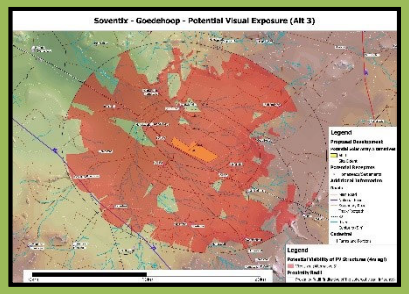
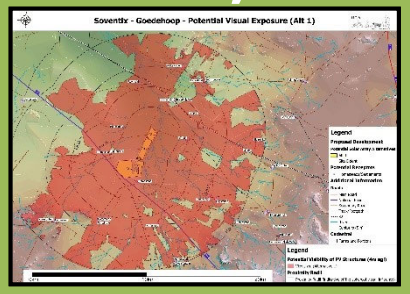
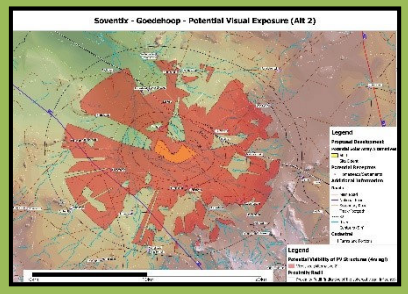
July 2017

VISUAL IMPACT ASSESSMENT REPORT

FOR THE PROPOSED SOVENTIX PHOTOVOLTAIC PLANT –. ON SEVERAL PORTIONS OF THE FARM GOEDEHOOP, HANOVER DISTRICT, NORTHERN CAPE







Produced for:
Ecoleges Environmental Consultants.

Produced by:
Henwood Environmental

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Acronyms

AGL	Above Ground Level
DoE	Department of Energy
EAP	Environmental Assessment Practitioner
GIS	Geographical Information System
HES	Henwood Environmental Solutions
HTF	Heat Transfer Fluid
LCAs	Landscape Character Areas
MW	Mega Watt
NEMA	National Environmental Management Act, Act No. 107 of 1998
NERSA	National Energy Regulator of South Africa
PPA	Power Purchase Agreement
PV	Photovoltaic
REFIT	The renewable energy feed-in tariff
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VISR	Visual Impact Scoping Report

1. INTRODUCTION

1.1. General

Soventix South Africa (Pty) Ltd, a multi-national renewable energy company with its head office in Germany, is in the process of investigating the development of a 225MW solar PV plant on an estimated development footprint of approximately 520ha. This area includes three 75MW solar PV plants (170ha each), with associated infrastructure, as well as the sub-station that will tie into the ESKOM overhead 132 KV or 400KV powerlines. Existing roads will be used for access.

The site is located on several portions of the farm Goedehoop, Hanover District, Northern Cape.

This Visual Impact Scoping Report (VISR) study forms part of the Scoping and Environmental Impact Assessment that is being carried out for the proposed solar PV plant by Ecoleges Environmental Consultants on behalf of Soventix South Africa (Pty) Ltd.

The EIA forms part of the feasibility study and prerequisite by NERSA for awarding a PPA under the REFIT programme.

1.2. Project Location, need and desirability

The site is located on several portions of the farm Goedehoop, Hanover District, Northern Cape.

Geographic coordinates for the centre point of each of the site alternatives is are as follows:

The primary rationale for developing any PV Solar Energy Facility is to add new generation capacity from renewable energy to the national electricity mix and to aid in achieving the goal of a 42% share of all new installed generating capacity (new build) being derived from renewable energy forms, as targeted by the Department of Energy (DoE) (Integrated Resource Plan 2010 – 2030).

In terms of the Integrated Resource Plan (IRP), approximately 8.4% of the renewable energy mix is planned to be generated from PV technologies over the next thirty years. This is, however, dependent on the assumed learning rates and associated cost reductions for renewable options.

In the event of the project being developed, it will contribute to the local electricity grid, as well as to the target for renewable energy as detailed in the IRP. In addition, the implementation of the proposed project will provide both economic stimulus to the local economy through the construction process and employment for the operational phase of the facility

Table 1: Locality Coordinates of each alternative.

Alternative 1

Latitude (S):			Longitude (E):		
30°	52’	24.27”	24°	15’	34.3547”

Alternative 2

Latitude (S):			Longitude (E):		
30°	53’	16.8735”	24°	18’	51.2191”

Alternative 3

Latitude (S):			Longitude (E):		
30°	50’	47.3468”	24°	20’	4.1040”

1.3. Qualification and Experience of the Practitioner

Ecoleges Environmental Consultants appointed Henwood Environmental Solutions (HES) as an independent specialist consultant to undertake the visual impact assessment for the proposed construction of a Photovoltaic Plant.

The professional team undertaking the visual assessment specialises in Environmental Planning, Environmental Management, Impact Assessment and Visual Impact Assessment and has been involved in the application of Geographical

Information Systems (GIS) in Environmental Planning and Management for several years.

This Visual Impact Assessment (VIA) is a specialist study to determine the potential visual affects of the proposed development on the receiving environment. Neither the author nor HES will benefit from the outcome of the project decision-making.
A brief Curriculum Vitae of relevant project is included as **Appendix A**.

1.4.

Legal Framework

The following guidelines have informed this VIA scoping study:

- The Environmental Impact Assessment Amendment Regulations, 2010;
- Guideline on Generic Terms of Reference for EAPs and Project Schedules (DEADP, Provincial Government of the Western Cape, 2011).
- Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (DEADP, Provincial Government of the Western Cape, 2005).
- The Government of the Western Cape Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (Western Cape Guidline) (Oberholzer 2005).

  The HES 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.

1.5. Information Sources

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 as well as other sources;
- Information received from the Environmental Assessment Practitioner;
- Professional judgement based on experience gained from similar projects; and
- Literature research on similar projects.

1.6. Scope of Work

Soventix South Africa (Pty) Ltd proposes to establish the following facility on a site near Honover within the Northern Cape Province:

- Three Photovoltaic (PV) Solar Energy Facilities with a combined generation capacity of 225 MW and a height of up to 4m.

The PV facility is proposed on the following properties:

- PORTIONS RE/26, 3/26, 3/27, 5/27 - 8/27, RE/39, 1/39, 2/39, RE/40, 1/40, 2/40, 4/41, 1/56 and 8/56, REGISTRATION DIVISION HANOVER RD.

The site, consisting of these properties, is located some 27 km north west of Honover and 38 km south east of De Aar.

The greater study area for the visual assessment encompasses a geographical area of approximately 1388.99 km² and includes a minimum 10km buffer zone from the proposed development area. The main road passing through the area is the N10 highway between De Aar and Hanover.

There are no towns or built up areas within the study area.

The scope of the work includes an indepth visual assessment of the issues related to the visual impact.

1.7 Assumptions and Limitations

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

There are three possible alternative sites each of which are situated on PORTIONS RE/26, 3/26, 3/27, 5/27 - 8/27, RE/39, 1/39, 2/39, RE/40, 1/40, 2/40, 4/41, 1/56 and 8/56, REGISTRATION DIVISION HANOVER RD.

1.8 Level of Confidence

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

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

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

These values are applied as follows:

Table 2: Level of confidence

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

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

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

[1] Adapted from Oberholzer (2005).

1.6. Methodology

A site visit was undertaken on the 7th, 8th and 9th of November 2016. The time of the site visit and the season will not have an impact on the out con=me of the study due to the inherently low capacity of the vegetation to absorb the visual impact.

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 facility. A detailed Digital Terrain Model (DTM) for the study area was created from 5m interval contours from the National Geo-Spatial Information data supplied by the Department: Rural Development and Land Reform.

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

- The creation of a detailed digital terrain model of the potentially affected environment.
- The sourcing of relevant spatial data. This included cadastral features, vegetation types, land use activities, topographical features, site placement, etc.
- The identification of sensitive environments upon which the proposed facility could have a potential impact.
- The creation of viewshed analyses from the proposed development area to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analyses consider 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 Solar Facility, including associated infrastructure, as well as offer potential mitigation measures, where required.

The following methodology has been followed for the assessment of visual impact:

- **Determine potential visual exposure**

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

Viewshed analyses of the proposed Solar Facility indicate the potential visibility.

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

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

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

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

The digital terrain model utilised in the calculation of the visual exposure of the facility 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, supplemented with field observations.

- **Determine visual distance and observer proximity to the facility**

In order to refine the visual exposure of the facility 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 Facility.

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

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

- **Determine viewer influence and viewer incidence**

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

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

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 impact index**

The results of the above analyses are merged in order to determine where the areas of likely visual impact would occur and analysed in order to judge the magnitude of each impact.

- **Determine 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. Mitigation is recommended where possible.

2. PROJECT DESCRIPTION

Soventix South Africa (Pty) Ltd is proposing the development of a 225MW solar PV plant on an estimated development footprint of approximately 520ha. This area includes three 75MW solar PV plants (170ha each), with associated infrastructure, as well as the sub-station that will tie into the ESKOM overhead 132KV or 400KV powerlines.

Photovoltaic technology is used to generate electricity by converting solar radiation into direct current electricity using semiconductors (i.e. silicon) through the photovoltaic effect. PV technology refers to the use of multiple PV cells which are linked together to form PV panels.

Photovoltaic energy generation is generally considered to be an environmentally friendly electricity generation option.

The purpose of the proposed plant is to add new capacity for generation of renewable energy to the national electricity mix.

The proposed PV Plant will consist of the following infrastructure:

- Three arrays of Photovoltaic solar panels situated within the proposed footprint, with a generating capacity of up to 225MW;
- The panels will be erected on support structures that will be up to 4m high and will be mounted on a single axis tilt mechanism to track the sun from East to West;
- Electrical cabling between the project components, to be laid underground where practical;
- Three small internal roads separating the array sections into four sections. These roads will run in an east/west direction;
- Fences to secure the project perimeter and
- Substation inverter building, inverter buildings, security building, offices, workshops and storage areas.

The power will feed into the Eskom electricity grid via the existing substation.

3. THE AFFECTED ENVIRONMENT

3.1. Regional

The proposed site is located on the northern side and adjacent to the N10 highway, some 27 km north west of Hanover and 38 km south east of De Aar within the Northern Cape Province. This area falls within the jurisdiction of the Emthanjeni Local Municipality. The Emthanjeni Local Municipality is one of the eight municipalities that constitute the Pixley ka Seme District Municipality. The District Municipality also includes one District Management Area (DMA) located in the north-western region of the District.

The Emthanjeni Local Municipality is approximately 11 390 km² in size (~11% of the greater Pixley ka Seme District Municipality) and is bordered in the north by the DMA, in the east by the Renosterberg Local Municipality and Umsobomvu Local Municipality, in the south by the Ubuntu Local Municipality and in the west by the Kareeberg Local Municipality. The largest towns within the Emthanjeni Local Municipality are De Aar, Britstown and Hanover.

The dominant land use activity in the area is farming, specifically livestock farming (sheep). Small game farming (springbok) is also prevalent in the broader area.

The N10 national road traverses the study area, as do several secondary roads. Access to the proposed site is via one of the secondary roads that branches off the N10. The secondary roads are predominantly utilised by local farmers to access the facilities and services in Hanover.

Rail infrastructure is prominent in the area, with De Aar representing the second most important railway junction in South Africa.

The railway line runs North west to the south east through the middle of the study area. These lines include both freight and passenger lines.

Other industrial infrastructure includes extensive network of Solar Facilities running north west to south east through the site.

3.2. The study area

The proposed site is located on Portions RE/26, 3/26, 3/27, 5/27 - 8/27, RE/39, 1/39, 2/39, RE/40, 1/40, 2/40, 4/41, 1/56 and 8/56, Registration Division Hanover RD, which is privately owned. The property is bounded to the east by a series of small, low lying hills and inselbergs, and the Brak River which exits the property from the north west. The site is bounded to the south by the N10 road. The homesteads of Burgervilleweg, De Fort and De Bad are located on the property. Known homesteads / farm houses and small farming settlements around the site include *Rooikraa*l, *Palmietfontein*, *Goodhope*, *Skilpad*, *Taaibosfontein*, *Constantia* and *Blouboskuil.*

The dominant land use on site is livestock grazing and the secondary land use is irrigated agriculture.

The topography of the site is relatively gentle and slopes gently towards the north west away from the hill to the east of the site. The elevation on site varies from 1300 m (along the drainage line) to 1354 m above sea level (at the top of the nearby koppies).

Figure 1: Agricultural land use and topography of the study area.

There are various drainage lines draining the larger study area, and these are classified as non-perennial. The main non-perennial drainage line (the Brak River) emanates from within the property and exits on the north-western boundary. A second non-perennial drainage line enters the site on the south western, and traverses the property until it joins the Brak River. Refer to **Map 1**.

The dominant land cover surrounding and including the site, consists primarily of *extensive grazing,* with the secondary land use being *irrigated agriculture (with associated infrastructure)*. The study area is located within the *Nama Karoo* biome, with rainfall ranging from 123 mm - 248 mm per annum. The vegetation type is classified as *Northern Upper Karoo*. Refer to **Map 2**.

Most the study area is sparsely populated (3.4 people per km2 within the Namakwa District Municipality) and consists of a landscape of wide-open expanses and vast desolation. The scarcity of water and other natural resources has influenced settlement within this region, keeping numbers low, and distribution limited to the

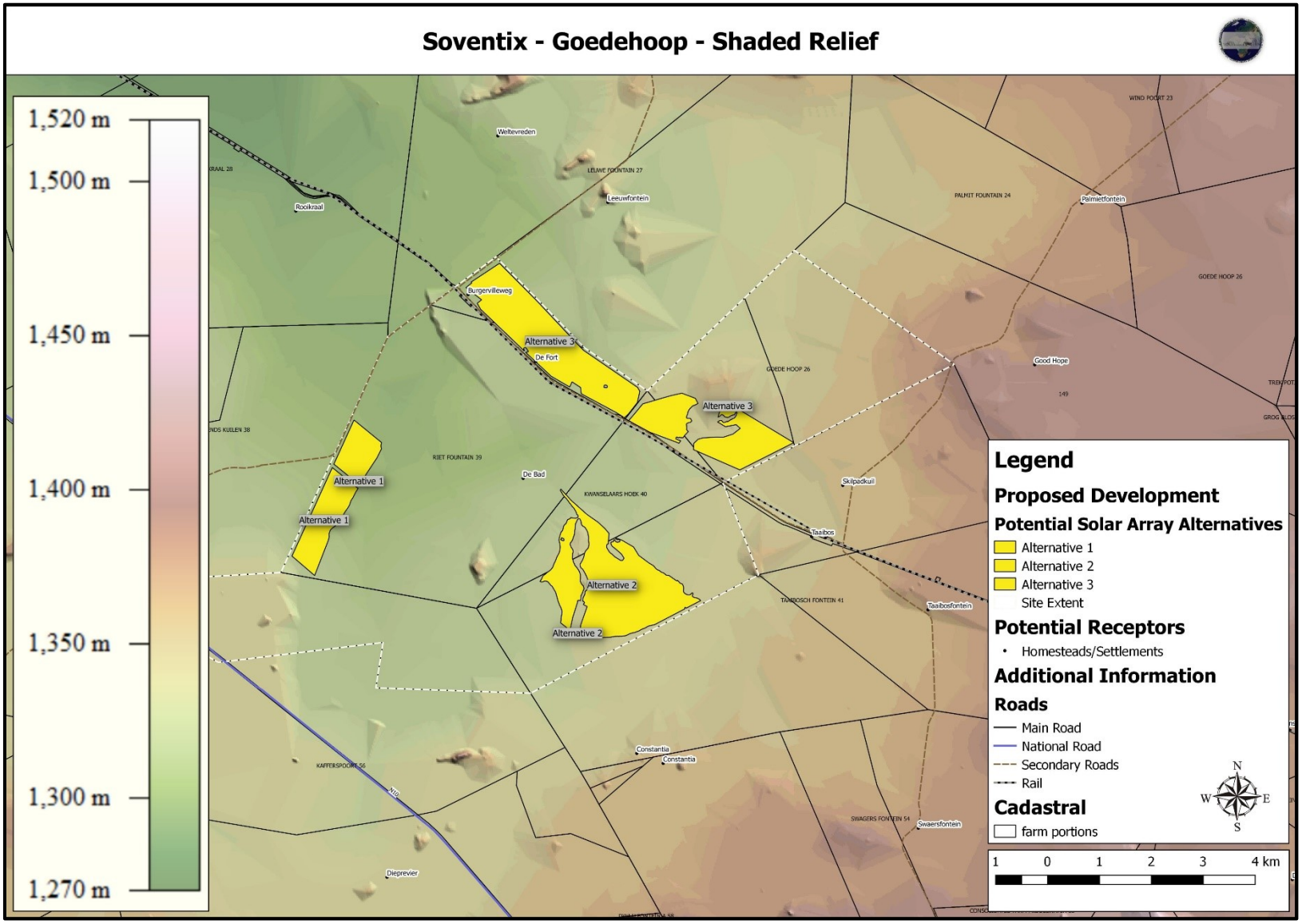
availability of permanent water. Settlements, where they occur, are usually rural homesteads and farmsteads.

No formally protected or conservation areas or major tourist attractions/resorts are present within the study area.

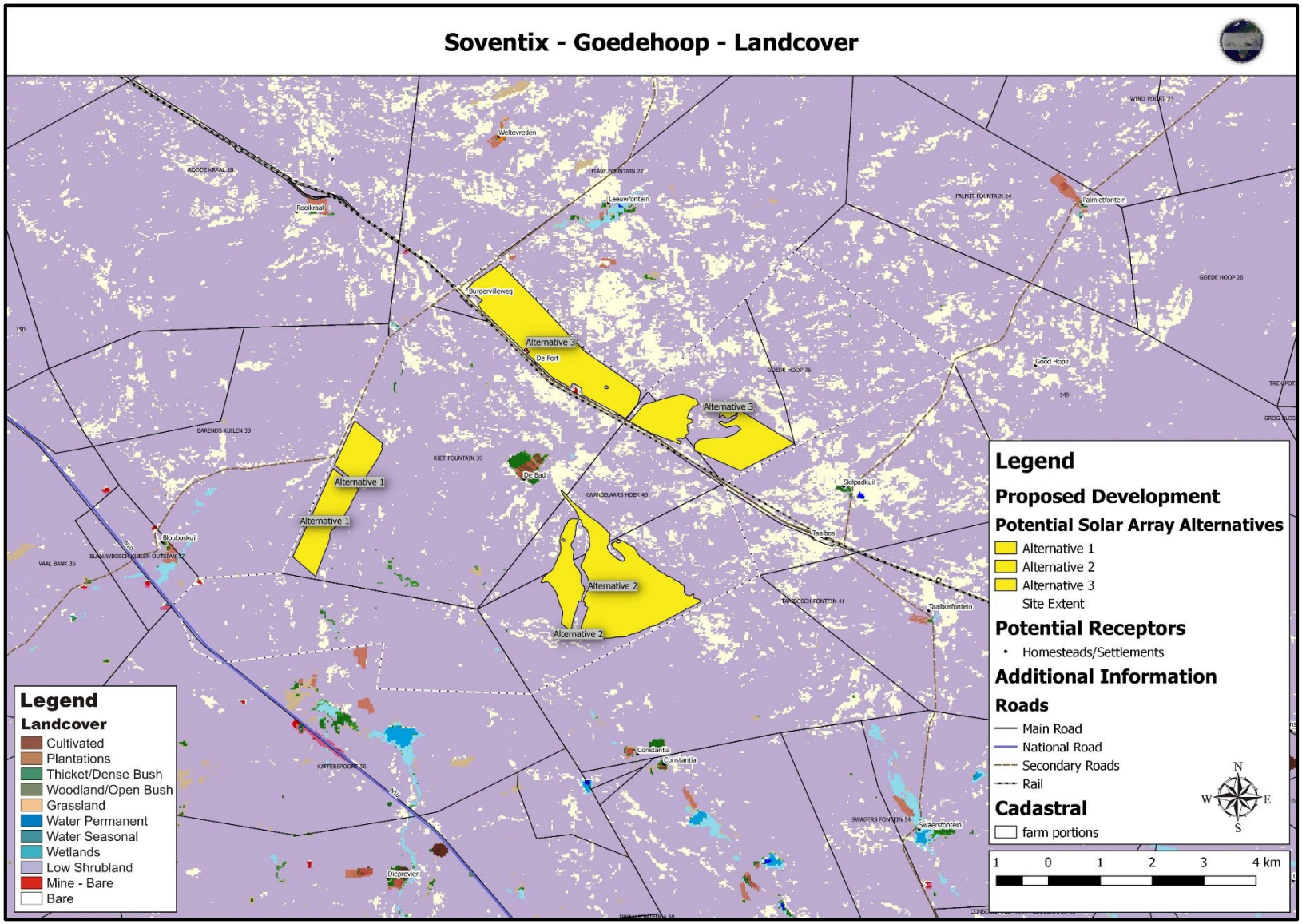
Figure 2: General environment surrounding the site.

Figure 3: Typical vegetation surrounding the Brak River on the north-western portion of the site.

Figure 4: Photograph showing the surrounding area and powerlines that run through the study area



Map 1: Shaded relief map (indicating the location of the proposed facility (all three alternatives) and the topography and elevation above sea level) of the broader study area



Map 2: Land cover/land use map.

4. RESULTS

4.1. VISUAL EXPOSURE/VISIBILITY

The results of the viewshed analyses for the proposed solar energy facility (all three possible alternatives) are shown on the maps that follow.

These viewshed analyses have been undertaken from the actual proposed solar plant positions to determine the general visual exposure (visibility) of the area under investigation, simulating the expected maximum height of the proposed primary structures associated with the facilities.

Map 3a (Alternative 1); Map 3b (Alternative 2); and Map 3c (Alternative 3) was generated at a height of 4m to illustrate the anticipated visual exposure of each possible PV Facility.

The viewshed analyses do not include the effect of vegetation cover or existing structures on the exposure of the proposed facilities, therefore signifying a worst-case scenario.

The following is an overview of the findings of the viewsheds:

4.1.1. Alternative 1 (Map 3a),

It is clear from the viewshed analysis for Alternative 1, that the solar facility would be exposed to a moderate geographical area within this region. This is a result of the proposed structure's location within a landscape of undulating hills and plains.

It is anticipated that the Alternative 1 will be highly visible from within the site itself, as well as immediately adjacent areas in all directions to the extent of 2 km. Outside of the 2 km (between 2 km and 6 km) radius, the visual impact is restricted somewhat by small rock outcrops. Further afield, areas, mostly to the north east, north west south and west are screened from visual impact due to the exaggerated topography and reduced elevation. The exception to this are the northern, eastern and south eastern long distance areas which display an intermittent exposure pattern.

The solar facility will be visible from the N10 at a range of between 2.5 km and 6 km. Further than this the N10 may be viewed but the visibility will be discontinuous, due to the presence of various landscape features (boulders etc...). The solar facility will not be visible from the R389 road between Phillips Town and Hanover.

The structure will be visible from the railway from the north, from a range of between 3 km to 8 km, where after visibility becomes discontinuous.

In addition, settlements and homesteads, especially those within a 4 km radius will be visually exposed, with a high frequency of exposure, however, it must be noted that many of the residential structures within the study area were dilapidated and not habitable, which would thus reduce the likelihood the proposed infrastructure impacting on these settlements and homesteads at all.

Within the visually exposed areas, it is envisaged that the nature of the structure, the largely natural state of the environment and the rural character of the study area would result in a significant visual contrast within the receiving environment.

4.1.2. Alternative 2 (Map 3b),

The viewshed analysis for Alternative 2 indicates that the solar facility would be exposed to a moderate to low geographical area within this region. This is heightened by the proposed structure's location within a landscape of undulating hills and plains, where numerous rocky outcrops are prominent.

It is anticipated that Alternative 2 will be highly visible from within the site itself, as well as all immediately adjacent areas within a radius of 3.6 km, but excluding scattered pockets to the north, east, south and west. Outside of the 3.6 km (between 3.6 km and 10 km) radius, the visual impact is restricted somewhat by small rock outcrops. This is particularly so to the north, south and east. Further afield, surrounding areas are screened from visual impact due to the exaggerated topography and reduced elevation.

The solar facility will be discontinuously visible from the N10 at a range of about 5.4 km and 10 km, while it will not be visible from the R389.

The solar facility will be visible from to the railway from the south, from a range of between 1.8 to 3.6 km, where after visibility becomes negligible.

Settlements and homesteads, especially those within a 3.6 km radius will be visually exposed, with a high frequency of exposure however, it must be noted that many of

the residential structures within the study area were dilapidated and not habitable, which would thus reduce the likelihood the proposed infrastructure impacting on these settlements and homesteads at all.

Within the visually exposed areas, it is envisaged that the nature of the structure, the largely natural state of the environment and the rural character of the study area would result in a significant visual contrast within the receiving environment.

4.1.3. Alternative 3 (Map 3c),

The viewshed analysis for Alternative 3 indicates that the solar facility would be exposed to a moderate geographical area within this region. Areas in the far distance, to the north and east of the facility will experience little or no visual intrusion. This is heightened by the proposed structure's location within a landscape of undulating hills and plains, where numerous rocky outcrops are prominent.

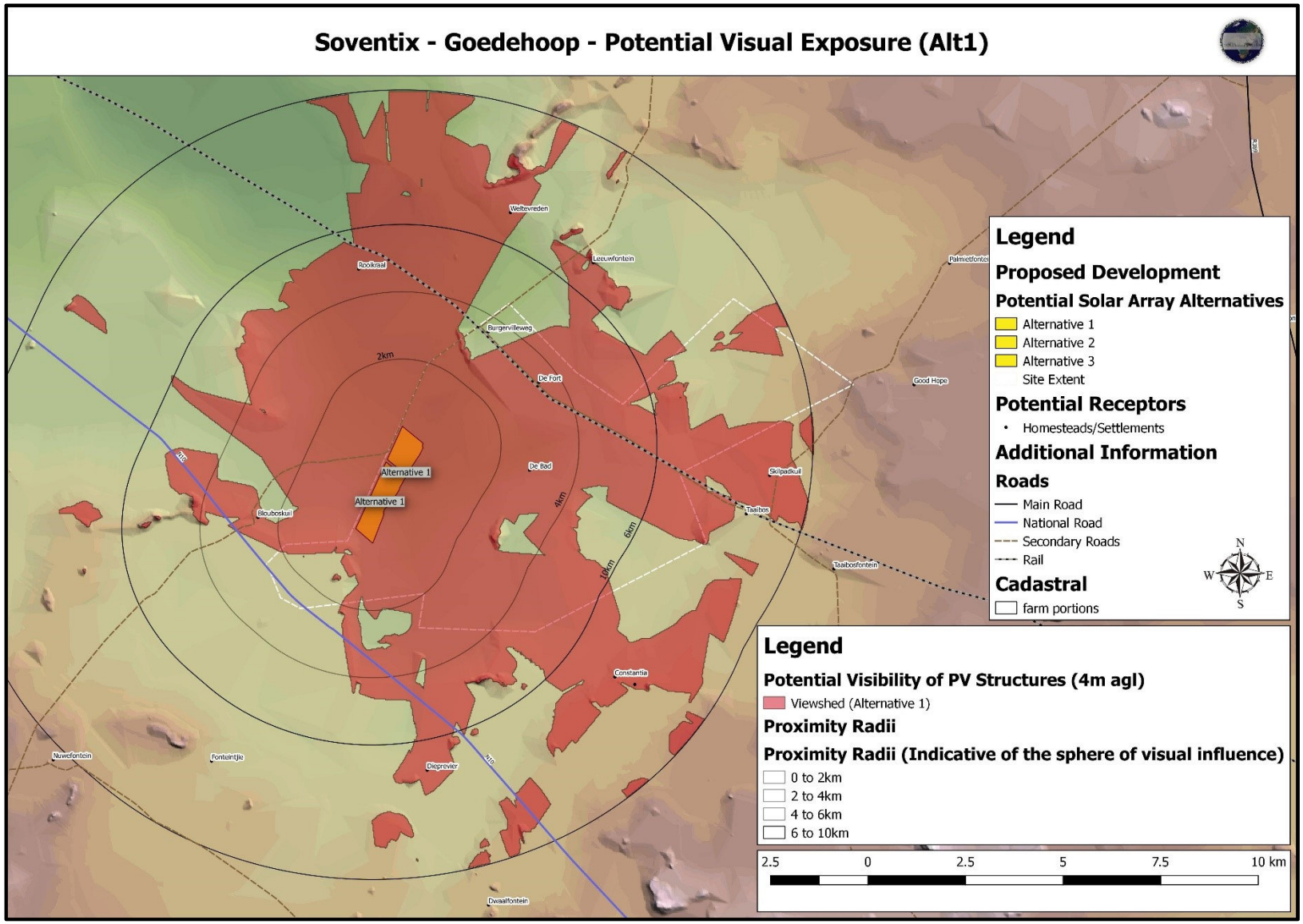
It is anticipated that Alternative 3 will be highly visible from within the site itself, as well as all immediately adjacent areas within a radius of 3.1 km. Visual impact will also be high within a radius of between 3.1 km and 6.2 km. Further than this visual impact becomes moderate to low.

The solar facility will be visible from the N10, but at a range of about 9 km. The R389 road, running to the south of this alternative will not be visually impacted.

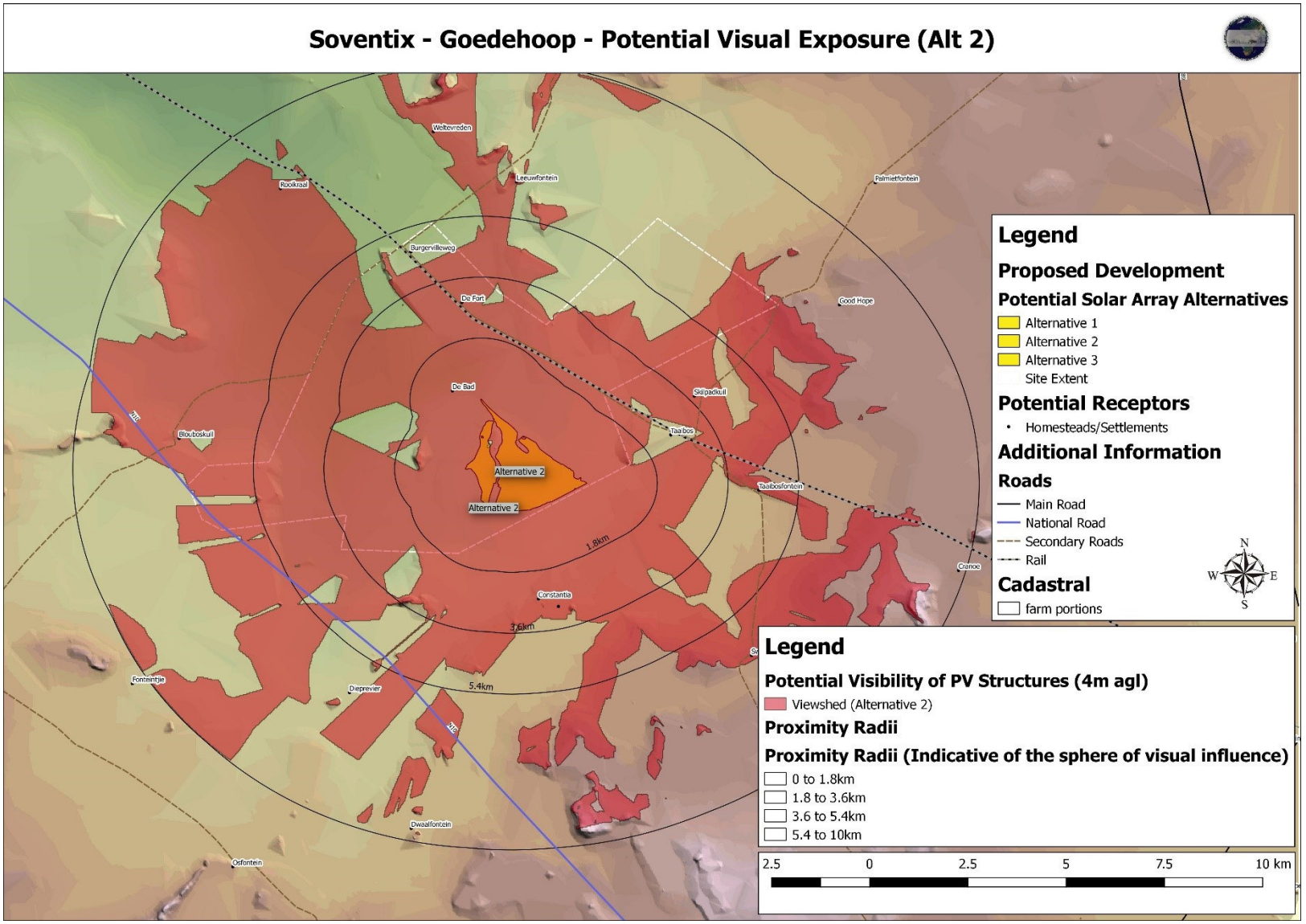
The solar facility will be visible from to the railway running to the south of this alternative. This will be visually impacted on for a range of about 0 km to 10 km (in the west).

Settlements and homesteads, especially those within a 6.2 km radius will be visually exposed, with a high to moderate frequency of exposure however, it must be noted that many of the residential structures within the study area were dilapidated and not habitable, which would thus reduce the likelihood the proposed infrastructure impacting on these settlements and homesteads at all.

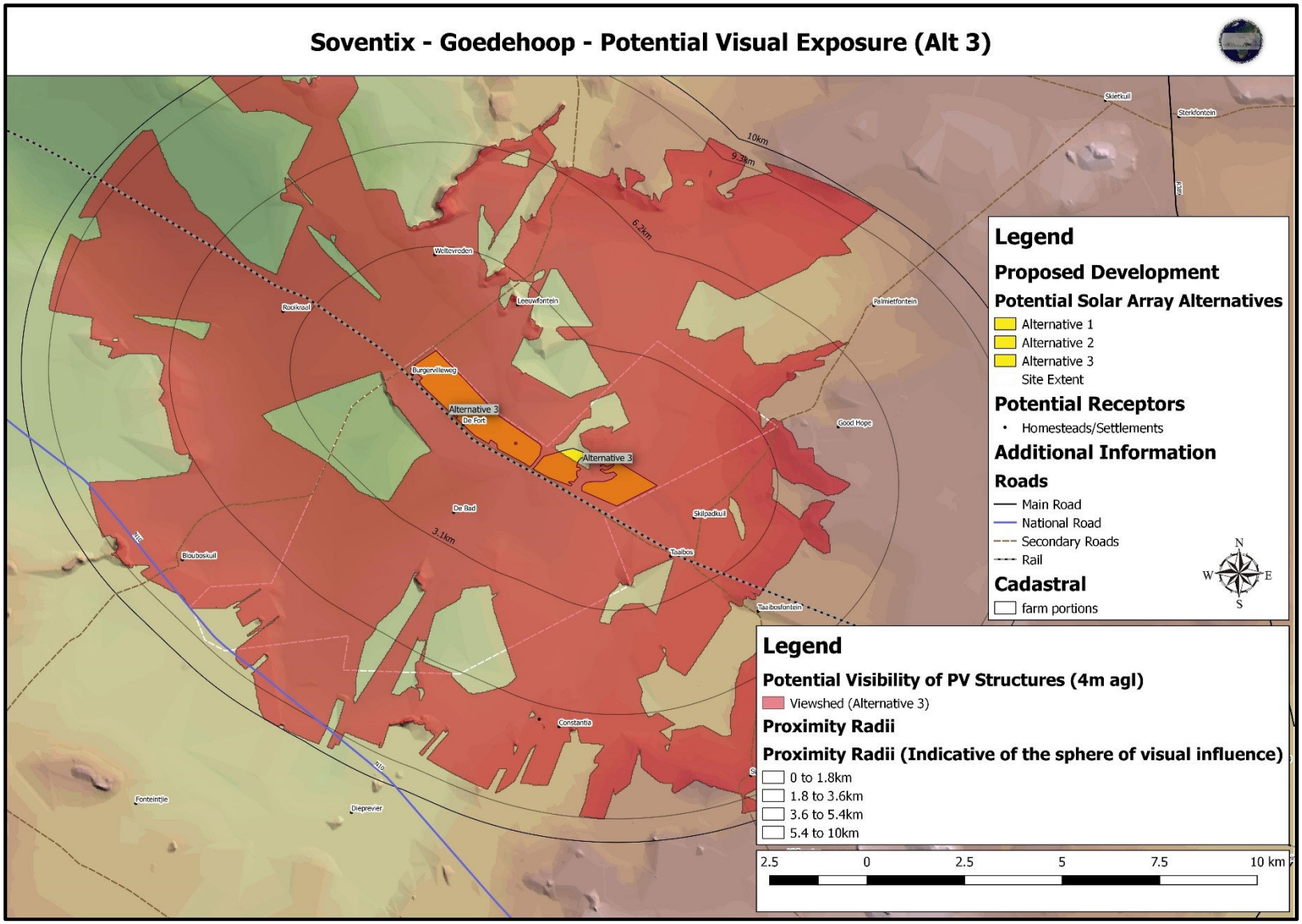
Within the visually exposed areas, it is envisaged that the nature of the structure, the largely natural state of the environment and the rural character of the study area would result in a significant visual contrast within the receiving environment.



Map 3a: Potential visual exposure of the proposed PV Facility (Alternative 1).



Map 3b: Potential visual exposure of the proposed PV Facility (Alternative 2).



Map 3c: Potential visual exposure of the proposed PV Facility (Alternative 3).

4.2. VISUAL DISTANCE / OBSERVER PROXIMITY

HES determined proximity offsets 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 methodology was developed in the absence of any known and/or acceptable standards for South African solar energy facilities.

Typically, the proximity radii, calculated from the edge of the actual PV footprint, would differ due to the varied extent of each potential alternative and would be as follows:

4.2.1. Alternative 1:

- 0 – 2 km. Short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence.
- 2 – 4 km. Medium distance view where the structures would be easily and comfortably visible and constitute a high visual prominence.
- 4 – 6 km. Longer distance view where the facility would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence.
- Greater than 6 km. Very long distance view of the facility where the facility could potentially still be visible, though not as easily recognisable. This zone constitutes a low visual prominence for the facility.

4.2.2. Alternative 2:

- 0 – 1.8 km. Short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence.
- 1.8 – 3.6 km. Medium distance view where the structures would be easily and comfortably visible and constitute a high visual prominence.
- 3.6 – 5.4 km. Longer distance view where the facility would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence.
- Greater than 5.4 km. Very long distance view of the facility where the facility could potentially still be visible, though not as easily recognisable. This zone constitutes a low visual prominence for the facility.

4.2.3. Alternative 3:

- 0 – 3.1 km. Short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence.
- 3.1 – 6.2 km. Medium distance view where the structures would be easily and comfortably visible and constitute a high visual prominence.
- 6.2 – 9.3 km. Longer distance view where the facility would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence.
- Greater than 9.3 km. Very long distance view of the facility where the facility could potentially still be visible, though not as easily recognisable. This zone constitutes a low visual prominence for the facility.

4.3. VIEWER INCIDENCE/VIEWER PERCEPTION

Refer **to Maps 4 a, b and c.**

4.3.1. Alternative 1

Viewer incidence is calculated to be the highest along the national and arterial roads (i.e. the N10) as well as the secondary roads and the railway within the study area. Commuters and tourists using these roads will be negatively impacted upon by visual exposure to the proposed solar facility.

Other than along the above roads and railway, viewer incidence is concentrated in the populated places within the study area.

Homesteads and settlements also occur within the area of visual influence and are as follows:

- Blouboskuil, Burgervilleweg, De Fort and De Bad are within 4 km of this alternative. Rooikraal lies between 4 and 6 km of the facility. A total of one

unnamed homestead is located with a radius of 6 and 10 km from the site, as are, the homesteads of Weltevreden, LeeuwfonteinSkilpad, Taaibos, Dieprevier, Constantia and Fonteintjie..

4.3.2. Alternative 2:

Viewer incidence is calculated to be the highest along the national and arterial roads (i.e. the N10) as well as the secondary roads and the railway within the study area. Commuters and tourists using these roads will be negatively impacted upon by visual exposure to the proposed solar facility.

Other than along the above roads and railway, viewer incidence is concentrated in the populated places within the study area.

Homesteads and settlements also occur within the area of visual influence and are as follows:

- The settlement of De Bad is located within a 1.8 km of this alternative, while the homesteads of De Fort, Taaibos, Constantia and one other unnamed homestead lie between 1.8 and 3.6 km of the facility. The homesteads of Taaibosfontein, Skilpad and Burgervilleweg are located within a radius of 3.6 to 5.4 km of this alternative. A total of 11 homesteads (Swaersfontien, Midelwater, Cranoe, Good Hope, Leeuwfontein, Weltevreden, Rooikraal, Blouboskuil, Dieprevier and Dwaalfontein) lie within the zone of 5.4 to 10 km from the site.

4.3.3. Alternative 3:

Viewer incidence is calculated to be the highest along the national and arterial roads (i.e. the N10) as well as the secondary roads and the railway within the study area. Commuters and tourists using these roads will be negatively impacted upon by visual exposure to the proposed solar facility.

Other than along the above roads and railway, viewer incidence is concentrated in the populated places within the study area.

Homesteads and settlements also occur within the area of visual influence and are as follows:

- Seven homesteads (Taaibos, Skilpad, De Bad, De Fort, Leeuwfontein, Burgervilleweg and Weltevreden), are located within 3.1 km of alternative 3, while the homesteads of Taaibosfontein, Good Hope and lie between 3.1 and 6.2 km of the facility. Within the radius of 6.2 and 9.3 the homesteads of Constantia, Swaersfontein, Palmietfontein, and Blouboskraal are to be found. Cyfferuil lies within the zone of 9.3 to 10 km from the site.

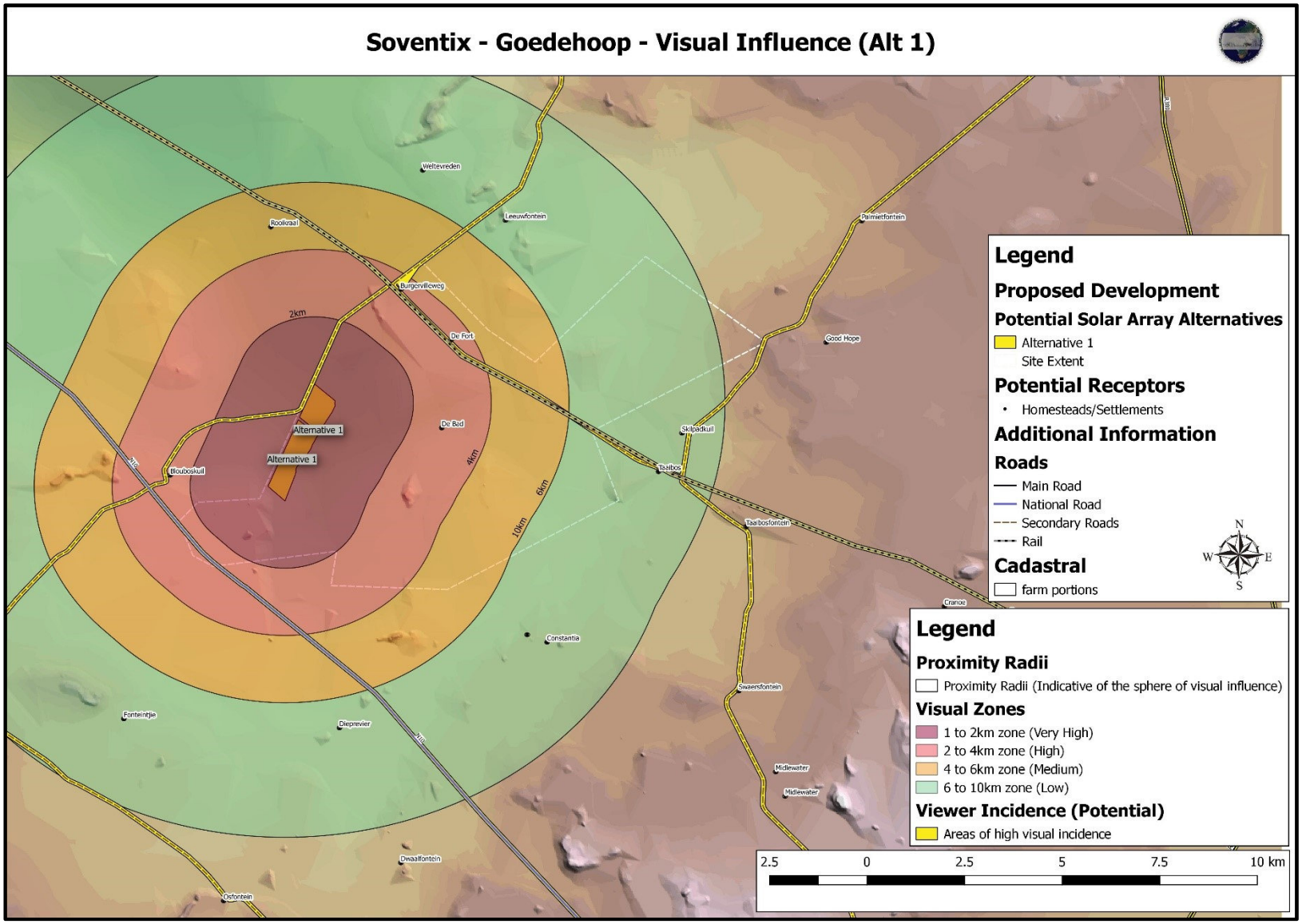
It is uncertain whether all of the potentially affected settlements/homesteads are inhabited or not, so it is assumed that they are all inhabited.

The remainder of the study area consists predominantly of undeveloped natural land or agriculture with a low occurrence of receptors.

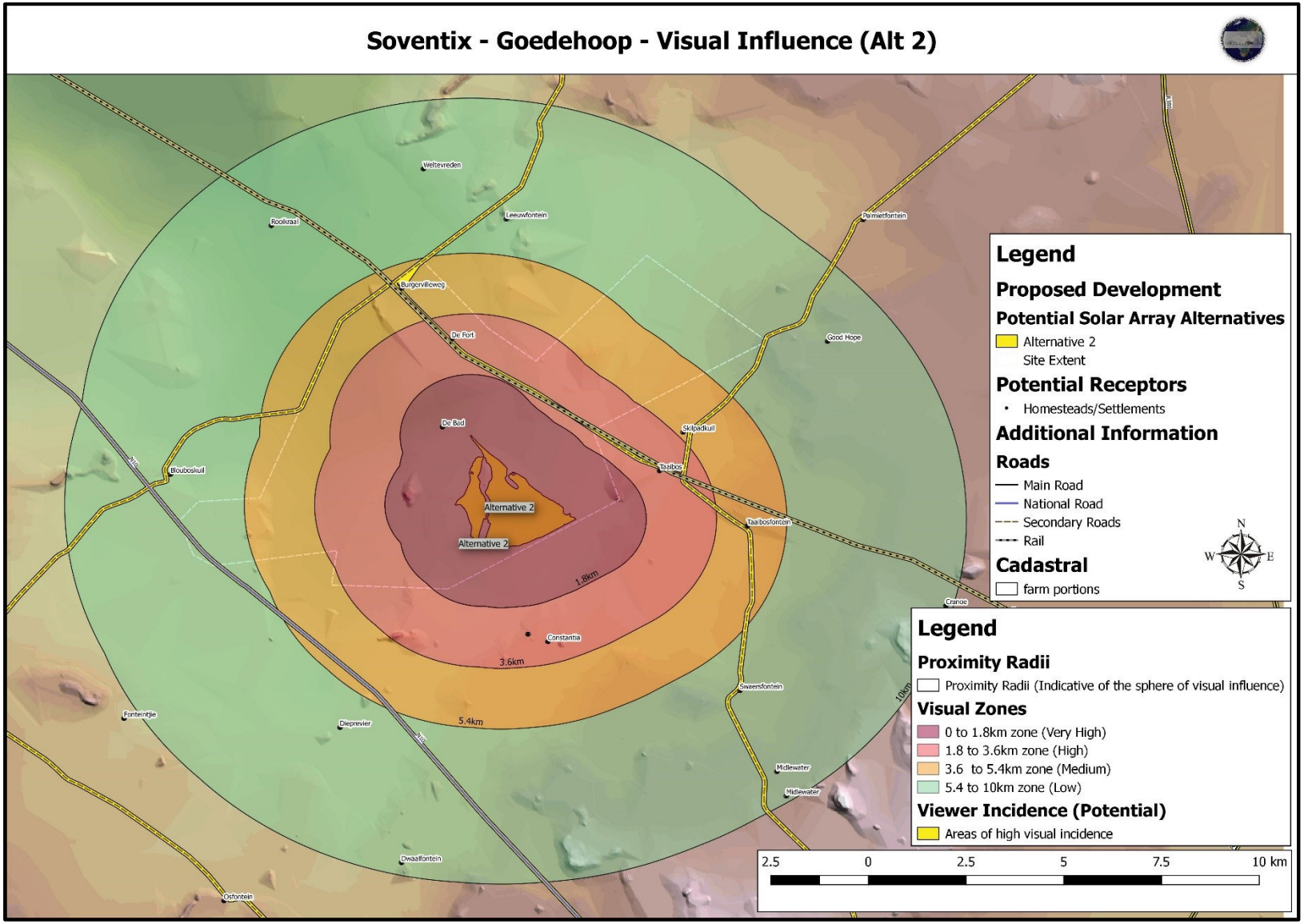
The region as a whole has a high scenic value, and an associated tourism value and sense of place. The wide open spaces, mountainous and undulating terrain have a specific aesthetic appeal.

Tourists and visitors to this area are therefore seen as sensitive visual receptors upon which the construction of the new solar facility could have a negative visual impact.

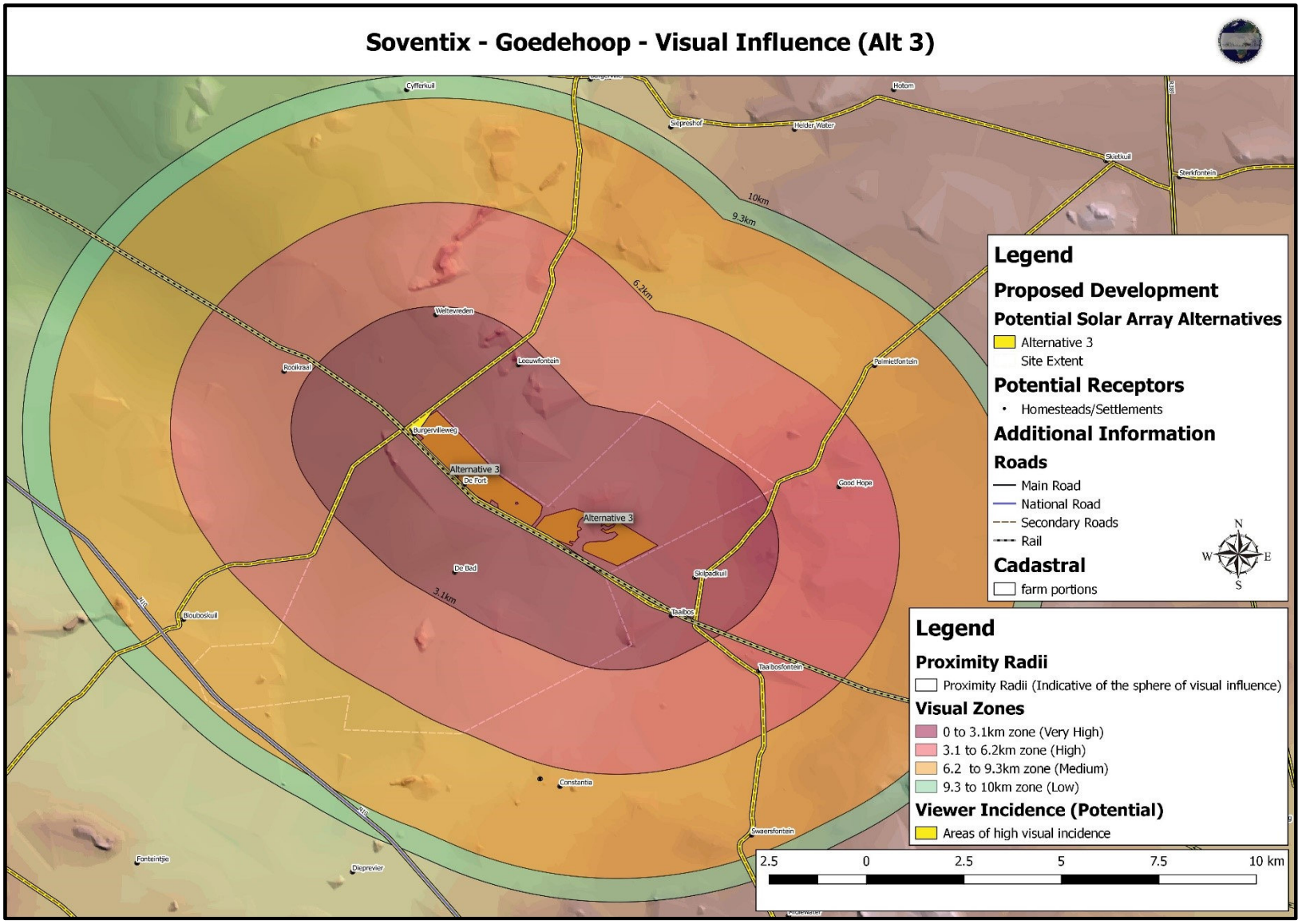
The severity of the visual impact on these receptors decreases with increased distance from the proposed infrastructure.



Map 4a: Observer proximity to the proposed PV Facility (Alternative 1), and areas of high viewer incidence.



Map 4b: Observer proximity to the proposed PV Facility (Alternative 2), and areas of high viewer incidence.



Map 4c: Observer proximity to the proposed PV Facility (Alternative 2), and areas of high viewer incidence.

4.4. VISUAL ABSORPTION CAPACITY OF THE NATURAL VEGETATION

The vegetation present in the study area surrounding the structure (predominantly Granite Lowveld and Kaalrug Mountain Bushveld) is known for its dense, short, mountain savannah or thickets and steep slopes. This added to the open agricultural fields in the vicinity of the site, implies that the Visual Absorption Capacity (VAC) is **low**.

4.5. VISUAL IMPACT INDEXES

The combined results of the visual exposure, viewer incidence/perception and visual distance of the solar facility alternatives, are displayed on **Maps 5 a, b and c.**

Here the weighted impact and the likely areas of impact are 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 short distance, high frequency of visual exposure to the proposed infrastructure, a high viewer incidence and a predominantly negative perception would therefore have a higher value (greater impact) on the index. This helps in focussing the attention to the critical areas of potential impact when evaluating the issues related to the visual impact.

It is important to note the undeveloped and natural landscape character as well as the tourism value of the area, both in terms of tourist access routes and destinations.

In addition, the construction of the facility in close proximity to features of natural beauty (such as the mountains), and tourist attractions is likely to impact on the sense of place and aesthetic appeal of the landscape.

The following is of specific relevance regarding the proposed solar facility alternatives:

Alternative 1

Refer to **Map 5a**.

- The visual impact index map clearly indicates a core area of potentially **very high** visual impact within a radius of 2 km of the proposed solar facility (alternative 1) (i.e. short distance).
- Within the study area and particularly within a 10 km radius, some visually protected patches occur, shielded from potential impact by virtue of the topography.
- Potential receptors that would experience a **very high** visual impact within the short to moderate distance include the following:
    - Commuters utilising the N10, as well as various secondary roads, that lie within a 4 km radius of the site;
    - A number of settlements and homesteads that lie within a 4 km radius of the site (De Bad, De Fort, and Blouboskuil);
    - Topographically sensitive features such as rocky outcrops and steep slopes.

- The extent of visual impact is **high** in the longer distance (i.e. between the 4 km and 6 km radius.
- Potential receptors that would experience a **high** visual impact within the longer distance include the following:
    - Commuters utilising the N10 and railway, as well as various secondary roads;
    - The settlement of Rooikraal;
    - Topographically sensitive features such as rocky outcrops and steep slopes.

- The extent of visual impact is greatly reduced in the very long distance (i.e. between the 6 and 10 km offset. Potential visual impact is mostly **medium** within this zone.
- Potential receptors that would experience **medium** visual intrusion include:
    - Stretches of national, arterial and secondary roads;
    - The settlement of Constantia, Dieprevier, Taaibos, Skilpad, Leeuwfontein and Welteverde;
    - Topographically sensitive features such as rocky outcrops and steep slopes.

- Beyond the 10 km offset, potential visual impacts are mostly **negligible.** Due to the very low nature of these impacts they have not been indicated on the maps.

Alternative 2

Refer to **Map 5b**.

- The visual impact index map clearly indicates a core area of potentially **very high** visual impact within a radius of 1.8 km of the proposed solar facility (alternative 2) (i.e. short distance).
- Within the study area and particularly within a 10 km radius, some visually protected patches occur, shielded from potential impact by virtue of the topography.
- Potential receptors that would experience a **very high** visual impact within the short to medium distance include the following:
    - Commuters utilising various secondary roads, that lie within a 3.6 km radius of the site;
    - The homesteads of De Bad, Constantia, and De Fort;
    - Topographically sensitive features such as rocky outcrops and steep slopes.

- The extent of visual impact is **high** in the longer distance (i.e. between the 3.6 and 5.4 km radius.
- Potential receptors that would experience a **high** visual impact within the longer distance include the following:
    - Commuters utilising various secondary roads,
    - The homsteads of Taaibosfontein an Skilpad;
    - Topographically sensitive features such as rocky outcrops and steep slopes.

- The extent of visual impact is somewhat reduced in the very long distance (i.e. between the 5.4 to 10 km offset. Potential visual impact is mostly **medium** within this zone.
- Potential receptors that would experience **medium** visual intrusion include:
    - Stretches of arterial and secondary roads as well as a section of the railway;
    - A number of settlements and households (Swaersfontein, Leeuwenfontein, Weltevrede, Rooikraal and Blouboskuil);
    - Topographically sensitive features such as rocky outcrops and steep slopes.

- Beyond the 10 km offset (i.e. very long distance), potential visual impacts are mostly **very low** to **negligible.** Due to the very low nature of these impacts they have not been indicated on the maps.

Alternative 3

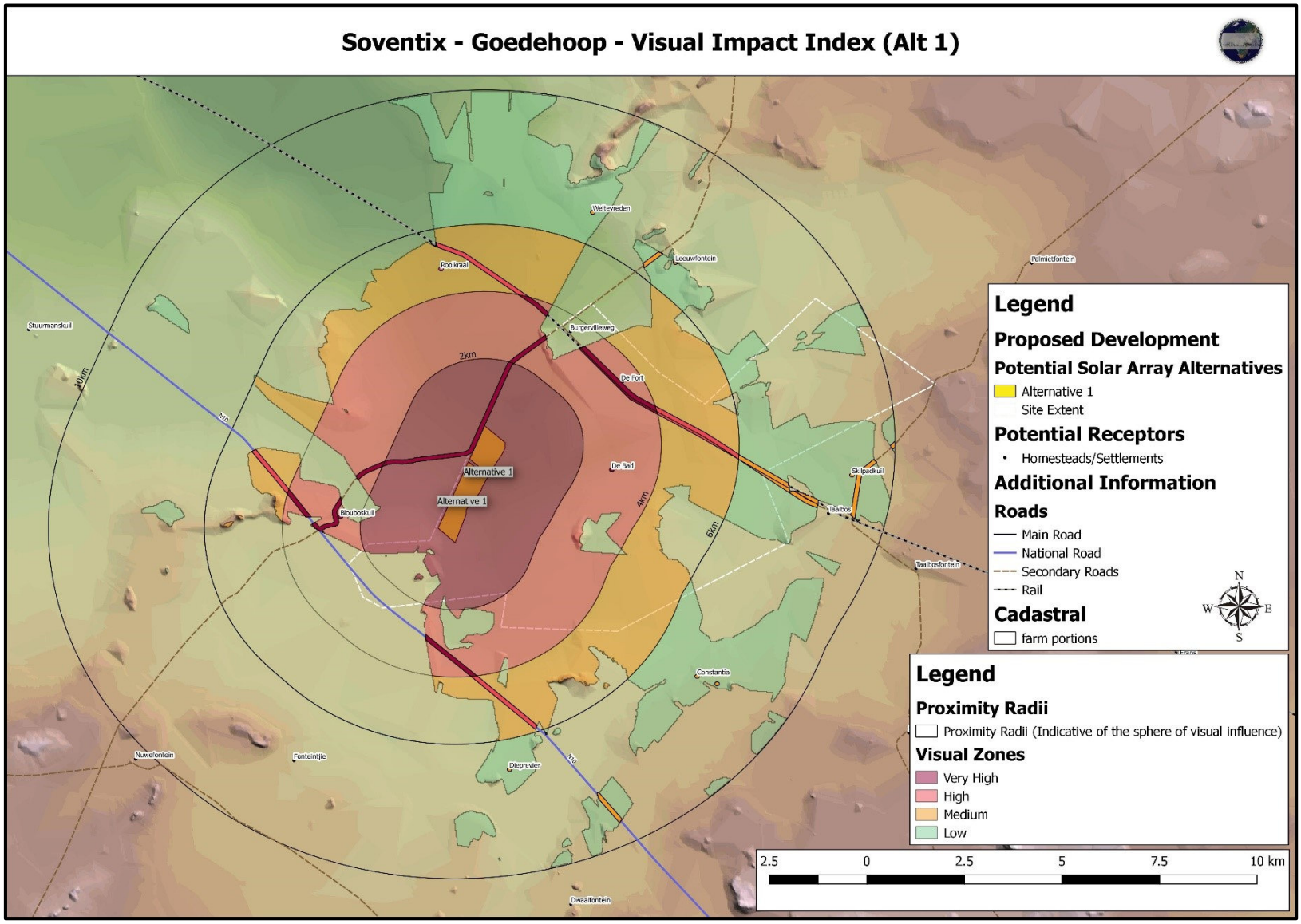
Refer to **Map 5c**.

- The visual impact index map clearly indicates a core area of potentially **very high** visual impact within a radius of 3.1 km of the proposed solar facility (alternative 3) (i.e. short distance).
- Within the study area and particularly within a 10 km radius, some visually protected patches occur, shielded from potential impact by virtue of the topography.
- Potential receptors that would experience a **very high** visual impact within the short to medium distance include the following:
    - Homsteads of De Bad, De Fort, Taaibos, Skilpad, Leeuwfontein, Welteverede, Burgervilleweg and Rooikraal
    - Commuters utilising the railway, as well as various secondary roads, that lie within a 6.2 km radius of the site;
    - Topographically sensitive features such as rocky outcrops and steep slopes.

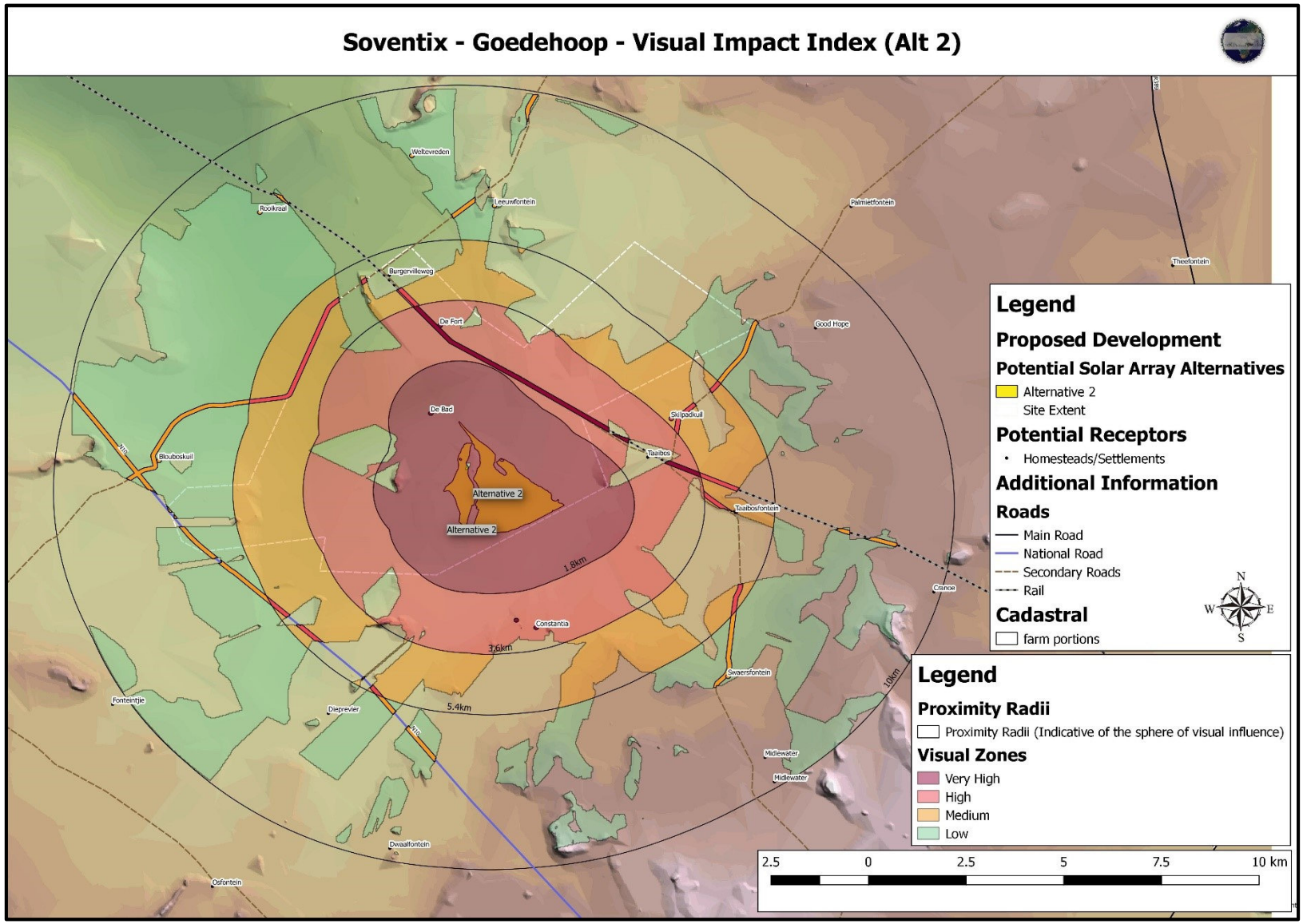
- The extent of visual impact is **high** in the longer distance (i.e. between the 6.2 and 9.3 km radius.
- Potential receptors that would experience a **high** visual impact within the medium distance include the following:
    - Commuters utilising the N10 and the railway, as well as various secondary roads;
    - A number of settlements (Swaersfontein, Constantia and Blouboskuil);
    - Topographically sensitive features such as rocky outcrops and steep slopes.

- The extent of visual impact is somewhat reduced in the medium in the very long distance (i.e. between the 9.3 and 10 km offset. Potential visual impact is mostly **medium** within this zone.
- Potential receptors that would experience **medium** to **high** visual intrusion include:
    - Stretches of arterial and secondary roads. The railway would also be impacted on;
    - Topographically sensitive features such as rocky outcrops and steep slopes.

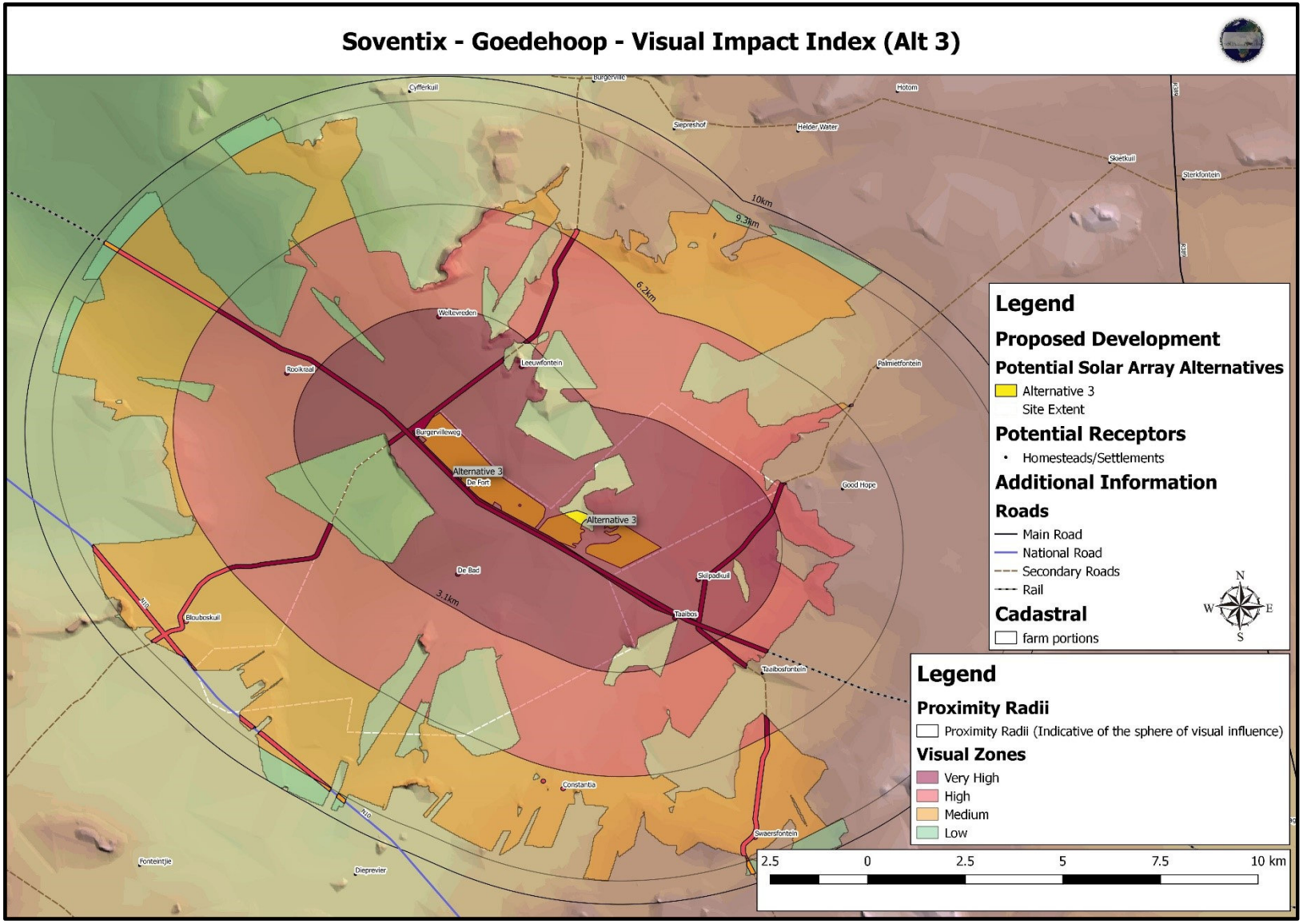
- Beyond the 10 km offset (i.e. very long distance), potential visual impacts are mostly **negligible.** Due to the very low nature of these impacts they have not been indicated on the maps.



Map 5a: Visual impact index of the proposed PV Facility (Alternative 1).



Map 5b: Visual impact index of the proposed PV Facility (Alternative 2).



Map 5c: Visual impact index of the proposed PV Facility (Alternative 3).

4.6. CUMULATIVE VISUAL IMPACT OF THE MAST

As part of the visual impact analysis scope of work it was deemed necessary to evaluate the cumulative impact of the proposed solar facility in the context of existing facilities in the vicinity.

This was done by identifying various facilities that were located within the study area as indicated on **Map 1**. This achieved, the facilities were positioned onto the 3-dimensional digital terrain model and a viewshed analysis rendered for each specific facility. Each of these viewshed analyses where in turn overlaid to ascertain which areas within the study area, would be affected visually by the various plants. Lastly the viewshed (generated at 4 m agl.) for the proposed PV facility was added and laid over the existing facilities' viewsheds, to ascertain which, if any additional areas would be impacted visually by the new facility.

The results of this exercise highlighted the following:

- **Cumulative Impact of Alternative 1:** 51.19km²
- **Cumulative Impact of Alternative 2:** 37.01km²
- **Cumulative Impact of Alternative 3:** 87.19km²

It was thus suggested that the cumulative visual impact of the new proposed PV facility Alternative 1 would be the lowest of the 3 possible alternatives. Moreover this additional impact would not greatly alter the inherent sense of place projected by the region.

4.7. VISUAL IMPACT ASSESSMENT

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

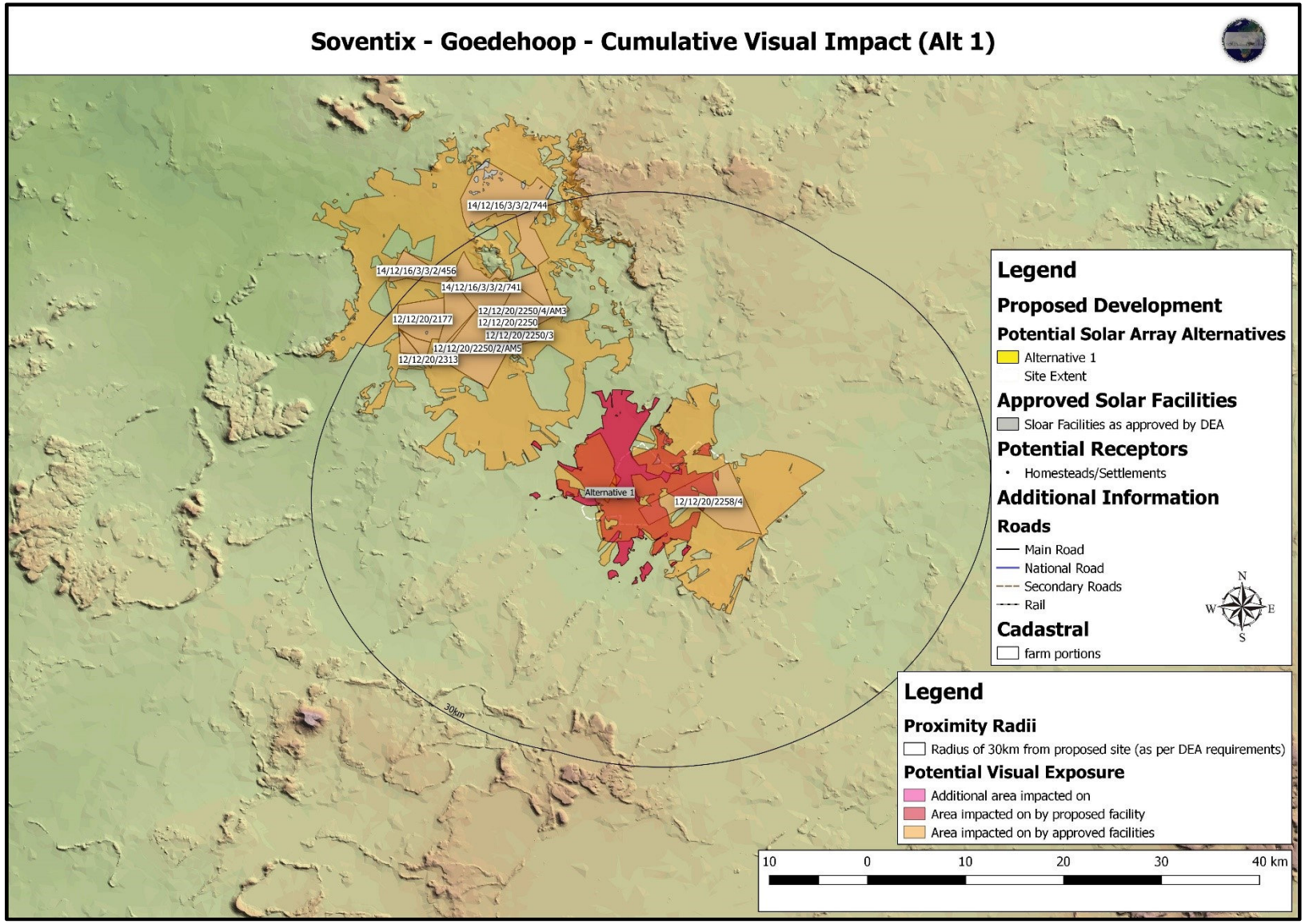
The methodology for the assessment of potential visual impacts states the nature of the potential visual impact (e.g. the visual impact on users of major roads in the vicinity of the proposed infrastructure) and includes a table quantifying the potential visual impact according to the following criteria:

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

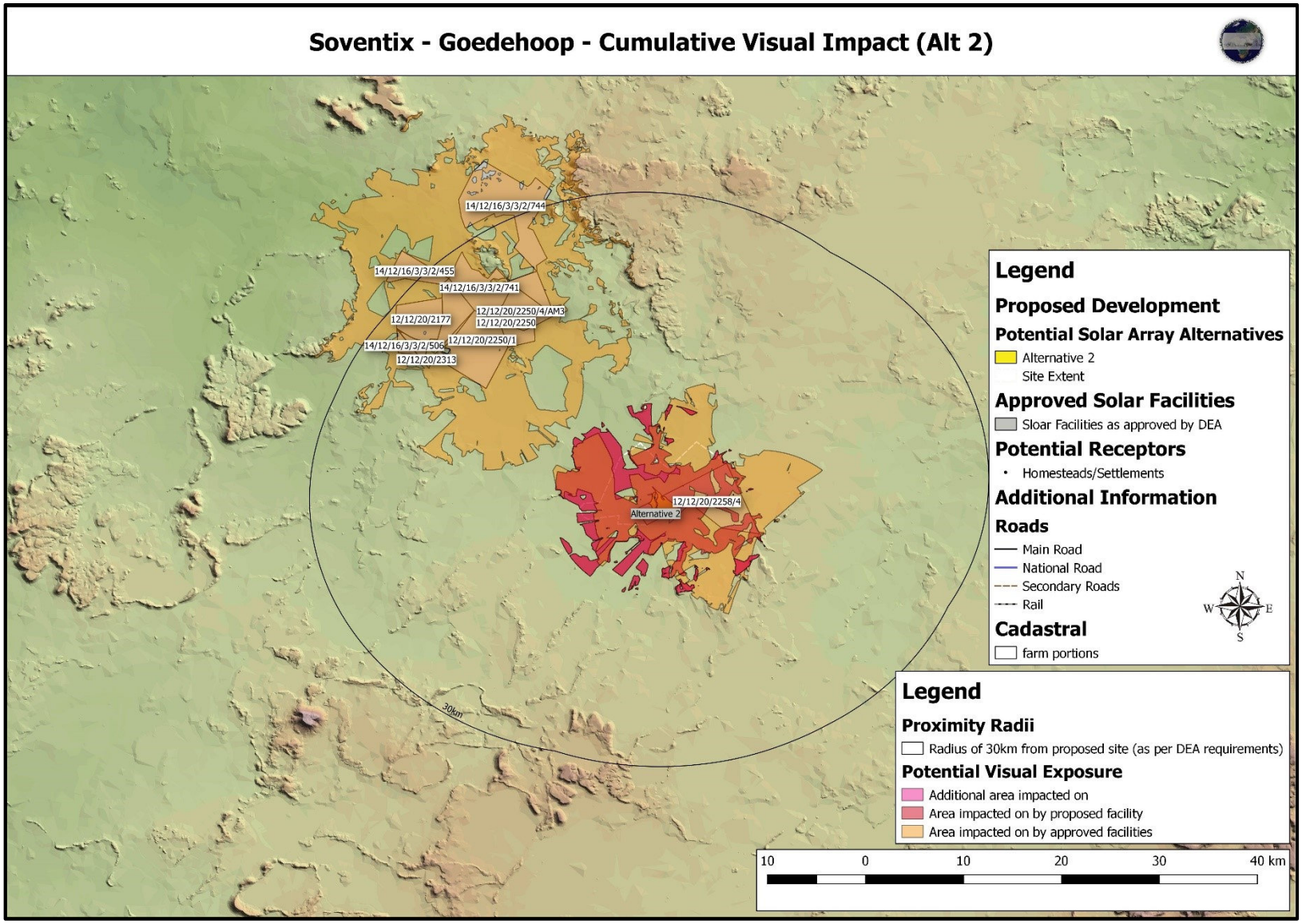
The significance of the potential visual impact is equal to the consequence multiplied by the probability of the impact occurring, where the consequence is determined by the sum of the individual scores for magnitude, duration and extent (i.e. significance = consequence (magnitude + duration + extent)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

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

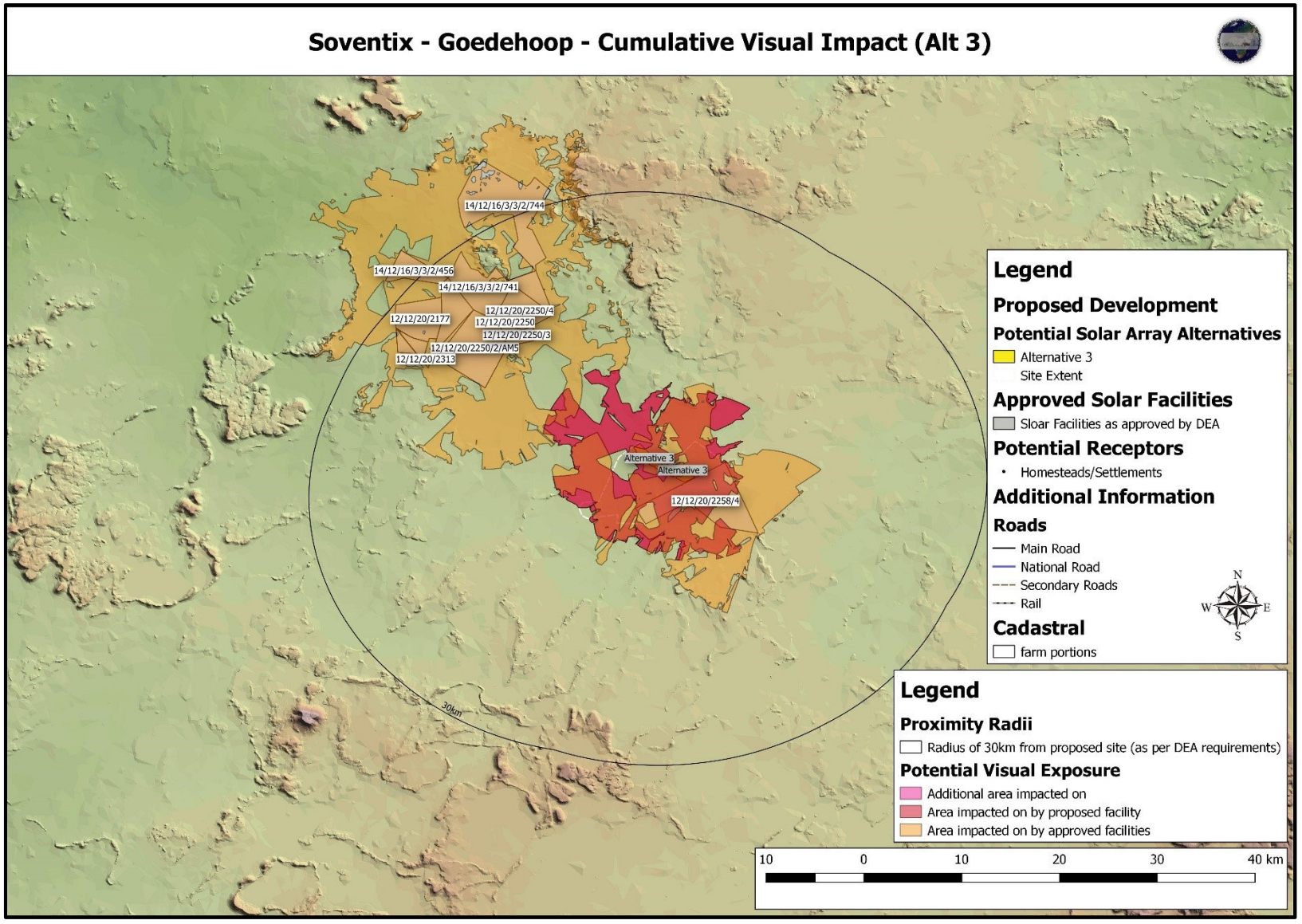
Please note that due to the declining visual impact over distance, the extent (or spatial scale) rating is reversed (i.e. a localised visual impact has a higher value rating than a national or regional value rating). This implies that the visual impact is highly unlikely to have a national or international extent, but that the local or site-specific impact could be of high significance.



Map 6a: Cumulative Visual Impact of the proposed PV Facility (Alternative 1). Note that an additional 51.19km² will be affected.



Map 6b: Cumulative Visual I of the proposed PV Facility (Alternative 2). Note that an additional 37.01km² will be affected.



Map 6c: Cumulative Visual I of the proposed PV Facility (Alternative 3). Note that an additional 87.19km² will be affected.

4.7.1 Visual impact assessment: primary impacts

Potential visual impact on users of major roads (N10), secondary roads and the railway in close proximity to the proposed solar facility.

Potential visual impact on users of national, arterial, secondary roads and the railway in close proximity of the proposed solar facility are expected to be of very high to high significance for Alternatives 1 and 3, and low for Alternative 2. No mitigation is possible. The table below illustrates this impact assessment.

Note: The frequency of exposure to roads and rail (based on the presence and length of these roads/rail within close proximity) influences the probability rating for each of the alternatives.

Table 3: Impact table summarising the significance of visual impacts on users of national, arterial and secondary roads in close proximity to the proposed solar facility

Nature of Impact: **Potential visual impact on users of national, arterial and secondary roads in close proximity to the proposed solar facility.**						
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	**Local (4)**	**n/a**	**Local (4)**	**n/a**	**Local (4)**	**n/a**
Duration	**Long term (4)**	**n/a**	**Long term (4)**	**n/a**	**Long term (4)**	**n/a**
Magnitude	**Very high (10)**	**n/a**	**Very high (10)**	**n/a**	**Very high (10)**	**n/a**
Probability	**Definite (5)**	**n/a**	**Very improbable (1)**	**n/a**	**Highly Probable (4)**	**n/a**
Significance	**High (90)**	**n/a**	**Low (18)**	**n/a**	**High (72)**	**n/a**
Status (positive or negative)	**Negative**	**n/a**	**Negative**	**n/a**	**Negative**	**n/a**
Reversibility	**Recoverable (3)**	**n/a**	**Recoverable (3)**	**n/a**	**Recoverable (3)**	**n/a**
Irreplaceable loss of resources?	**No**	**n/a**	**No**	**n/a**	**No**	**n/a**
Can impacts be mitigated during operational phase?	**No**	**n/a**	**No**	**n/a**	**No**	**n/a**
Mitigation: • ***Retain a buffer (approximately 20m wide) of intact natural vegetation along the perimeter of the development area and/or along the site boundary. This measure will give some distance between the facility footprint and the visual receptors.*** • ***Retain and maintain natural vegetation in all areas outside of the development footprint.*** • **Decommissioning: removal of the solar facility and associated infrastructure once the lifespan has expired**						
Cumulative impacts: **The construction of the solar facility will increase the cumulative visual impact of electrical type infrastructure within the region.**						
Residual impacts: **None. The visual impact of the solar facility will be removed after decommissioning.**						

Potential visual impact on the residents of various settlements and homesteads in close proximity to the proposed solar facility

The potential visual impact on residents of various settlements and homesteads in close proximity of the proposed solar facility is expected to be of very high to high significance for both Alternative 1 and 3 and low for Alternative 2.

No mitigation is possible. The table below illustrates this impact assessment.

Table 4: Impact table summarising the significance of visual impacts on residents of various settlements and homesteads in close proximity of the proposed solar facility

Nature of Impact: **The potential visual impact on residents of various settlements and homesteads in close proximity of the proposed solar facility.**						
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	**Local (4)**	**n/a**	**Local (4)**	**n/a**	**Local (4)**	**n/a**
Duration	**Long term (4)**	**n/a**	**Long term (4)**	**n/a**	**Long term (4)**	**n/a**
Magnitude	**Very high (10)**	**n/a**	**Very high (10)**	**n/a**	**Very high (10)**	**n/a**
Probability	**Definite (5)**	**n/a**	**Very improbable (1)**	**n/a**	**Highly Probable (4)**	**n/a**
Significance	**High (70)**	**n/a**	**Low (14)**	**n/a**	**High (56)**	**n/a**
Status (positive or negative)	**Negative**	**n/a**	**Negative**	**n/a**	**Negative**	**n/a**
Reversibility	**Recoverable (3)**	**n/a**	**Recoverable (3)**	**n/a**	**Recoverable (3)**	**n/a**
Irreplaceable loss of resources?	**No**	**n/a**	**No**	**n/a**	**No**	**n/a**
Can impacts be mitigated during operational phase?	**No**	**n/a**	**No**	**n/a**	**No**	**n/a**
Mitigation: • ***Retain a buffer (approximately 20m wide) of intact natural vegetation along the perimeter of the development area and/or along the site boundary. This measure will give some distance between the facility footprint and the visual receptors.*** • ***Retain and maintain natural vegetation in all areas outside of the development footprint.*** • **Decommissioning: removal of the solar facility and associated infrastructure once the lifespan has expired**						
Cumulative impacts: **The construction of the solar facility will increase the cumulative visual impact of electrical type infrastructure within the region.**						
Residual impacts: **None. The visual impact of the solar facility will be removed after decommissioning.**						

Potential visual impact on sensitive visual receptors (residents of towns, settlements and homesteads) within the region.

Where these occur, the visual impact on the settlements and homesteads within the region is expected to be of high significance for Alternative 1, low significance for Alternative 2 and high significance for Alternative 2. No mitigation is possible. The table below illustrates this impact assessment.

Note: The frequency of exposure to farmsteads and settlements (based on the frequency of occurrence beyond a 1.01 km offset) influences the probability rating for each of the alternatives.

Table 5: Impact table summarising the significance of visual impacts on sensitive visual receptors within the region.

Nature of Impact: **Potential visual impact on sensitive visual receptors within the region.**						
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 2***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	**Regional (3)**	**n/a**	**Regional (3)**	**n/a**	**Regional (3)**	**n/a**
Duration	**Long term (4)**	**n/a**	**Long term (4)**	**n/a**	**Long term (4)**	**n/a**
Magnitude	**High (7)**	**n/a**	**High (7)**	**n/a**	**Very high (7)**	**n/a**
Probability	**High (5)**	**n/a**	**High (2)**	**n/a**	**High (4)**	**n/a**
Significance	**High (70)**	**n/a**	**Low (28)**	**n/a**	**High (56)**	**n/a**
Status (positive or negative)	**Negative**	**n/a**	**Negative**	**n/a**	**Negative**	**n/a**
Reversibility	**Recoverable (3)**	**n/a**	**Recoverable (3)**	**n/a**	**Recoverable (3)**	**n/a**
Irreplaceable loss of resources?	**No**	**n/a**	**No**	**n/a**	**No**	**n/a**
Can impacts be mitigated during operational phase?	**No**	**n/a**	**No**	**n/a**	**No**	**n/a**
Mitigation: • ***Retain a buffer (approximately 20m wide) of intact natural vegetation along the perimeter of the development area and/or along the site boundary. This measure will give some distance between the facility footprint and the visual receptors.*** • ***Retain and maintain natural vegetation in all areas outside of the development footprint.*** • **Decommissioning: removal of the solar facility and associated infrastructure once the lifespan has expired**						
Cumulative impacts: **The construction of the solar facility will increase the cumulative visual impact of electrical type infrastructure within the region.**						
Residual impacts: **None. The visual impact of the solar facility will be removed after decommissioning.**						

Potential visual impact of access roads on observers in close proximity to the proposed facility.

Access roads will be required, firstly to construct the solar facility, and secondly to maintain it (operational phase). These access roads have the potential of manifesting as landscape scarring, and thus a potential visual impact within the viewshed areas. This is especially relevant for steep slopes where cut and fill may be required to render access possible in high lying areas and on steep slopes. Graded slopes could be vulnerable to erosion over time. This also represents a potential visual impact.

No dedicated viewshed has been generated for the access roads. However, it is assumed, that the area of potential visual exposure will lie within that of the solar facility.

The table below illustrates the assessment of this anticipated impact, which is likely to be of moderate significance for all Alternatives. Mitigation can reduce the significance of impacts to low.

Table 6: Impact table summarising the significance of visual impact of access roads on observers in close proximity to the solar facility.

Nature of Impact: **Potential visual impact of access roads on observers in close proximity to the solar facility.**						
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 2***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	**Local (4)**	**Local (4)**	**Local (4)**	**Local (4)**	**Local (4)**	**Local (4)**
Duration	**Long term (4)**	**Long term (4)**	**Long term (4)**	**Long term (4)**	**Long term (4)**	**Long term (4)**
Magnitude	**High (8)**	**Moderate (6)**	**High (8)**	**Moderate (6)**	**High (8)**	**Moderate (6)**
Probability	**Probable (3)**	**Improbable (2)**	**Probable (3)**	**Improbable (2)**	**Probable (3)**	**Improbable (2)**
Significance	**Moderate (48)**	**Low (28)**	**Moderate (48)**	**Low (28)**	**Moderate (48)**	**Low (28)**
Status (positive or negative)	**Negative**	**n/a**	**Negative**	**n/a**	**Negative**	**n/a**
Reversibility	**Recoverable (3)**	**n/a**	**Recoverable (3)**	**n/a**	**Recoverable (3)**	**n/a**
Irreplaceable loss of resources?	**No**	**No**	**No**	**No**	**No**	**No**
Can impacts be mitigated during operational phase?	**No**	**No**	**No**	**No**	**No**	**No**
Mitigation: • ***Retain a buffer (approximately 20m wide) of intact natural vegetation along the perimeter of the development area and/or along the site boundary. This measure will give some distance between the facility footprint and the visual receptors.*** • ***Retain and maintain natural vegetation in all areas outside of the development footprint.*** • **Decommissioning: removal of the solar facility and associated infrastructure once the lifespan has expired**						
Cumulative impacts: **The construction of the solar facility will increase the cumulative visual impact of electrical type infrastructure within the region.**						
Residual impacts: **None. The visual impact of the solar facility will be removed after decommissioning.**						

Potential visual impact of construction on visual receptors in close proximity to the proposed solar facility

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 land owners in the area. Mitigation entails proper planning, management and rehabilitation of all construction sites to forego visual impacts. The table below illustrates the assessment of this anticipated impact, which is likely to be of moderate significance for all Alternatives, and may be mitigated to low.

Table 7: Impact table summarising the significance of visual impact of construction on visual receptors in close proximity to the proposed solar facility.

Nature of Impact: **Potential visual impact of construction on visual receptors in close proximity to the solar facility.**						
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	**Local (4)**	**Local (4)**	**Local (4)**	**Local (4)**	**Local (4)**	**Local (4)**
Duration	**Very short term (1)**	**Very short term (1)**	**Very short term (1)**	**Very short term (1)**	**Very short term (1)**	**Very short term (1)**
Magnitude	**Moderate (6)**	**Low (4)**	**Moderate (6)**	**Low (4)**	**Moderate (6)**	**Low (4)**
Probability	**High (4)**	**Improbable (2)**	**High (4)**	**Improbable (2)**	**High (4)**	**Improbable (2)**
Significance	**Moderate (44)**	**Low (18)**	**Moderate (44)**	**Low (18)**	**Moderate (44)**	**Low (18)**
Status (positive or negative)	**Negative**	**Negative**	**Negative**	**Negative**	**Negative**	**Negative**
Reversibility	**Recoverable (3)**	**Recoverable (3)**	**Recoverable (3)**	**Recoverable (3)**	**Recoverable (3)**	**Recoverable (3)**
Irreplaceable loss of resources?	**No**	**No**	**No**	**No**	**No**	**No**
Can impacts be mitigated?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Mitigation: • **Rehabilitation of all construction areas.** • **Ensure that vegetation is not cleared unnecessarily to make way for the access road and ancillary buildings.**						
Cumulative impacts: **None**						
Residual impacts: **None.**						

4.7.2 Visual impact assessment: Secondary Impacts

Potential visual impacts of the proposed infrastructure on the visual character 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, and 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.

A visual 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.

Specific aspects contributing to the sense of place of this region include the rugged, undeveloped nature of the area, the wide open vistas and the scenic beauty of the landscape and the mountains.

The anticipated visual impact of the infrastructure on the regional visual character, and by implication, on the sense of place, is expected to be of **low** significance for Alternatives 1, 2 and 3.

There is no mitigation for this impact. The table below illustrates the assessment of this anticipated impact.

Table 8: Impact table summarising the significance of visual impacts on the visual character and sense of place of the region.

Nature of Impact: **Potential visual impact of the proposed structure on visual character and sense of place within the region**						
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 2***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	**Regional (3)**	**n/a**	**Regional (3)**	**n/a**	**Regional (3)**	**n/a**
Duration	**Long term (4)**	**n/a**	**Long term (4)**	**n/a**	**Long term (4)**	**n/a**
Magnitude	**High (8)**	**n/a**	**High (8)**	**n/a**	**High (8)**	**n/a**
Probability	**Improbable (2)**	**n/a**	**Improbable (2)**	**n/a**	**Improbable (2)**	**n/a**
Significance	**Low (30)**	**n/a**	**Low (30)**	**n/a**	**Low (30)**	**n/a**
Status (positive or negative)	**Negative**	**n/a**	**Negative**	**n/a**	**Negative**	**n/a**
Reversibility	**Recoverable (3)**	**n/a**	**Recoverable (3)**	**n/a**	**Recoverable (3)**	**n/a**
Irreplaceable loss of resources?	**No**	**n/a**	**No**	**n/a**	**No**	**n/a**
Can impacts be mitigated during operational phase?	**No**	**n/a**	**No**	**n/a**	**No**	**n/a**
Mitigation: • ***Retain a buffer (approximately 20m wide) of intact natural vegetation along the perimeter of the development area and/or along the site boundary. This measure will give some distance between the facility footprint and the visual receptors.*** • ***Retain and maintain natural vegetation in all areas outside of the development footprint.*** • **Decommissioning: removal of the solar facility and associated infrastructure once the lifespan has expired**						
Cumulative impacts: **The construction of the solar facility will increase the cumulative visual impact of electrical type infrastructure within the region.**						
Residual impacts: **None. The visual impact of the solar facility will be removed after decommissioning.**						

Potential visual impact of the proposed infrastructure on tourist routes, tourist destinations and tourism potential within the region.

The greater region is generally seen as having a high scenic value. The N10 is a primary tourist access route linking Upington in the northern Cape to Grahamstown in the Eastern Cape.

The Greater Karoo area is a well known tourist destination, specifically in terms of, history, culture and eco-tourism.

During peak tourist season, a number of secondary roads are favoured by tourists.

Visual intrusion through the development of industrial type infrastructure within this environment could affect the area's tourism value and potential. The anticipated visual impact of the solar facility on existing tourist routes, as well as on the tourism value and potential of the region is expected to be of **low** significance for all of the Alternatives.

There is no mitigation for this impact. The table overleaf illustrates the assessment of this anticipated impact.

Notes:
The magnitude of impact on tourist access routes, scenic drives and passes influences the magnitude rating used in the assessment of this impact.
The frequency of exposure to major and secondary roads that are recognised tourist access routes and scenic drives (based on the frequency of occurrence beyond a 2 km offset) influences the probability rating for each of the alternatives.

Table 9: Impact table summarising the significance of visual impacts on tourist routes, tourist destinations and tourist potential within the region.

Nature of Impact: ***Potential visual impact of the proposed structure on tourist routes and tourist potential within the region.***						
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 2***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	**Regional (3)**	**n/a**	**Regional (3)**	**n/a**	**Regional (3)**	**n/a**
Duration	**Long term (4)**	**n/a**	**Long term (4)**	**n/a**	**Long term (4)**	**n/a**
Magnitude	**Moderate (4)**	**n/a**	**Moderate (4)**	**n/a**	**Moderate (4)**	**n/a**
Probability	**Probable (3)**	**n/a**	**Improbable (2)**	**n/a**	**Probable (3)**	**n/a**
Significance	**Low (33)**	**n/a**	**Low (22)**	**n/a**	**Low (33)**	**n/a**
Status (positive or negative)	**Negative**	**n/a**	**Negative**	**n/a**	**Negative**	**n/a**
Reversibility	**Recoverable (3)**	**n/a**	**Recoverable (3)**	**n/a**	**Recoverable (3)**	**n/a**
Irreplaceable loss of resources?	**No**	**n/a**	**No**	**n/a**	**No**	**n/a**
Can impacts be mitigated during operational phase?	**No**	**n/a**	**No**	**n/a**	**No**	**n/a**
Mitigation: • ***Retain a buffer (approximately 20m wide) of intact natural vegetation along the perimeter of the development area and/or along the site boundary. This measure will give some distance between the facility footprint and the visual receptors.*** • ***Retain and maintain natural vegetation in all areas outside of the development footprint.*** • **Decommissioning: removal of the solar facility and associated infrastructure once the lifespan has expired**						
Cumulative impacts: **The construction of the solar facility will increase the cumulative visual impact of electrical type infrastructure within the region.**						
Residual impacts: **None. The visual impact of the solar facility will be removed after decommissioning.**						

The potential to mitigate visual impacts

- The primary visual impact, namely the presence of the solar facility is not possible to mitigate.
- Mitigation of visual impacts associated with the construction of access roads is possible through the use of 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.

Access roads which are not required post-construction or later, post decommissioning should be ripped and rehabilitated.

- 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:
    - Reduce the construction period through careful planning and productive implementation of resources.
    - Plan the placement of lay-down areas and any potential temporary construction camps along the corridor 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 managed and removed regularly.
    - Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way
    - Reduce and control construction dust through the use of approved dust suppression techniques.
    - Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
    - Rehabilitate all disturbed areas, construction areas, road servitudes and cut and fill slopes to acceptable visual standards.

- Secondary impacts anticipated as a result of the proposed solar facility (i.e. impacts on visual character and sense of place) are not possible to mitigate.
- There is no mitigation to ameliorate the negative visual impacts on tourist routes and destinations.
- After decommissioning, all infrastructures should be removed and all disturbed areas appropriately rehabilitated.

4.7.3 Comparative assessment of the alternatives

The scope of work undertaken in Chapter 3 has revealed much in terms of the anticipated nature and significance of the visual impacts likely to result from the proposed solar facility Alternatives. This exercise was not sufficient, however to distinguish between and compare the 3 Alternatives from a visual perspective.

In this respect, it is necessary to undertake a comparative assessment of the 3 Alternatives according to relevant visual criteria. The aim of the assessment is to identify which of the 3 Alternatives is most and least preferable from a visual perspective.

The following visual criteria are applied[2]:

- The **extent** of the proposed solar facility corridor. The greater the extent, the greater the visual impact, and therefore the less desirable the alternative.
- The exposure to **major roads** (national and arterial), based on the length of road sections running within a 10km offset. The greater the exposure, the greater the visual impact, and therefore the less desirable the alternative.
- The exposure to **secondary roads**, based on length of road sections running within a 10km offset. The greater the exposure, the greater the visual impact, and therefore the less desirable the alternative.
- The exposure to farmsteads and **settlements** based on the frequency of occurrence within a 10km offset. The higher the number of farmsteads and settlements, the greater the number of visual receptors, and therefore the less desirable the alternative.
- The exposure to **scenic and sensitive topographical** features based on the number of points within a 10 km offset. The higher the number of mountains, out crops and scenic and sensitive topographical features, the greater the visual impact, and therefore the less desirable the alternative.
- The significance of potential visual impacts on **tourism** (i.e. tourist routes, tourist destinations and tourist potential) within the region.

The table below shows the application of the above criteria to each Alternative. Values of 1-4 are used, with a value of 4 indicating the highest visual impact and a value of 1 indicating the lowest.

The sum of accumulated values gives an indication of which Alternative is likely to have the greatest visual impact. The Alternative with the highest total is the least desirable, while that with the lowest is the preferred option from a visual perspective.

[2] It is important to note that none of these criteria should be viewed in isolation, as all are relevant in the comparison between alternatives. It is the actual comparison of the 2 alignments making use of these criteria (included as table **11**) that is of importance.

Table 10: Comparative assessment of the solar facility Alternatives.

CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Total extent	**2** (5.139km²)	**1** (4.583km²)	**1** (4.546km²)
Major roads	**4** (25.562km)	**3** (16.849km)	**4** (24.199)
Secondary roads	**4** (19.653km)	**5** (35.261km)	**3** (11.229)
Settlements	**5** (Approx. 47)	**2** (Approx. 34)	**4** (Approx. 44)
Mountainous areas	**2** (Approx. 12)	**3** (Approx. 9)	**3** (Approx. 9)
Existing power lines	**3**	**3**	**3**
Tourism	**5** (high impact)	**3** (moderate impact)	**4** (moderate - high impact)
TOTAL	**25**	**20**	**22**

Overall, considering all relevant criteria, Alternative 2 is considered preferable, while Alternative 1 is the least desirable from a visual perspective. Please note however that even though Alternatives 1 and 3 are not the visually preferred alternative, that they are still within acceptable visual parameters.

5. CONCLUSION AND RECOMMENDATIONS

The construction and operation of the proposed Solar facility and its associated infrastructure will have a visual impact on the scenic resources of this region.

The solar facility infrastructure will be visible within an area that is generally seen as having a high quality natural and scenic landscape and a resultant tourism value and potential. The infrastructure would thus be visible within an area that incorporates various sensitive visual receptors who would consider visual exposure to this type of infrastructure to be intrusive.

The rocky outcrops and open space of the Greater Karoo is of scenic beauty, and the proposed solar facility is expected to transform the natural character of this area for the entire operational phase of the infrastructure. In addition, the tourism value of the region must not be overlooked, specifically its location within Greater Karoo.

There are not many options as to the mitigation of the visual impact of the solar facilities. The infrastructure extent exceeds at least 4 km² and vegetation screening or landscaping would only partly be able to hide structures of these dimensions.

In terms of the Alternatives, all three alternatives will be visually exposed to large areas within their respective 10m offsets. This is due to the extent and dimension of the infrastructure associated with solar facilities.

Overall, considering all relevant criteria, **Alternative 2** is considered the **preferred alternative**, and is recommended from a visual perspective. However, both Alternatives 1 and 3 would be acceptable should Alternative 2 not be viable due to other constraints.

The following (as detailed in section 6.7) is also recommended:

- Mitigate secondary visual impacts associated with the construction of roads by using existing roads wherever possible. Where new roads are required, these should be planned carefully, taking due cognisance of the 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.

- Access roads which are not required post-construction or later, post decommissioning should be ripped and rehabilitated.

- Mitigate visual impacts associated with the construction phase, albeit temporary, through proper planning, management and rehabilitation of all construction sites.

- Retain a buffer (approximately 20m wide) of intact natural vegetation along the perimeter of the development area and/or along the site boundary. This measure will give some distance between the facility footprint and the visual receptors.

- Retain and maintain natural vegetation in all areas outside of the development footprint.

- After decommissioning, all infrastructure should be removed and all disturbed areas appropriately rehabilitated.

6. IMPACT STATEMENT

In light of the results and findings of the Visual Impact Assessment undertaken for the proposed Solar facility, it is acknowledged that the natural and relatively unspoiled wide-open views adjacent to the solar facility alignment will be transformed for the entire operational lifespan of the infrastructure.

The following is a summary of impacts remaining, assuming Alternative 2 is selected, and that mitigation as recommended is exercised:

- The potential visual impact of the infrastructure on users of national, arterial and secondary roads in close proximity to the proposed infrastructure will be of **high** significance.
- The anticipated visual impact on residents of settlements and homesteads in close proximity to the proposed infrastructure will be of **high** significance.
- Within the greater region, the potential visual impact on sensitive visual receptors (i.e. residents of settlements and homesteads) will be of **low** significance.
- In terms of access roads, the anticipated visual impact will be of **low** significance.
- Similarly, the visual impact of construction is also expected to be of **low** significance.
- In terms of secondary visual impacts, the significance of the anticipated impact on the visual character and sense of place of the region will be of **low** significance.
- Potential visual impacts on tourist routes, tourist destinations and tourism potential within the region will be of **moderate** significance.
- Lastly, the visual impact on sensitive topographic features within the region will be of **moderate** significance.

The anticipated visual impacts listed above (i.e. post mitigation impacts) are not considered to be fatal flaws from a visual perspective, especially considering the low occurrence of visual receptors within the 10km offset of Alternative 2. Alternatives 1 and 3 also exhibit a low occurrence of visual receptors.

Furthermore, it is the opinion of the author that the anticipated visual impact is not likely to detract from the regional tourism appeal, numbers of tourists travelling along the N10, and it is unlikely that the infrastructure will be visible from many tourist destinations.

It is therefore recommended that the development of the solar facility as proposed (i.e. Alternative 2) be supported, subject to the implementation of the recommended mitigation measures (section 6.7) and management actions (Chapter 9).

7. MANAGEMENT PLAN

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

Table 11: Management plan – Planning.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the planning of the proposed Solar facility.		
Project component/s	**The solar facility and access roads.**	
Potential Impact	**Primary visual impact of the infrastructure due to the presence of the solar facility and the access roads in the landscape.**	
Activity/risk source	**The viewing of the above mentioned by observers on or near the site as well as within the region.**	
Mitigation: Target/Objective	**Optimal planning of infrastructure so as to minimise visual impact.**	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Implement an environmentally responsive planning approach to roads and infrastructure to limit cut and fill requirements. Plan with due cognisance of the topography. **Implement solar facility alignment Alternative 2.**	**Applicant / design consultant** **Applicant/ design consultant**	**Planning.** **Planning.**
Performance Indicator	**No internal access roads are visible from surrounding areas.**	
Monitoring	**Not applicable.**	

Table 12: Management plan – Construction.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the construction of the proposed Solar facility.		
Project component/s	**Construction activities related to the solar facility and associated infrastructure**	
Potential Impact	**Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing.**	
Activity/risk source	**The viewing of the above mentioned by observers on or near the site.**	
Mitigation: Target/Objective	**Minimal visual intrusion by construction activities and intact vegetation cover outside of immediate works areas.**	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Reduce the construction period through careful planning and productive implementation of resources.	**Applicant/ contractor**	**Construction.**
Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing.	**Applicant/ contractor**	**Construction.**
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	**Applicant/ contractor**	**Construction.**
Ensure that rubble, litter and disused construction materials are managed and removed regularly.	**Applicant/ contractor**	**Construction.**
Ensure that all infrastructure and the sites and general surrounds are maintained in a neat and appealing way.	**Applicant/ contractor**	**Construction.**
Reduce and control construction dust through the use of approved dust suppression techniques.	**Applicant/ contractor**	**Construction.**
Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.	**Applicant/ contractor**	**Construction.**
Rehabilitate all disturbed areas, construction areas, road servitudes and cut and fill slopes to acceptable visual standards.	**Applicant/ contractor**	**Construction.**
Performance Indicator	**Vegetation cover on and in the vicinity of the site is intact with no evidence of degradation or erosion.**	
Monitoring	**Monitoring of vegetation clearing during construction.** **Monitoring of rehabilitated areas post construction.**	

Table 13: Management plan – Operation.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the operation of the proposed Solar facility.		
Project component/s	The solar facility servitude and access roads.	
Potential Impact	Visual impact of vegetation rehabilitation failure.	
Activity/risk source	The viewing of the above mentioned by observers on or near the site.	
Mitigation: Target/Objective	Well rehabilitated and maintained alignment.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Monitor rehabilitated areas, and implement remedial action as and when required.	Applicant/ Operator.	Operation.
Performance Indicator	Intact vegetation on and in the vicinity of the alignment.	
Monitoring	Monitoring of rehabilitated areas.	

Table 14: Management plan – Decommissioning.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the decommissioning of the proposed Solar facility.		
Project component/s	The solar facility servitude and access roads.	
Potential Impact	Visual impact of residual visual scarring and vegetation rehabilitation failure.	
Activity/risk source	The viewing of the above mentioned by observers on or near the site.	
Mitigation: Target/Objective	Rehabilitated vegetation in all disturbed areas.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Remove infrastructure. Rip and rehabilitate access roads not required for the post-decommissioning use of the site. Monitor rehabilitated areas, and implement remedial action as and when required.	Applicant/ Operator. Applicant/ Operator. Applicant/ Operator.	Decommissioning. Decommissioning. Decommissioning.
Performance Indicator	Intact vegetation on and in the vicinity of the alignment.	
Monitoring	Monitoring of rehabilitated areas.	

8. REFERENCES/DATA SOURCES

Chief Director of Surveys and Mapping, varying dates. *1:50 000 Topo-cadastral Maps and Data.*

CSIR/ARC, 2014. *National Land-cover Database 2014 (NLC 2014).*

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

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

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

9. APPENDICES

9.1. Assessors Curriculum Vitae (Brief).

Curriculum vitae: Mr S Henwood

Name	:	**Steven Henwood**
Date of Birth	:	27 September 1976
Profession/Specialisation	:	Environmental Practitioner
Specialisation	:	Environmental Planning, Environmental Impact Assessment, Environmental Monitoring and Visual Impact Assessment
Nationality	:	South African
Years experience	:	19

Key qualifications

Mr Steven Henwood is an Environmental Practitioner, having obtained a Nat. Dip in Nature Conservation from Pretoria Technikon in 1997. Mr Henwood has also obtained a certificate in Environmental Impact Assessment from Rhodes University (course hosted by CES Environmental Consultants), as well as a having obtained a FGASA level 3 SKS dangerous animals qualification. In addition to these qualifications, he has done courses in advanced weapon handling, First Aid level 1, Basic fire fighting and prevention and Hospitality training. Mr Henwood is qualified to plan and conduct an assessment (THETA) he completed his training at the South African Wildlife College.

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Mr Henwood's consulting experience started in the Kruger National Park and various private reserves in Southern Africa. He has managed numerous environmental applications (Basic Assessments and full EIA's). His skill set includes Global Information Systems - including Visual Impact Analysis, Environmental Management Planning, Conservation Planning and Tourism Planning.

Employment record

04/2011 – Date	Henwood Environmental Solutions, Nelspruit, Director/Environmental Consultant
01/2008 – 04/2011	Velcich & Louw Landscape Architects, Nelspruit, Environmental Consultant
12/2007 - 01/2008	Ninham Shand, Nelspruit, Environmental Consultant
11/2006 - 12/2007	Ecotechnik Environmental Consultants, Nelspruit, Environmental Consultant
07/2006 - 10/2006	Makweti Safari Lodge, Welgevonden Game Reserve, Lodge Manager
05/2004 - 07/2006	Honeyguide Tented Safari Camps, Manyeleti Game Reserve, Lodge Manager
07/2002 - 01/2004	Lukimbi Safari Lodge, KNP, Head Ranger
12/1998 - 07/2002	Idube Game Lodge, Sabi Sands Game Reserve, Field guide & Head Ranger

12/1996 - 12/1997 Crocodile Bridge, Kruger National Park, Student & Field Guide

Relevent Experience

Project: **Mbombela Stadium Powerline Visual impact Analysis**
Project Description: Compile a visual analysis for the Mbombela Powerline, including photographic representation of the proposed powerline to scale and view shed analysis
Project Duties: Project Management
Proposal and Costing compilation
Mapping
Graphics and GIS
Public Presentation

Project: **Mbombela Stadium Powerline Vegetation Augmentation Visual Analysis**
Project Description: Visual analysis of possible vegetation augmentation to minimise the visual impact of the Mbombela Powerline
Photographic representation of tree planting and placement
Project Duties: Project Management
Proposal and Costing compilation
Mapping
Graphics and GIS
Public Presentation

Project: **Fire and Burning Policy for the Sabi Sands Wildtuin (Francois De Wet)**
Project Description: Annual compilation of map sets indicating proposed block burns for the North Western Sector of the Sabi Sands Wildtuin
Project Duties: Project Management
Proposal and Costing compilation
Mapping
Graphics and GIS

Project: **Visual Impact Analyses for a large number of Wind Energy Facilities in the Cape Province**
Project Description: Full visual impact analyses including photosimulation for numerous Wind Energy Facilities in the Cape
Project Duties: Project Management
Reporting
Mapping
Graphics and GIS

Project: **Visual Impact Analyses for a large number of Solar Facilities in the Cape and Limpopo Provinces**
Project Description: Full visual impact analyses including photosimulation for numerous Solar Facilities in the Cape and Limpopo Provinces
Project Duties: Project Management
Reporting
Mapping
Graphics and GIS

Projects completed by Henwood Environmental Solutions

Project: **Visual Impact Analyses for a Telecommunications Mast in the Croc River Gorge**
Project Description: Full visual impact analyses including photosimulation for a Telecommunications Mast in the Croc River Gorge
Project Duties: Project Management
Proposal and costing
Reporting
Mapping
Graphics and GIS

Project: **Visual Impact Analyses for a Telecommunications Mast Lomshiyo, Barberton**
Project Description: Full visual impact analyses including photosimulation for a Telecommunications Mast Lomshiyo, Barberton
Project Duties: Project Management
Proposal and costing
Reporting
Mapping
Graphics and GIS

Project: **Visual Impact Analyses for an Industrial Township, Alkmaar, Mpumalanga**
Project Description: Full visual impact analyses for an Industrial Township
Project Duties: Project Management
Proposal and costing
Reporting
Mapping
Graphics and GIS

Project: **Visual Impact Analyses for an Eskom 132Kv Solar Facility, Malelane, Mpumalanga**

Project Description: Full visual impact analyses including photosimulation for a 132Kv Solar Facility
Project Duties: Project Management
Proposal and costing
Reporting
Mapping
Graphics and GIS

Project: **Visual Impact Analyses for Graskop Gorge Lift, Mpumalanga**
Project Description: Full visual impact analyses including photosimulation for a 132Kv Solar Facility
Project Duties: Project Management
Proposal and costing
Reporting
Mapping
Graphics and GIS

Project: **Visual Impact Analyses for White River Cultural Hub**
Project Description: Full visual impact analyses including photosimulation for a 132Kv Solar Facility
Project Duties: Project Management
Proposal and costing
Reporting
Mapping
Graphics and GIS

Project: **Goede Hoop Sensitivity Screening and Feasibility Study**
Project Description: Assessment and reporting on the ecological sensitivity of the site
Project Duties: Project Management
Proposal and Costing compilation
Mapping
Graphics and GIS

Project: **Doornpoort Reclemation Scheme Feasibility Study**
Project Description: Assessment and reporting on the ecological sensitivity of the site
Project Duties: Project Management
Proposal and Costing compilation
Mapping
Graphics and GIS

Education

1997 : National Diploma in Nature Conservation, Pretoria Technikon, South Africa
1994 : Matric - Senior Certificate, St Martin's High School, Rosettenville, JHB South Africa

Languages

	Reading	**Writing**	**Speaking**
English	Excellent	Excellent	Excellent
Afrikaans	Good	Good	Good
Shangaan	Average	Average	Good

Signature of Staff Member

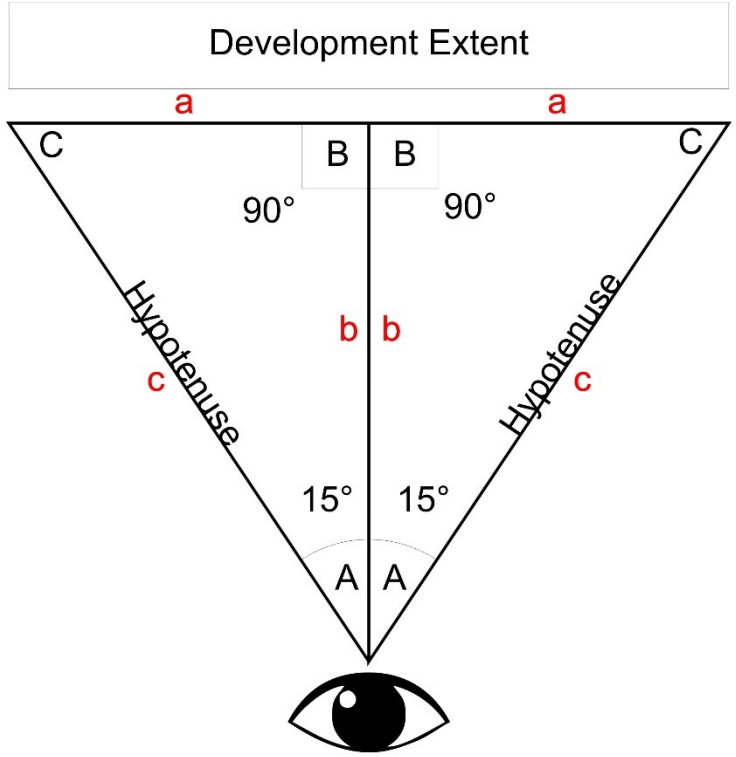
20 February 2017
Date

9.2. Calculation of Proximity Radii

For a facility, such as the proposed PV Project, both the horizontal and vertical extent of the development is of significance. Despite being made up of individual smaller components (i.e. the individual buildings and solar arrays within the proposed development), a PV facility will manifest as a single visual entity. It follows that the larger the facility, the larger will be the anticipated visual impact at any given distance, and the more visible the facility will be over larger distances.

In this respect, the proximity radii are calculated as a function of the critical point at which an observer will be able to perceive the full extent of the facility within a normal 30-degree cone of vision.

The calculation used to ascertain the proximity radii is based on the theory of Pythagoras and is as follows:



Where a + a = Development Extent

Where b = distance of observer from development

Where A + A = Normal 30 degree cone of vision

9.3. Specialist Declaration

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA
Date Received:	

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014; and

(2) National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 921, 2013

PROJECT TITLE

PROPOSED SOVENTIX PHOTOVOLTAIC PLANT –. ON SEVERAL PORTIONS OF THE FARM GOEDEHOOP, HANOVER DISTRICT, NORTHERN CAPE

Specialist:	Steven Henwood (Henwood Environmental Solutions)		
Contact person:	Steven Henwood		
Postal address:	PO Box 12340, Steiltes, Nelspruit		
Postal code:	1213	Cell:	078 672 3645
Telephone:	078 672 36 45	Fax:	
E-mail:	shenwood@mweb.co.za		
Professional affiliation(s) (if any)	IAIAsa		

Project Consultant:	Steven Henwood		
Contact person:	Steven Henwood		
Postal address:	PO Box 12340, Steiltes, Nelspruit		
Postal code:	1213	Cell:	078 672 3645
Telephone:	078 672 36 45	Fax:	
E-mail:			

4.2 The specialist appointed in terms of the Regulations_

I, ~~Steven Henwood~~ , declare that --

General declaration:

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

Signature of the specialist:

Henwood Environmental Solutions

Name of company (if applicable):

20 July 2017

Date: