impeded to the extent that the presence of the solar panels cannot be easily discerned at first glance. This can be achieved through the application of one or a combination of the following methods:
    - Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the boundary of the entire development footprint.
    - Construct and plant a vegetated berm
    - Should no existing vegetation be present in certain areas or should it be insufficient in height to provide sufficient screening in certain areas, then it is recommended that vegetated berms be constructed and planted. This vegetated berm is required to consist of the following:
        - Plant species that are preferably locally endemic but at a minimum at least indigenous.
        - A combination of plant species of various height variations (i.e. low shrubs to tall trees) to ensure sufficient coverage exceeding the expected panel heights.
        - Evergreen species to ensure coverage through all seasons of the year, especially winter.

- Should the construction and planting of a vegetated screen not be possible then it is recommended that a wall be constructed exceeding the height of the panels.
- Reduce the mounting height of the panels to as low as possible to ensure that the screening measures recommended above are possible to implement.

Mitigation of visual impacts associated with the construction phase, albeit temporary, entails proper planning, management, and rehabilitation of all construction sites. Construction should be managed according to the following principles:

- Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
- Reduce the construction period through careful logistical planning and productive implementation of resources.
- Plan the placement of lay-down areas and any potential temporary construction camps in order to minimise vegetation clearing.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities.
- Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e., whenever dust becomes apparent).
- Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
- Ensure that all infrastructure and the site and general surrounds are maintained and kept neat.
- Access roads, which are not required post-construction, should be ripped and rehabilitated.
- Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.
- Monitor all rehabilitated areas for at least a year for rehabilitation failure and implement remedial action as required. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.

- During Operations, monitor the general appearance of the facility as a whole as well as all rehabilitated areas. Implement remedial action where required.
- Retain natural pockets (wetland, river, and other sensitive vegetation zones) as buffers within the property and along the perimeter.
- Keeping infrastructure at minimum heights.
- Avoid the use of highly reflective material.
- Metal surfaces, where they occur, should be painted in natural soft colours that would blend in with the environment.
- Indirect impacts anticipated as a result of the proposed infrastructure (i.e., impacts on landscape character and sense of place) are not possible to mitigate.

- After decommissioning, all infrastructure should be removed and all disturbed areas appropriately rehabilitated. Monitor rehabilitated areas post-decommissioning and implement remedial actions and consult an ecologist regarding rehabilitation specifications if necessary.

The possible mitigation of both direct and indirect visual impacts as listed above should be implemented and maintained on an ongoing basis.

9. IMPACT STATEMENT

The findings of the Visual Impact Assessment undertaken for the proposed Langside SEF is that the visual environment surrounding the site, especially within a 1km radius (and potentially up to a radius of 3km) of the proposed facility, may be visually impacted during the anticipated operational lifespan of the facility (i.e. >15 years). The table below is a summary of the visual impacts as assessed above:

Table 17: Impact table summarising the significance ratings as determined

Significance Ratings Summary		
	Pre-mitigation	**Post mitigation**

	impact rating	impact rating
Direct Impacts		
Construction Phase		
Potential temporary visual impact of construction on residents of towns and homesteads located within 1km of the proposed PV Facility	High	Moderate
Potential temporary visual impact of construction on observers travelling along the various roads within 1km to the proposed PV Facility	Moderate	Moderate
Operational Phase		
Potential visual impact on residents at homesteads, suburbs, developed areas, and visitors/tourists within1km of the proposed PV Facility	High	Moderate
Potential visual impact on observers travelling along roads located within a 1km radius of the proposed PV Facility	Moderate	Moderate
Potential visual impact on sensitive visual receptors within 1 - 3km radius of the proposed PV Facility	Moderate	Moderate
Potential visual impact on sensitive visual receptors within 3 - 6km radius of the proposed PV Facility	Moderate	Low
Potential visual impact of operational, safety and security lighting of the facility on sensitive visual receptors at night	Moderate	Low
Potential visual impact of solar glint and glare on roads users within 1km of the proposed PV Facility	Moderate	Low
Potential visual impact of solar glint and glare as an air hazard within 3km of the proposed PV Facility	N/A	N/A
Potential visual impact of solar glint and glare on static ground-based receptors within 1km of the proposed PV Facility	High	Moderate
Potential visual impact of ancillary infrastructure	Low	Low
Decommissioning		
Potential temporary visual impact of decommissioning on sensitive receptors located within 1km of the proposed PV Facility	Moderate	Moderate
Indirect Impacts		
Operational Phase		
Potential visual impact of the proposed infrastructure on the sense of place of the region	Moderate	Moderate
Cumulative Impacts		
The potential cumulative visual impact of the proposed PV Facility on the visual quality of the landscape	*In isolation* Moderate	*Cumulative* Low

The anticipated visual impacts listed above (i.e. post mitigation impacts) range from prominently **moderate** to **low** significance. No post-mitigation visual impacts of **high** is anticipated in terms of the proposed Langside SEF.

10. CONCLUSION AND RECOMMENDATIONS

The visual impact assessment (VIA) practitioner takes great care to ensure that all the spatial analyses and mapping is as accurate as possible. The intention is to quantify, using visibility analyses, proximity analyses and the identification of sensitive receptors and the potential visual impacts associated with the proposed **Langside Solar Energy Facility**. These processes are deemed to be transparent and scientifically defensible when interrogated.

The construction and operation of the proposed Langside SEF may have a visual impact on the study area, especially within a 1km radius (and potentially up to a radius of 3km) of the proposed facility. The visual impact will differ amongst places, depending on the distance from the facility. Overall, the post mitigation significance of the visual impacts are expected to range from **moderate** to **low**.

The REEA database indicates that there are no proposed PV Facilities within 30km of the proposed facility. Additionally, the proposed Langside SEF is located within the Stormberg REDZ. REDZ concentrate renewable energy facilities within identified zones in an effort to prevent the scattered proliferation of renewable energy generation infrastructure beyond the REDZ and throughout the greater region. Considering the above, the potential **cumulative visual impact is considered to be low and within acceptable limits**.

The DFFE screening tool generated for Solar PV Facility made no specific mention to the landscape/solar theme. However, based on the above findings in this report, it can be found that the sensitivity of the visual environment for the proposed Solar PV Facility is confirmed to be **moderate** due to:

- Lack of placement of panels on steep slopes or mountain tops/ridges
- Low occurrence of homesteads within 500m
- Low to moderate VAC of the receiving environment
- Dams within 250 m of the site
- The R61 and scenic routes within 500m to 1 km form the proposed site
- The placement of the development within the Stormberg REDZ
- Moderate quantities of existing built infrastructure within the study area

According to the Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning (DEA&DP) Guideline for Involving Visual and Aesthetic Specialists in the EIA Process (Oberholzer, 2005), the criteria that determine whether or not a visual impact constitutes a potential fatal flaw are categorised as follows:

1. Non-compliance with Acts, Ordinances, By-laws and adopted policies relating to visual pollution, scenic routes, special areas or proclaimed heritage sites.
2. Non-compliance with conditions of existing Records of Decision.
3. Impacts that may be evaluated to be of high significance and that are considered by the majority of the stakeholders and decision-makers to be unacceptable.

In terms of the above and to the knowledge of the author the proposed development is compliant with all Acts, Ordinances, By-laws and adopted policies relating to visual pollution, scenic routes, special areas or proclaimed heritage sites, as well as, conditions of existing Records of Decisions.

Since no objections have been reported from stakeholders or decision-makers within the region to the knowledge of the author, this assessment has adopted a risk averse approach by assuming that the perception of most (if not all) of the sensitive visual receptors within the study area would be predominantly neutral towards the development.

Overall, the significance of the visual impacts is expected to range from **moderate** to **low.** Therefore, with the information available to the specialist at the time of writing this report, it cannot be empirically determined that the statistical majority of objecting stakeholders were exceeded. If evidence to the contrary surfaces during the progression of the development application, the specialist reserves the right to revise the statement below.

A number of mitigation measures have been proposed (**Section 8.4**). Regardless of whether or not mitigation measures will reduce the significance of the anticipated visual impacts, they are considered to be good practice and should all be implemented and maintained throughout the construction, operation and decommissioning phases of the proposed facility.

If mitigation is undertaken as recommended, it is concluded that the significance of most of the anticipated visual impacts will remain at or be managed to acceptable levels. As such, the Langside Solar Energy Facility would be considered to be acceptable from a visual impact perspective.

It should be noted that the results/deductions in this report are based solely from a visual perspective in relation to potential visual impacts and sensitive visual receptors and exclude any potential issues/comments/fatal flaws identified by other specialist studies.

11. REFERENCES

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