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

MT ROPER, PORTION FARM 321: SOLAR ENERGY FACILITY

VISUAL ASSESSMENT

For consideration in the Basic Assessment
For
EnviroAfrica
PO Box 5367
Helderberg
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Final Report
11 May 2012

Compiled by:
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GeoStratics

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Report history:

Version	Date	Amendments
Draft Report: Version 1	26 March 2012	
Final Report	11 May 2012	

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 321, Mt Roper in the Kuruman district.

The site is situated on the R31 approximate 30km northwest of Kuruman.

The aim of the assessment is to identify view receptors and assess the impact of the development on these receptors. In this regard the larger site was screened and based on this findings as well as inputs by other specialists, a most suitable area of 20ha was identified on which the final assessment focus.

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.

The assessment established that the receiving environment comprise an area dominated by low intensity agriculture and game farming. The site is in close proximity to an ESKOM substation and HV power lines. The development will change the character of the area but the assessment establishes that due to the scale and absorption capacity of the environment, the change is within acceptable levels.

The only sensitive receptor identified is the R 31. It was however determined that the positioning of the facility a distance away from the road reduce the intrusion level. The R31 southbound however may experience an issue with glare off the panels, which may require mitigation measures to ensure road safety. Given the screening properties of the topographical features, the exposure level and intrusion factor reduce the impact to within the acceptable levels and with the necessary mitigation measures in place it does not to have a significant visual impact on the identified sensitive receptors.

The overall conclusion is that the visual impact is within acceptable levels and could thus be recommended.

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 321, Mt Roper in the Kuruman district.

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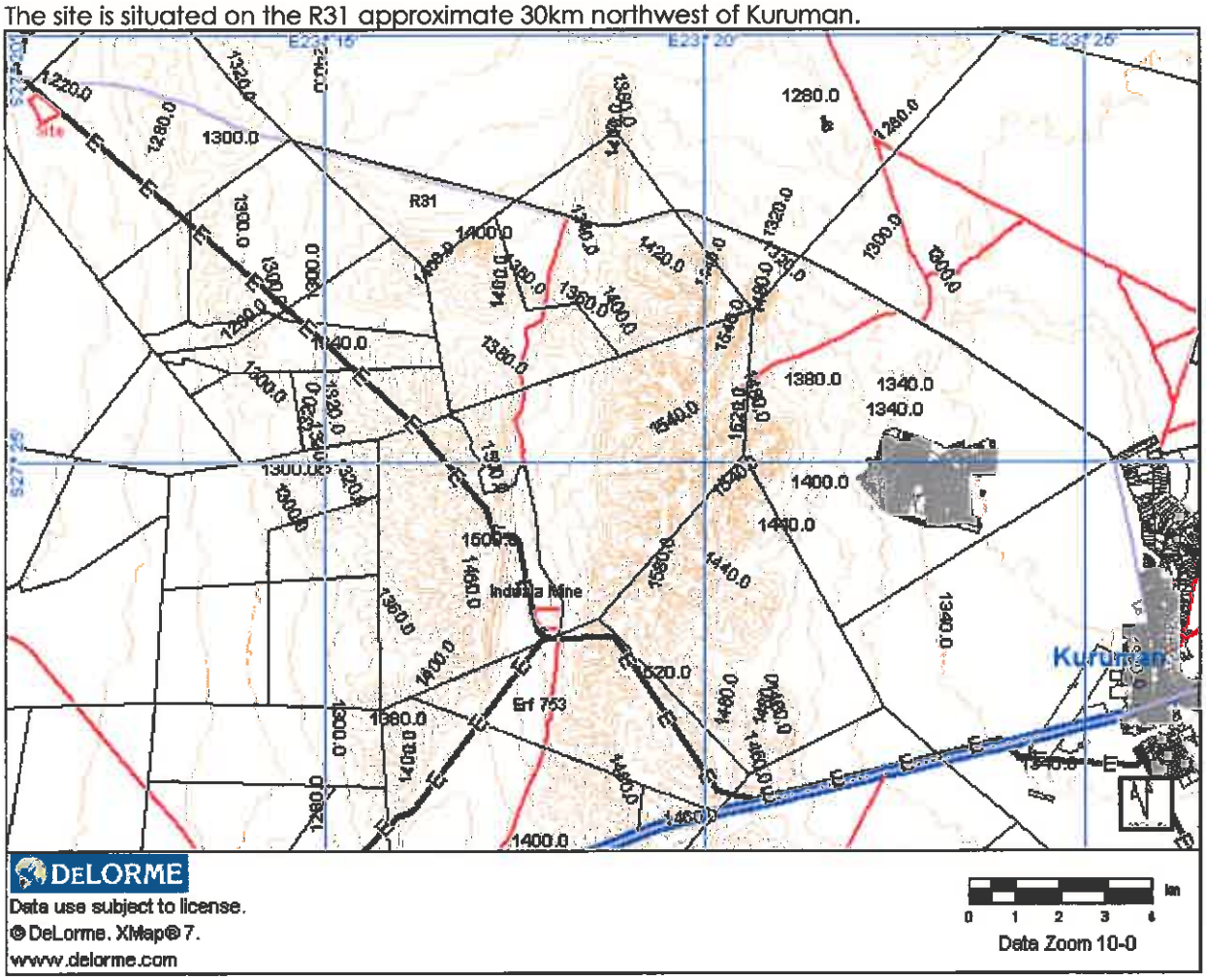


Figure 1: Locality

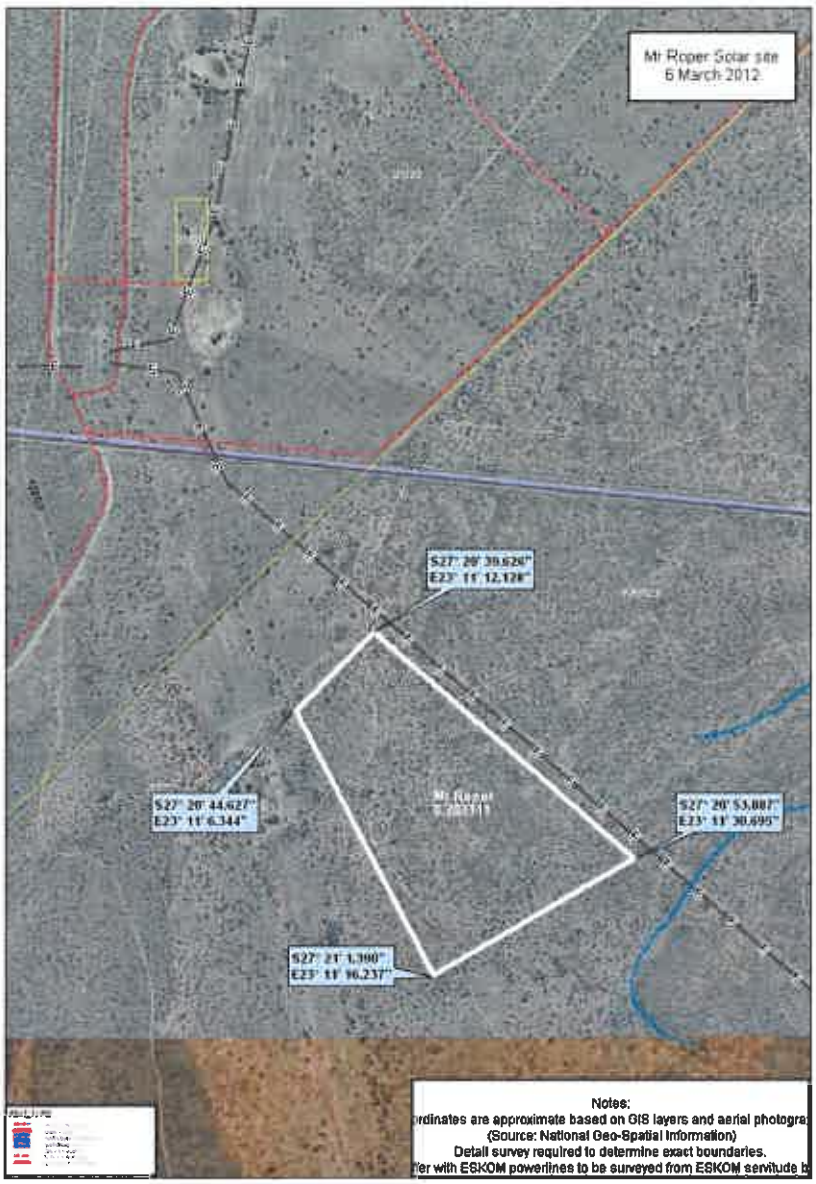


Figure 2: Site boundary

2 TERMS OF REFERENCE

The applicant intends the development of a solar farm on a portion of Farm 321, Mt Roper, Kuruman district. The site gain access off the R31 between Kuruman and Hotazel, approximately 30km from Kuruman.

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.

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 game farming.
Areas with intact or outstanding rural or townscape qualities	None
Areas with a recognized special character or sense of place	None
Areas with sites of cultural or religious significance	None
Areas of important tourism or recreation value	The site is in a region where such elements exists and are important in the Green Kalahari tourist route, although the specific route, namely R31 has not been identified as a scenic drive or tourist route, it is an alternative route from Kuruman to the Kgalagadi Transfrontier Park.
Areas with important vistas or scenic corridors	To assess.
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	No
A significant change to the fabric and character of the area	Yes
A significant change to the townscape or streetscape	No
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 are 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 Gaps, limitations and assumptions

The assessment has to be read with the following in mind:

1. No information is available on the alignment of transmission lines linking the solar facility with the ESKOM substation. The site is on the opposite side of the R31 than the ESKOM substation and transmission lines will have to be constructed. This assessment could however not assess the impact thereof due to a lack of information.
2. Access is obtained via existing roads and no road upgrades or new roads will be constructed.

3.1.4 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.

3.2 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 Northern Cape PSDF

The PSDF provides guidance to ensure that

- development is of a quality that promotes environmental integrity.
- based upon the principles of 'critical regionalism" which promotes a return to the development of high-quality settlements.
- remised upon "The Big Five" principles that guide the planning, design and management of development namely sense of place, sense of history, sense of nature, sense of craft and sense of limits.

3.2.3 Green Kalahari tourism

The Green Kalahari tourist plan is an initiative to promote tourism in the region. The protection of cultural and heritage resources as well as the active involvement and empowerment of local communities through tourism is a core theme through the tourism plan. The R31 from Kuruman northward provide an alternative access to the Kgalagadi Transfrontier Park.

4 DEVELOPMENT PROPOSAL

4.1 General Description

Construction of Solar energy production facility ("Solar Farm") with a maximum capacity of 10Megawatt, consisting of approximately 140 tracking CPV units, on approximately 20ha. The exact technology to be used has not been determined and this assessment is based on the following typical parameters. Units are typically positioned in rows with access roads between every second row. Unit spacing typically varies between 43x37 and 33x30m.

Figure 3: Typical Solar Farm layout

Figure 4: Typical CPV Unit

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

4.2 Project Elements

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 access roads in between.

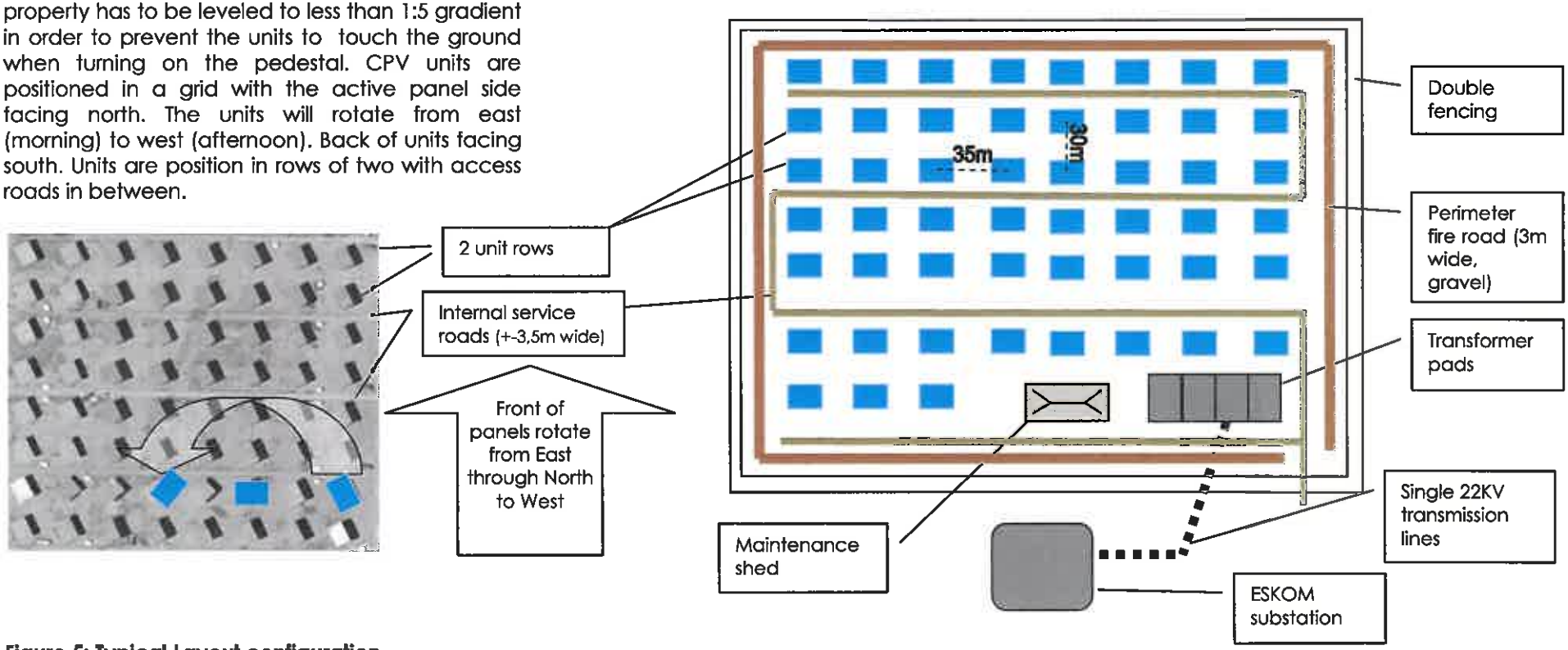


Figure 5: Typical Layout configuration

4.2.2 Tracking CPV Units

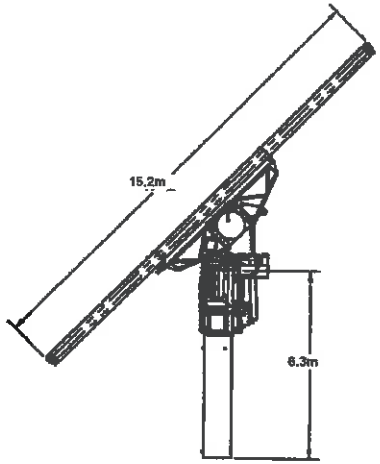
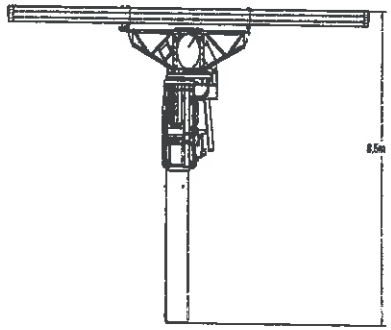
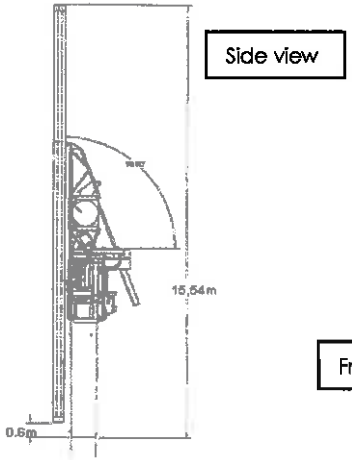


Figure 7: Typical Operational position



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

Figure 6: Storm Stow position



Side view

Front view

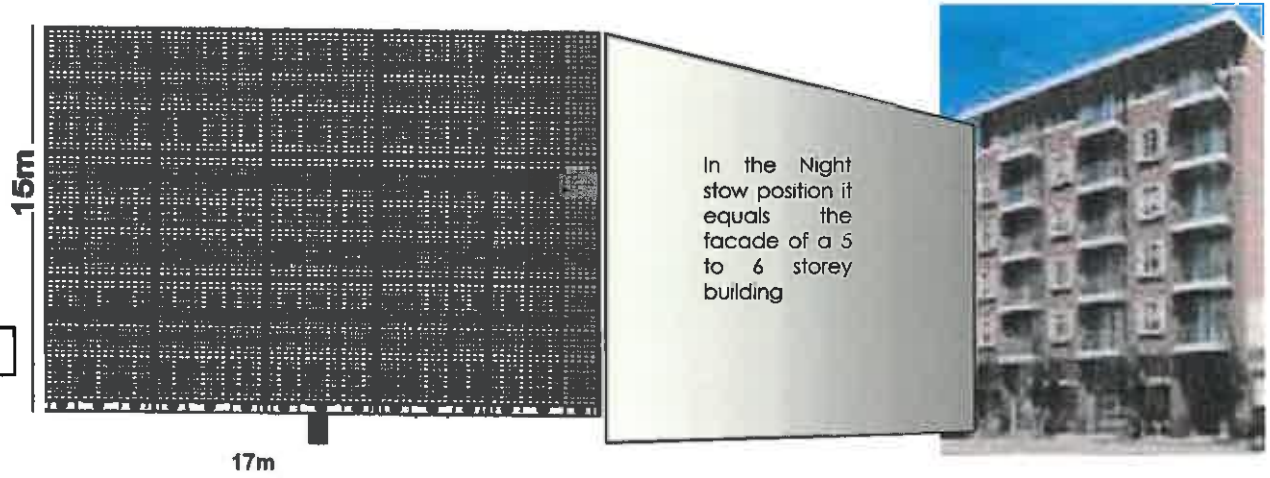


Figure 8: Night stow position

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

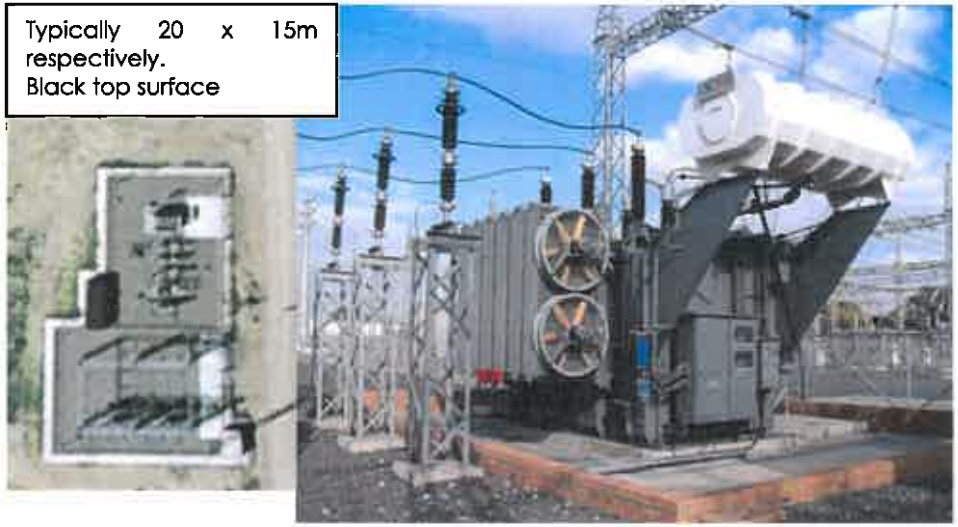


Figure 12: Transformer Pads and typical transformer

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

Figure 11: Typical 22KV single Power line

4.2.5 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.

4.3 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 landscape consists of undulating hills which restrict the catchment area and present a high absorption level. The site slope slightly in a western direction towards the valley. Due to the topographical nature of the landscape the catchment is restricted to approximately 2km in all directions (Figure 13).

5.1.2 Sense of Place:
The site is situated in a rural to natural landscape and although low intensity farming occurs and electrical infrastructure exists, the overall sense of place display a natural character. The traveler on the R31 is halfway between towns and will thus have a lower capacity to accept urban infrastructure than within a town. The region is however known for mining and intermittent observation of mining activities again increase the travelers capacity slightly. The presence of infrastructure is thus not totally foreign to the area, as long as it does not create a high level of intrusion.

5.2 Findings
The proposed site is situated in the rural area with natural vegetation. The area displays a rural character with low intensity farming, game farming and natural areas. An ESKOM substation is in close proximity to the site and HV power lines cross the property and the R31.

The area is characterized by hills and valleys which creates a high absorption capacity. This high absorption rate restricts the catchment area to below 5km radius.

Statement 1: The property, on which the development is proposed, is currently used for low intensity farming but HV power lines do cross the site. The proposed solar farm will change the character of the immediate surrounds.

Figure 13: Receiving Environment

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.

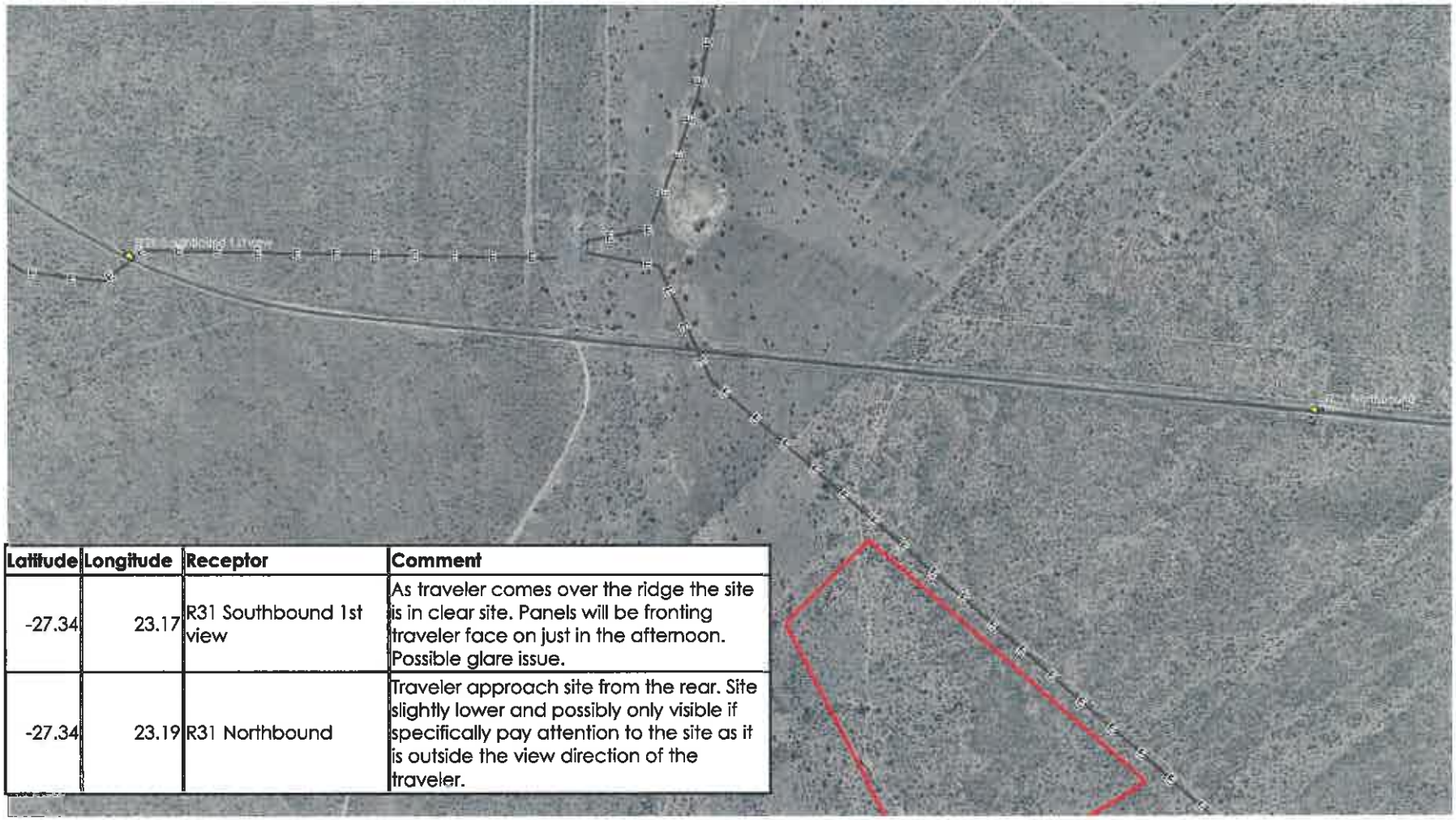
6.1 Potential Receptors

The only identified receptor is the R31 both north and south bound.

6.2 Assessment of Receptors

1. R31 southbound (Figure 17): As the traveler approach over the ridge the site is in clear site. Panels will be fronting the traveler face on in the afternoon and this can create a possible glare with potential reduction in road safety. This will only occur in the afternoon and probably more significant during the winter when the sun is low on the horizon and the panels are in a more upright position. This issue can however be mitigated to reduce the glare or even eliminate. The visual significance without mitigation is thus high, but with mitigation it can be reduced to low.

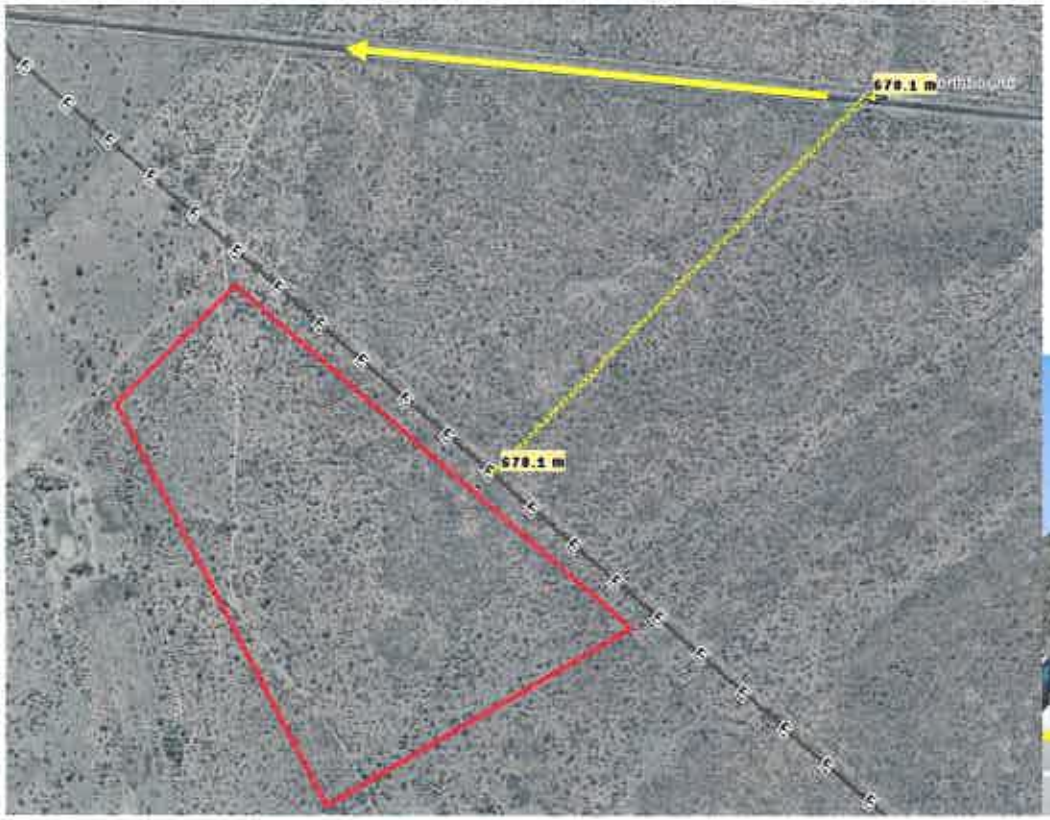
2. R31 northbound (Figure 16): The view direction of the traveler is parallel to the site and not towards the site. The site slope away from the road, diminishing the exposure of the site. The site is more than 600m from the road reducing the intrusion level. The traveler is at a lower level than the site and dense vegetation reduce view in the direction of the site. The visual significance on the northbound traveler is thus low.



Latitude	Longitude	Receptor	Comment
-27.34	23.17	R31 Southbound 1st view	As traveler comes over the ridge the site is in clear site. Panels will be fronting traveler face on just in the afternoon. Possible glare issue.
-27.34	23.19	R31 Northbound	Traveler approach site from the rear. Site slightly lower and possibly only visible if specifically pay attention to the site as it is outside the view direction of the traveler.

Figure 14: Visual receptors

VIA: Mt Roper



The view direction of the traveler is parallel to the site and not towards the site.
The site slope away from the road, diminishing the exposure of the site.
The site is more than 600m from the road reducing the intrusion level.
The traveler is at a lower level than the site and dense vegetation reduce view in the direction of the site

Figure 15: R31 northbound as receptor

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

Table 3: R31 northbound receptor assessed

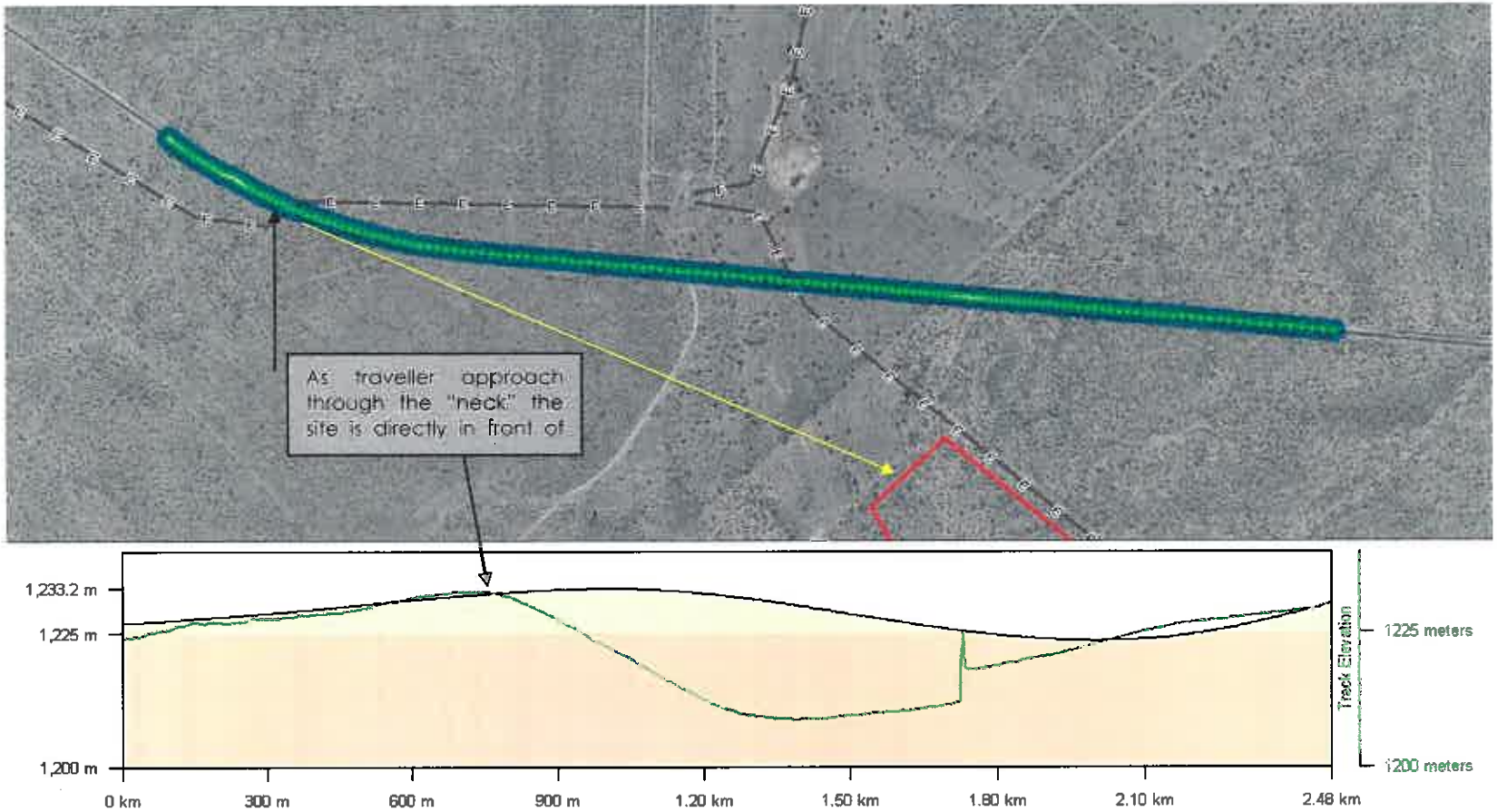


Figure 16: R31 southbound assessed

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

Table 4: R31 southbound receptor assessed

Table 5: Summary of Visual Receptor assessment

Latitude	Longitude	Receptor	Comment	Exposure	Sensitivity	Intrusion/Obstructive	Finding
-27.34	23.17	R31 Southbound 1st view	As traveler comes over the ridge the site is in clear site. Panels will be fronting traveler face on just in the afternoon. Possible glare issue.	Rating: High	Rating: High	Rating: High	Due to the full exposure when crossing the hill to the north travelling south and the elevation in comparison to the site, possible glare may occur. This will only occur in the afternoon and probably more significant during the winter when the sun is low on the horizon and the panels are in a more upright position. This has potential road safety issue. Significance: high
-27.34	23.19	R31 Northbound	Traveler approach site from the rear. Site slightly lower and possibly only visible if specifically pay attention to the site as it is outside the view direction of the traveler.	Rating: Low	Rating: High	Rating: Low	The position of the site to the traveler is such that the site is almost outside the view line of the traveler. Should the traveler take specific notice of the area the site will be visible. The site is however slightly lower and sloping away from the road. Significance: Low

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

The site is situated in an area with a rural character. The immediate area however does host an electrical substation and HV lines. The solar farm will thus change the character of the immediate environment. The view catchment is however small due to topographical variations. The landscape has a medium absorption rate which reduces the significance of land use change.

The possible glare impact on the southbound traffic may have road safety implication. Therefore the impact from this receptor is high and should either be avoided or mitigated.

As the CPV units are across the road from the substation and therefore additional 22KV power lines will have to cross the R31. As long as these lines are combined with the alignment of the existing lines crossing the road it will have no significant additional visual impact.

Apart from the glare issue from the R31, the proposal does not present an unacceptable level of change to the visual environment and therefore the development can be recommended, subject to the prevention of any road safety issues.

9 MITIGATION MEASURES

The nature of the development is such that very little mitigation measures is possible.
It is however recommended that the transmission lines follow the alignment of the existing power lines as to reduce additional intrusion of infrastructure into the area.
The operational management program should include a monitoring mechanism of potential glare issues and should such issues occur, the positioning of panels during the problematic period should be changed. This may impact slightly on the energy output sufficiency.

Appendix D4: Visual Impact Assessment
(Original report)

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The overall conclusion is that the visual impact is within acceptable levels and could thus be recommended.

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 321, Mt Roper in the Kuruman district.

The site is situated on the R31 approximate 30km northwest of Kuruman.

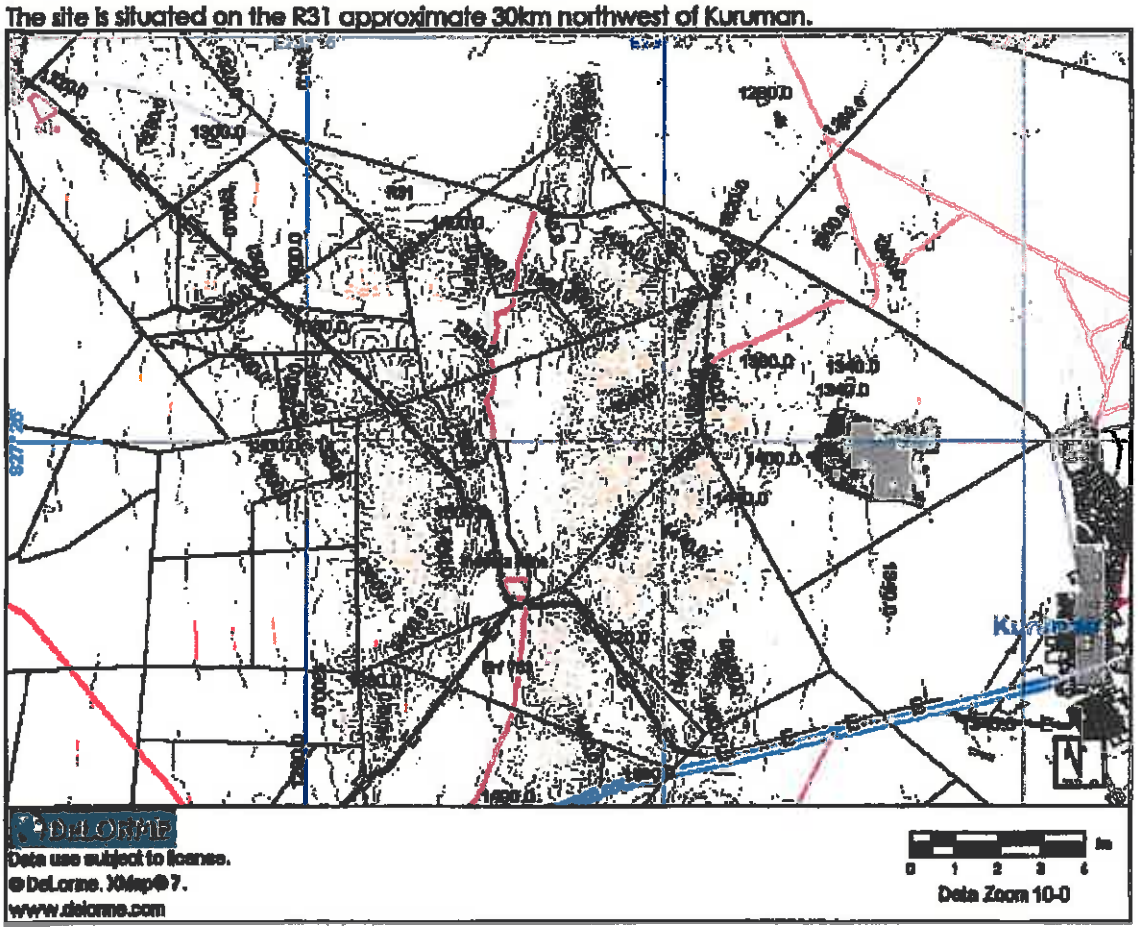


Figure 1: Locality

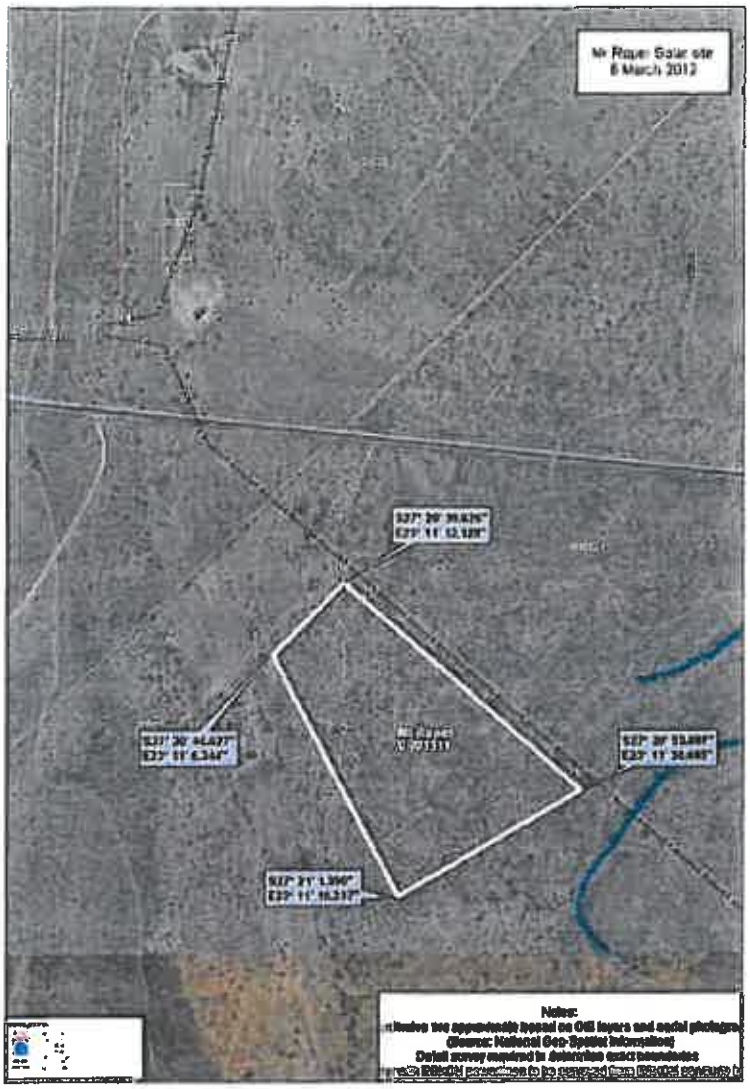


Figure 2: Site boundary

2 TERMS OF REFERENCE

The applicant intends the development of a solar farm on a portion of Farm 321, Mt Roper, Kuruman district. The site gain access off the R31 between Kuruman and Hotazel, approximately 30km from Kuruman.

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.

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 game farming.
Areas with intact or outstanding rural or townscape qualities	None
Areas with a recognized special character or sense of place	None
Areas with sites of cultural or religious significance	None
Areas of important tourism or recreation value	The site is in a region where such elements exists and are important in the Green Kalahari tourist route, although the specific route, namely R31 has not been identified as a scenic drive or tourist route, it is an alternative route from Kuruman to the Kgalagadi Transfrontier Park.
Areas with important vistas or scenic corridors	To assess.
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	No
A significant change to the fabric and character of the area	Yes
A significant change to the townscape or streetscape	No
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 are 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 Gaps, limitations and assumptions

The assessment has to be read with the following in mind:

1. No information is available on the alignment of transmission lines linking the solar facility with the ESKOM substation. The site is on the opposite side of the R31 than the ESKOM substation and transmission lines will have to be constructed. This assessment could however not assess the impact thereof due to a lack of information.
2. Access is obtained via existing roads and no road upgrades or new roads will be constructed.

3.1.4 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.

3.2 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 Northern Cape PSDF

The PSDF provides guidance to ensure that

- development is of a quality that promotes environmental integrity.
- based upon the principles of 'critical regionalism" which promotes a return to the development of high-quality settlements.
- remised upon "The Big Five" principles that guide the planning, design and management of development namely sense of place, sense of history, sense of nature, sense of craft and sense of limits.

3.2.3 Green Kalahari tourism

The Green Kalahari tourist plan is an initiative to promote tourism in the region. The protection of cultural and heritage resources as well as the active involvement and empowerment of local communities through tourism is a core theme through the tourism plan. The R31 from Kuruman northward provide an alternative access to the Kgalagadi Transfrontier Park.

4 DEVELOPMENT PROPOSAL

4.1 General Description

Construction of Solar energy production facility ("Solar Farm") with a maximum capacity of 10Megawatt, consisting of approximately 140 tracking CPV units, on approximately 20ha. The exact technology to be used has not been determined and this assessment is based on the following typical parameters. Units are typically positioned in rows with access roads between every second row. Unit spacing typically varies between 43x37 and 33x30m.

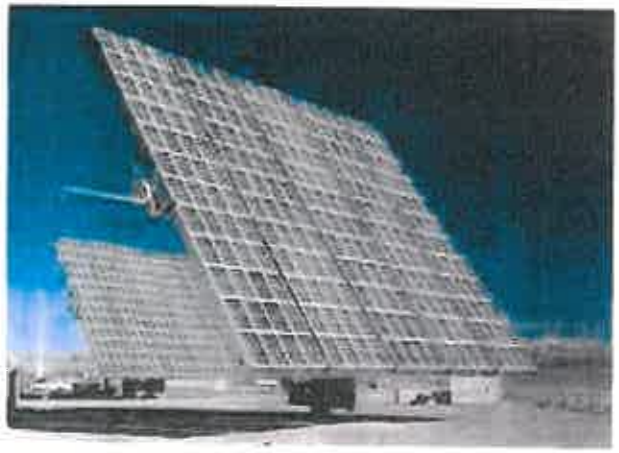


Figure 4: Typical CPV Unit

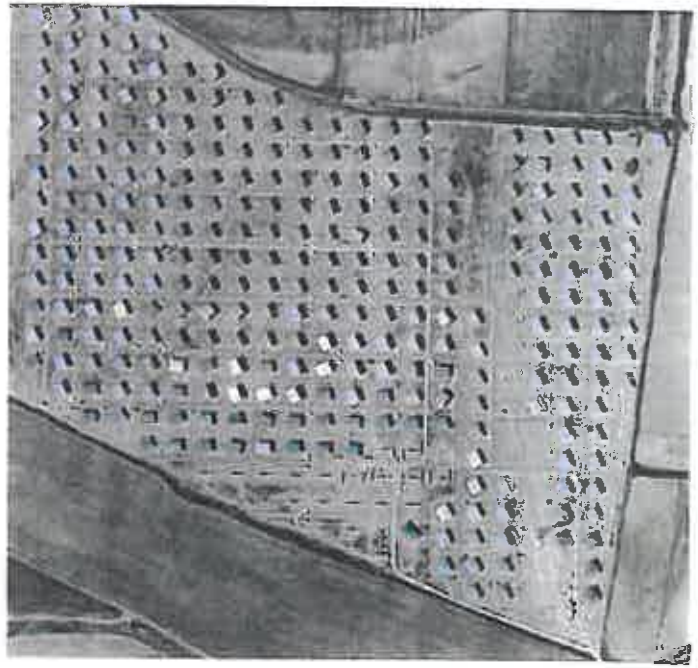


Figure 5: Typical Solar Farm layout

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

4.2 Project Elements

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 access roads in between.

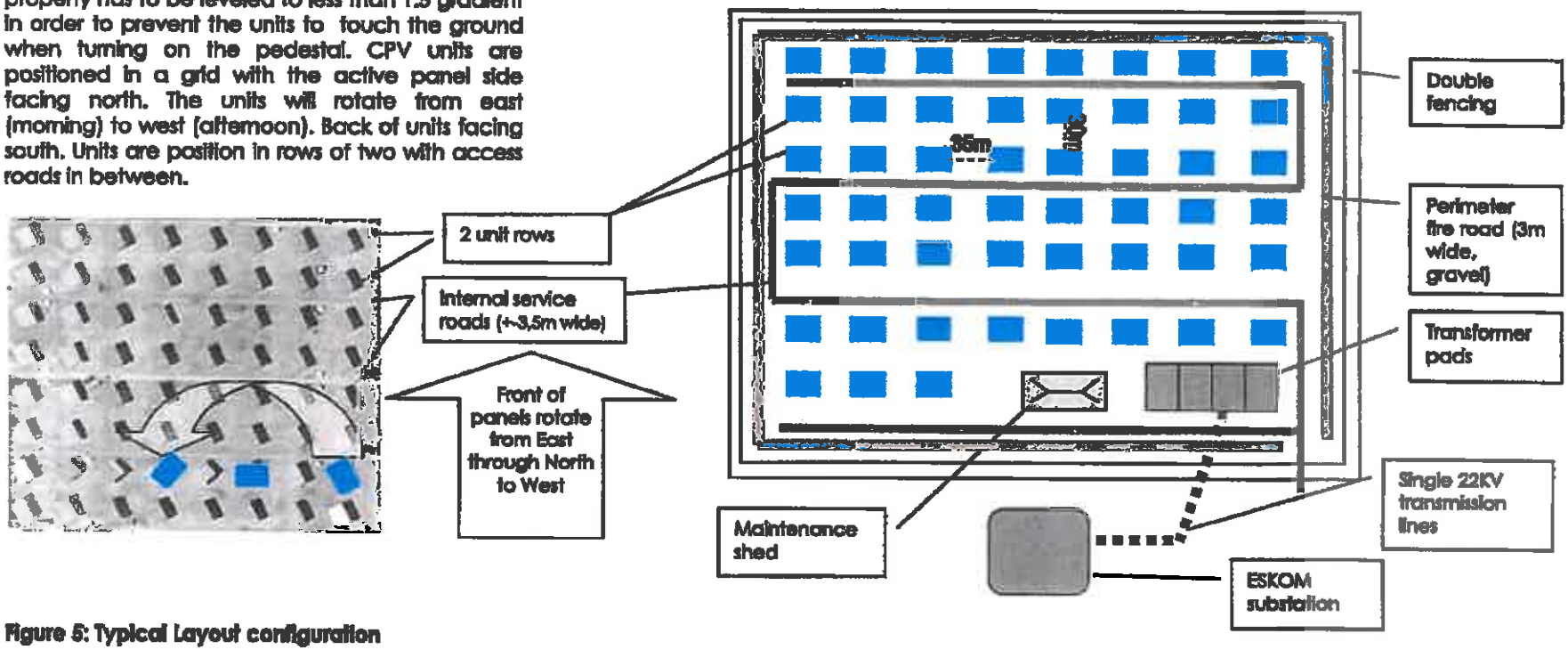


Figure 5: Typical Layout configuration

4.2.2 Tracking CPV Units

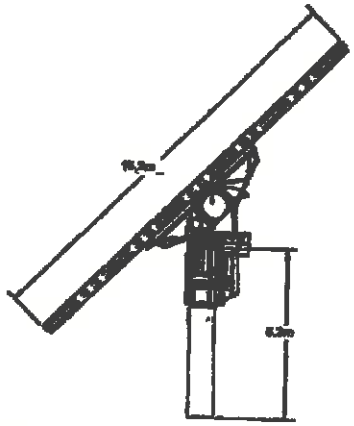
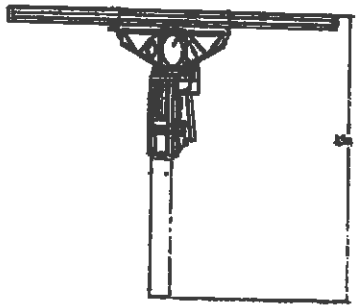
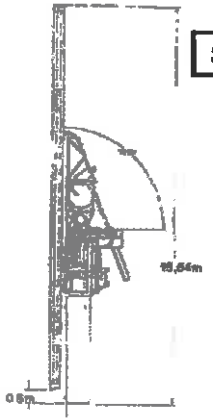


Figure 7: Typical Operational position



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

Figure 6: Storm Stow position



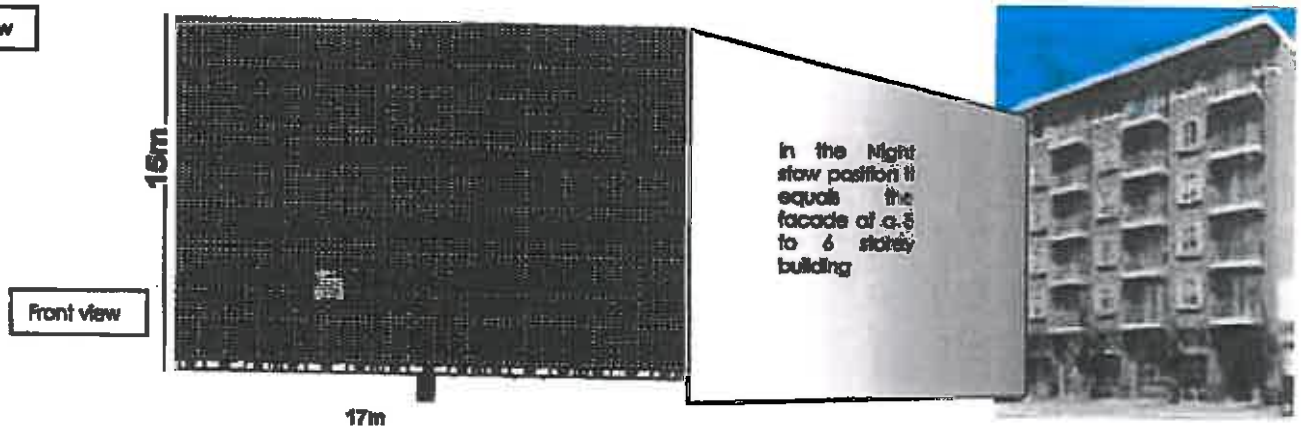


Figure 8: Night stow position

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

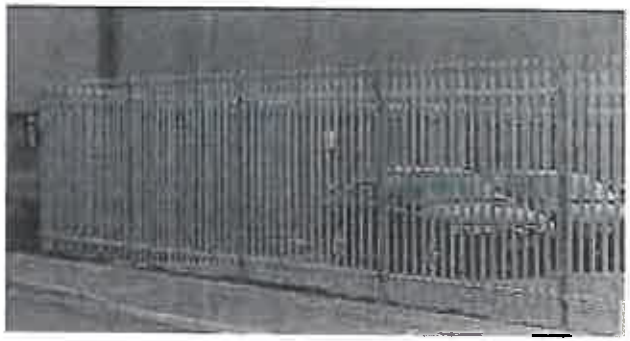


Figure 10: Typical galvanized palisade fence

4.2.4 Supportive Infrastructure

Typically 20 x 15m respectively.
Black top surface

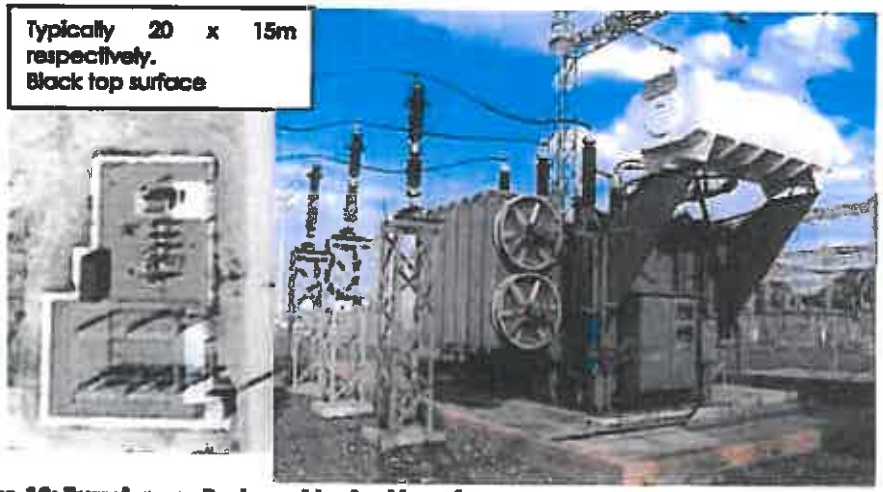


Figure 12: Transformer Pads and typical transformer

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

Figure 11: Typical 22KV single Power line

4.2.5 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.

4.3 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 landscape consists of undulating hills which restrict the catchment area and present a high absorption level. The site slope slightly in a western direction towards the valley. Due to the topographical nature of the landscape the catchment is restricted to approximately 2km in all directions (Figure 13).

5.1.2 Sense of Place:

The site is situated in a rural to natural landscape and although low intensity farming occurs and electrical infrastructure exists, the overall sense of place display a natural character. The traveler on the R31 is halfway between towns and will thus have a lower capacity to accept urban infrastructure than within a town. The region is however known for mining and intermittent observation of mining activities again increase the travelers capacity slightly. The presence of infrastructure is thus not totally foreign to the area, as long as it does not create a high level of intrusion.

5.2 Findings

The proposed site is situated in the rural area with natural vegetation. The area displays a rural character with low intensity farming, game farming and natural areas. An ESKOM substation is in close proximity to the site and HV power lines cross the property and the R31.

The area is characterized by hills and valleys which creates a high absorption capacity. This high absorption rate restricts the catchment area to below 5km radius.

Statement 1: The property, on which the development is proposed, is currently used for low intensity farming but HV power lines do cross the site. The proposed solar farm will change the character of the immediate surrounds.

Figure 13: Receiving Environment

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.

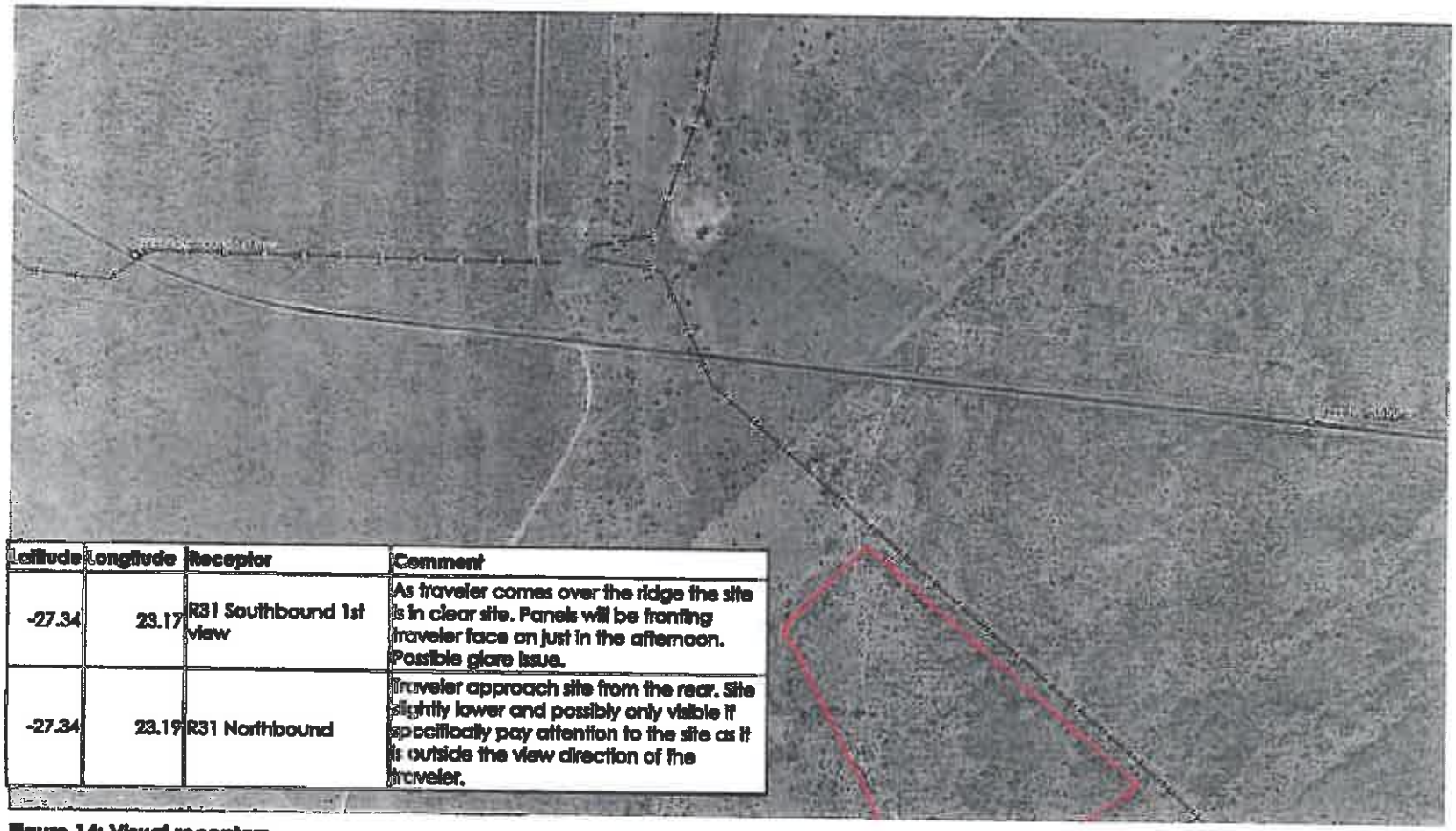
6.1 Potential Receptors

The only identified receptor is the R31 both north and south bound.

6.2 Assessment of Receptors

1. R31 southbound (Figure 17): As the traveler approach over the ridge the site is in clear site. Panels will be fronting the traveler face on in the afternoon and this can create a possible glare with potential reduction in road safety. This will only occur in the afternoon and probably more significant during the winter when the sun is low on the horizon and the panels are in a more upright position. This issue can however be mitigated to reduce the glare or even eliminate. The visual significance without mitigation is thus high, but with mitigation it can be reduced to low.

2. R31 northbound (Figure 16): The view direction of the traveler is parallel to the site and not towards the site. The site slope away from the road, diminishing the exposure of the site. The site is more than 600m from the road reducing the intrusion level. The traveler is at a lower level than the site and dense vegetation reduce view in the direction of the site. The visual significance on the northbound traveler is thus low.



Latitude	Longitude	Receptor	Comment
-27.34	23.17	R31 Southbound 1st view	As traveler comes over the ridge the site is in clear site. Panels will be fronting traveler face on just in the afternoon. Possible glare issue.
-27.34	23.19	R31 Northbound	Traveler approach site from the rear. Site slightly lower and possibly only visible if specifically pay attention to the site as it is outside the view direction of the traveler.

Figure 14: Visual receptors

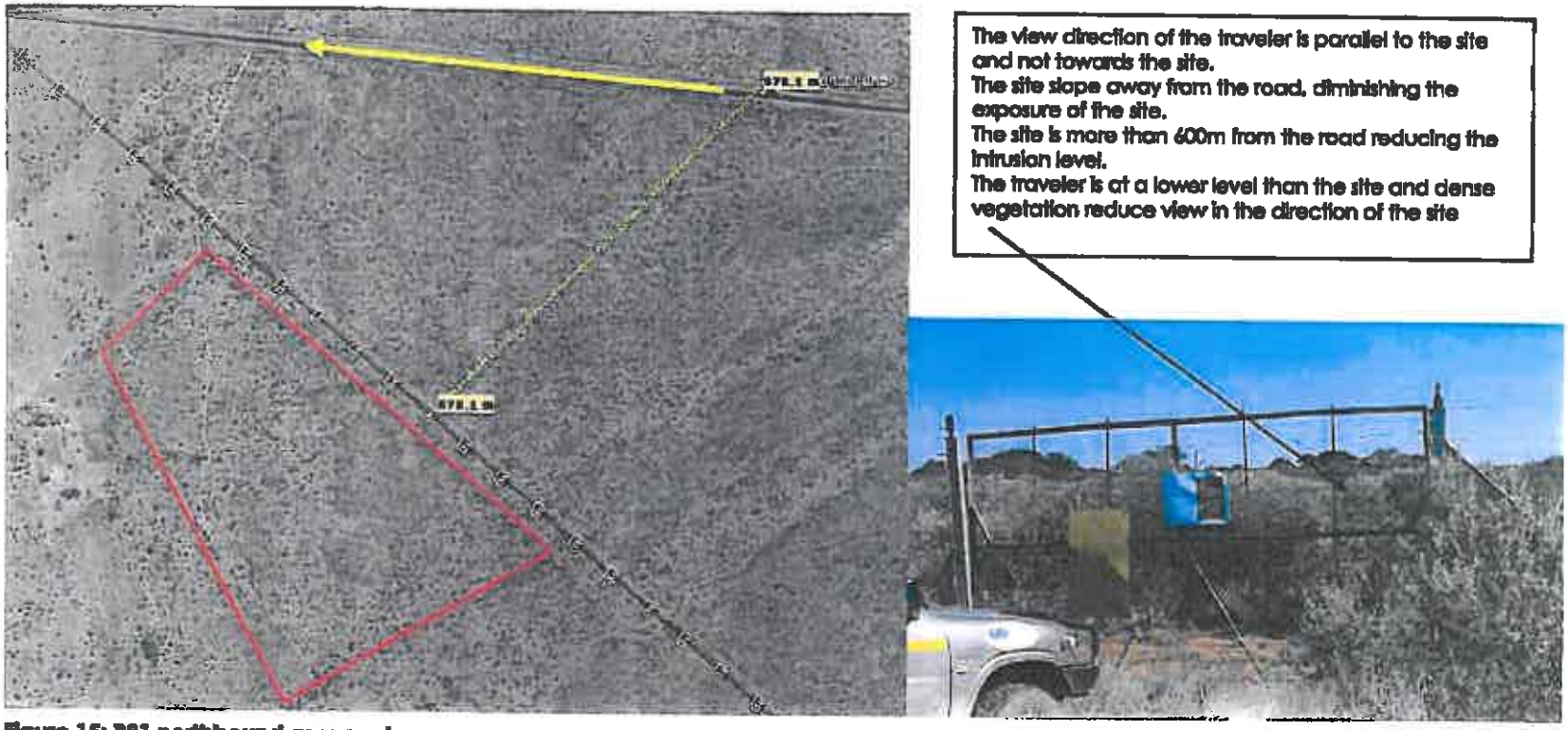


Figure 15: R31 northbound as receptor

Criteria	High	Moderate	Low
Exposure	dominant, clearly visible	recognizable to the viewer	not particularly noticeable to the viewer
Sensitivity	[redacted]	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

Table 3: R31 northbound receptor assessed

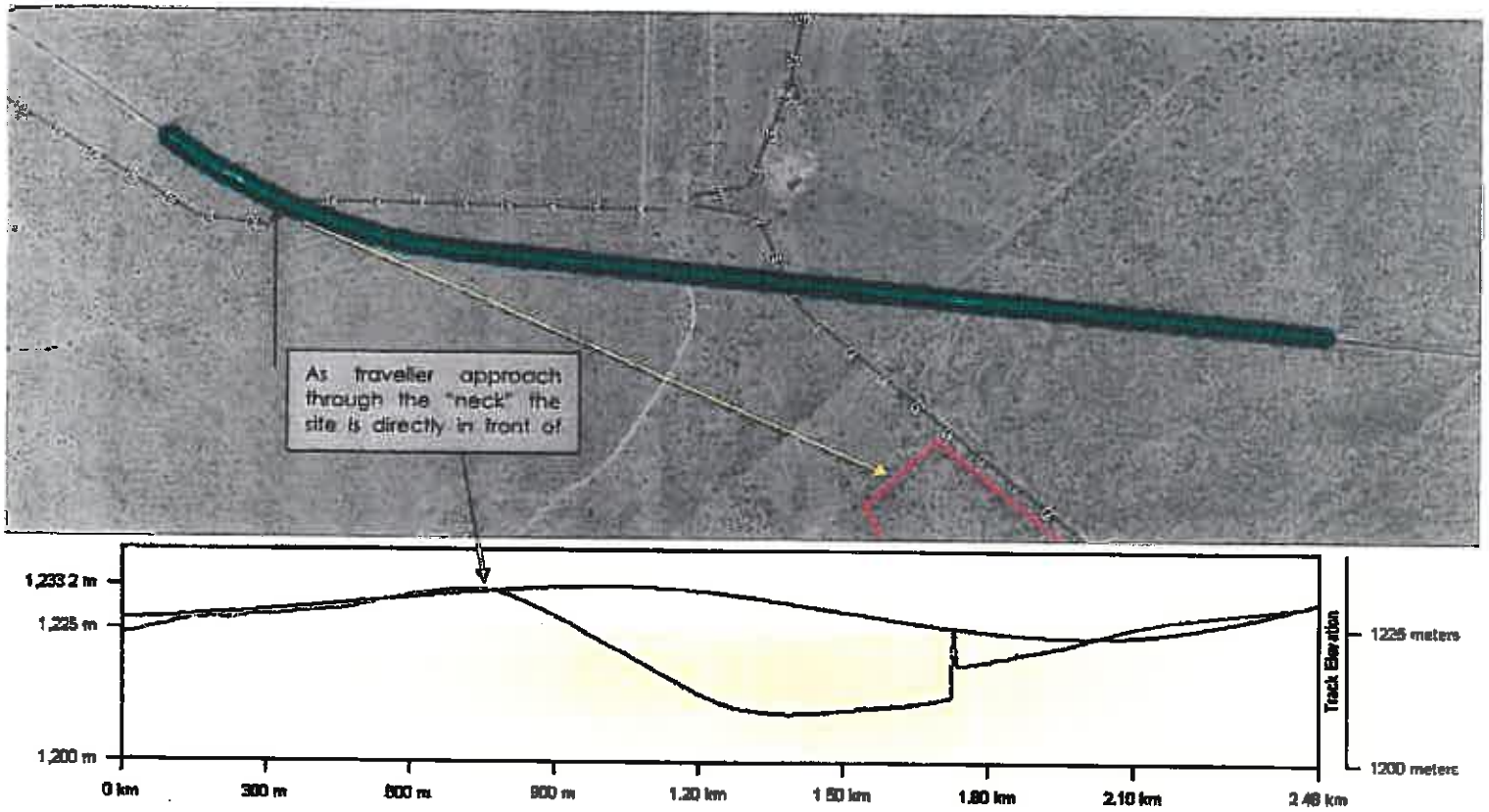


Figure 16: R31 southbound assessed

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

Table 4: R31 southbound receptor assessed

Table 5: Summary of Visual Receptor assessment

Latitude	Longitude	Receptor	Comment	Exposure	Sensitivity	Intrusion/Obstructive	Finding
-27.34	23.17	R31 Southbound 1st view	As traveler comes over the ridge the site is in clear site. Panels will be fronting traveler face on just in the afternoon. Possible glare issue.	Rating: High	Rating: High	Rating: High	Due to the full exposure when crossing the hill to the north travelling south and the elevation in comparison to the site, possible glare may occur. This will only occur in the afternoon and probably more significant during the winter when the sun is low on the horizon and the panels are in a more upright position. This has potential road safety issue. Significance: high
-27.34	23.19	R31 Northbound	Traveler approach site from the rear. Site slightly lower and possibly only visible if specifically pay attention to the site as it is outside the view direction of the traveler.	Rating: Low	Rating: High	Rating: Low	The position of the site to the traveler is such that the site is almost outside the view line of the traveler. Should the traveler take specific notice of the area the site will be visible. The site is however slightly lower and sloping away from the road. Significance: Low

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

The site is situated in an area with a rural character. The immediate area however does host an electrical substation and HV lines. The solar farm will thus change the character of the immediate environment. The view catchment is however small due to topographical variations. The landscape has a medium absorption rate which reduces the significance of land use change.

The possible glare impact on the southbound traffic may have road safety implication. Therefore the impact from this receptor is high and should either be avoided or mitigated.

As the CPV units are across the road from the substation and therefore additional 22KV power lines will have to cross the R31. As long as these lines are combined with the alignment of the existing lines crossing the road it will have no significant additional visual impact.

Apart from the glare issue from the R31, the proposal does not present an unacceptable level of change to the visual environment and therefore the development can be recommended, subject to the prevention of any road safety issues.

9 MITIGATION MEASURES

The nature of the development is such that very little mitigation measures is possible.
It is however recommended that the transmission lines follow the alignment of the existing power lines as to reduce additional intrusion of infrastructure into the area.
The operational management program should include a monitoring mechanism of potential glare issues and should such issues occur, the positioning of panels during the problematic period should be changed. This may impact slightly on the energy output sufficiency.

Appendix D5: Updated Socio-economic Assessment/Addendum (2017 revision)

Socio- Economic Impact Assessment of Amended 2017 Solar Energy Facility Proposal, Mt Roper

For

Roma Energy Mount Roper (Pty) Ltd

In support of the Environmental Basic Assessment Report by EnviroAfrica, Helderberg.

Compiled by

leap sustainable development

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022 482 4653

Reports

Preliminary SEI	March 2012
SEI	May 1012
SEI of Amended Proposal	March 2017

Executive Summary

In 2012 EnviroAfrica cc, was appointed by Roma Energy Mount Roper (Pty) Ltd to undertake a Basic Environmental Assessment (BA Report) for a proposed Photovoltaic Energy Generation Facility on a portion of Farm 321, Mount Roper (situated on south of the R31 and 13.2 km WNW of Kuruman, Ga Segonyana Local Municipality) in accordance with the Environmental Management Act, 1998 (Act no 107 of 1998), as amended and the Environmental Assessment Regulations, 2010. Leap Sustainable Development was appointed to undertake the specialist socio-economic impact assessment as part of the BAR. The reports generated in this round were a Preliminary Socio-economic Impact Assessment and a Socio-economic Impact Assessment.

The Environmental Authorizations granted lapsed and applications have to be made afresh. This report represents a Socio- Economic Impact Assessment of the amended 2017 Solar Energy Facility Proposal, Mt Roper.

Purpose

This report assesses

a) the amended application to accommodate any changes that may come about since the original assessment and
b) The cumulative impacts as required by DEAT.

Approach

The assessment is done by

a) Comparing development proposals in 2011 – 2012 with development proposals in 2017. The impact of the differences, if any, is then evaluated and mitigation measures are proposed.
b) Evaluating cumulative impacts as per DEAT's requirements.

Comparison between 2012 and 2017 proposal

Changes in the 2017 proposal are tabulated below and can be summarized as follows:

a) Different technology is used (Crystalline photovoltaic instead of concentrated photovoltaic)
b) Less energy will be generate (5MW instead of 10 MW)
c) Downscaling in size of infrastructure

No downscaling in extent of the facility.

Impacts and Cumulative impacts during the Construction, Operational and Decommissioning Phases:

The significance and intensity of impacts during the **construction phase** stays the same as in 2012 should the proposed mitigation measures be applied.

The significance and intensity during the **operational phase** stays the same as in 2012 should the proposed mitigation measures be applied.

The cumulative impacts of the propose development and one other renewable projects planned have the following results for both the construction and operational phase:

a) The community will experience positive changes in their economic and material well-being as
   - More job and job opportunities will be generated.
   - Skills levels will increase
   - the local economy will improve (increased sales and contribution to GGP)

b) The community will experience the following environments to be under stress, but through mitigation the stress can be managed:
   Construction phase:
   - The roads as there are more slow moving vehicles using the road (R31).
   - Authority and municipal services as the likelihood of incidences and need for engineering services may be more likely.
   - Living environment as increased dust and noise levels will decrease air quality.
   - Community resources: archaeological, palaeontolgical and sense of place.
     The Sense of Place changes although this impact is of a temporary nature.

     Archaeological: The northern portion of the development site must be resurveyed once the vegetation has been cleared from the site. Archaeological visibility will be higher and many more tools are likely to be encountered on the ironstone gravels which cover this portion of the farm. These tools should be documented before any physical construction takes place on the site, so as to record a more representative sample of the archaeological record.

     Palaeontological: the current losses of Precambrian fossil heritage can be set against the probable widespread occurrence of stromatolitic beds in the subsurface of the extensive Ghaap Plateau (*i.e.* unique fossil heritage is not highly threatened). Furthermore, mining and other bedrock excavations may provide access for palaeontologists to previously inaccessible stromatolite beds. A premium should be set on the conservation of surface exposures of well-preserved stromatolites since partial surface weathering usefully enhances many of the stromatolitic features for scientific study (*cf* Almond 2015).

     Bio-diversity: The site is located in the Griqualand West Centre of Endemism. Two protected species (NFA) i.e. the Camel Thorn Tree (Vachellia Erioloba) and the Sheppard's trees (Boscia albitrunca) populate the site. These protected species can be avoided (excluded) from development when micro site development plan is finalized. The impact on biodiversity can be minimized regionally as corridor functions or special habitats can function undisturbed.

   Operational phase
   - Authority and municipal services as the likelihood of fires and theft of livestock and increase in noise levels during decommissioning (although temporary) may be more likely.
   - Community resources:
     Sense of Place of place will change but within acceptable levels:
     The visual impact is of such level (proposed facility will change immediate surroundings) that very little mitigation is possible as the receiving environment consist of undiluting hills and low intensity farming. These changes to the living environment are at acceptable levels. Therefore it is recommended that the transmission follow the alignment of the exiting power lines as to reduce additional intrusion of infrastructure into the area.

Biodiversity: The potential fire risk high and good fire management protocols will have to be implemented.

c) The community will experience the following environments to be under stress and mitigation is indirect:
   - The employment sector as more people will migrate into Mount Roper looking for work. However, the in-migration of job seekers is a national trend and can be mitigated by enhancing the economy country wide, which is what the proposed development does

Conclusion

The impacts of the 2017 Proposal is similar and overall positive after mitigation as proposed in 2011.

The cumulative impacts are positive, or can be mitigated to support the positive impacts. These changes to the living environment, i.e. sense of place and increased fire risk, are at acceptable levels. The in-migration of job seekers is a national trend and can be mitigated by enhancing the economy country wide, which is what the proposed development does.

The Northern Cape Economic Potential and Investment Profile, 2012 highlights the energy sector as one of the sectors to enhance the socio-economic circumstances of the Northern Cape. Moreover, the carbon footprint to generate electricity will get reduced.

Therefore the proposed development is supported from a socio-economic perspective.

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

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

Application for integrated environmental authorization and waste management license in terms of the-

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

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

PROJECT TITLE

Roma Energy Mount Roper (Pty) Ltd: Proposed 5MW Photovoltaic Energy Generation Plant

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4.2 The specialist appointed in terms of the Regulations_

I, Anelia Coetzee declare that –

General declaration:

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

Signature of the specialist:

Leap Sustainable Development cc

Name of company (if applicable):

30 March 2017

Date:

Background

In 2012 EnviroAfrica cc, was appointed by Roma Energy Mount Roper (Pty) Ltd to undertake a Basic Environmental Assessment (BA Report) for a proposed Photovoltaic Energy Electricity Facility on a portion of Farm 321, Mount Roper, situated south of the R31 and 13.2 km WNW of Kuruman, Ga Segonyana Local Municipality, in accordance with the Environmental Management Act, 1998 (Act no 107 of 1998), as amended and the Environmental Assessment Regulations, 2010. Leap Sustainable Development was appointed to undertake the specialist socio-economic impact assessment as part of the BAR. The reports generated in this round were a Preliminary Socio-economic Impact Assessment and a Socio-economic Impact Assessment.

The Environmental Authorizations granted lapsed and applications have to be made afresh. This report represents a Socio-Economic Impact Assessment of the amended 2017 Solar Energy Facility Proposal, Mount Roper.

Purpose

This report assesses

c) the amended application to accommodate any changes that may come about since the original assessment and
d) the cumulative impacts as required by DEAT.

Approach

The assessment is done by

c) Comparing development proposals in 2011 – 2012 with development proposals in 2017. The impact of the differences, if any, is then evaluated and mitigation measures are proposed.
d) Evaluating cumulative impacts will be evaluated as per DEAT's requirements.

Amended Proposal (2017)

Roma Energy Mount Roper (Pty) Ltd intends to construct a 5 MW solar photovoltaic (PV) energy generation facility on Farm Farm 321, Mount Roper, (situated on south of the R31 and 13.2 km WNW of Kuruman), Ga Segonyana Local Municipality, Northern Cape. The land is owned by Roper Moore CC and the zoning is Agriculture 1

The proposed development entails the construction of about 18540 PV solar panels with a footprint of less than 20 ha. The PV panels will be mounted on pedestals drilled and set into the ground. Associated infrastructure includes a perimeter access road, single track internal access roads, trenches for underground cables, 2 to 4 transformer pads, a switching station, a maintenance shed, and a temporary construction camp. The Riries 66/11kV substation is situated on site.

Comparison between 2012 and 2017 proposal

Changes in the 2017 proposal are tabulated below and can be summarized as follows:

d) Different technology is used (Crystalline photovoltaic instead of concentrated photovoltaic)
e) Less energy will be generate (5MW instead of 10 MW)
f) Downscaling in size of infrastructure

No downscaling in extent of the facility.

Elements	2012 Proposal	2017 Proposal	Result
- Technology Type	- concentrated photovoltaic (CPV) - uses Fresnel lenses to concentrate light from sun onto individual PV cells	Solar Photovoltaic, Crystalline PV	Different Technology
- Capacity	- 10MW, - A single solar generator produces ±66kV. A number of generators arranged in multiple/ arrays produce 10MW.	5MW, 18540 solar modules, 927 Modules strings (a string constitutes a number of modules connected to a common inverter)	Less (half) energy generated
- Inversion and inverters	- An inverter is used to convert direct current electricity produced into alternating current in order to connect to ESKOM grid	3 inverter stations (inverters to keep generation of energy at 5MW or below). A total of 7 central inverters will be used.	None
- Specifications/ Scale & Mass	- CPV panels will be elevated 2m above ground supported by a structure, and track path of the sun during the day for maximum efficiency.	Single axis unit, Elevated ±1.5m above ground	Shorter axis, down scaling of size of infrastructure
	- Approximately 1.8ha is required to install 1MW (Thus 10MV require 20ha)	Extent of the development stays the same.	Smaller take up but extent of the development stays the same
	- Each panel will be approximately 17-22m wide by 12.5m high. When panels are tracking vertically the structure will have a maximum height of approximately15, 64m.	Module: 1.956m x 0.992m Module String: 20 x 1.956m x 0.992m = ±40m x ±20m Height tracking vertically: ±10.5m	Maximum height lower
- Mounting	- CPV panels will be mounted on pedestals drilled and set into the ground.	Same	None
- Preparation of land to assemble stands	- Extensive bedrock excavations are not envisaged, but some vegetation will need to be cleared form the site.	Excavations for footings are 1.5m in diameter	None
- Associated Infrastructure	- Single track internal access roads, trenches for underground cables, transformer pads, a switching station, a maintenance shed, and a temporary construction camp on site (containers will be used as sheds)	A perimeter access road, single track internal access roads, trenches for underground cables, 2 to 4 transformer pads, a switching station, a maintenance shed, and a temporary construction camp	None
- Transmission & Substation	- General: Electricity generated will be fed into the national grid at an Eskom substation: Riries substation	Riries Eskom substation located alongside subject property, linked with 22kV	None
- Access	- Site will be accessed from N31, using existing secondary roads.	Site will be accessed from N31.	None
- Location, Ownership, extent	- to be established on 20ha of land on Farm 321, Mount Roper	10h to be established on 20ha of land on Farm 321, Mount Roper owned by Roper Moore cc zoned Agriculture 1.	None
- Changes in receiving environment		No changes occurred in receiving environment which impact on the original assessment.	None

Impacts and Cumulative impacts during the Construction, Operational and Decommissioning Phases:

Summary of impacts during the Construction Phase

The impacts identified in the 2012 assessment, have low levels of significance. Where negative, mitigation could keep the levels of significance low or could reverse the impact to become neutral.
The 2017 proposal (different technology, less energy generate, downscaled infrastructure but development footprint stay the same) is compared and evaluated.
The same is done for the cumulative impacts.
The table below lists all the impacts identified during the construction phase, their significance (low or high) and intensity (positive or negative) before and after mitigation:

Impacts	Related Impact	Preferred Alternative 2011	Preferred Alternative 2011 mitigated	Proposal 2017 (2011 mitigation measures)	Cumulative (within 30km)
More jobs / increase in job opportunities will be generated	- Low skills level may cause an influx of job seekers, some loss of community safety	Low, positive	Low, positive	Low positive	Medium positive (job creation)
	- Influx of people			Insignificant	Medium negative
Increase skills levels (changes in economic and material well-being)	- Skills development, training and capacity building locals may not benefit as "others" may be employed	None	Low, positive	Low, positive	Medium, positive
Reduced road safety	- Less than 50 trips per day (stock & workers). - Slow moving vehicles may cause intersection to be less safe - Heavy vehicles may cause deteriorating road surfaces	Low, negative	Neutral	Neutral	Medium Negative
Local resources (i.e. clinic) & services under stress.	- Increased demand for municipal and authority services	Insignificant	Insignificant	Insignificant	Low, negative
Decrease Health and Social Well being	Dust and noise levels raise	Medium, negative	Low, negative	Low, negative	Low negative
Increased sales and contribution to GGP		Low, positive	Low, positive	Low, positive	Medium, positive
Community Resources (and tourist attractions) under stress	Archaeological Resources: archaeological remains rated as having medium-low significance (Grade 3B-3C)	Low	Low	Low	Low: One other renewable energy (RE) project planned: Do not impact on archaeological resources.
	Palaeontology Resources: Precambrian banded iron formations of low palaeontological sensitivity (microfossils only) underlay area. These Precambrian rocks are deeply buried beneath unfossiliferous rock rubble and wind-blown sands	Low	Low	Low	

	Bio-diversity: Site located in Griqualand West Centre of Endemism. Two species protected (NFA) Camel Thorn Tree (Vachellia Erioloba) & Sheppard's trees (Boscia albitrunca) associated with watercourses. Four species protected (NCNCA).			Medium	Medium Protected species can be avoided (excluded) from development when micro site development plan is finalized. These measures will minimize impact regionally as corridor functions or special habitats can function undisturbed.
	Sense of Place Constituted by Eskom Riries substation, overhead powerlines, and farming infrastructure (fences, boreholes, earth dam, etc.). No other industrial or infrastructural-type developments immediately surrounding the proposed PV facility.	Temporary, Low		Temporary, Low	Temporary, Medium
	Loss of agricultural land: The farm is used for cattle grazing.			Low, negative	Low, as the land can return to agriculture

The significance and intensity of impacts during the construction phase stays the same as in 2012 should the proposed mitigation measures be applied.

The cumulative impacts of the propose development and four other renewable projects planned have the following results:

d) The community will experience positive changes in their economic and material well-being as
   - More job and job opportunities will be generated.
   - Skills levels will increase
   - the local economy will improve (increased sales and contribution to GGP

e) The community will experience the following environments to be under stress, but through mitigation the stress can be managed:
   - The roads as there are more slow moving vehicles using the road (R31).
   - Authority and municipal services as the likelihood of incidences and need for engineering services may be more likely.
   - Living environment as increased dust and noise levels will decrease air quality.
   - Community resources: archaeological, palaeontolgical and sense of place.
     The Sense of Place changes although this impact is of a temporary nature.

     Archaeological: The northern portion of the development site must be resurveyed once the vegetation has been cleared from the site. Archaeological visibility will be higher and many more tools are likely to be encountered on the ironstone gravels which cover this portion of the farm. These tools should be documented before any physical construction takes place on the site, so as to record a more representative sample of the archaeological record.

Palaeontological: The current losses of Precambrian fossil heritage can be set against the probable widespread occurrence of stromatolitic beds in the subsurface of the extensive Ghaap Plateau (*i.e.* unique fossil heritage is not highly threatened). Furthermore, mining and other bedrock excavations may provide access for palaeontologists to previously inaccessible stromatolite beds. A premium should be set on the conservation of surface exposures of well-preserved stromatolites since partial surface weathering usefully enhances many of the stromatolitic features for scientific study (*cf* Almond 2015).

Bio-diversity: The site is located in the Griqualand West Centre of Endemism. Two protected species (NFA) i.e. the Camel Thorn Tree (Vachellia Erioloba) and the Sheppard's trees (Boscia albitrunca) populate the site. These protected species can be avoided (excluded) from development when micro site development plan is finalized. The impact on biodiversity can be minimized regionally as corridor functions or special habitats can function undisturbed.
The potential fire risk high and good fire management protocols will have to be implemented.

f) The community will experience the following environments to be under stress and mitigation is indirect:
- The employment sector as more people will migrate into Mount Roper looking for work. However, the in-migration of job seekers is a national trend and can be mitigated by enhancing the economy country wide, which is what the proposed development does.

Operations and Demolition

The impacts identified in the 2012 assessment, have low levels of significance. Where negative, mitigation could keep the levels of significance low or could reverse the impact to become neutral.
The 2017 proposal (different technology, less energy generate, downscaled infrastructure but development footprint stay the same) is compared and evaluated.
The same is done for the cumulative impacts.
The table below lists all the impacts identified during the construction phase, their significance (low or high) and intensity (positive or negative) before and after mitigation:

Impacts		**Preferred Alternative 2011**	**Preferred Alternative 2011 mitigated**	**Proposal 2017** (2011 mitigation measures)	**Cumulative**
More jobs / increase in job opportunities will be generated	- Low skills level may cause an influx of job seekers, some loss of community safety	Low, positive	Low, positive	Low positive	Medium positive (job creation)
	- Influx of people			Insignificant	Medium negative
Reduced road safety	- Increased traffic below threshold of 50 trips per day (security & maintenance).	Low, negative	Neutral, insignificant	Neutral, Insignificant	Neutral, insignificant
Decrease health & social well-being	- Fire hazard - Livestock get stolen (perception security staff steal live stock) - Noise during decommissioning: short	Low, negative	Low, negative	Low, negative	Low, negative

	term, safety as per international standards.				
Increased sales and contribution to GGP		Low, positive	Low, positive	Low, positive	Medium positive
Sense of place change (changes in quality of living environment)	Visual impact is similar to original proposal. Proposed 22kV powerline is similar to telephone line in extent and connect to the adjacent Riries substation. Intrusion levels, due to glare and size of units were rated high. With new technology these impacts are significantly reduced Receiving environment is home to infrastructure: Eskom Riries substation, overhead powerlines, and farming infrastructure (fences, boreholes, earth dam, etc.). No other industrial or infrastructural -type developments immediately surrounding the proposed PV facility. Hills and valleys creates a high absorption capacity	Low	Low	Low, no mitigation required except Transmission line follow alignment of existing power line as to reduce intrusion of infrastructure	Not significant (One renewable energy projects planned)
Enhanced tourism causing changes in economic and material well being	Archaeological Resources: archaeological remains rated as having medium-low significance (Grade 3B-3C)	Low	Low	Low	Low. One other renewable energy (RE) projects planned: Do not impact on archaeological resources.
Enhanced tourism causing changes in economic and material well being	Palaeontology Precambrian banded iron formations of low palaeontological sensitivity (microfossils only) underlay the area. These Precambrian rocks are deeply buried beneath unfossiliferous rock rubble and wind-blown sands (No deep bedrock excavations planned).	Low	Low	Low	Cumulative impacts: anticipated significance on local fossil heritage in Kuruman - Hotazel region is rated as low to very low.

The significance and intensity during the operational phase stays the same as in 2012 should the proposed mitigation measures be applied.

The cumulative impacts of the propose development and four other renewable projects planned have the following results:

g) The community will experience positive changes in their economic and material well-being as
   - More job and job opportunities will be generated.
   - The local economy will improve (increased sales and contribution to GGP
h) The community will experience the following environments to be under stress, but through mitigation the stress can be managed:

- Authority and municipal services as the likelihood of fires and theft of livestock and increase in noise levels during decommissioning (although temporary) may be more likely.
- Community resources:
  Sense of Place of place will change but within acceptable levels:
  The visual impact is of such level (proposed facility will change immediate surroundings) that very little mitigation is possible as the receiving environment consist of undiluting hills and low intensity farming. These changes to the living environment are at acceptable levels. Therefore it is recommended that the transmission follow the alignment of the exiting power lines as to reduce additional intrusion of infrastructure into the area.
  Biodiversity: The potential fire risk is high and good fire management protocols will have to be implemented.

i) The community will experience the following environments to be under stress and mitigation is indirect:
   - The employment sector as more people will migrate into Mount Roper looking for work. However, the in-migration of job seekers is a national trend and can be mitigated by enhancing the economy country wide, which is what the proposed development does.

Conclusion

The impacts of the 2017 Proposal is similar and overall positive after mitigation as proposed in 2011.

The cumulative impacts are positive, or can be mitigated to support the positive impacts. These changes to the living environment, i.e. sense of place and increased fire risk, are at acceptable levels. The in-migration of job seekers is a national trend and can be mitigated by enhancing the economy country wide, which is what the proposed development does.

The Northern Cape Economic Potential and Investment Profile, 2012 highlights the energy sector as one of the sectors to enhance the socio-economic circumstances of the Northern Cape. Moreover, the carbon footprint to generate electricity will get reduced.

Therefore the proposed development is supported form a socio-economic perspective.

References

ACRM, 2017: Archaeological Impact Assessment: The proposed Roma Energy Mount Roper Solar Energy Farm 321, Mount Roper, Northern Cape.

Goestratics, 2017: MT Roper, Farm 321, Solar Energy Facility, Visual Assessment

Leap Sustainable Development, 2012: Socio Economic Impact Assessment: Mount Roper Photovoltaic Electricity Generation Facility

Natura Viva cc. 2017: Recommended exemption from further palaeontolgical studies & mitigation: Proposed Mount Roper Roma Energy Solar Plant, Ga Segonyana Local Municipality, Northern Cape

PB Consult: Ecological & Botanical management services, 2017: Addendum to the biodiversity assessment & biodiversity assessment & botanical scan, for the Mount Roper Solar project: