VANRHYNSDORP, PORTION OF FARM 258: SOLAR AND HYDROGEN ENERGY FACILITY

VISUAL ASSESSMENT

For consideration in the Basic Assessment and
Heritage Impact Assessment (conducted under Section 38 (3) of the National Heritage Resource Act (No. 25 of 1999)

For
EnviroAfrica
PO Box 5367
Helderberg
7135
info@enviroafrica.co.za

Final Report
January 2023

Compiled by:
S.C. Lategan

PO Box 1082
Strand
7139

Report history:

Version	Date	Amendments
Final Ref VIA-258.01	13 January 2023	
Ref VIA-258.02	11 July 2023	Correct error in project description in Executive summary and Section 4.1 Add note to Section 9 confirming that correction is administrative and does not impact the assessment and findings.

Report to be cited: Visual Impact Assessment for Solar and Hydrogen facility on portion farm 258, Vanrhynsdorp, January 2023.

CONTENT

Tables:

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Relevant Qualifications & Experience of the Author

Ms Sarien Lategan holds an Honours Degree in Geography as well as a Masters Degree in Town and Regional Planning from the University of Stellenbosch. She has 7 years experience as Town Planner at a local government, 3 years with South African National Parks as planner and project manager of various GEF and World Bank managed, tourist facilities in the Table Mountain National Park and since 2004 as private practitioner involved in inter alia Site Analysis and Visual Impact Assessments for various types of developments ranging from housing, tourism to infrastructure developments.

Declaration of Independence

I, Sarah C. Lategan, declare that I am an independent consultant to EnviroAfrica and, has no business, financial, personal, or other interest in the proposed project or application in respect of which I was appointed, other than fair remuneration for work performed in connection with the application. There are furthermore no circumstances which compromise my objectivity in executing the task appointed for.

SC Lategan
13 January 2023

EXECUTIVE SUMMARY

The project is proposed on a site for which a solar development was previously approved. The original site approved for a solar development comprised about 20ha solely for a Solar PV installation. The amended proposal includes a 5MW Hydrogen plant and a 10MW Module array PV installation. The total area including support infrastructure comprise approximately 20ha.

The infrastructure associated with the Hydrogen plant can be compared to normal industrial installations of limited extend and height. The solar arrays are also of limited height of approximately 3m. All buildings are less than normal double storey in extent.

The assessment established that the receiving environment comprises a production landscape i.e. a landscape used for various types and intensity of agricultural use. It abuts an area of natural vegetation. The site slope northward towards the river. The valley has a very gentle slope but the variation in topography is sufficient to absorb facilities of low vertical extent such as proposed.

The development of the facility will change the character of the area, but the small size of the development reduces the significance. Due to the distance from town, the impact is not significant. The area does not hold very unique or specific visual quality of high significance.

The modelled viewshed is small and restricted due to the topographic character of the landscape. Due to dry conditions and the cold Atlantic air moving over the dry hot landscape, the air has a hazy quality which makes the distinction of element in the distance difficult. This adds to the absorption capacity of the area.

The identified receptors were analyzed, and the finding was that none display a high visual significance and therefore the overall visual impact of the proposed project is low. Due to the low impact, no mitigation measures are required.

The cumulative impact of the project is low as only one other project of a similar extent, has been approved in the area and due to the vastness of the landscape, the cumulative impact is rated as low.

1 BACKGROUND

Sarien Lategan was appointed to undertake the visual impact assessment of a 10Megawatt solar facility and Hydrogen Plant, as input to the Environmental process in terms of the National Environmental management Act, 1998 (Act no. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, as amended, undertaken by EnviroAfrica. The site on which the facility is planned comprises a portion of Farm 258, Vanrhynsdorp.

The site is located to the north of the town of Vanrhynsdorp, south of the Droë river in the rural hinterland of the town.

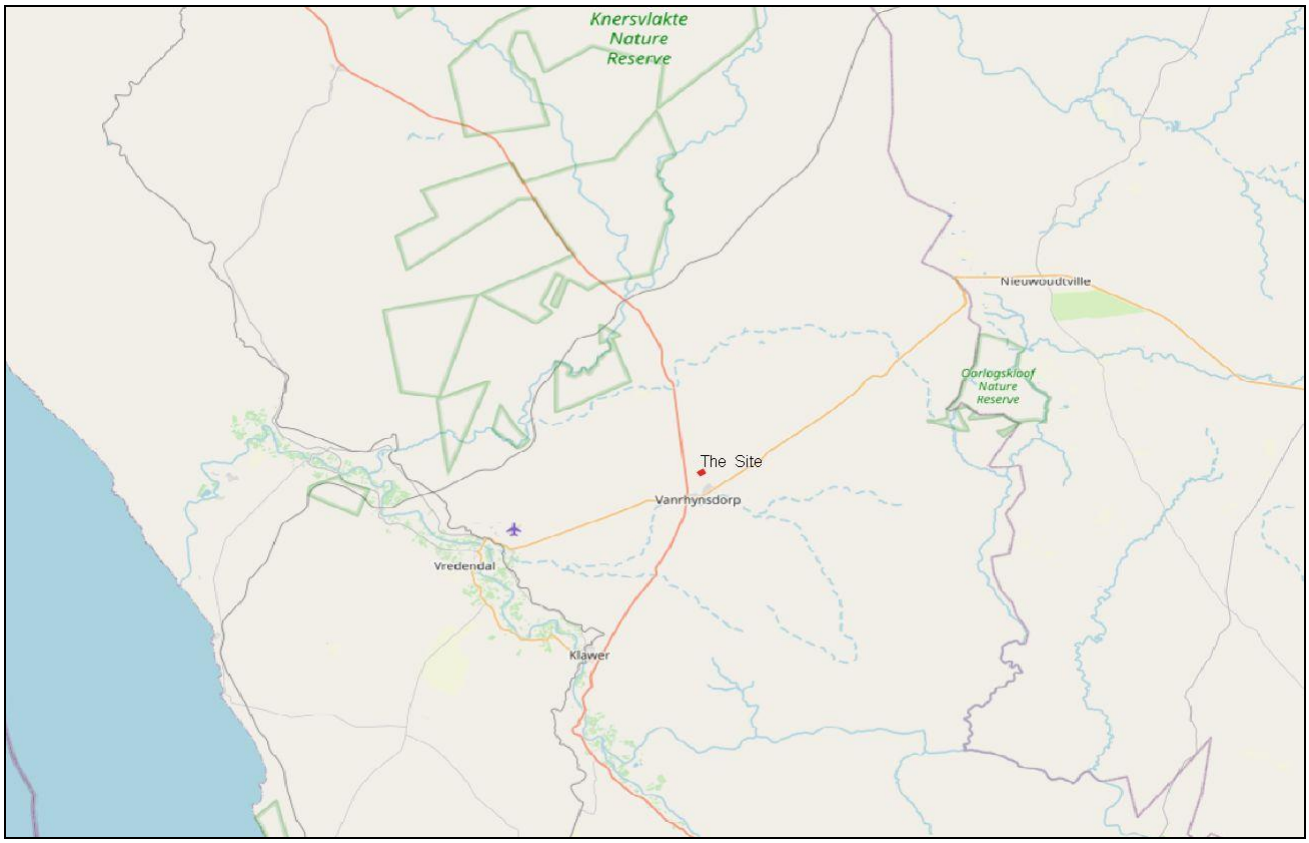


Figure 1 The site in a regional context

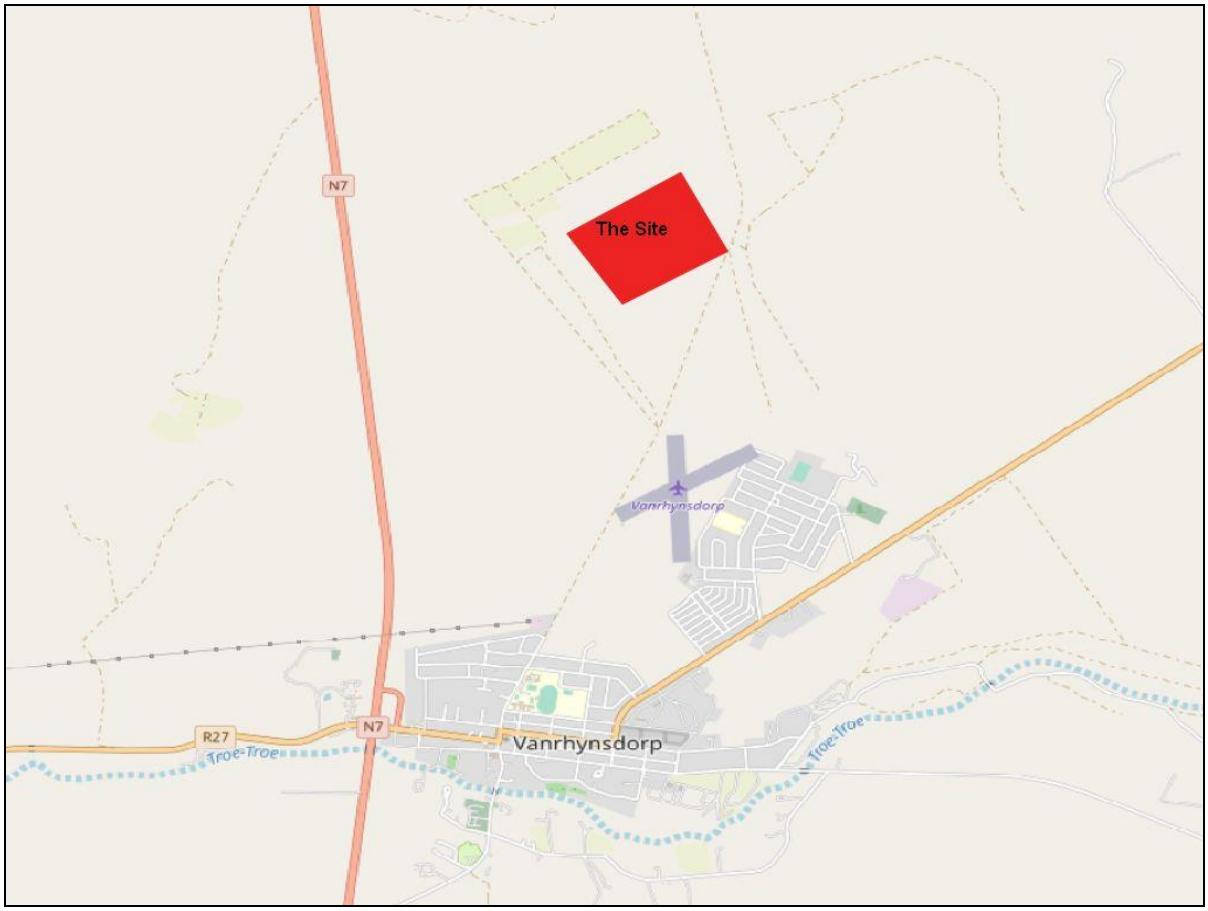


Figure 2 Locality

2 TERMS OF REFERENCE

The applicant intends the development of a solar farm and Hydrogen plant on a portion of Remainder Farm 258, Vanrhynsdorp in the northern edge of the town.

The objective of the Visual Impact assessment is to determine the significance of any visual impact. This assessment will indicate whether from a visual perspective the development constitutes an acceptable level of change and if so what potential mitigation measures can reduce any visual impact as to limit

To determine the potential extent of the VIA required the following broad criteria are considered.

Criteria	Comment
Areas with protection status, e.g. nature reserves	None. Closest is the *Knersvlakte Nature reserve* approx. 13km to the north and the *Op de Berg Private Nature Reserve* 13km to the south
Areas with proclaimed heritage sites or scenic routes	None.
Areas with intact wilderness qualities, or pristine ecosystems	Natural areas, low intensity agriculture and production landscape.

Areas with intact or outstanding rural or townscape qualities	None	
Areas with a recognized special character or sense of place	Distance from residential area into a production landscape	
Areas with sites of cultural or religious significance	None	
Areas of important tourism or recreation value	None	
Areas with important vistas or scenic corridors	Potentially.	
Areas with visually prominent ridgelines or skylines.	Mountain range approximately 20km to the east and the Maskam ridge approx. 13km to the south	

Table 1: Requirements for visual assessment

High intensity type projects including large-scale infrastructure	yes
A change in land use from the prevailing use	Yes
A use that is in conflict with an adopted plan or vision for the area	The site is located in an identified power corridor
A significant change to the fabric and character of the area	Potentially
A significant change to the townscape or streetscape	Potentially
Possible visual intrusion in the landscape	Potentially
Obstruction of views of others in the area	Potentially

Table 2: Nature of intended development

From the above it is clear that the receiving environment holds certain visual elements which may be impacted upon by development of the site.

The potential thus exist that the development of the site may have a significant visual impact. In order to assist authorities to make an informed decision, the input of a specialist is required to assess such potential visual impact.

The term visual and aesthetic is defined to cover the broad range of visual, scenic, cultural, and spiritual aspects of the landscape. The terms of reference for the specialist is to:

- Provide the visual context of the site with regard to the broader landscape context and site specific characteristics.
- Provide input in compiling layout alternatives.
- To describe the affected environment and set the visual baseline for assessment
- Identify the legal, policy and planning context
- Identifying visual receptors
- Predicting and assessing impacts
- Recommending management and monitoring actions

3 Methodology and principles

3.1 Methodology

Table 4: Summary of methodology

Task undertaken	Purpose	Resources used
A screening of the site and environment	To obtain an understanding of the site and area characteristics and potential visual elements	Photographs Site visits
Identify visual receptors	To assess visual impact from specific view points within the viewshed.	Photographs, profiles
Contextualize the site within the visual resources	To present an easy to understand context of the site within the visual resource baseline	Specialist: S Lategan Graphic presentation Superimposed photo's Model in case of high significance
Propose possible mitigation measures	To present practical guidelines to reduce any potential negative impacts.	Specialist: S. Lategan

Throughout the evaluation the following fundamental criteria applied:

- Awareness that "visual' implies the full range of visual, aesthetic, cultural and spiritual aspects of the environment that contribute to the area's sense of place.
- Consideration of both the natural and cultural (urban) landscape, and their inter-connectivity.
- The identification of all scenic resources, protected areas and sites of special interest, as well as their relative importance in the region.
- Understanding of the landscape processes, including geological, vegetation and settlements patterns which give the landscape its particular character or scenic attributes.
- The inclusion of both quantitative criteria, such as visibility and qualitative criteria, such as aesthetic value or sense of place.
- The incorporation of visual input as an integral part of the project planning and design process, so that the findings and recommended mitigation measures can inform the final design and quality of the project.
- To test the value of visual/aesthetic resources through public involvement.

3.1.1 Principles

The following principles to apply throughout the project:

- The need to maintain the integrity of the landscape within a changing land use process
- To preserve the special character or 'sense of place' of the area
- To minimize visual intrusion or obstruction of views
- To recognize the regional or local idiom of the landscape.

3.1.2 Fatal flaw statement

A potential fatal flaw is defined as an impact that could have a "no-go" implication for the project. A "no-go" situation could arise if the proposed project were to lead to (Oberholzer, 2005):

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

The screening of the site and initial project intentions did not reveal any of the above issues which may result in a fatal flaw.

3.1.3 Assessment explained

The assessment of visual impact is done on two levels namely the absorption rate of the receiving environment and the individual view receptors. The absorption rate of the receiving environment is determined by various elements e.g. topography, land use etc and the assessment will focus on the acceptable level of change of the area.
Visual receptors are assessed individually based on the sensitivity of the receptor, exposure to the development and intrusion rate.
The following framework is used in order to assess view receptors:

Criteria	High	Moderate	Low
Exposure	Dominant, clearly visible	Recognizable to the viewer	Not particularly noticeable to the viewer
Sensitivity	Residential, nature reserves, scenic routes	Sporting, recreational, places of work	Industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	Minimal change or blends with surroundings

3.1.4 Gaps and assumptions

1. The assessment is made on a broad development and technology concepts as per the Engineering Report dated January 2020 and site layout proposals dated 28 September 2022.

2. Transmission lines will connect to the ESKOM substation to the west. No detail alignment of this line is currently available and therefore the impact cannot be assessed in detail.

3. It is not known whether any new access roads will be constructed and therefore such infrastructure has not been assessed.

4. Safety issues and approach lines for aircraft using the landing strip abutting the site is regarded outside the scope and terms of reference of this visual assessment.

3.2 Legal Framework, Guidelines and policies

3.2.1 National Environmental Management Act, 107, 1998 and relevant Guidelines:

An assessment in terms of any activity that required an EIA or Basic Assessment may be subjected to a specialist visual assessment in order to determine the significance of the potential impacts to result from a proposed activity.

3.2.2 Western Cape PSDF

No specific relevant references to visual impacts.

3.2.3 Vanrhynsdorp SDF

The site is outside the urban area identified in the SDF.

4 DEVELOPMENT PROPOSAL ALTERNATIVES

4.1 General Description PV units

Construction of Solar energy production facility ("Solar Farm") Consisting of Solar Arrays and a Hydrogen plant. The site will accommodate support infrastructure such as a site office, switching gear and internal roads. The site will be secured with a fence and the facility will be connected to the nations grid with a grid connection line.

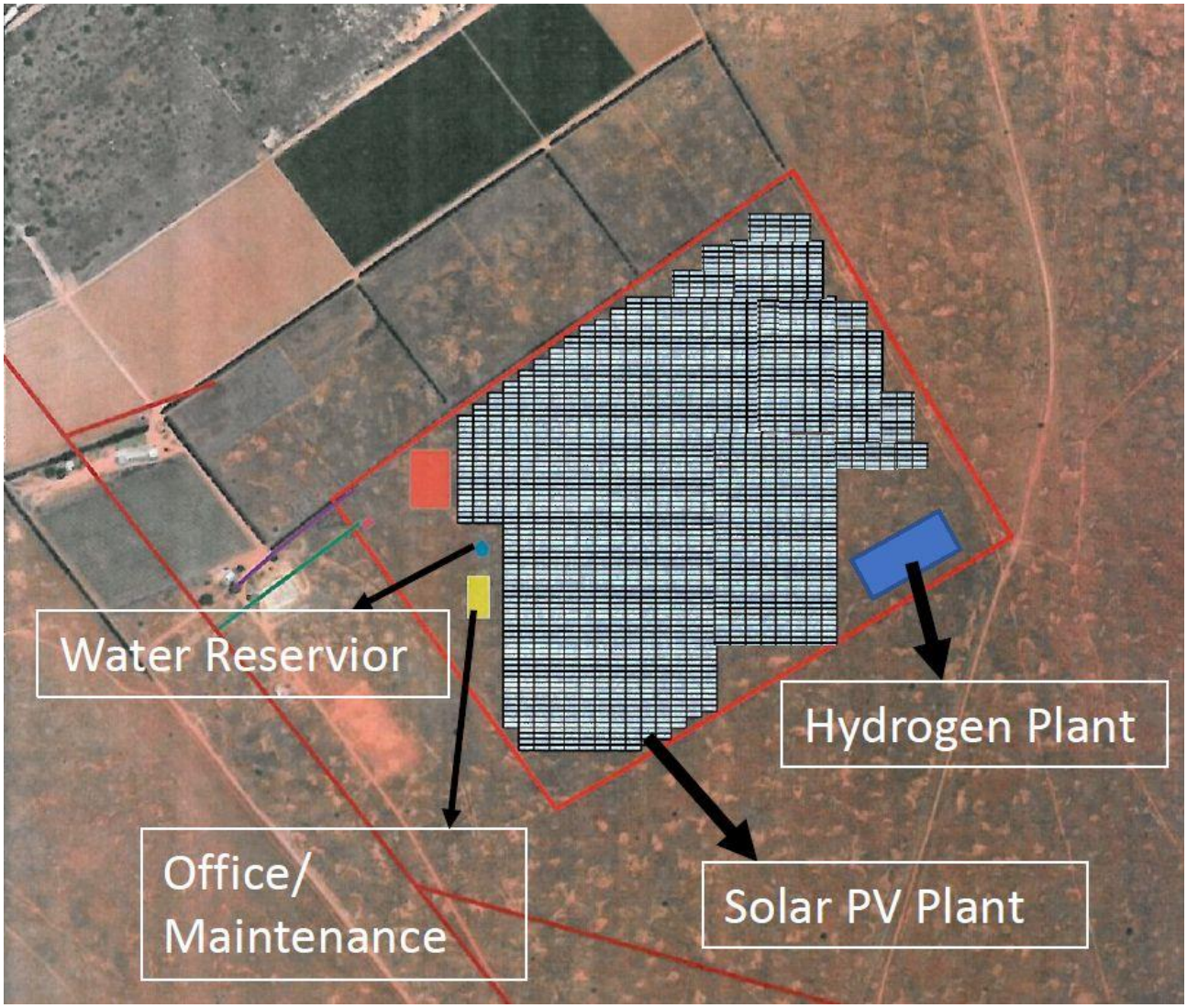


Figure 3: Proposed Layout

4.2 Project Elements PV units

4.2.1 Extent and layout

The Solar farm will occupy approximately 20ha. The solar arrays are orientated in east-west configuration with panels fronting north. The height is limited to of approximately 3m. All buildings are less than normal double storey in extent..

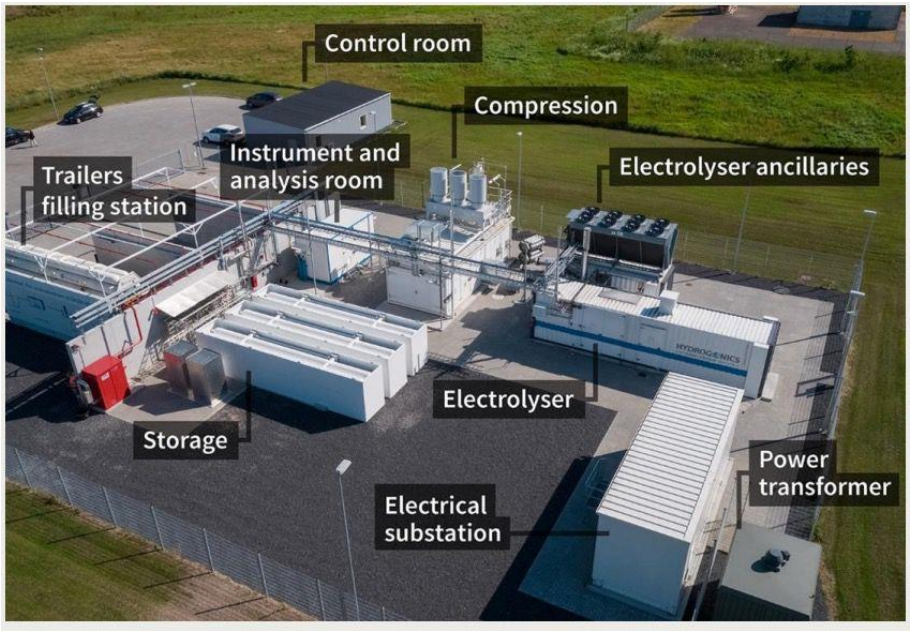


Figure 4 ; Typical Hydrogen Plant

4.2.2 Project perimeter

Double fencing with inner fence consisting of galvanized palisade fence and outer an electrified fence of 2,4m in height.

Figure 5: Typical electrical fence

Figure 6: Typical galvanized palisade fence

4.2.3 Supportive Infrastructure

Typically 20 x 15m respectively.
Black top surface

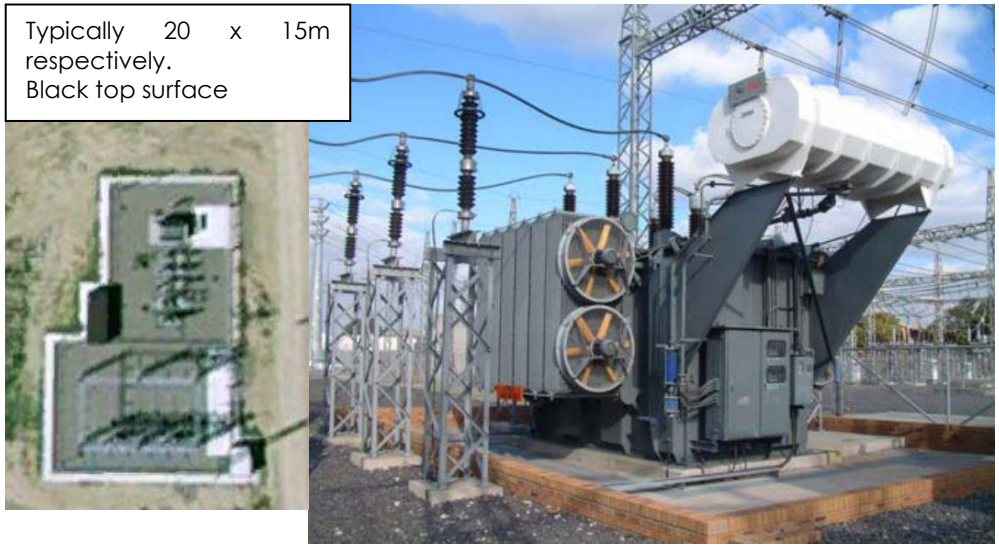


Figure 8: Transformer Pads and typical transformer

Single 22KV Power lines will feed from the transformers to the ESKOM substation

Figure 7: Typical 22KV single Powerline

4.3 General Description PV units

The development will consists of solar panels mounted on steel supporting array structures and are configured into 33 sub array systems. The development consists of the following elements
1) Solar Array and infrastructure
2) DC to AC Inverter stations (12 units required)
3) LV to MV transformer stations (6 units required)
4) MV to HV transformer stations and feed to Sub Station
Site needs some leveling. Expected height 2,4m but maximum height for any structures assumed at 3m above ground. Arrays orientated north.

Figure 9: Example of PV arrays

4.4 Project Elements PV units

Figure 10: DC to AC inverter Interface

Figure 12: LV to MV Transformer station

Figure 11: MV to HV Transformer

4.4.1 Operational elements

Depending on the exact technology the operational activities can vary. For the typical units described above, teams will access the site and physically clean panels. This is done either by rope access or the use of "cherry pickers". In areas of high dust conditions, cleaning can be more regular.

4.5 Construction elements

For the construction of the typical units describe above, large earth moving equipment will be used as well as high lift equipment and cranes. Large transport trucks for delivery will enter the site during construction. For technology that uses smaller units or static units the scale of equipment required for construction will be less.
Construction process entails:

- clearing and leveling of the site,
- construction of pedestals which involve concrete bases and
- fitting of panels
- construction of internal and access roads
- Fencing and security infrastructure
- Construction of support facilities such as maintenance sheds, etc
- Construction of transmission lines

5 RECEIVING VISUAL ENVIRONMENT

5.1 Description

Understanding the potential impact of a proposed development, an understanding of the receiving environment is important. In this regard the main elements of the receiving environment relates to the character of the current surrounding land use and the absorption capacity of the area. The character of the area entails the sense of place created by the current land use and the scale and type of infrastructure or physical elements within the immediate area. The absorption capacity relates to the density of physical elements and topographical variations of the landscape, and the resulting ability of the landscape to absorb elements in the landscape and effectively reduce the visibility of such elements. The human eye will observe the horizon on a perfectly flat surface at a distance of 30km. This is however significantly reduced by landscape elements which obstruct the view. With a focal length of less than 50mm, elements at such distances are also difficult for the human eye to identify unless the object is of great extent.

5.1.1 Viewshed

A digital elevation model computed on 5m contour intervals were used with a view height above ground level of 3m, as the baseline to create the viewshed (Figure 13). Figure 14 illustrates the viewshed and the major landscape elements provides an explanation for the extent of the viewshed.

Towards the town i.e. southern direction the landscape slope upwards. The northern extensions of the town is located on this high ground. From there the land slopes down southward toward the Troe-Troe valley where the main town is located. . The site falls outside the view from the main town. The site is approximately 1,5km from town, but behind the rise in the land.

To the north and north-east the view catchment is restricted to approximately 10km due to the low hills which rise to approximately 200m and then slope down eastwards which obstruct the view. The Vanrhyneveld pass is 30km to the east and the traveler has a view from the pass across the plains. Due to the distance however the town of Vanrhynsdorp is barely visible on a clear day.

The Western Cape Biodiversity Framework included an initial viewshed analysis based on the Knersvlakte core conservation area. This viewshed indicated that the site falls within the view catchment of the Knersvlakte core conservation area. It should be noted that parameters for this viewshed analysis is not provided in the WCBF and simply serve as a note to consider visual impacts due to the low elevation variation of the region and the importance of tourism to the Knersvlakte.

The viewshed modelled in this report however demonstrates that the Knersvlakte Nature Reserve is not within the viewshed of the site. Figure 13 confirms the result of the viewshed.

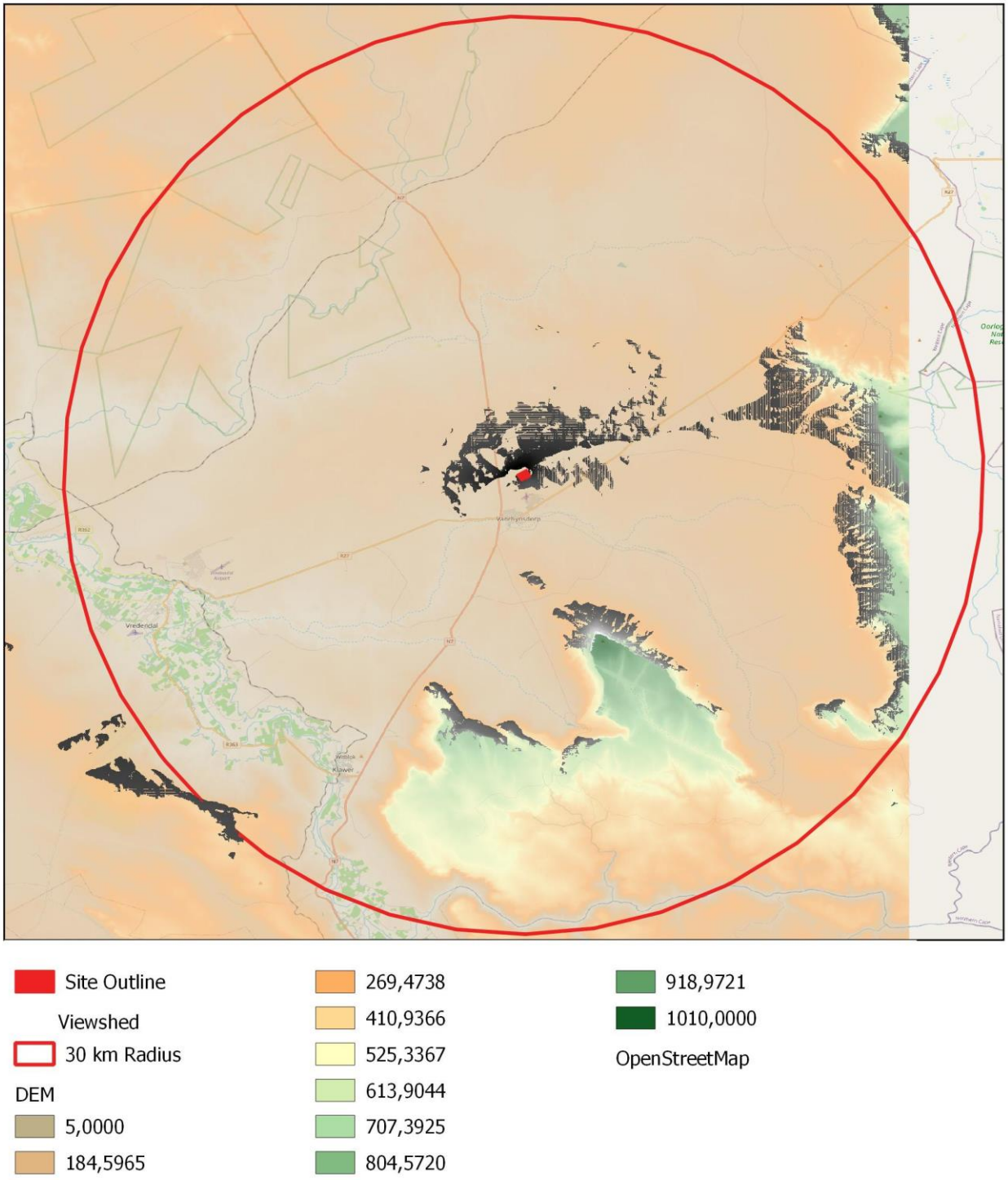


Figure 13 Viewshed

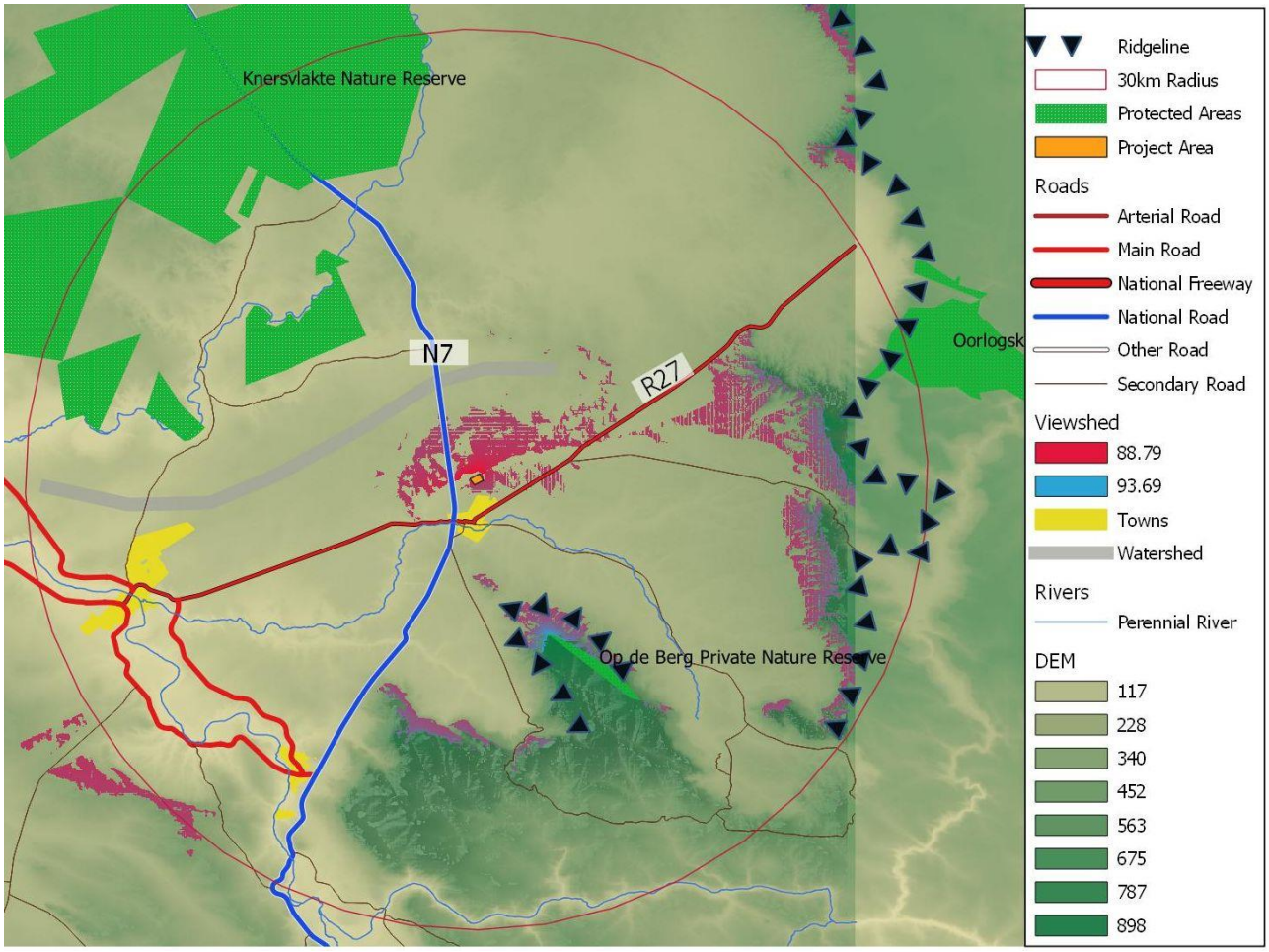


Figure 14 Viewshed and landscape elements

5.1.2 Sense of Place

Although the site is situated away from town it is still within the experiential boundaries of the town. Infrastructure this close to town is thus not totally foreign. A short distance to the north is mining activities.
The area thus lacks a defined character. The urban area approximately 1,5km to thee south, included a low cost residential area, sports grounds and sewage works. It is assumed that the use frequency of the airstrip to the south, is low and the occasional disturbance by small aircraft should not have a significant impact on the quality of life. Most of the time this area which resembles a large vacant area, simply contribute to a feeling of openness. Beyond the borders of the town the area is used for low intensity agriculture.
The site abuts an intensive agricultural area to the north. Toward the north in the distance, some mining activity occurs, but it has no direct physical or visual link to the town.

Although the development will change the character of the area it should be within acceptable levels of change as it is abutting irrigation land which represents more of a production landscape than a natural landscape

Photo 1: Residential area to the south

Photo 2 Character of the area

5.2 Findings

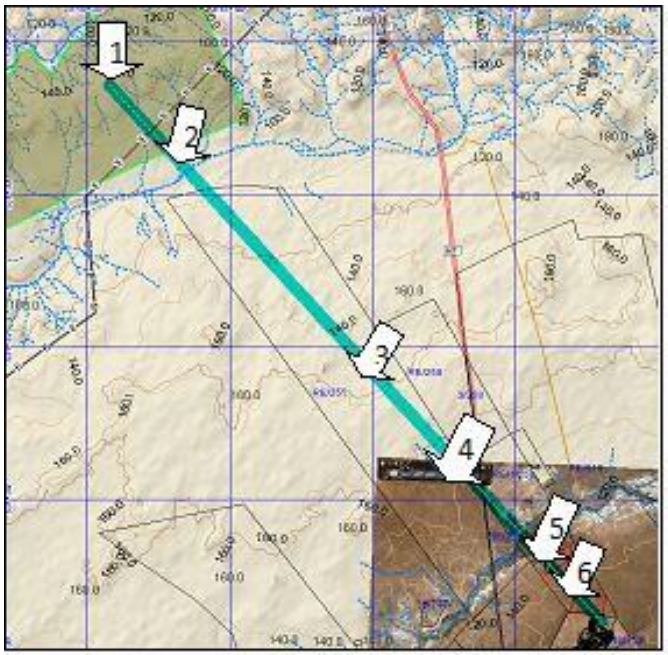
The town of Vanrhynsdorp is situated on a low lying area adjacent the Troe-troe river. Travelling towards the town on any of the main routes namely N7 highway or local R27, one only becomes aware of the town when almost in the town. Only approaching from the east on the R27 is the town visible from about 5km. From any other approach, the town catchment is less than 2km.
To the north of the town the landscape rises about 20m to form a higher plain. The town has extended onto the plain and the site is located on this plain. Due to this topographical character, the northern section of the town is out of view from the main town.

The site is located on the urban edge and characterized by utility type of uses often found on the edge of towns. It is assumed that the residential area has expanded into these non-residential use area.

In conclusion it can be accepted that the site is situated in a transitional area from urban to natural with a range of activities and land uses in the immediate surrounds. The area does not have a

strong sense of place and adaptation to new land uses would be accepted with little if any opposition.

Statement 1: The property is situated in the transitional area from urban to natural, where a mix of land uses are typically found. The area does not have a strong sense of place and any change in land uses within this context, would potentially accepted. The viewshed is limited due to the topography of the landscape and the absorption rate of the landscape is fairly high.



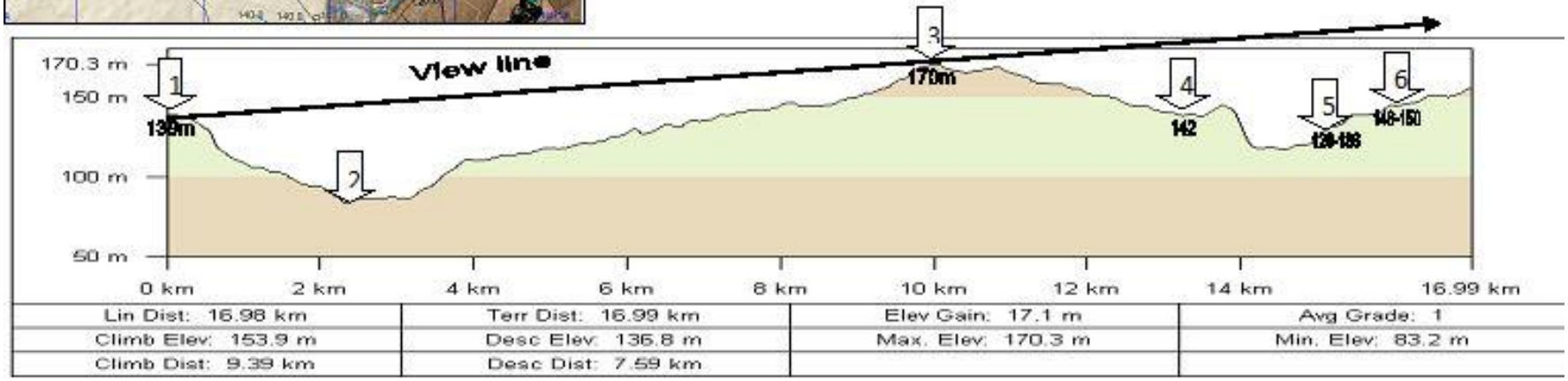
1 = highest point in Moedverloor Knersvlakte Reserve (139m)

2 = Valley

3 = High ground

4 = N7 highway (142m)

The height on the watershed, which represents the highest area of the Moedverloor Knersvlakte Reserve is at 139m ASL. The site are between 126m and 136m at a distance of approximately 15km. The site is thus slightly higher than the reserve and should there be no obstructions in between, a viewer at the reserve would look down onto the site. However, a higher lying area which rise to 170m and in some places 180m is between the reserve and the sites. This means the view from the reserve to the south east is obstructed by this high ground to such an extent that the sites are not visible from the reserve. The



Lin Dist: 16.98 km	Terr Dist: 16.99 km	Elev Gain: 17.1 m	Avg Grade: 1
Climb Elev: 153.9 m	Desc Elev: 136.8 m	Max. Elev: 170.3 m	Min. Elev: 83.2 m
Climb Dist: 9.39 km	Desc Dist: 7.59 km		

Figure 15 Profile confirming viewshed analysis

6 VISUAL RECEPTORS

Visual receptors are those positions from where the development site is potentially visible. Based on the character of the area and the specific land use of the viewpoint, the sensitivity of that viewpoint to visual change can be determined. Generally residential areas and tourism related destinations and routes are sensitive to visual intrusions as they relate to the well-being of residents and the tourism quality of the area.

Table 3 lists the potential receptors and based on the viewshed analysis the expected impact and aspects to be considered.

Table 3 Potential Receptors

Potential Receptor	Comment	Screening
N7	Partially screened by landscape. Only small section within viewshed	Assess profile. Low visibility expected
Town and Residential area to the south	Closest residential area approximately 1.5km from the site. Town outside viewshed.	Sensitive receptor.
R27 westbound	Partially screened by landscape. Small section close to town and Vanrhyns pass within viewshed	Assess profile. Low visibility expected due to distance land topographic screening
Nature Reserves	The Knersvlakte Reserve is outside the viewshed. Oorlogskloof Nature reserve is on the plateau. The town of Vanrhynsdorp is in the distance. Op die berg Reserve. The facility is on the northern slope and would hardly be visible from the reserve	3D modelling and profiles to assess views

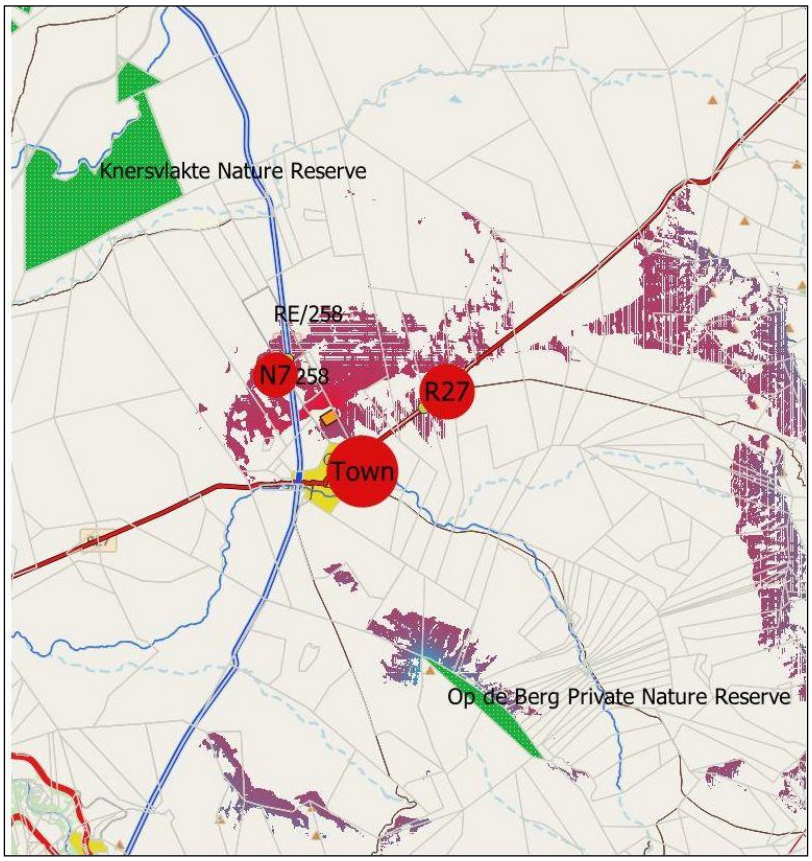


Figure 16 Receptors

6.1 N7 as receptor

Approaching from the north, site comes into view to the left. The solar arrays however front north which implicates that the observer has a sideview of the panels. The hydrogen plant will be behind the arrays and visible similar to fuel tanks. Photo 3 indicates the position of the site when approaching on the N7 from the north.
N7 has been identified as the Cape to Namibia tourist route and from this perspective any changes in the view corridor is important and need to be evaluated as to how it impact on tourism.

Photo 3 North approach on N7

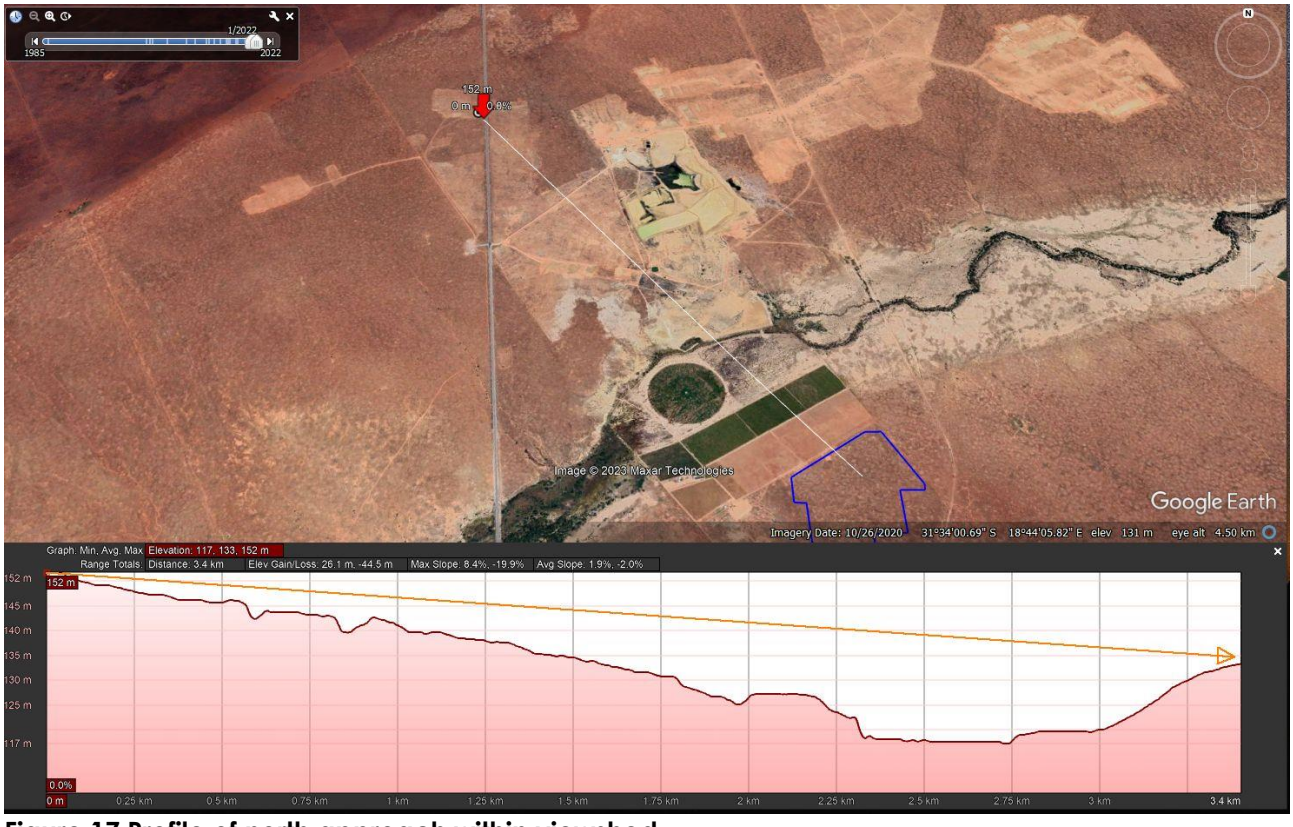


Figure 17 Profile of north approach within viewshed

The facility will stay in view for approximately 3km until the observer reach the bottom of the valley.

Approaching from the south the facility is on the north slope and thus screened from the observer as confirmed in the viewshed analysis.

Table 4 N7 assessment

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserves, scenic routes	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

6.2 R27 as Receptor

The site is barely visible from the R27 in a westerly approach. Photo X indicates the general view towards the site. The low rises screen the view and the hazy air makes view of distant objects difficult.

Descending the Vanrhynspass, the town of Vanrhynsdorp is not visible due to the distance and hazy air due to dust or fog which is a daily occurrence. Due to the low extent of the facility close to the town boundaries, should the town be visible on a clear day, it would hardly be distinguishable at this distance.

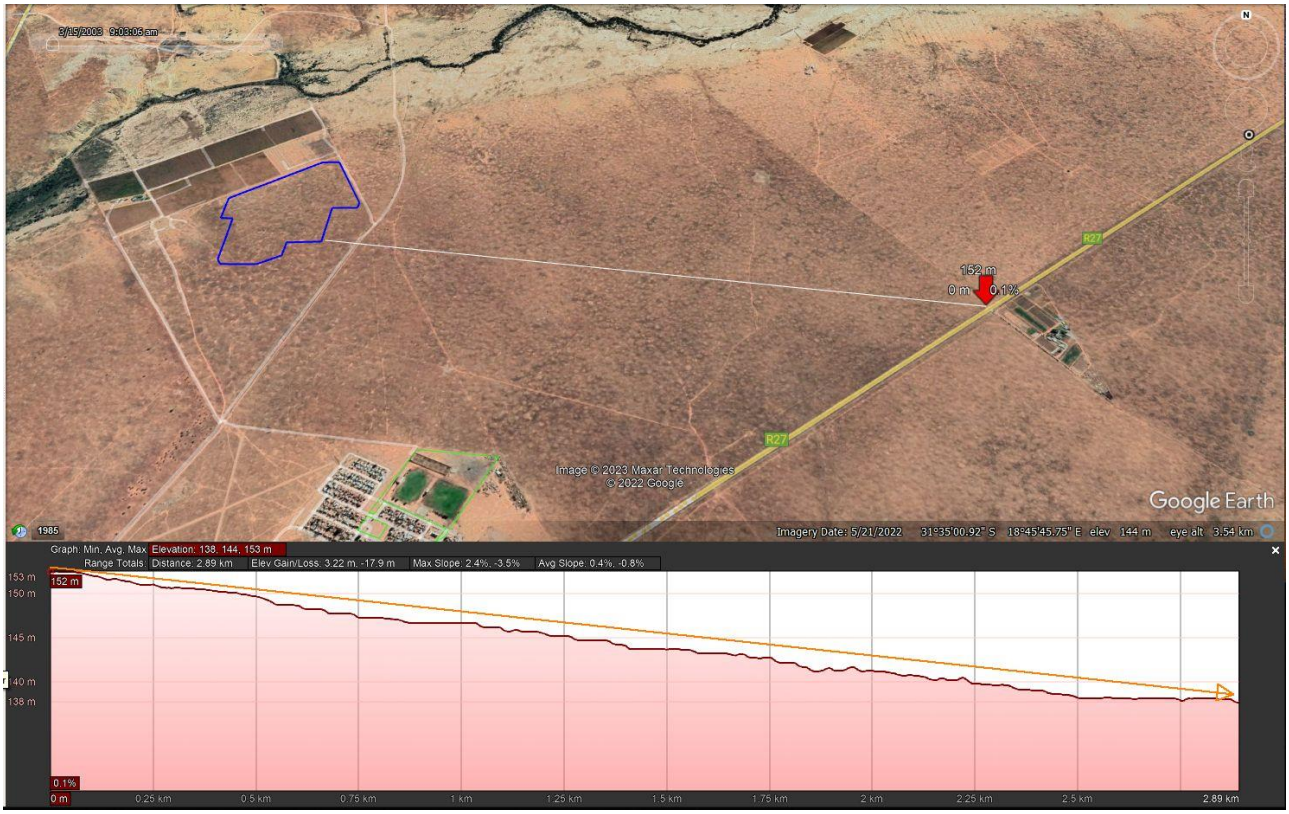


Figure 18 R27 view Profile

Photo 4 View from R27 towards the site 3km east of town

Photo 5 View from Vanrhynspass across the lowland

Table 5 R27 view assessed

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserves, scenic routes	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

6.3 Vanrhynsdorp town and residential areas as receptor

The town of Vanrhynsdorp is situated in the valley and is not within the viewshed. It is only the northern extensions that are situated on the rise to the north and approximately on the same level than the project. The project is however on the downward slope and thus the project would be below the horizon from the observers position. Structure of more than 3m in height may be visible. The intrusion level is very low.

Photo 6 Character of residential area on the northern side of town

Photo 7 View from residential area towards site

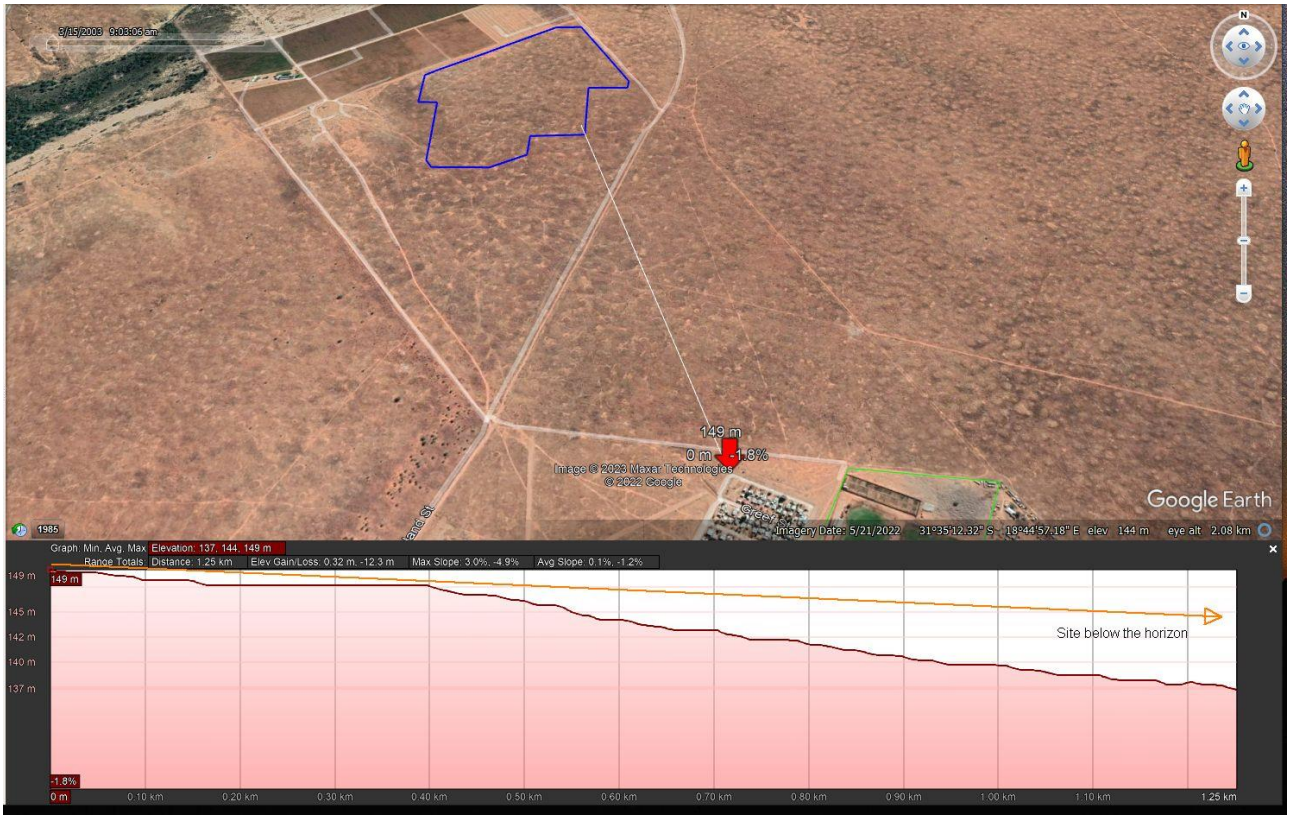


Figure 19 Viewline from residential area towards project

Table 6 Residential area view assessed

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserves, scenic routes	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

6.4 Protected areas in the region

The Knersvlakte Nature reserve is outside of the viewshed.

The Op die berg reserve face to the east, but hiking trails to extent to the northern edge of the Maskam mountain. The town is visible from the point. The facility may be visible but due to the orientation of solar arrays to the north, it will not create a glare towards this viewpoint.

The Oorlogskloof Nature reserve is on top of the mountain to the east and the views from the edge of the plateau will be similar to the Vanrhynspass assessed in section 6.2.

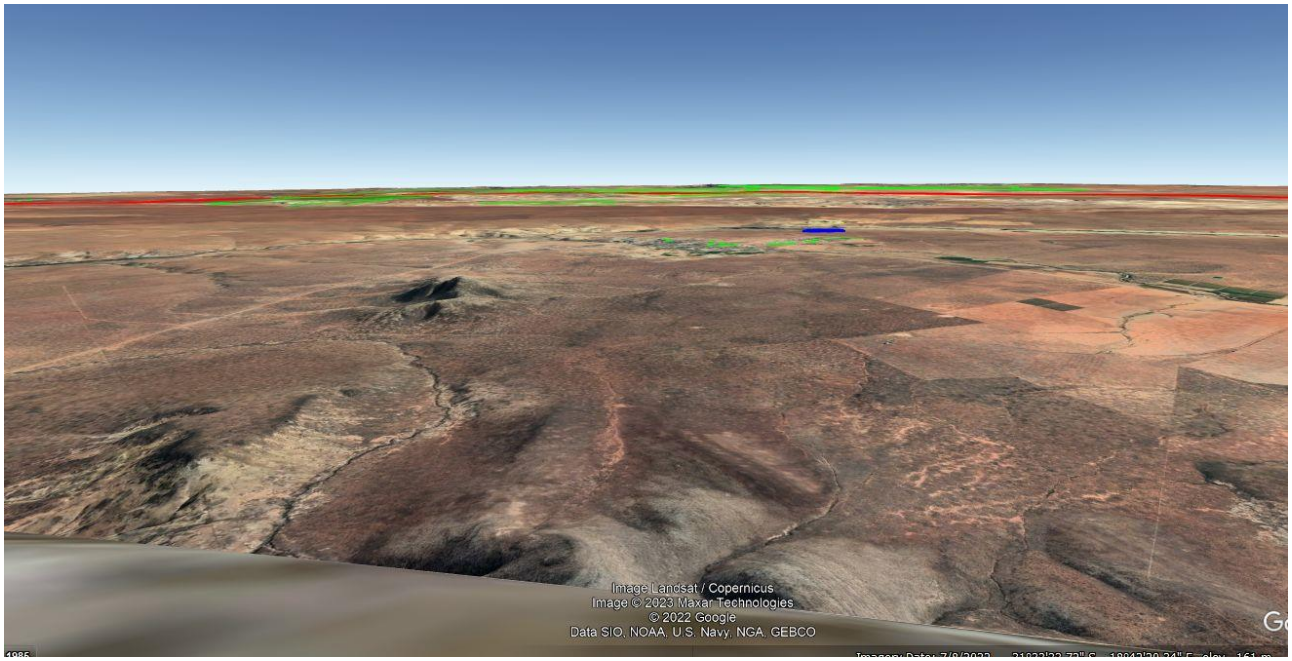


Photo 8 View from Maskam

6.5 Findings

Table 7 indicates that the overall visual impact of the proposed project is very low with regard to the identified view receptors.

Receptor	Comment	Exposure	Sensitivity	Intrusion	Finding
N7	Screened by landscape.	If visible it will be only briefly. The viewer also travel at 120km/h and observation level is low. Rating: Low	The N7 is a national highway, but also identified as the Cape-Namibia tourist connection. Rating: High to Moderate	The distance from the road reduces any possible intrusion and direction of panels will not impact on any reflection to the road. Potential brief awareness of facility Rating: Low	Low significance
Town	Town outside viewshed. Project below horizon from northern neighbourhood.	Low	Moderate	Low	Low
R27 westbound	Descending the mountain pass views are important as one of the few routes connecting the coast with the interior. Not officially identified as a scenic drive. Closer to town facilities may be visible	The development is not of great vertical or horizontal extent and due to distance barely distinguishable from the surrounding infrastructure Low	Moderate	Only in view line for short duration Rating: Low	Low significance.
Protected areas	Only edge of Oorlogskloof within viewshed. No impact on any other reserve	Due do distance very low	High as conservation areas and tourism destinations	Due to distance and air quality very low	Very low

Table 7: Summary of Visual Receptor assessment

7 CONSTRUCTION

During construction, various large earth moving equipment and equipment will be transported to the site and work on the site. This will impact on the general experience of viewers. This impact is however temporary and not uncommon during construction of infrastructure. Communities have fairly high tolerance levels for such activities if it contributes to the infrastructure of the area.
Rating: Low

8 CUMULATIVE IMPACTS

The Department of Environment and Tourism issued a guideline document in terms of which cumulative impacts should be assessed.[1] This guideline document identifies the types and characteristics of different cumulative effects as summarized in the table below.

Figure X indicates all approved Renewable projects within a 30km radius. Note that the area to the north of the current application was added by default in the database since Rem Farm 258 consists of two portions. Only the southern section was approved and the northern section was not part of the original application approved. The current application is an amendment of the approved application for the southern section of Rem Farm 258.

Table 8: Types and characteristics of cumulative effects

TYPE	CHARACTERISTIC	IDENTIFY POTENTIAL IMPACT
Time Crowding	Frequent and repetitive effects.	Activity remains at the same pace, frequency and intensity over time. No time crowding impacts.
Time Lags	Delayed effects.	No time lag impacts.
Space Crowding	High spatial density of effects.	The project is fairly small and the adjacent approved project also only comprise a 10MW facility. The two projects combined would not create a large scale development footprint and the space crowing is low.
Cross-boundary	Effects occur away from the source.	No impact
Fragmentation	Change in landscape pattern.	Impact on landscape pattern low
Compounding Effects	Effects arising from multiple sources or pathways.	No compounding impacts.
Indirect Effects	Secondary effects.	Minor impacts regarding access to the site
Triggers and Thresholds	Fundamental changes in system functioning and structure.	No fundamental changes to urban or ecological systems or structures

[1] DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria

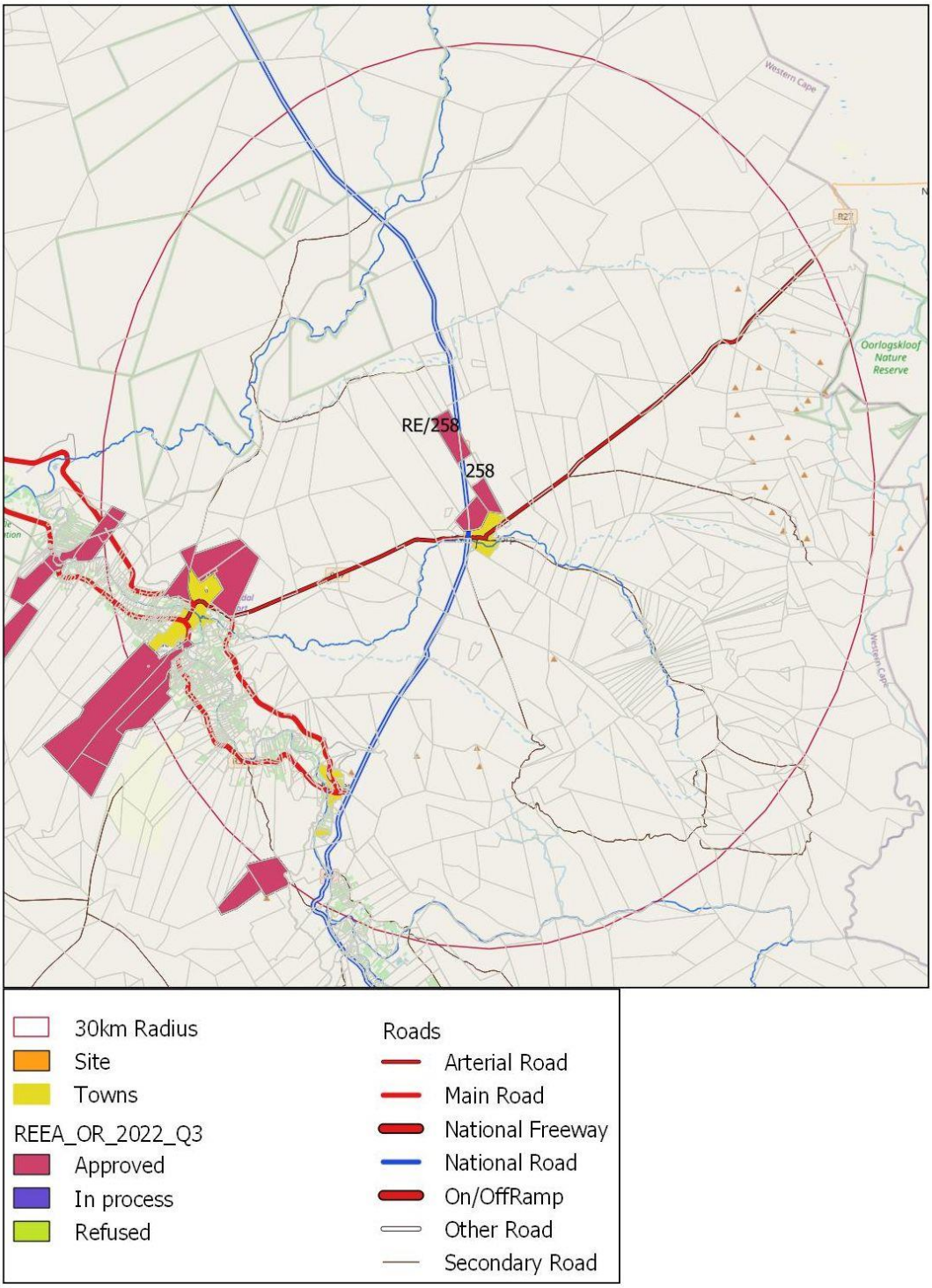


Figure 20 Status of existing renewable energy projects

Statement 3: The cumulative impact of is low due to the small footprint as well as similar small footprint of adjacent approved project.

9 FINDINGS

The undulating landscape has a surprisingly high absorption level and due to the low extent, the viewshed is small and restricted. The impact within the viewshed is within acceptable levels of change and the change in land use is of low significance.

The impact on identified view receptors are low due to the distance from the site, the air quality and the small extent of the project.

The overall visual impact is thus low and it is suggested that the development can be supported from this perspective. No mitigation measures are required.

Note: The administrative error in the project description has no impact on the assessment and findings as the correct physical and geographical site was assessed.

10 MITIGATION MEASURES

No significant visual impacts have been identified which required mitigation measures. No mitigation measures concerning visual impact is required.

APPENDIX A

GLOSSARY OF TERMS

Receptors: Important points from where viewers will be able to view the proposed or actual development and from where the development may be significant.

Sense of place: The character of a place, whether natural, rural or urban. It is allocated to a place or area through cognitive experience by the user.

View shed: The theoretical area within which an observer is likely to see a specific structure or area in the landscape. It is generated from a digital elevation model

Visual absorption capacity: The ability of elements of the landscape to "absorb" or mitigate the visibility of an element in the landscape. Visual absorption capacity is based on factors such as vegetation height, structures and topographical variation which hides elements in the landscape and therefore increases the absorption capacity.

Visual character: The overall impression of a landscape created by the order of the patterns composing it; the visual elements of these patterns are the form, line, colour and texture of the landscape's components. Their interrelationships are described in terms of dominance, scale, diversity and continuity. This characteristic is also associated with land use.

Visual exposure: Visual exposure is based on distance from the project to selected viewpoints. Visual exposure or visual impact tends to diminish exponentially with distance.

Appendix D4: Updated Visual Impact Assessment/Addendum (2017)

VANRHYNSDORP, PORTION OF FARM 258: SOLAR ENERGY FACILITY

VISUAL ASSESSMENT
ADDENDUM A

For consideration in the Basic Assessment
For

EnviroAfrica
PO Box 5367
Helderberg
7135
info@enviroafrica.co.za

Addendum A (March 2017) to original Report (2012)

Compiled by:
S.C. Lategan

GeoStratics

PO Box 1082
Strand
7139

Report history:

Version	Date	Amendments
Draft Report v1.1	26 March 2012	
Draft Report V1.2	17 May 2012	Include new site
Final Report	15/06/12	Include N7 photos. Confirm DEM accuracy
Addendum	March2017	

CONTENT

Tables

Figures:

Relevant Qualifications & Experience of the Author

Ms Sarien Lategan holds a Honours Degree in Geography as well as a Masters Degree in Town and Regional Planning from the University of Stellenbosch. She has 7 years experience as Town planner at a local government, 3 years with South African national Parks as planner and project manager of various GEF and World Bank managed, tourist facilities in the Table Mountain National Park and since 2004 as private practitioner involved in inter alia Site Analysis and Visual Impact assessments for various types of developments ranging from housing, tourism to infrastructure developments.

Ms Lategan is registered as a professional Town and Regional Planner as well as Environmental Assessment Practitioner.

Declaration of Independence

I, Sarah C. Lategan, fully authorized by Geostratics CC, declare that I am an independent consultant to EnviroAfrica and neither myself nor Geostratics, has any business, financial, personal or other interest in the proposed project or application in respect of which I was appointed, other than fair remuneration for work performed in connection with the application. There are furthermore no circumstances which compromise my objectivity in executing the task appointed for.

SC Lategan

EXECUTIVE SUMMARY

Sarien Lategan of Geostratics was appointed to undertake the visual impact assessment of a maximum 10Megawatt solar facility, as input to the Basic Assessment in terms of the National Environmental Management Act, 1998 (Act no. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010 by undertaken EnviroAfrica. The development of the solar farm is proposed by Keren Energy (Pty) Ltd. The site on which the facility is planned comprises a portion of Farm 258, Vanrhynsdorp. The original site considered was to the south of farm 258 adjacent the landing strip and residential area. Due to different specialist inputs the position of the solar farm was moved north and this site assessed.

An environmental authorization was obtained but has since expired. A new application will now be submitted for which the original VIA needs to be re-assessed to accommodate any changes that may have occurred since the original assessment as well as include an assessment of cumulative impacts. This report serves as an addendum to the original VIA for this purpose and should be read with the original report.

At the time of the original assessment a final decision was not yet been taken on the exact technology or mix of technology to be used in the development and therefore the worst case scenario was followed by assessing the technology most probably going to have the highest visual impact in terms of size of structures. For the purposes of the original study thus, tracking CPV units of dimensions 15,64m in height and 17m wide has been assessed. The technology currently proposed comprise single axis tracking system with a max tilt of 50°. This setup results in infrastructure to be significantly lower than the units assessed in the original VIA and therefore has a significant lower visual impact.

The overall conclusion in the original assessment was that the visual impact is within acceptable levels and could thus be recommended. Due to the nature of the type of technology, little mitigation measures can be implemented to further reduces any potential visual impacts. With the technology now proposed the visual impact is even further reduced.

With regard to cumulative impacts it is concluded in this addendum that no significant cumulative visual impacts will arise from the development and it is thus within the acceptable level of change.

It can thus be concluded that the overall visual impact of the new application is similar and even slightly less than the original proposal and from a visual perspective can be considered for approval. No additional mitigation measures are required.

1 OBJECTIVE

In 2012, Sarien Lategan of Geostratics was appointed to undertake the visual impact assessment of a maximum 10Megawatt solar facility, as input to the Basic Assessment in terms of the National Environmental Management Act, 1998 (Act no. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010 by undertaken EnviroAfrica. The development of the solar farm is proposed by Keren Energy (Pty) Ltd. The site on which the facility is planned comprises a portion of Farm 258, Vanrhynsdorp. The original site considered was to the south of farm 258 adjacent the landing strip and residential area. Due to different specialist inputs the position of the solar farm was moved north.

An environmental authorization was obtained but has since expired. A new application will now be submitted for which the original VIA needs to be re-assessed to accommodate any changes that may have occurred since the original assessment as well as include an assessment of cumulative impacts. This report serves as an addendum t.o the original VIA for this purpose and should be read with the original report.

The objective of this addendum is to access changes that occurred since the original VIA and the subsequent impact thereof on the recommendations. It will futher more also assess the cumulative impacts of the proposal.

The changes that may have occurred includes the following:

1. Changes in the proposal namely -
    a. Site boundary
    b. Extent of solar production
    c. Technology
2. Changes in the receiving environment

Cumulative impact holds two components namely the visual catchment area of assement and the criteria as defined by the DEA guideline on cumulative impacts.
It is important to note that the original VIA did assess impacts within the normal visual sphere of observation namely 30km.

2 CHANGES IN PROPOSAL

2.1 Site Boundary

The preferred site in the original assessment was site 2 which is further north from the neighbourhood. This site was assessed and found to hold no significant visual impacts to deem the development undesirable. Therefore the previous assessment of receptors remains unchanged. The solar facility link to the adjacent Vanrhynsdopr substation with 22kV power lines and thus add no additional elements to the original assessment.

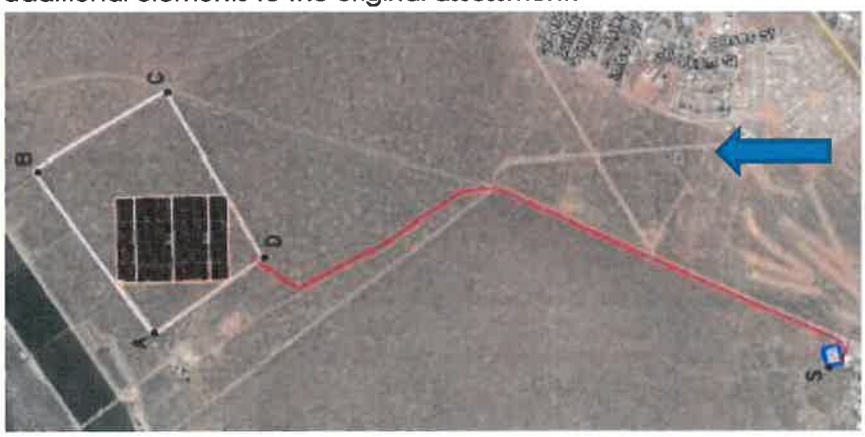


Figure 1: Site boundary

2.2 Extend of solar facility and power line connection

The proposal has been changed from the assessed extent of 10MW to a final proposal of 5MW. The footprint area however remains the same. The visual impact is thus similar to the original proposal.

The proposed 22kV powerline is similar to telephone line in extent and connect to the Vanrhynsdorp substation within the original defined area of assessment.

2.3 Proposed Technology

At the time of the original assessment a final decision was not yet been taken on the exact technology or mix of technology to be used in the development and therefore the worst case scenario was followed by assessing the technology most probably going to have the highest visual impact in terms of size of structures. For the purposes of the original study thus, tracking CPV units of dimensions 15,64m in height and 17m wide has been assessed.

The technology currently proposed, comprise is a crystalline PV single axis plant. It has 18540 solar modules connected to 7 central inverters, and makes use of Exosun single axis trackers. The facility will be connected to Eskom's Vanrhynsdorp Substation.
This proposal result in significant downscale in the size of infrastructure being less intrusive. The orignal proposal comprise units of up to 6m in height where the PV single axis system is approximately 2m.

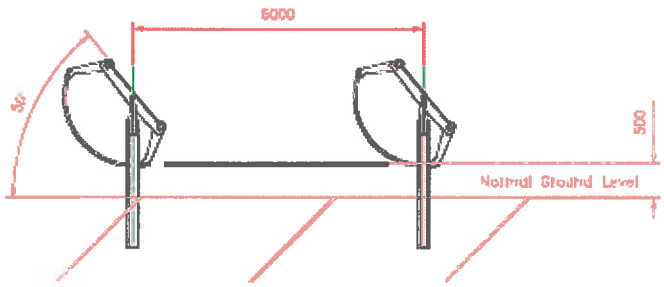


Figure 3: Single axis mounting system

No changes has been made to site parameter fencing and type of access roads.

3 CHANGES IN RECEIVING ENVIRONMENT

No changes occurred in the receiving environment which impact on the original assessment.

4 CUMULATIVE IMPACTS

4.1 Methodology

Ccumulative effects occur when:

- Impacts on the environment take place so frequently in time or so densely in space that the effects of individual impacts cannot be assimilated; or
- The impacts of one activity combine with those of another in a synergistic manner

DEAT has issued a guideline which identify types and characteristics of different cumulative effects.[1] Table 1 below summarise these criteria and these have been used to assess the cumulative visual impact.

Table 1: Types and characteristics of cumulative impacts

TYPE	CHARACTERISTIC
Time Crowding	Frequent and repetitive effects.
Time Lags	Delayed effects.
Space Crowding	High spatial density of effects.
Cross-boundary	Effects occur away from the source.
Fragmentation	Change in landscape pattern.
Compounding Effects	Effects arising from multiple sources or pathways.
Indirect Effects	Secondary effects.
Triggers and Thresholds	Fundamental changes in system functioning and structure.

DEAT also require that cumulative impacts of all energy projects within a 30km radius be assessed.

4.2 Assessment of cumulative impacts

4.2.1 Time Crowding

There is only one other energy production site in close proximity to the application site and therefore no time crowding effects are expected.

With regard to operational visual impact of a static land use change as proposed, this aspect is not relevant.

4.2.2 Time Lags

The facility does not change in its visual appeal over time and therefore there are no visual time lag effects.

4.2.3 Space crowding

The site is situated outside the urban edge but within visual context of the urban environment. The character of the immediate surrounds will be changed by the development, but it should be within acceptable levels of change.

In the original assessment it was determined that the viewshed does not extend as far as the Moedverloor Reserve. In the direction of the town the landscape slope upwards and the town is located on this high ground and on the down slope of the Troe-Troe valley. The current site is approximately 1,5km from town, but behind the rise in the land

This thus concluded that the catchment area does not extent to the 30km radius. Other energy production sites within a 30km radius is spatially removed from the application erf and will therefore not result in any space crowding effects.

4.2.4 Cross Boundary

From a visual perspective the site has no cross boundary impacts.

4.2.5 Fragmentation

The location of the site in a production landscape within the outer confines of the urban area therefore result in the development not posing a threat to fragmentation.

[1] DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria

4.2.6 Compounding Effects
From a visual perspective the site has no compounding impacts.

4.2.7 Indirect Effects
Support services will have to be provided from the nearest towns and will create limited effects of increased regular traffic. The levels hereof is however low and not significant.

4.2.8 Triggers and Thresholds
From a visual perspective the site has no impacts on Triggers and Thresholds.

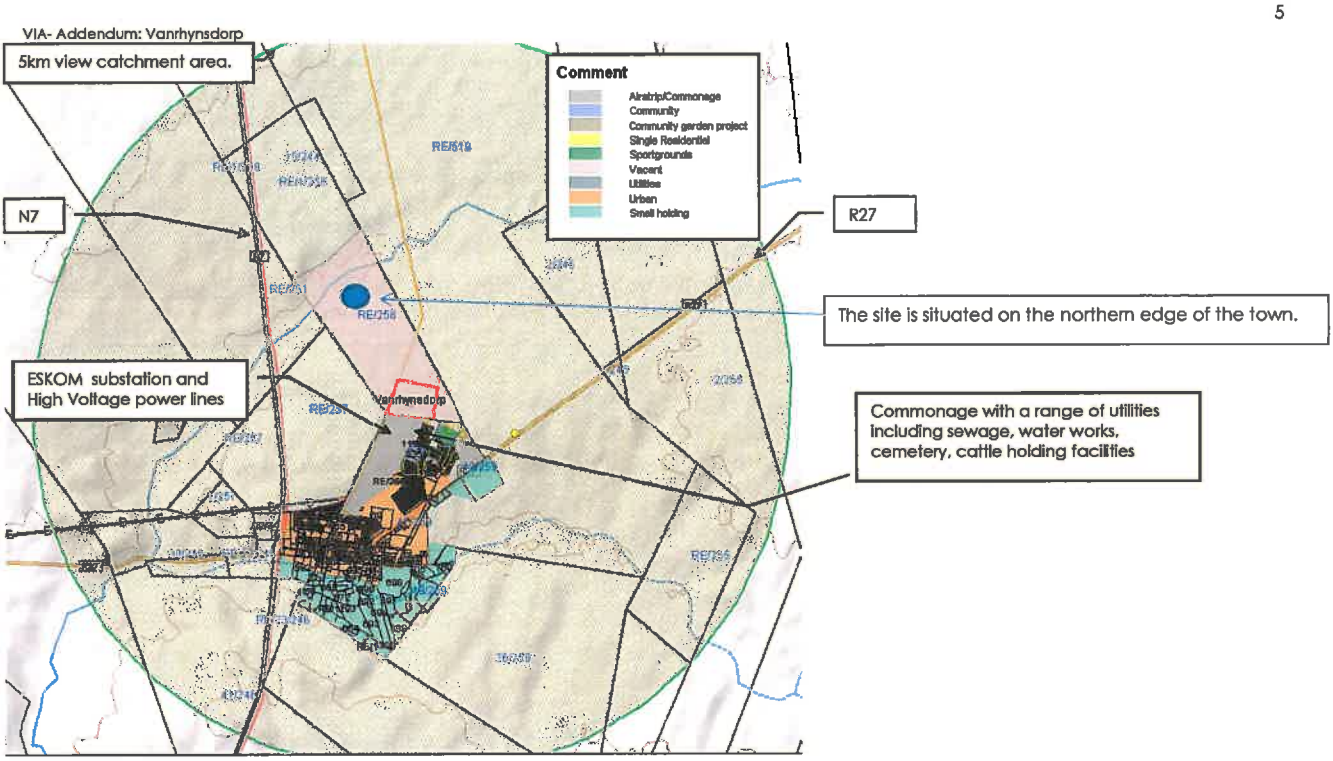


Figure 4: View catchment

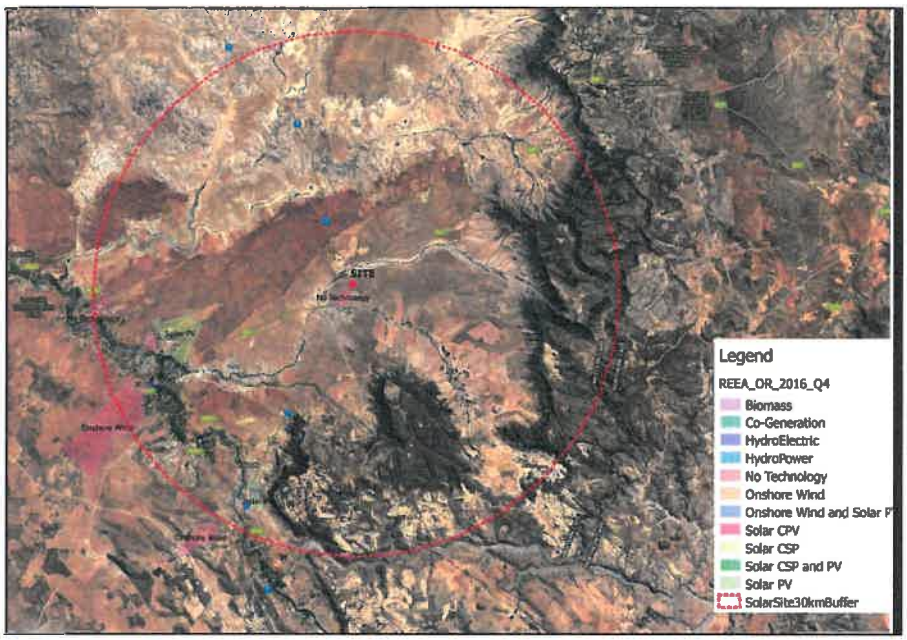


Figure 5: 30km radius

5 FINDINGS AND CONCLUSIONS

5.1 Construction Impacts

During construction, various large earth moving equipment and equipment will be transported to the site and work on the site. This will impact on the general experience of viewers. This impact is however temporary and not uncommon during construction of infrastructure. Communities have fairly high tolerance levels for such activities if it contributes to the infrastructure of the area.
Rating: Low

5.2 Operational Impacts

The site is situated outside the urban edge but within visual context of the urban environment. The character of the immediate surrounds will be changed by the development, but it should be within acceptable levels of change.

The N7 southbound present the only receptor which pose a potential visual impact of significance but due to the short duration it is regarded as of lesser significance and within acceptable levels.

Overall the visual impact of the development is of low significance.

Statement 1: The visual impact is rated within acceptable levels of change which requires no mitigation

Statement 2: The proposal does not pose any significant cumulative visual impacts which would deem the proposal unacceptable.

6 MITIGATION MEASURES

The visual impacts are low and requires no mitigation measures.

Appendix D4: Original Visual Impact Assessment (2012)

VANRHYNSDORP, PORTION OF FARM 258: SOLAR ENERGY FACILITY

VISUAL ASSESSMENT

For consideration in the Basic Assessment and
Heritage Impact Assessment (conducted under Section 38 (3) of the National Heritage Resource Act (No. 25 of 1999)

For
EnviroAfrica
PO Box 5367
Helderberg
7135
info@enviroafrica.co.za

Final Report
15 June 2012

Compiled by:
S.C. Lategan
GeoStratics

PO Box 1082
Strand
7139

Report history:

Version	Date	Amendments
Draft Report v1.1	26 March 2012	
Draft Report V1.2	17 May 2012	Include new site
Final Report	15/06/12	Include N7 photos. Confirm DEM accuracy

CONTENT

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Figures:

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Declaration of Independence

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SC Lategan

EXECUTIVE SUMMARY

At the time of assessment a final decision has not yet been taken on the exact technology or mix of technology to be used in the development. In this regard the worst case scenario has been followed by assessing the technology most probably going to have the most visual impact in terms of size of structures. Should a different technology thus been decided on which involve smaller units, the visual impacts will certainly be less than what is assessed in this report. For the purposes of this study thus, tracking CPV units of dimensions 15,64m in height and 17m wide has been assessed.

For the construction of the larger tracking units, the development would have had a significant impact on the adjacent residential area specifically with regard to shadows to be casted on the houses. Moving the site slightly to the north would result in the division of a critical biodiversity corridor. The decision was then taken to move the site well north to avoid the CBA.

The assessment established that the receiving environment of the previous site and the new site differs slightly, based on the difference in distance from the residential area. The area comprises a production landscape i.e. a landscape used for various types and intensity of agricultural use. It abuts an area of natural vegetation. The site slope northward towards the river, but the valley has a very gentle slope and the variation in topography, however sufficient to absorb single storey structures.
The development of a solar farm on either site will change the character of the area, but the small size of the development reduces the significance. The impact is however higher closer to town and the larger structures/PV units also hold a potential higher impact than the smaller arrays.

On the original site it was determined that the larger units will have a significant negative impact on the adjacent residential area due to the long shadows it will cast over the houses especially in winter. The smaller units have a lesser impact and should be within acceptable levels if positioned such not to cast shadows on the houses. This report confirms the finding of the desktop review for site 2 and include such actual tracks and photos. In this regard the N7 is a potential receptor, but it is envisaged that the intrusion level for the larger units will be of medium significance and the smaller unit of low significance. Neither will have a significant impact on obstruction levels.

The overall conclusion is that the visual impact of the new site is within acceptable levels for the smaller units. Any units within the height scale of single storey houses i.e. maximum height of 8m is expected to be within acceptable levels. Units exceeding 8m may have a more significant impact and an on-site assessment is required. Due to the nature of the type of technology, little mitigation measures can be implemented to further reduces any potential visual impacts. However different technology comprising smaller tracking units or small static arrays may have a lesser impact.

1 BACKGROUND

Sarien Lategan of Geostratics was appointed to undertake the visual impact assessment of a maximum 10Megawatt solar facility, as input to the Basic Assessment in terms of the national Environmental management Act, 1998 (Act no. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010 by undertaken EnviroAfrica. The development of the solar farm is proposed by Keren Energy (Pty) Ltd. The site on which the facility is planned comprises a portion of Farm 258, Vanrhynsdorp. The original site considered was to the south of farm 258 adjacent the landing strip and residential area. Due to different specialist inputs the position of the solar farm was moved north.

This report includes the original site assessment as well as the new site.

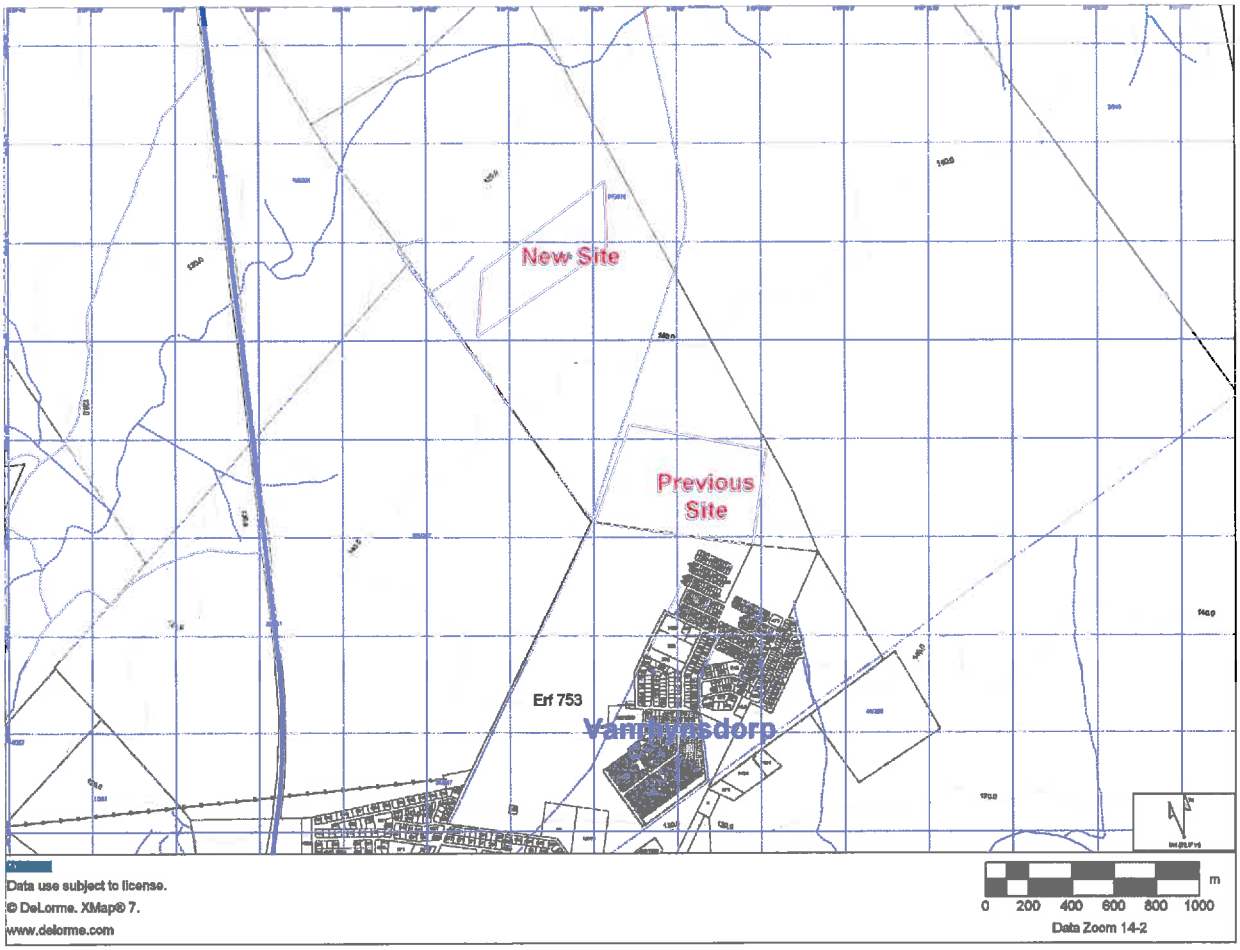


Figure 1: Locality

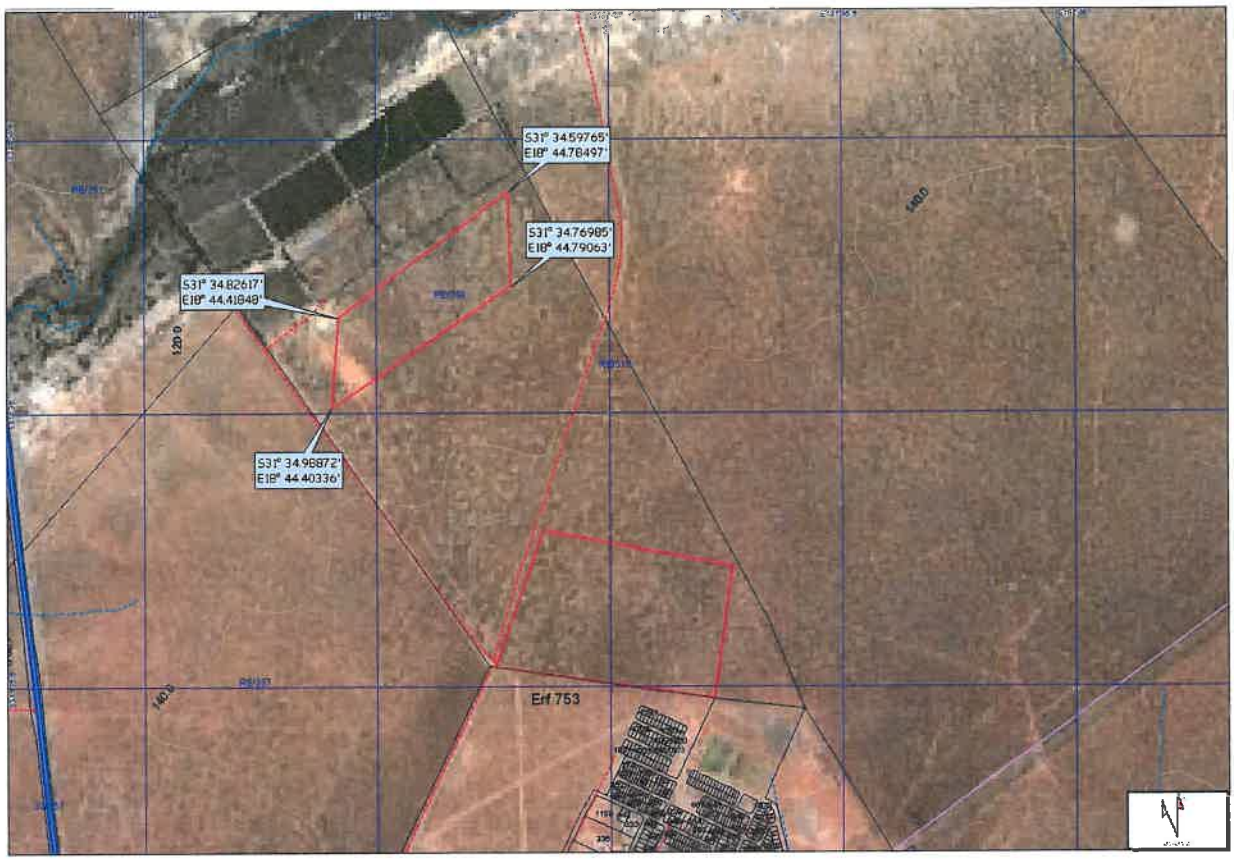


Figure 2: Site boundaries

2 TERMS OF REFERENCE

The applicant intends the development of a solar farm on a portion of Remainder Farm 258, Vanrhynsdorp in the northern edge of the town. Two sites have been considered namely directly abutting the landing strip site which gains access directly via local streets and a site further north gaining access off a secondary gravel road.

The objective of the Visual Impact assessment is to determine the significance of any visual impact. This assessment will indicate whether from a visual perspective the development constitute and acceptable level of change and if so what potential mitigation measures can reduce any visual impact as to limit

To determine the potential extent of the VIA required the following broad criteria are considered.

	Previous site	New site
Areas with protection status, e.g. nature reserves	None	
Areas with proclaimed heritage sites or scenic routes	None.	
Areas with intact wilderness qualities, or pristine ecosystems	Natural areas, low intensity agriculture and production landscape.	

Areas with intact or outstanding rural or townscape qualities	None	
Areas with a recognized special character or sense of place	Abutting residential area potentially	Distance from residential area into a production landscape
Areas with sites of cultural or religious significance	None	
Areas of important tourism or recreation value	No	
Areas with important vistas or scenic corridors	Potentially.	
Areas with visually prominent ridgelines or skylines.	None	

Table 1: Requirements for visual assessment

High intensity type projects including large-scale infrastructure	yes
A change in land use from the prevailing use	Yes
A use that is in conflict with an adopted plan or vision for the area	Unknown
A significant change to the fabric and character of the area	Potentially
A significant change to the townscape or streetscape	Potentially
Possible visual intrusion in the landscape	Potentially
Obstruction of views of others in the area	Potentially

Table 2: Nature of intended development

From the above it is clear that the receiving environment holds certain visual elements which may be impacted upon by development of the site.

It is thus clear that the potential exist that development of the site may have a visual impact. In order to assist authorities thus to make an informed decision, the input of a specialist is required to assist in the project design and assess the visual impact of the preferred project proposal.

The term visual and aesthetic is defined to cover the broad range of visual, scenic, cultural, and spiritual aspects of the landscape. The terms of reference for the specialist is to:

- Provide the visual context of the site with regard to the broader landscape context and site specific characteristics.
- Provide input in compiling layout alternatives.
- To describe the affected environment and set the visual baseline for assessment
- Identify the legal, policy and planning context
- Identifying visual receptors
- Predicting and assessing impacts
- Recommending management and monitoring actions

3 Methodology and principles

3.1 Methodology

Table 4: Summary of methodology

Task undertaken	Purpose	Resources used
A screening of the site and environment	To obtain an understanding of the site and area characteristics and potential visual elements	Photographs Site visits
Identify visual receptors	To assess visual impact from specific view points	Photographs, profiles
Contextualize the site within the visual resources	To present an easy to understand context of the site within the visual resource baseline	Specialist: S Lategan Graphic presentation Superimposed photo's Model in case of high significance
Propose possible mitigation measures	To present practical guidelines to reduce any potential negative impacts.	Specialist: S. Lategan

Throughout the evaluation the following fundamental criteria applied:

- Awareness that "visual' implies the full range of visual, aesthetic, cultural and spiritual aspects of the environment that contribute to the area's sense of place.
- Consideration of both the natural and cultural (urban) landscape, and their inter-connectivity.
- The identification of all scenic resources, protected areas and sites of special interest, as well as their relative importance in the region.
- Understanding of the landscape processes, including geological, vegetation and settlements patterns which give the landscape its particular character or scenic attributes.
- The inclusion of both quantitative criteria, such as visibility and qualitative criteria, such as aesthetic value or sense of place.
- The incorporation of visual input as an integral part of the project planning and design process, so that the findings and recommended mitigation measures can inform the final design and quality of the project.
- To test the value of visual/aesthetic resources through public involvement.

3.1.1 Principles

The following principles to apply throughout the project:

- The need to maintain the integrity of the landscape within a changing land use process
- To preserve the special character or 'sense of place' of the area
- To minimize visual intrusion or obstruction of views
- To recognize the regional or local idiom of the landscape.

3.1.2 Fatal flaw statement

A potential fatal flaw is defined as an impact that could have a "no-go" implication for the project. A "no-go" situation could arise if the proposed project were to lead to (Oberholzer, 2005):

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

The screening of the site and initial project intentions did not reveal any of the above issues which may result in a fatal flaw.

3.1.3 Assessment explained

The assessment of visual impact is done on two levels namely the absorption rate of the receiving environment and the individual view receptors. The absorption rate of the receiving environment is determined by various elements e.g. topography, land use etc and the assessment will focus on the acceptable level of change of the area.
Visual receptors are assessed individually based on the sensitivity of the receptor, exposure to the development and intrusion rate.
The following framework is used in order to assess view receptors:

Criteria	High	Moderate	Low
Exposure	Dominant, clearly visible	Recognizable to the viewer	Not particularly noticeable to the viewer
Sensitivity	Residential, nature reserves, scenic routes	Sporting, recreational, places of work	Industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	Minimal change or blends with surroundings

A sensitive receptor with a low exposure and/or low intrusion rate can be regarded as a low significance rating. A receptor of low sensitivity but with high exposure can be of high significance if the intrusion rate is also high but is reduced if the intrusion rate is medium or low.
The overall significance therefore depends not only on the sensitivity of the receptor but also on the exposure and intrusion rate and thus a combination of the criteria.

3.1.4 Gaps and assumptions

1. The assessment is made on a broad development and technology concepts as no detail information is available.

2. Currently two different technologies are considered namely CPV (large tracking units) and PV (small static units). Both technologies will be assessed. Exact height of PV units is not provided and assessment is based on assumption that the units are approximately 2,4m in height and therefore a maximum height of 3m will be assessed.

3. Transmission lines will connect to the ESKOM substation to the west. No detail alignment of this line is currently available and therefore the impact cannot be assessed in detail.

4. It is not know whether any new access roads will be constructed and therefore such infrastructure has not been assessed.

5. Safety issues and approach lines for aircraft using the landing strip abutting the site is regarded outside the scope and terms of reference of this visual assessment.

3.2 Legal Framework, Guidelines and policies

3.2.1 National Environmental Management Act, 107, 1998 and relevant Guidelines:

An assessment in terms of any activity that required an EIA or Basic Assessment may be subjected to a specialist visual assessment in order to determine the significance of the potential impacts to result from a proposed activity.

The National Dept has subsequently determined that all applications for solar farms are subject to a visual impact assessment.

3.2.2 Western Cape PSDF

No specific relevant references to visual impacts.

3.2.3 Vanrhynsdorp SDF

The site is outside the urban area identified in the SDF.

4 DEVELOPMENT PROPOSAL ALTERNATIVES

4.1 General Description CPV units

Construction of Solar energy production facility ("Solar Farm") with a 10Megawatt capacity, consisting of 140 tracking CPV units, on approximately 20ha. Each unit have approximately 30m tracker clearance zone. Units are typically positioned in rows with access roads between every second row. Unit spacing typically varies between 43x37 and 33x30m.

Figure 4: Typical CPV Unit

Figure 3: Typical Solar Farm layout

The Solar Farm include supportive infrastructure which consists of 2 -4 concrete transformer pads approximately 20x15m respectively, a fence construction staging area, maintenance shed and a switch panel for connection to the grid and transmission line from the transformers to the closest ESKOM substation.

4.2 Project Elements CPV units

4.2.1 Extent and layout

The Solar farm will occupy approximately 20ha. The nature of the tracking CPV units are such that the property has to be leveled to less than 1:5 gradient in order to prevent the units to touch the ground when turning on the pedestal. CPV units are positioned in a grid with the active panel side facing north. The units will rotate from east (morning) to west (afternoon). Back of units facing south. Units are position in rows of two with an access roads in between.

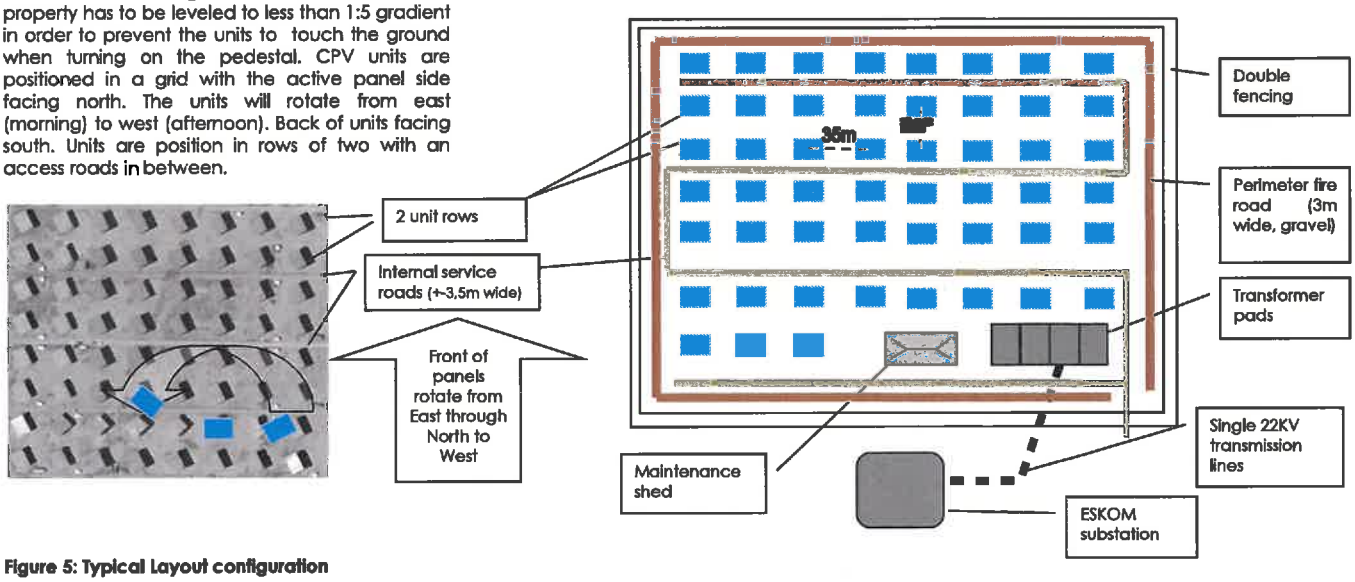


Figure 5: Typical Layout configuration

4.2.2 Tracking CPV Units

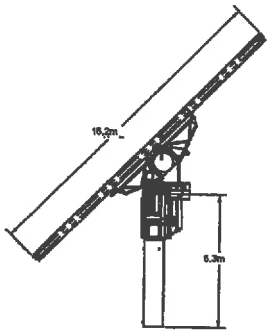
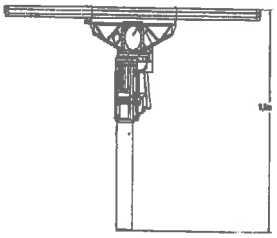


Figure 7: Typical Operational position



In stow: >28 mph. > 10 sec. Out of stow : <26 mph. >300 sec.

Figure 6: Storm Stow position

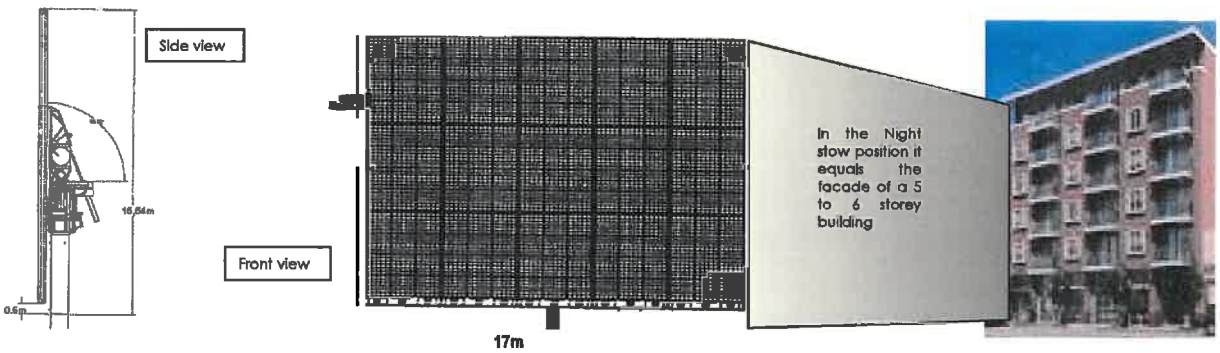


Figure 8: Night stow position

4.2.3 Project perimeter

Double fencing with inner fence consisting of galvanized palisade fence and outer an electrified fence of 2.4m in height.

Figure 9: Typical electrical fence

Figure 10: Typical galvanized palisade fence

4.2.4 Supportive Infrastructure

Typically 20 x 15m respectively.
Black top surface

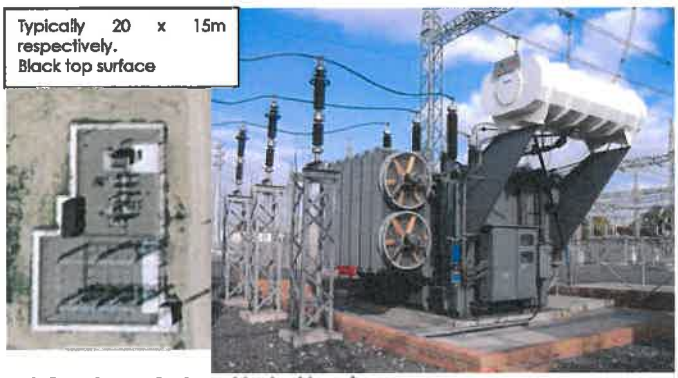


Figure 12: Transformer Pads and typical transformer

Single 22KV Power lines will feed from the transformers to the ESKOM substation

Figure 11: Typical 22KV single Powerline

4.3 General Description PV units

The development will consists of solar panels mounted on steel supporting array structures and are configured into 33 sub array systems. The development consists of the following elements
1) Solar Array and infrastructure
2) DC to AC inverter stations (12 units required)
3) LV to MV transformer stations (6 units required)
4) MV to HV transformer stations and feed to Sub Station (1 unit required)
Site needs some leveling. Expected height 2.4m but maximum height for any structures assumed at 3m above ground. Arrays orientated north.

Figure 13: Example of PV arrays

4.4 Project Elements PV units

Figure 14: DC to AC Inverter Interface

Figure 16: LV to MV Transformer station

Figure 15: MV to HV Transformer

4.4.1 Operational elements

Depending on the exact technology the operational activities can vary. Tor the typical units described above, teams will access the site and physically clean panels. This is done either by rope access or the use of "cherry pickers". In areas of high dust conditions, cleaning can be more regular.

4.5 Construction elements

For the construction of the typical units describe above, large earth moving equipment will be used as well as high lift equipment and cranes. Large transport trucks for delivery will enter the site during construction. For technology that uses smaller units or static units the scale of equipment required for construction will be less.
Construction process entails:

- clearing and leveling of the site,
- construction of pedestals which involve concrete bases and
- fitting of panels
- construction of internal and access roads
- Fencing and security infrastructure
- Construction of support facilities such as maintenance sheds, etc
- Construction of transmission lines

5 RECEIVING VISUAL ENVIRONMENT

5.1 Description

Understanding the potential impact of a proposed development, an understanding of the receiving environment is important. In this regard the main elements of the receiving environment relates to the character of the current surrounding land use and the absorption capacity of the area. The character of the area entails the sense of place created by the current land use and the scale and type of infrastructure or physical elements within the immediate area. The absorption capacity relate to the density of physical elements and topographical variations of the landscape, which will determine the catchment area. The human eye will observe the horizon on a perfectly flat surface at a distance of 30km. This is however significantly reduced by landscape elements which obstruct the view.

5.1.1 Catchment area

The site is situated on the northern edge of the town. Surrounding land use includes low cost housing, airstrip, sports grounds, communal garden project, cattle kraal, waterworks, and large stretches of vacant land. The previous site was situated closer to the residential area, on a higher elevation than the new site. The new site is adjacent agricultural land and surrounded by vacant land.

The Western Cape Biodiversity Framework included an initial viewshed analysis based on the Knersvlakte core conservation area. This viewshed indicated that the site falls within the view catchment of the Knersvlakte core conservation area. It should be noted that parameters for this viewshed analysis is not provided in the WCBF and simply serve as a note to consider visual impacts due to the low elevation variation of the region and the importance of tourism to the Knersvlakte. indicates that the Moedverloor Reserve is not within the view catchment of the proposed sites. The catchment in this direction is restricted to approximately 5km by the high ground, which rises to approximately 180m ALS.

Towards the town i.e. southern direction the landscape slope upwards and the town is located on this high ground and on the down slope of the Troe-Troe valley. The previous site is thus visible from town but the new site falls outside the view from the town. The new site is approximately 1,5km from town, but behind the rise in the land.

To the north east and east the view catchment is restricted to between 5 and 7km due to the low hills which rise to approximately 200m and then slope down eastwards which obstruct the view. The Vanrhyneveld pass is 30km to the north east and the traveler has a view from the pass across the plains. Due to the distance however the town of Vanrhynsdorp is barely visible on a clear day.

5.1.2 Sense of Place:

Site 1 (previous site) is located in a production landscape i.e. a landscape used for various types and intensity of agricultural use. It abuts an area of natural vegetation. Different infrastructure exists in the area e.g. substation, overhead power lines, telephone lines, irrigation systems.
The development will change the character of the area. Due to the absorption level of the area however, the change is within acceptable levels.

Site 2 (new site) is further away from town but still within the experiential boundaries of the town. Infrastructure this close to town is thus not totally foreign. Although the development will thus change the character of the area it should be within acceptable levels of change as it is abutting irrigation land which represents more of a production landscape than a natural landscape.

5.2 Findings

The site is located on the urban edge and characterized by utility type of uses often found on the edge of towns. It is assumed that the residential area has expanded into these non-residential use area. Community facilities such as a large sport grounds is also in close proximity. The area thus lacks a defined character. The softening of the sport ground perimeter by trees indicates an attempt to improve the character of the residential area and screen it from utility uses. It is assumed that the use frequency of the airstrip is low and the occasional disturbance by small aircraft should not have a significant impact on the quality of life. Most of the time this area which resembles a large vacant area, simply contribute to a feeling of openness. Beyond the borders of the town the area is used for low intensity agriculture.

No large utility infrastructure exist south of the site. Toward the north in the distance, some mining activity occurs, but it has no direct physical or visual link to the town.

The town of Vanrhynsdorp is situated on a low lying area adjacent the Troe-troe river. Travelling towards the town on any of the main routes namely N7 highway or local R27, one only becomes aware of the town when almost in the town. Only approaching from the east on the R27 is the town visible from about 5km. From any other approaches the town catchment is less than 2km.
To the north of the town the landscape rises about 20m to form a higher plain. The town has extended onto the plain and the site is located on this plain. Due to this topographical character, the northern section of the town is out of view from the main town.

Statement 1: The property on which the development is proposed, is currently vacant. Surrounding land use does not constitute hard, large infrastructure, but community associated uses. The area beyond the town boundary is characterized by low intensity agriculture. The proposed solar farm will change the character of the immediate surrounds. Large infrastructure has the potential to negatively impact on the abutting residential area, where-as the area can absorbed some infrastructure of a lesser extent.

VIA: Vanrhynsdorp

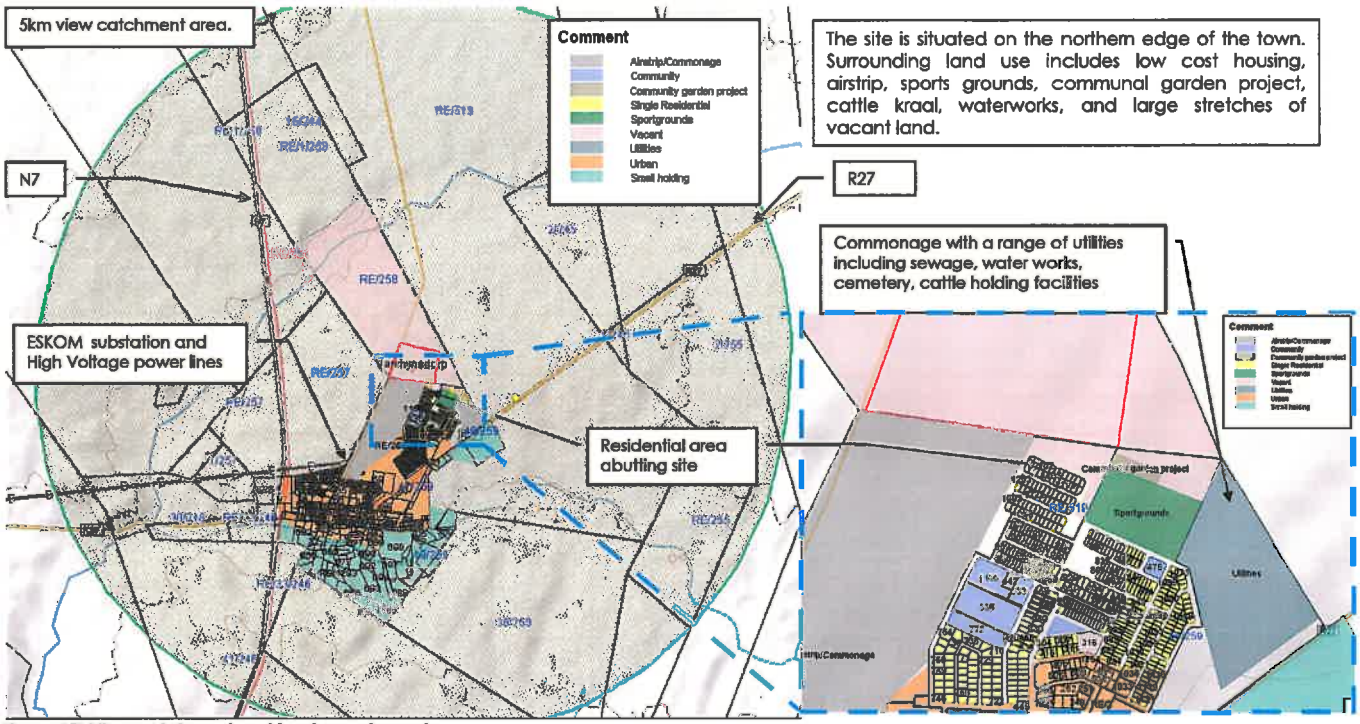
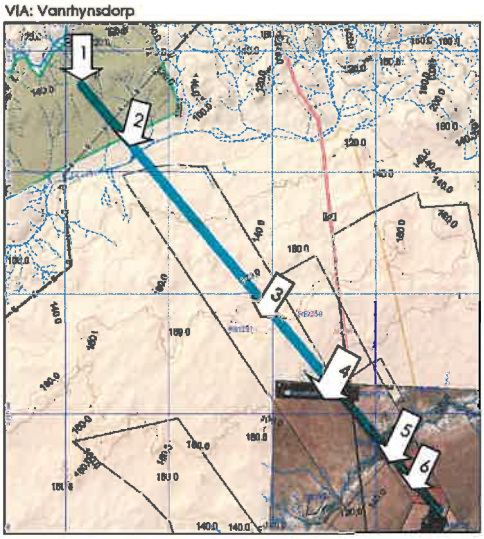


Figure 17: View catchment and land use elements

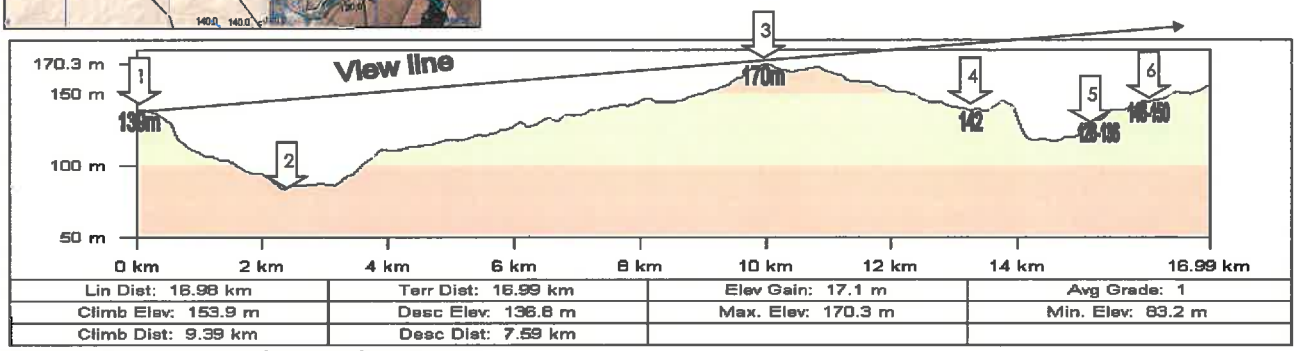
Prepared by: SC Lategan
17 May 2012

VIA: Vanrhynsdorp



1 = highest point in Moedverloor Knersvlakte Reserve (139m)
2 = Valley
3 = High ground
4 = N7 highway (142m)
5 = New site (126 – 136m)
6 = Previous site (146 -150)

The height on the watershed, which represents the highest area of the Moedverloor Knersvlakte Reserve is at 139m ASL. The two sites are between 126m and 150m at a distance of approximately 15km. The sites are thus slightly higher than the reserve and should there be no obstructions in between, a viewer at the reserve would look down onto the site. However, a higher lying area which rise to 170m and in some places 180m is between the reserve and the sites. This means the view from the reserve to the south east is obstructed by this high ground to such an extent that the sites are not visible from the reserve. The reserve is thus not within the view catchment of the sites.



Lin Dist: 16.98 km	Terr Dist: 16.99 km	Elev Gain: 17.1 m	Avg Grade: 1
Climb Elev: 153.9 m	Desc Elev: 136.8 m	Max. Elev: 170.3 m	Min. Elev: 83.2 m
Climb Dist: 9.39 km	Desc Dist: 7.59 km		

Figure 18: View from Moedverloor Knersvlakte Reserve

Prepared by: SC Lategan
17 May 2012

VIA: Vanrhynsdorp

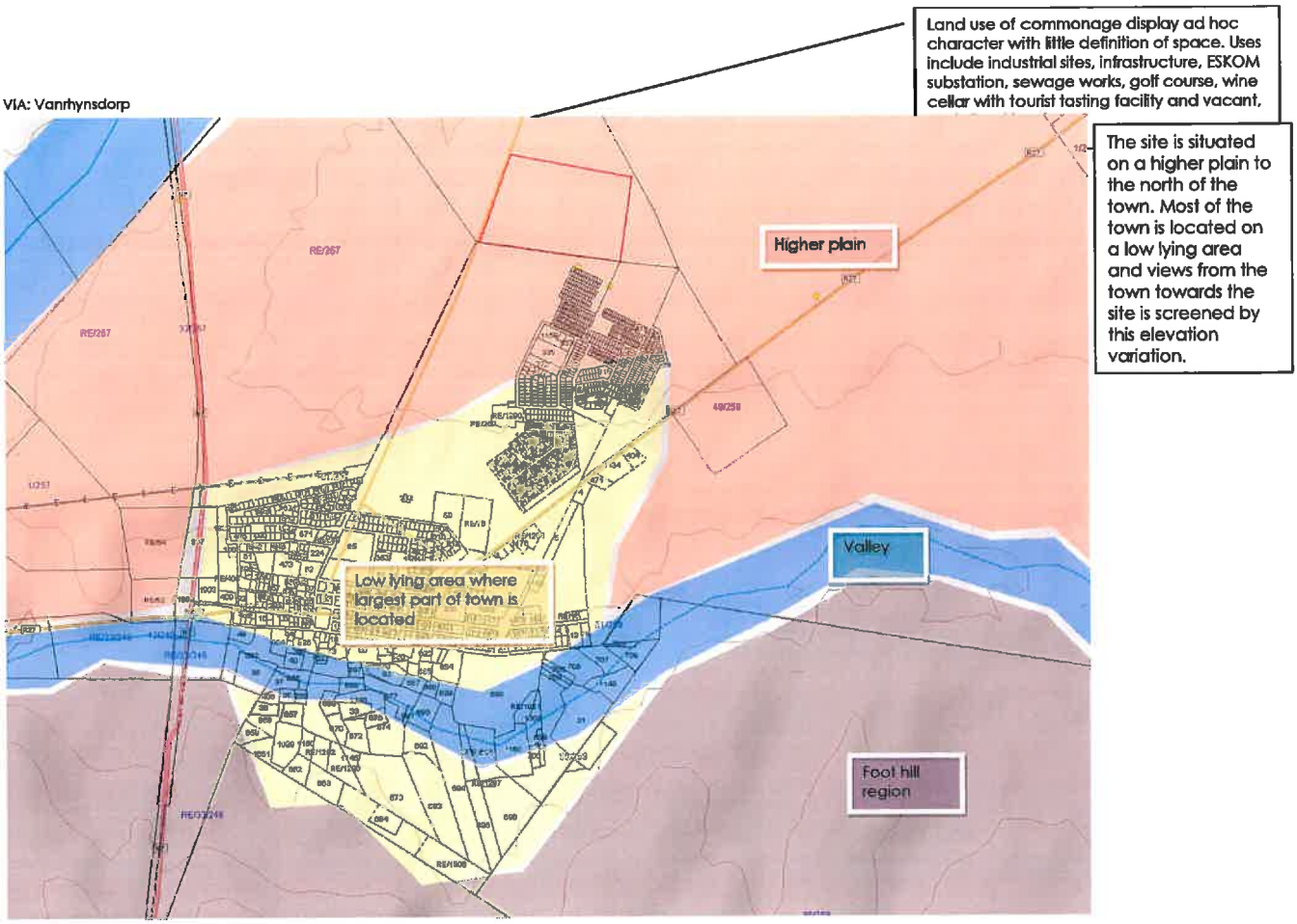


Figure 19: Topographical characteristics of area
Prepared by: SC Lategan
17 May 2012

6 VISUAL RECEPTORS

Visual receptors are those positions from where the development site is potentially visible. Based on the character of the locality of the receptor its sensitivity can be rated. Generally residential areas and tourism related destinations and routes are sensitive to visual intrusions as they relate to the well-being of residents and the tourism quality of the area.

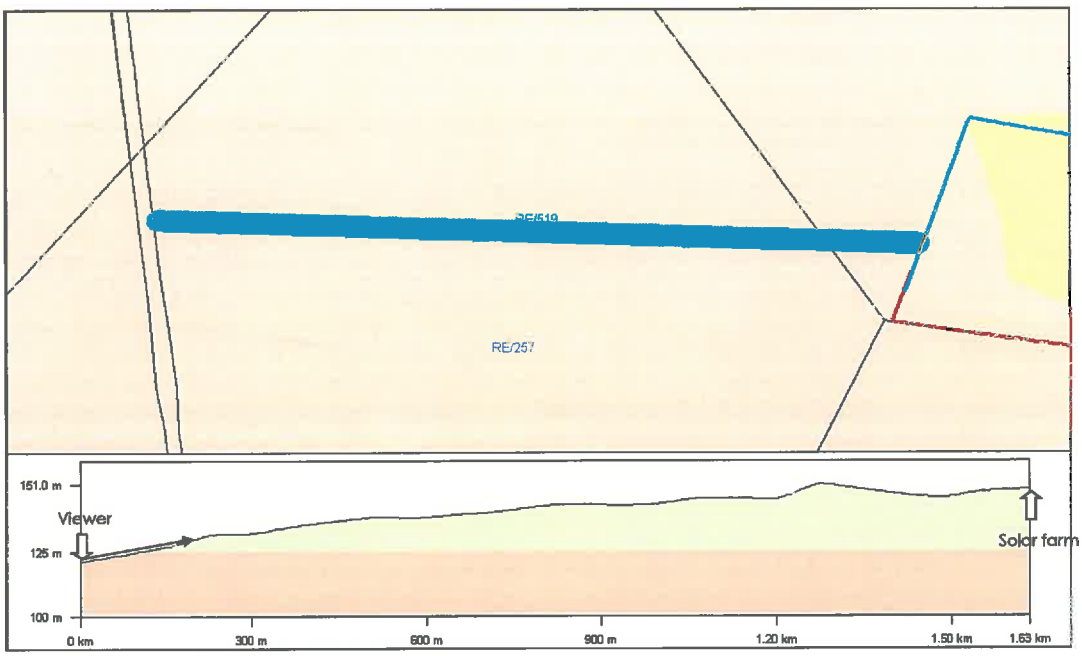
6.1 Site 1 (Previous site)

The following viewpoints have been considered as potential receptors

Potential Receptor	Comment	Screening
N7 southbound (1)	Partially screened by landscape.	Assess profile. Low visibility expected
North Residential (2)	High exposure. Within 100m of the site. No screening	Sensitive receptor. Assess and potential mitigation
Sport grounds (3)	Entrance not in view of facility and no specific view focus. Inside grounds screened	Low exposure to attendants. No significant impact expected. No further assessment required
R27 westbound (4)	Partially screened by landscape and distance	Assess profile. Low visibility due to distance and screening of landscape elements expected
West Neighbourhood (5)	Close to substation. Site not visible	Assess profile. Low visibility expected
N7 northbound (6)	Town visible. Site absorbed by urban elements	Low impact expected

Figure 20: Potential Receptor positions

VIA: Vanrhynsdorp



The viewer is significantly lower than the site (26m) and therefore the view to the site is obscured by the landscape topography. CPV units may be briefly visible in the distance but PV units will be totally out of view.

Figure 21: N7 Southbound as receptor

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	[illegible]	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

Table 3: N7 Southbound as receptor assessed

Figure 22: Graphical presentation of PV units seen from northern residential area

In the case of PV units, the perimeter fence will most probably screen the units from site and the residents will simply observe a security fence around the site. The maximum shadow cast by such structure, based on the maximum height of 3m is approximately 87m at sunrise in the middle of winter. The shadow then quickly shorten within 30min to 23m. The closest house boundary to the site boundary is 60m. The afternoon shadow is slightly shorter with a maximum around 17:30 of 58m just before sunset.

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserves, scenic routes	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

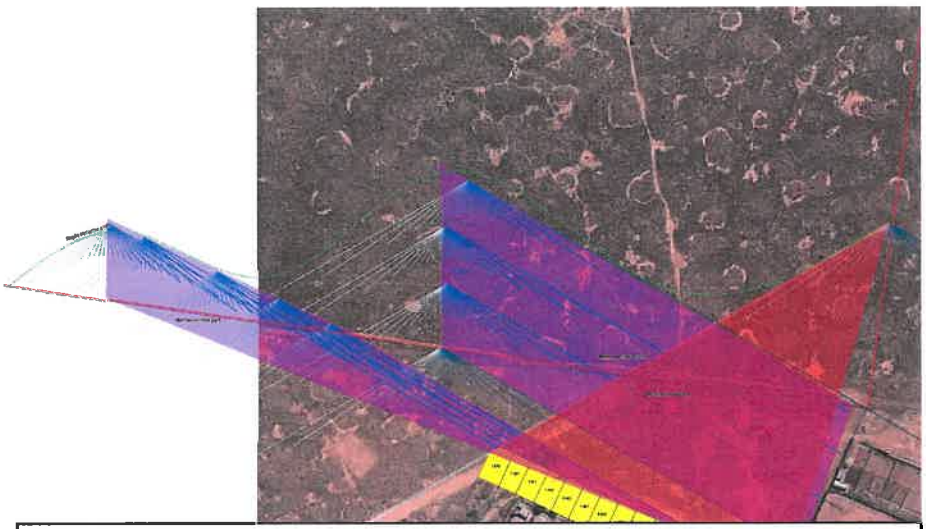
Table 4: Northern residential as receptor for PV units assessed

Figure 23: Graphical presentation of CPV units seen from northern residential area

Figure 24: Northern residential area abutting site

VIA: Vanrhynsdorp

Local time GMT+2	Azimuth (deg from N)	Altitude degrees	Shadow length multiplier	Shadow length (panel night stow 15.54m)
07:47	62.467	RISE	-	
08:00	60.747	1.974	29.014	456.68036
08:30	56.54	7.429	7.669	120.71006
09:00	51.948	12.613	4.469	70.34206
09:30	46.897	17.466	3.178	50.02172
10:00	41.322	21.914	2.486	39.12964
10:30	35.165	25.87	2.062	32.45588
11:00	28.397	29.237	1.787	28.12738
11:30	21.033	31.911	1.606	25.27844
12:00	13.154	33.791	1.494	23.51556
12:30	4.914	34.795	1.439	22.64986
13:00	356.532	34.876	1.435	22.5869
13:30	348.251	34.029	1.481	23.31094
14:00	340.296	32.296	1.582	24.90068
14:30	332.835	29.752	1.749	27.52926
15:00	325.961	26.498	2.006	31.57444
15:30	319.7	22.636	2.398	37.74452
16:00	314.027	18.267	3.03	47.6922
16:30	308.891	13.479	4.172	65.66728
17:00	304.224	8.347	6.816	107.28384
17:30	299.956	2.935	19.505	307.0087
17:49	297.427	SET	-	



CPV units positioned south of the green dotted line will cast a morning and afternoon shadow onto the last row of houses. The winter shadow is of particular importance to income groups who live in small houses with little if any heating. Reduction in early morning and late afternoon sun can cause these houses to become extremely cold and even damp during the winter.
Summer shadows are significantly shorter and will not impact on the houses.
As this can impact on the living conditions of the residents, it is recommended that should CPV units be considered, it be positioned north of the exclusion line.

Figure 25: Shadow lines for CPV units

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserves, scenic routes	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change - discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

Table 5: Northern residential area assess as receptor

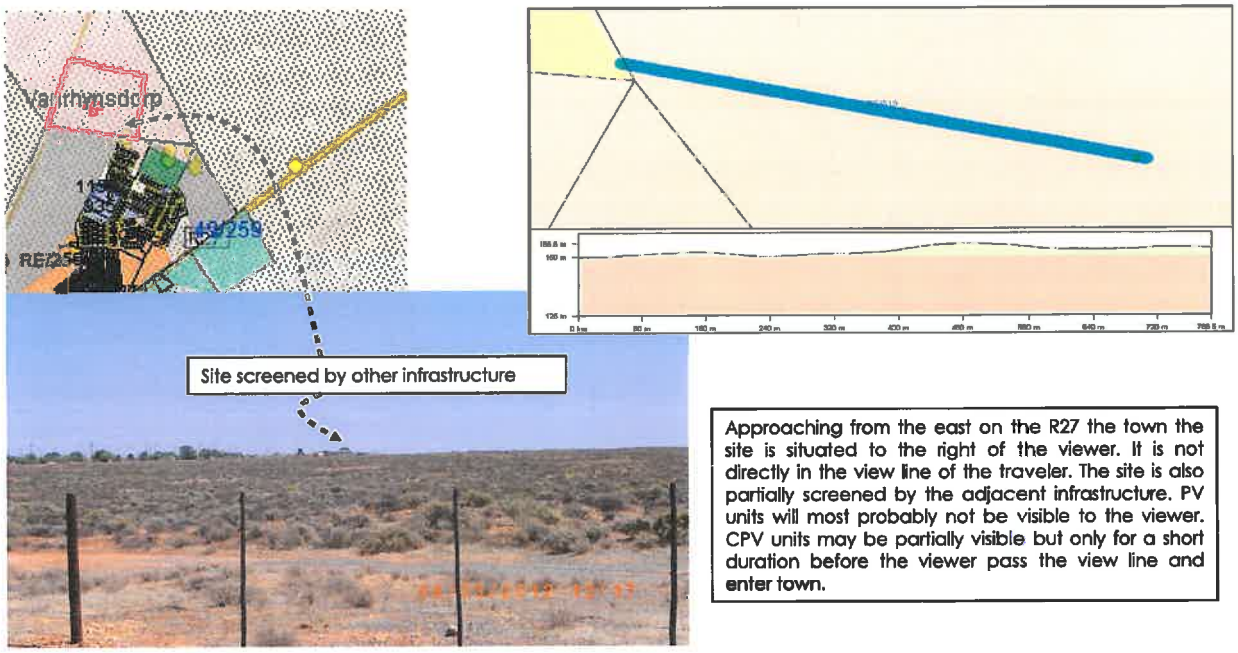


Figure 26: R27 Westbound as receptor

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	CPV - recognizable to the viewer	PV - not particularly noticeable to the viewer
Sensitivity	residential, nature reserves, scenic routes	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

Table 6: R27 westbound assessed

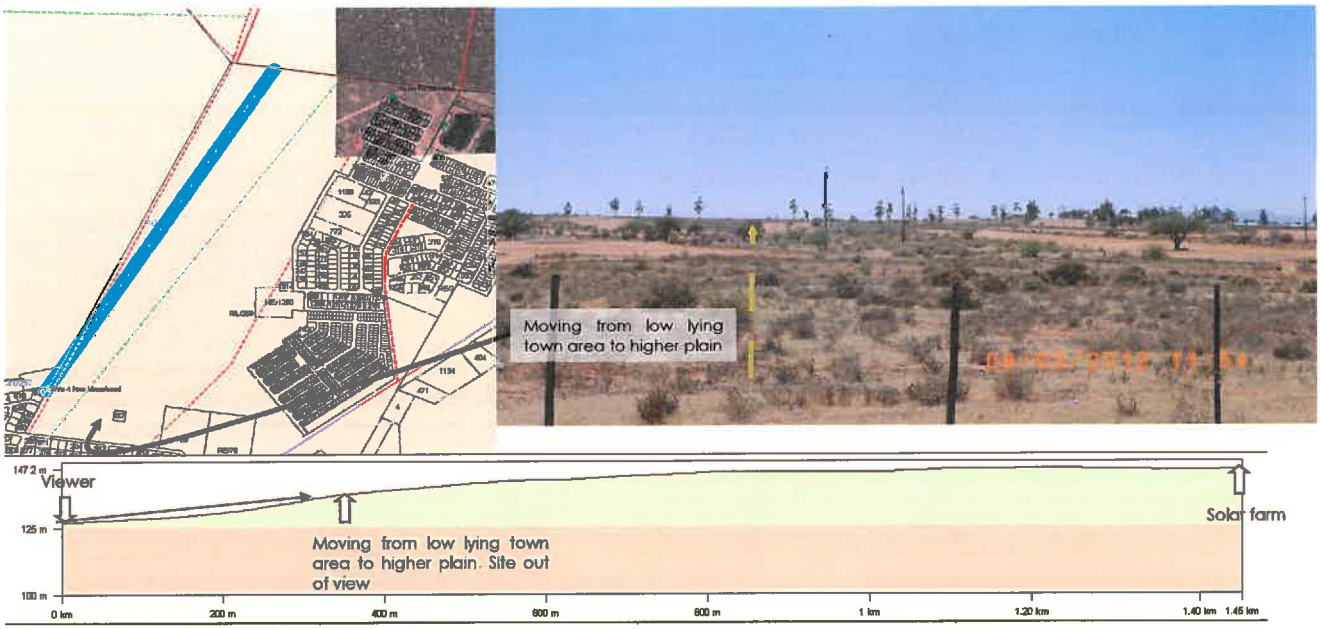
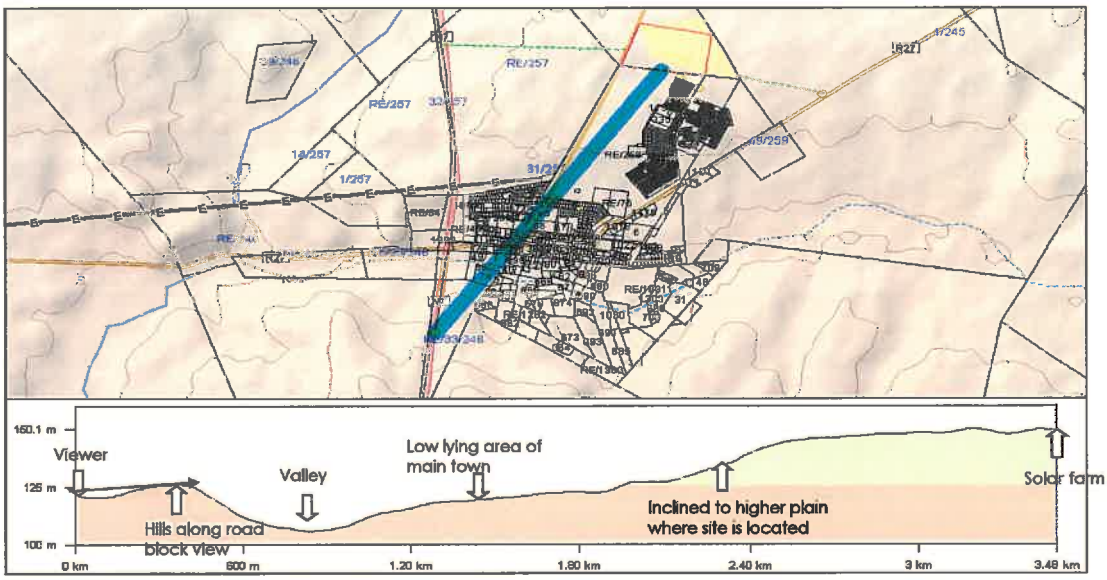


Figure 27: Western Residential area as receptor

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	[illegible]	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

Table 7: Western Residential area assessed as receptor

VIA: Vanrhynsdorp



As traveller approach town in northbound direction, hills to the east block view to the town and the traveller only becomes aware of the town when approximately 1km from town. Facilities on the opposite higher plain is above the viewer's line of sight. Landscape elements blends the landscape and the viewer may be aware of CPV units briefly and intermitted. Due to the speed limit identification of actual facility would be low.

Figure 28 : N7 northbound as receptor

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserve, scenic route	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

Table 8: N7 northbound assessed as receptor

Latitude	Longitude	Receptor	Comment	Exposure	Sensitivity	Intrusion	Finding
-31.5889931	18.7291675	N7 southbound	Screened by landscape.	If visible it will be only briefly. The viewer also travel at 120km/h and observation level is low. Rating: Low	The N7 is a national highway, but also identified as the Cape-Namibia tourist connection. Rating: High to Moderate	The site is not visible PV units will not be visible at all. Potential brief awareness of CPV units. Rating: Low	CPV and PV units low significance
-31.5922594	18.7513723	North Residential	High exposure. Within 100m of the site. No screening	The facility will be in close proximity to the houses. PV: Rating:High CPV: Rating: High	Residential area is sensitive to change in residential character. PV: Rating:High CPV: Rating: High	The PV units will be smaller and fit more with other infrastructure in the area. Shadows will be insignificant CPV units represent very large infrastructure with an extremely high level of intrusion. Shadows increase intrusion level and have impact on possible living conditions/health PV: Rating:Moderate CPV: Rating: High	**PV:** Moderate significance. Mitigation recommended: 1. position at least 90m from the boundaries of the closes houses. 2. Soften perimeter with planting similar than to sport grounds. **CPV:** High Mitigation recommended: 1. position units north of determined exclusion line 2. Soften perimeter with planting similar than to sport grounds
-31.5936971	18.7647153	R27 westbound	Partially screened by landscape and distance	Screened by other infrastructure CPV: Rating Moderate PV: Rating Low	R27 is local route and although not officially identified as tourist route, it is one of the few routes leading from the west coast inland and thus frequented by	Only in view line for short duration Rating: Low	Low significance.

					tourists. Rating: Moderate		
-31.6023289	18.7392951	West Neighbourhood	The area is below the edge of the higher plain and thus screened by the topography from the site	Rating: Low	Rating: High	Rating: Low	Low significance
-31.6170419	18.7285454	N7 northbound	Town visible. Site absorbed by urban elements.	Rating: Low	The N7 is a national highway, but also identified as the Cape-Namibia tourist connection. Rating: High to Moderate	Rating: Low	Low significance

Table 9: Summary of Visual Receptor assessment

6.2 Site 2 (New Site)

Potential view receptors include:

1. N7 highway south bound: The sites may be visible intermittently and this receptor has to be assessed.
2. N7 highway north bound: The sites may be intermittently visible intermittently and this receptor has to be assessed
3. Town: and 5.1.1 indicate that the site is not visible from town and this does not need any further assessment.
4. R27 Westbound. The site may be visible intermittently and need to be assessed.

Following a review of the receptors.

1. N7 highway southbound: The site comes into view when the traveler passes the crescent of the high ground to the north. The view continues to the point where the bridge is crossed. This is a distance of approximately 1,6km and at a speed of 120km/h the view will last for about 1minute. Although the N7 is a national highway it forms part of the Cape-Namibia route frequented by tourist and therefore is of high sensitivity.
   The exposure and Intrusion levels are moderate and the sensitivity high. This would rate the significance high to medium. The short duration however of the exposure and the fact that the traveler is approaching a town and would soon be exposed to an urban environment reduce the significance to overall medium significance.
   Units in the scale of single storey buildings i.e. maximum 8m will further reduce the significance and depending on the type of technology the significance can be reduced to medium-low which is within acceptable levels of change.

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserves, scenic routes	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings
Duration			< 1 min

Table 10: N7 southbound as receptor for site 2

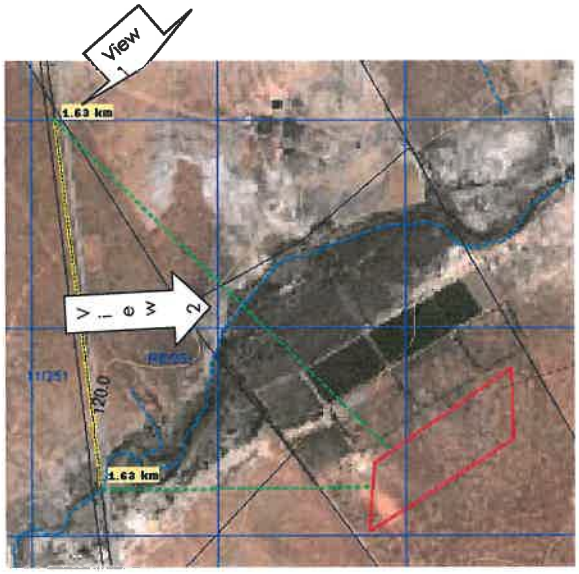
2. N7 highway northbound:
   indicates that the site is not visible to the traveler travelling north on the N7. Approaching from the north the traveler will first observe the site at "view 1" The site will remain in view until "view 2". The site will thus be in view for 1,6km. At a speed of 120km/hour the view will last for about 1min before the site disappear in the side view of the traveler.

3. R27 west bound: As the traveler approaches Vanrhynsdorp, the site will be intermittently visible from about 5km. The site however slopes away from the road and low rise next to the road screen the view partially. The visual significance from the R27 is thus overall low.

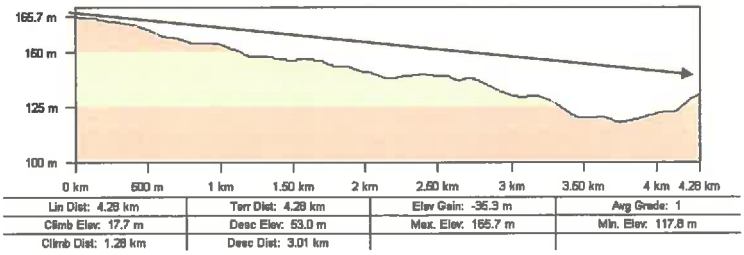
Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserves, scenic routes	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings
Duration			Intermittently

Table 11: R27 assessed as receptor for site 2

VIA: Vanrhynsdorp

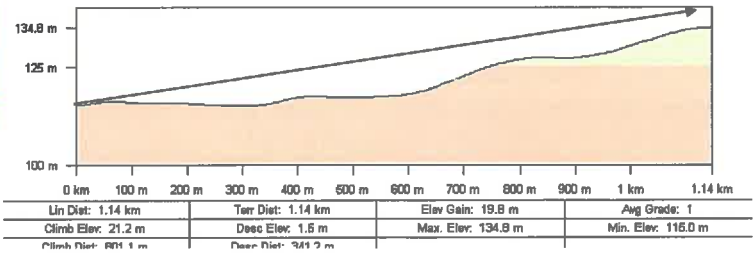


View 1: First view of site approaching from north



Lin Dist: 4.28 km	Terr Dist: 4.28 km	Elev Gain: -36.3 m	Avg Grade: 1
Climb Elev: 17.7 m	Desc Elev: 53.0 m	Max. Elev: 165.7 m	Min. Elev: 117.8 m
Climb Dist: 1.28 km	Desc Dist: 3.01 km		

View 2: View of site disappear



Lin Dist: 1.14 km	Terr Dist: 1.14 km	Elev Gain: 19.8 m	Avg Grade: 1
Climb Elev: 21.2 m	Desc Elev: 1.5 m	Max. Elev: 134.8 m	Min. Elev: 116.0 m
Climb Dist: 601.1 m	Desc Dist: 341.2 m		

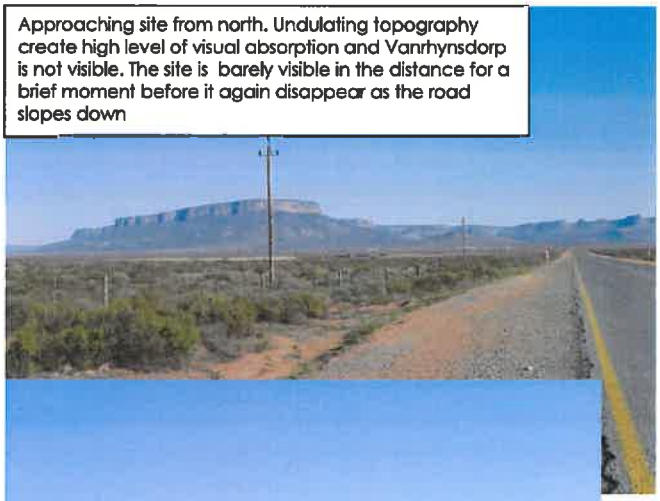
Approaching from the north the traveler will first observe the site at "view 1" The site will remain in view until "view 2". The site will thus be in view for 1,6km. At a speed of 120km/hour the view will last for about 1min before the site disappear in the side view of the traveler.

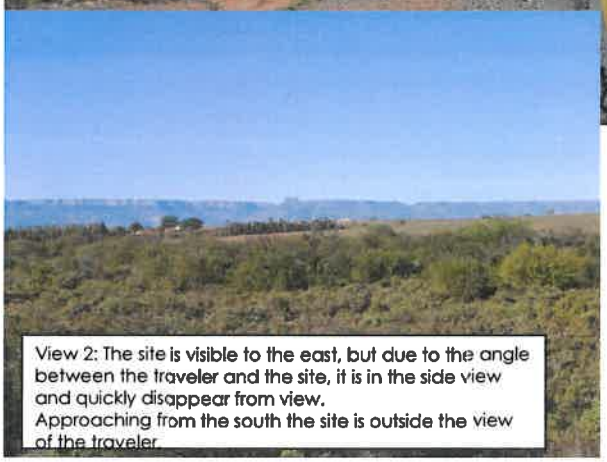
Figure 29: N7 southbound as receptor for site 2

Prepared by: SC Lategan
15 June 2012

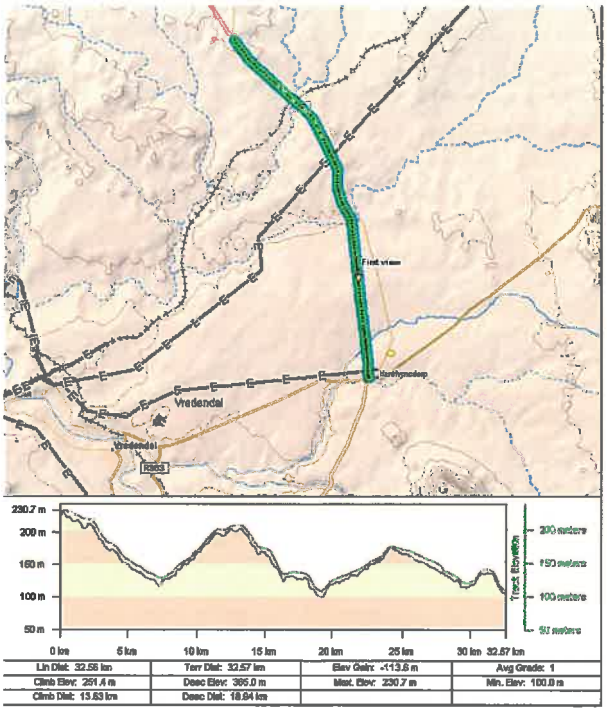
VIA: Vanrhynsdorp

Approaching site from north. Undulating topography create high level of visual absorption and Vanrhynsdorp is not visible. The site is barely visible in the distance for a brief moment before it again disappear as the road slopes down





View 2: The site is visible to the east, but due to the angle between the traveler and the site, it is in the side view and quickly disappear from view.
Approaching from the south the site is outside the view of the traveler.



Profile: The green line is an actual track recorded along the N7. It corresponds with a high level of accuracy with the elevation model used in the analysis and therefore confirm the accuracy of findings made in the Draft Report version 1.2

Figure 30: N7 profile and viewpoints

Prepared by: SC Lategan
15 June 2012

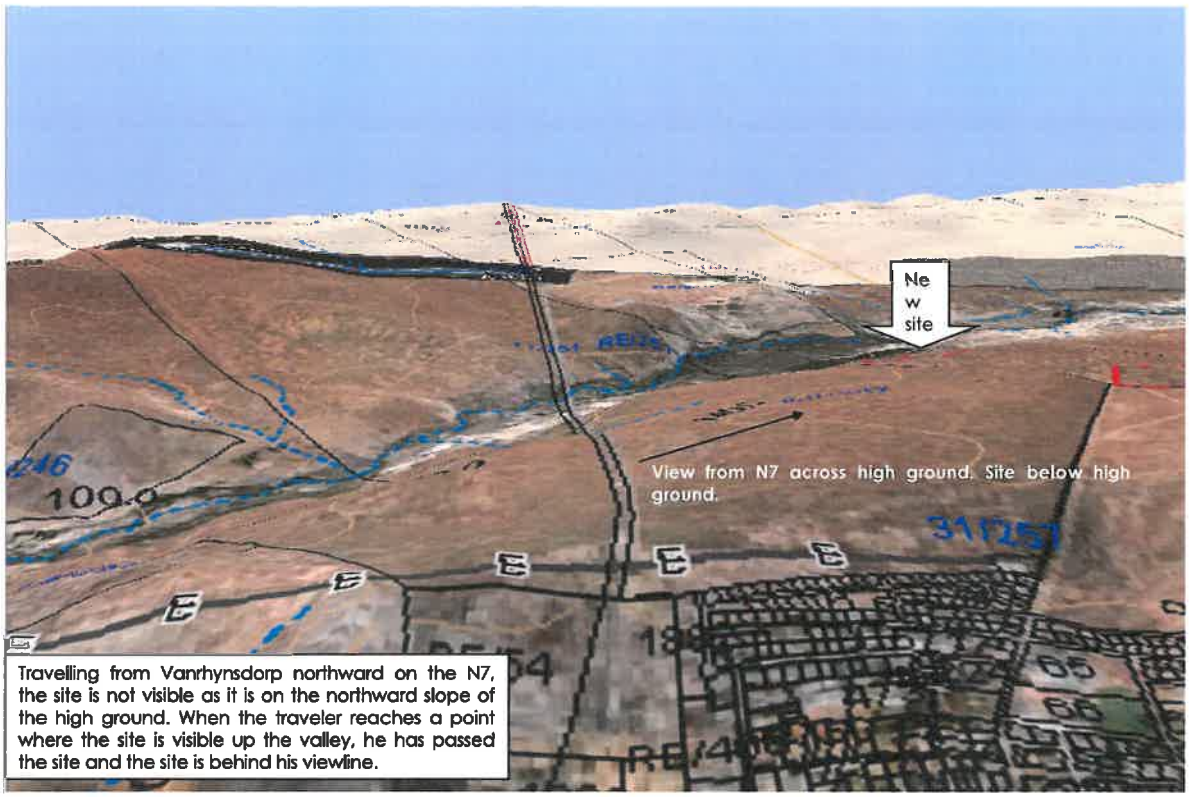


Figure 31: N7 northbound as receptor for site 2

VIA: Vanrhynsdorp

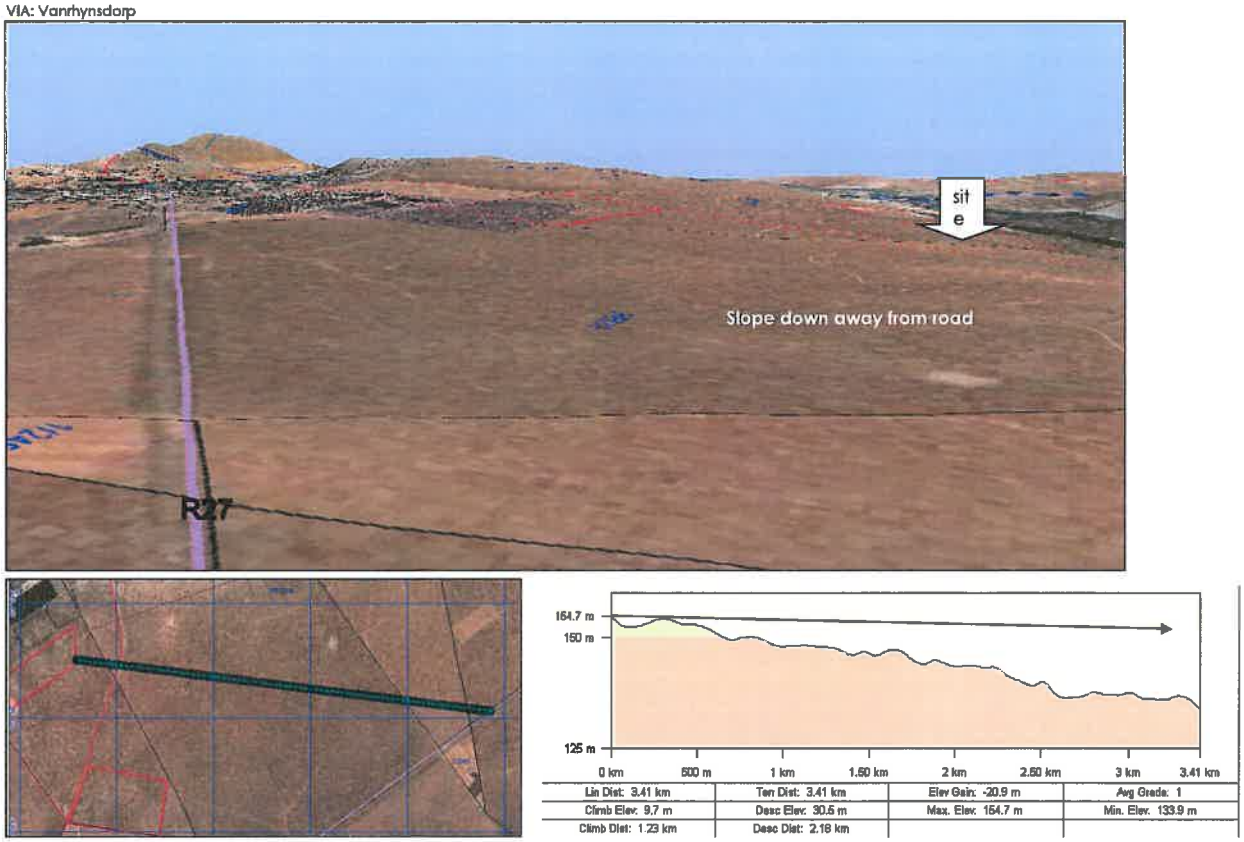


Figure 30: R27 as receptor for site 2

Prepared by: SC Lategan
15 June 2012

7 CONSTRUCTION

During construction, various large earth moving equipment and equipment will be transported to the site and work on the site. This will impact on the general experience of viewers. This impact is however temporary and not uncommon during construction of infrastructure. Communities have fairly high tolerance levels for such activities if it contributes to the infrastructure of the area.
Rating: Low

8 FINDINGS

8.1 Site 1 (Previous site)

The following findings should be read in context with the gaps and assumptions made in par. 2.1.4.

The site is situated on the urban edge characterized by various utility infrastructure, community facilities and low cost housing. The utility infrastructure is however of low extent and does not present large facilities.
The most significant receptor is the abutting residential area. The impact of CPV units on this area constitutes an unacceptable level of change without mitigation. Should the proposed mitigation measures be implemented the impact can be reduced. The acceptability of this level should be tested with the affected public.

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserves, scenic routes	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

Table 12: North Residential area assessed for CPV units after mitigation

PV units will also change the character of the area, but due to the size of units, is absorbed better into the landscape. Should the proposed mitigation measures be implemented the impact can be reduced to within acceptable levels.

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	residential, nature reserves, scenic routes	sporting, recreational, places of work, Highway	industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	minimal change or blends with surroundings

Table 13: North Residential area assessed for PV units after mitigation

Transmission lines will have to cross the adjacent property to be linked to the substation to the west. The extent of the 22KV lines are however in character with the numerous other infrastructures in the area.
If not mitigated the solar farm, will pose an unacceptable level of landscape change and can be detrimental to the area.

8.2 Site 2 (new site)

The following findings should be read in context with the gaps and assumptions made in par. 2.1.4. The assessment of site 2 is based on the author's on-site assessment of site 1 which provided background to the overall landscape characteristics, desktop and DEM review followed by on-site confirmation of modelling.

The site is situated outside the urban edge but within visual context of the urban environment. The character of the immediate surrounds will be changed by the development, but it should be within acceptable levels of change. Smaller units will have a lesser effect on the change especially if these units can be kept within the scale of single storey buildings.

The N7 southbound present the only receptor which pose a potential visual impact of significance but due to the short duration it is regarded as of lesser significance and within acceptable levels.

Overall the visual impact of the development is of medium-low significance. This rating can be reduced with the use of smaller units.

9 MITIGATION MEASURES

Site 1:
It is recommended that from a visual perspective PV units be the preferred technology option. Should this option be accepted the following mitigation measures are recommended:

1. All PV units to be set back at least 90m from the closest residential boundaries.
2. Perimeter fence facing residential area should be softened with planting.

Should the development of CPV units proceed, the following mitigation measures are recommended:

1. All CPV units to be set back north of the determined shadow exclusion line
2. Perimeter fence facing residential area should be softened with planting

Site 2:
Should this option be accepted no mitigation measures concerning visual impact is required.