

# KAKAMAS, PORTION ERF 1654: 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



PO Box 1082

Strand

7139

### Report history:

Version	Date	Amendments
Version 1	26 March 2012	
Version 1.1	31 March 2012	Par 2.1.3, 7, 8 Editing
Final	11 May 2012	
Addendum	18 March 2017	

## CONTENT

1	OBJECTIVE .....	1
2	CHANGES IN PROPOSAL .....	1
2.1	Site Boundary .....	1
2.2	Extend of solar facility and power line connection .....	2
2.3	Proposed Technology .....	3
3	CHANGES IN RECEIVING ENVIRONMENT .....	3
4	CUMULATIVE IMPACTS .....	4
4.1	Methodology .....	4
4.2	Assessment of cumulative impacts .....	4
4.2.1	Time Crowding .....	4
4.2.2	Time Lags .....	4
4.2.3	Space crowding .....	4
4.2.4	Cross Boundary .....	5
4.2.5	Fragmentation .....	5
4.2.6	Compounding Effects .....	5
4.2.7	Indirect Effects .....	5
4.2.8	Triggers and Thresholds .....	5
5	FINDINGS AND CONCLUSIONS .....	8
5.1	Construction Impacts .....	8
5.2	Operational Impacts .....	8
6	MITIGATION MEASURES .....	8

### Tables

Table 1: Assessment of powerline N14 receptor .....	2
Table 2: Types and characteristics of cumulative impacts .....	4

### Figures:

Figure 1: Site boundary .....	1
Figure 2: Typical 22kV Powerlines to connect to Taaibos Substation .....	2
Figure 3: N14 from Augrabies as potential receptor for powerline .....	2
Figure 4: Single axis mounting system .....	3
Figure 5: View catchment and site elements .....	6
Figure 6: 30km radius .....	7

**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 Erf 1654, Kakamas and in ownership of the Kai Garib local municipality.

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 alignment of the powerlines have not be determined and is also included in this addendum.

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 Erf 1654, Kakamas and in ownership of the Kai Garib local municipality.

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

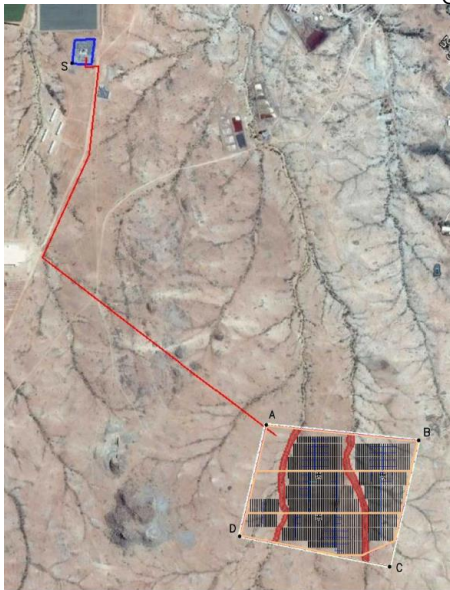
Cumulative impact holds two components namely the visual catchment area of assement and the criteria as defined by the DEA guideline on cumulative impacts.

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

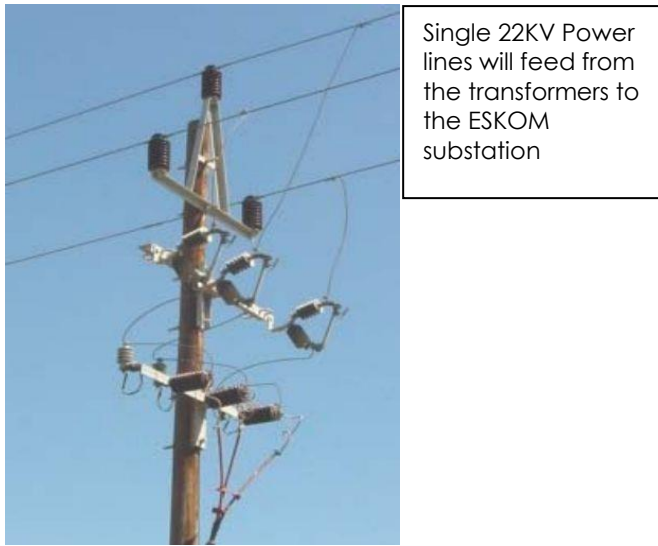
The site boundary remained similiar to the effect that it will change the assessment of the receptors as per the original report. Therefore the previous assessment of receptors remains unchanged. Added to the assessment is the alignment of the powerline to connect to the Tacibos substation.



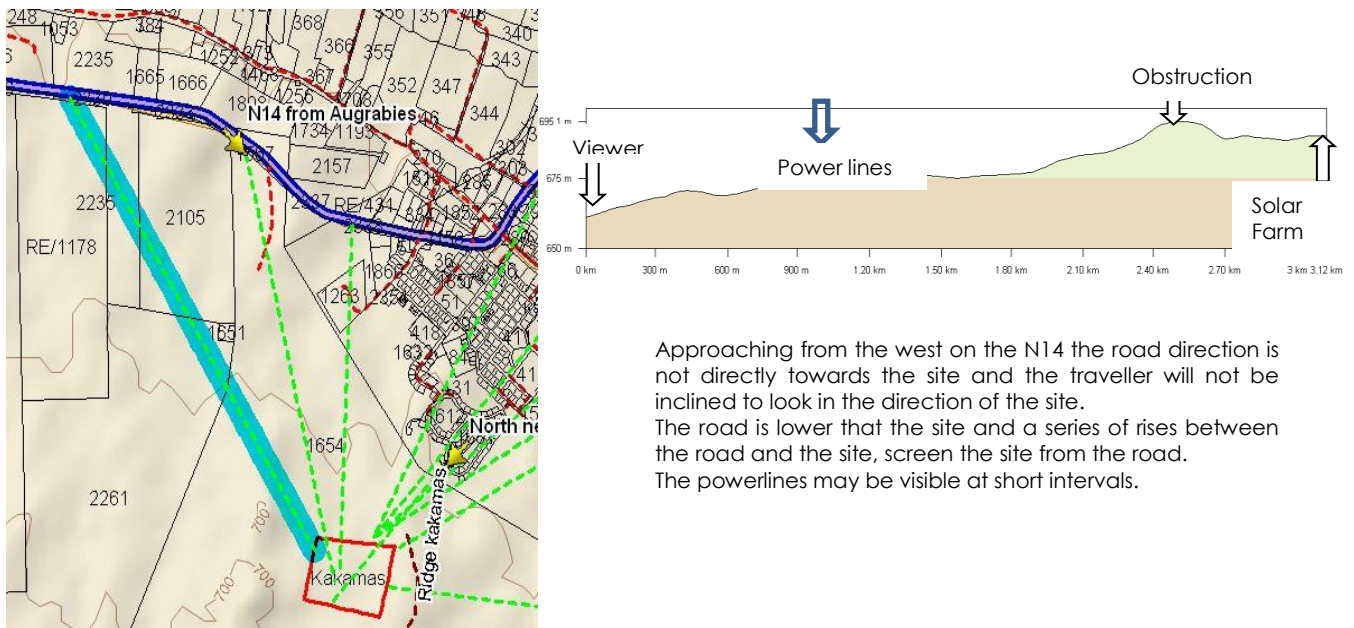
**Figure 1: Site boundary**

## 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.



**Figure 2: Typical 22kV Powerlines to connect to Taibos Substation**



**Figure 3: N14 from Augrabies as potential receptor for powerline**

Approaching from the west on the N14 the road direction is not directly towards the site and the traveller will not be inclined to look in the direction of the site. The road is lower than the site and a series of rises between the road and the site, screen the site from the road. The powerlines may be visible at short intervals.

**Table 1: Assessment of powerline N14 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

Label	Lat	Lon	Comment	Exposure	Sensitivity	Introsion	Finding
N14 from Augrabies	-28.7647	20.59846	Approaching from west screened by low ridge. Possible brief glimpse of the powerline	Approaching Kakamas from Augrabies, the travelers view is not directed towards the site. The topography is also such that the traveler is screened from the site. Rate: Low	The N14 and especially entrances to towns along this road has been identified of tourism importance. Rate: High	The undulating landscape provide screening at intervals . Rate: Low	No significant impact

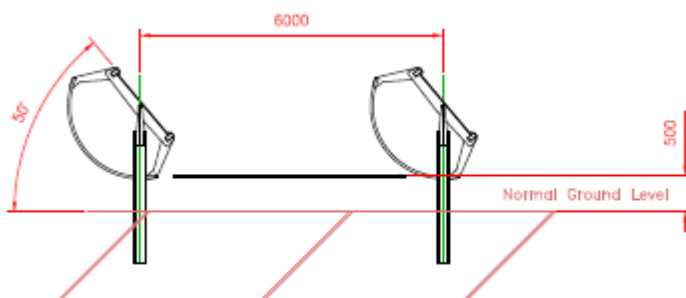
The proposed 22kV powerline is similar to telephone line in extent and thus acceptable within a rural and urban environment. No receptors have been identified which will be affected by the powerline. The impact of the line is thus low.

### 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 Ouplaas Substation.

This proposal result in significant downscale in the size of infrastructure being less intrusive. The original proposal comprise units of up to 6m in height where the PV single axis system is approximately 2m.



**Figure 4: Single axis mounting system**

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

The new proposed technology therefor reduce the visual impact with regard to the production technology.

## 3 CHANGES IN RECEIVING ENVIRONMENT

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

## 4 CUMULATIVE IMPACTS

### 4.1 Methodology

Cumulative 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.<sup>1</sup> Table 1 below summarise these criteria and these have been used to assess the cumulative visual impact.

**Table 2: 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

With regard to construction, should the other proposed projects in the area be undertaken at the same time the construction activities can cause increased level of such activities. However this is only temporary. There are only 2 other proposed PV sites within a 30km radius and thus the impacts will be limited. It is unclear what the construction of a proposed hydro facility will entail but the construction extent of the application PV site will be far less than that of the hydro facility. These sites are directly off the N14 and only the application site will gain access via the street of Kakamas during construction.

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 landscape consists of a valley with a hinterland to the north and south of this valley. The immediate hinterland to the south consist of hills and almost rocky/mountainous appearance. The hinterland to the north is more flat, but with interspersed hills, 'spitskoppe' and dunes. In general the area display a surprisingly variety in slope, hills, gradients and landform.

<sup>1</sup> DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria



These variations in landform reduce the visual reach and the view catchment of the area (**Error! eference source not found.**). The catchment area is thus restricted in the south, but due to the up slope to the north and northwest the catchment area extent to the hills north of the valley. Along the N14 towards Upington the catchment area extent intermittently to about 7km from the site however to the north it is restricted to about 5km and to the west, east and south it is less than 1km. (Refer Figure 3 below)

This thus concluded that the catchment area does not extent to the 30km radius. (Refer Figure 4 below) However a traveller through the landscape may experience the other two energy facilities within this radius and generally within a timeframe of 30min. A traveller will thus experience a number of solar sites on his journey through the landscape but since they are spaces apart with the urban area provididing a flow in variation. The topography of the landscape also absorb the sites and prevent crowding within the space.

#### **4.2.4 Cross Boundary**

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

#### **4.2.5 Fragmentation**

The site is adjacent to commanage with wastewater and refuse infrastructure as well as abutted by a neighbour and production landscape. The proposal may result in a low level of fragmentation but due to the size and locality within the urban parameter this is not significant.

#### **4.2.6 Compounding Effects**

From a visual perspective the site has no compounding impacts.

#### **4.2.7 Indirect Effects**

The development is on the edge of the urban development and does has the potential to attract further development. The support services anticipated should however be of low impact such as general maintenance services as the facility does not require large scale industrial maintenance systems of equipment. The anticipated indirect visual effects are thus insignificant.

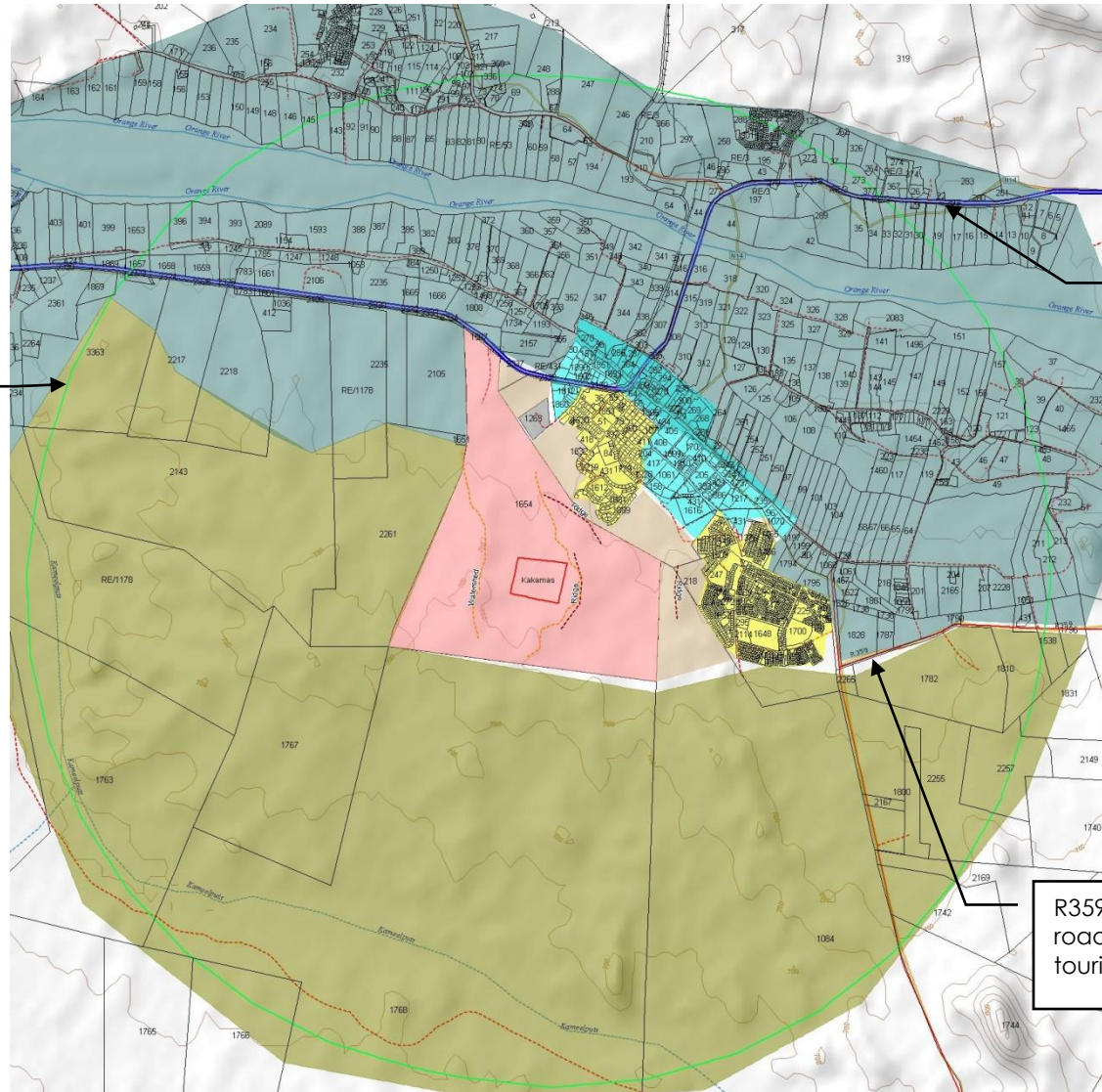
#### **4.2.8 Triggers and Thresholds**

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

### Kakamas Receiving Environment

- Commonage
- Industrial
- Low intensity farming
- Production landscape
- Residential
- Urban
- Vacant

5km view catchment area. The landscape consists of a valley with a hinterland to the north and south of this valley. The immediate hinterland to the south consist of hills and almost rocky/mountainous appearance. The hinterland to the north is more flat, but with interspersed hills, 'spitskoppe' and dunes. In general the area display a surprisingly variety in slope, hills, gradients and landform. This variation in landform reduces the visual reach and the view catchment of the area.



N14 : National road which is the main transport route through the area. This route has also been identified as an important tourist route and proposals were made that the entrances to towns along this route should be improved.

R359 also known as the rocky road presents an alternative tourist route

Figure 5: View catchment and site elements

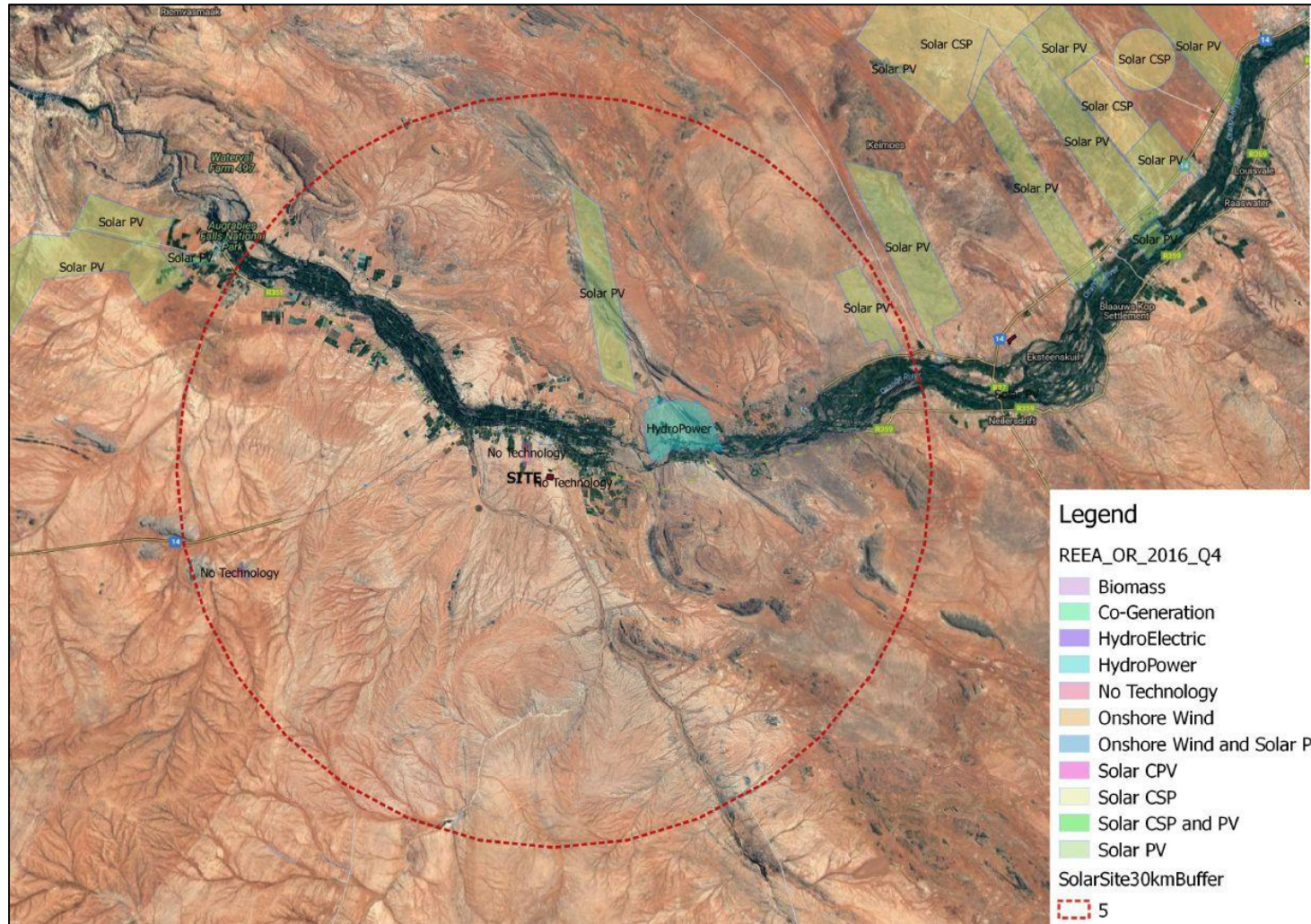


Figure 6: 30km radius

## 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 in an area of little coherence and ad hoc position of a range of industrial and utility land uses. The site has a high absorption capacity due to the presence of existing land use and topographical variation.

The sensitive receptors namely the N14, R359 and residential areas are situated such that the exposure to the site and the intrusion is low.

The scale of the powerline is such that the overall visual intrusion is low and thus of low visual significance.

The proposal does not present an unacceptable level of change to the visual environment and therefore the development can be recommended.

**Statement 1:** The property on which the development is proposed, is currently used for a range of utility type of land use and therefore the proposed solar farm seems to be in character with these elements.

**Statement 2:** Due to the medium to high absorption capacity of the landscape, the development will easily be absorbed into the existing visual structure.

**Statement 3:** The proposal does not pose any significant cumulative visual impacts which would deem the proposal unacceptable.

## 6 MITIGATION MEASURES

The level of visual impact is of such level that no mitigation to the proposed on-site development elements is recommended.

The level of visual impact of the power lines are low and no mitigation is required.