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D G Paterson

Savannah Environmental
Attention: Ms Tebogo Mapinga
PO Box 148
Sunninghill 2157

18th April 2016

Dear Ms Mapinga,

KAROSHOEK SOLAR PARK (ADDITIONAL CSP FACILITIES ON SITES 1.3, 1.4, 3, 4 and 5 NEAR UPINGTON, NORTHERN CAPE): SOIL, LAND USE, LAND CAPABILITY AND AGRICULTURAL POTENTIAL SCOPING REPORT

As part of the peer review process, I was requested to review the report prepared by Mr Jaco Jansen of Savannah Environmental, concerning the soils and associated agricultural potential on the specific sites within the project area (report dated September 2015).

1. **Acceptance of the ToR**

The terms of reference, as stated in the report, have been adhered to and the stated issues have been addressed, except that a specific table for cumulative impacts has not been compiled.

2. **Is the methodology clearly explained and acceptable?**

The methodology used in the report is clear and unambiguous, so that both specialists and non-specialists will have little difficulty in comprehending.

3. **Evaluate the validity of the findings (review data evidence)**

The findings are based on acceptable source data and can be regarded as reliable.

4. **Discuss the mitigation measures and recommendations**

The mitigation measures listed are somewhat incomplete in that they do not separate **water erosion** (which would be comparatively insignificant in this area) from **wind erosion** (which could be an important factor).

5. **Evaluate the appropriateness of the reference literature**

The references used are logical and complete

6. **Is the article well written and easy to understand?**

Yes, it is clear and concise

7. **Identify any shortcomings**

As listed above, a cumulative impact table and specific mitigation measures to combat wind erosion (see Appendix to this review).

The main conclusion of the report was that, due to various factors, it would in all probability not be necessary to carry out any more detailed soil investigations. This is supported by the fact that the prevailing rainfall in the vicinity is very low (<200 mm per annum), coupled with very high summer temperatures. When the fact that the soils occurring across the site seldom have more than 400 mm effective depth onto underlying rock and calcrete, and have a sandy texture, this conclusion is clearly supported.

I can thus conclude that the report accurately represents the soils occurring, as well as the general environmental situation in that part of the Northern Cape Province, and that the conclusions drawn are sensible and can be accepted.

Yours sincerely,



DG Paterson (PhD)

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APPENDIX A: Impact Assessment

1. Assessment of Potential Agricultural Potential Impacts associated with the proposed 50MW Ilanga CSP Facility

1.1. Results of the Soil and Agricultural Potential Assessment

The overall impacts of the proposed facility on agriculture and soil conditions will be low, principally because of the climatic conditions and the low agricultural and grazing potential of the site. There have never been any substantial farming practices (agriculture or grazing) on the property because of the dominant climatic conditions and prevailing soil conditions. Very low rainfall, along with other soil-related factors lead to low vegetative cover throughout the area. The soil and rock type properties tend to be very homogenous in the area and the whole site can be better utilised for development (such as that associated with power generation) in comparison to any other practise. This project site is not regarded as a viable commercial farming site and would be suited to house the proposed facility.

There is the potential for the loss of soil resources through erosion, particularly during the construction phase. This impact can be effectively minimised through the implementation of appropriate management and mitigation measures including implementation of an appropriate stormwater management plan and regular monitoring of the occurrence, spread and potential cumulative effects of erosion. Impacts post-mitigation are expected to be of low significance.

1.2. Description of the impacts on Soil and Agricultural Potential

a) Potential Wind Erosion:

The soils in the study area are somewhat susceptible to wind erosion and are largely classified under category 2a where sands are strongly dominant. The measure as to how easy soil may erode by means of wind transportation is given below:

- » Fine silt and clay (<0.01 mm) offer strong resistance to movement.
- » Coarse silt and very fine sand (0.01-0.1 mm) are lost in suspension.
- » Very fine to medium sand (0.1-0.5 mm) is subjected to saltation.
- » Coarse sand (0.5-1.0 mm) moves as surface creep.

Soils on the site generally have below 10% dominant clay in the top soils. The soils are moderately susceptible to water erosion which varies across the site. The general assumption is that the erosion susceptibility increases with an increase in the slope angle and/if the slope length is constant.

There is the potential for the loss of soil resources through erosion, particularly during the construction phase. Impacts post-mitigation are expected to be of low significance.

b) Loss of Agricultural Land

The eight-class land capability system from Klingebiel & Montgomery which was drafted in 1961¹ (reflected in Table 1) provides a way in which agricultural potential data for the country can be measured on a macro scale, grouping similar areas together. The available data was adapted for use with GIS in South Africa and made available by the Land Type Survey Staff under the ISCW. The entire study area falls within Land **Class VII** – very severe limitations that make it unsuited to cultivation and which restrict its use mainly to grazing and habitat for wildlife. Restrictions are more severe than those for Class VI because of one or more continuing limitations that cannot be corrected. The main restrictions present in this area are the low rainfall and high sun intensity.

The unfavourable climate of the environment greatly decreases agricultural potential. The area is known to be an agricultural-hub but the sites are too far from the Orange River and its fertile banks to realistically be considered for high intensity grazing and/or cultivation practices.

The overall impacts of the proposed facility on agriculture and soil conditions will be low, principally because of the local climatic conditions and the low agricultural and grazing potential of the soils on the site.

¹ The eight-class land capability system from Klingebiel & Montgomery which was drafted in 1961 are reflected in Table 1 in the specialist report – refer to Appendix H.

Nature of impact: Wind erosion		
	Without mitigation	With mitigation
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	Low (30)	Low (16)
Status (positive or negative)	Negative	Negative
Reversibility	Irreversible	Reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation:		
» Ensure that the footprint for vegetation removal is restricted to as small an extent as possible. In addition, appropriate soil conservation measures to combat wind erosion (windbreaks, geotextiles on the soil surface and immediate re-establishment of vegetation) should be implemented and monitored on at least a six-monthly basis.		
Residual Impacts:		
None		

Nature of impact: Loss of agricultural land		
	Without mitigation	With mitigation
Extent	Local (2)	N/A
Duration	Long-term (4)	N/A
Magnitude	Minor (2)	N/A
Probability	Improbable (2)	N/A
Significance	Low (16)	N/A
Status (positive or negative)	Negative	N/A
Reversibility	Irreversible	N/A
Irreplaceable loss of resources?	No	N/A
Can impacts be mitigated?	Yes	N/A
Mitigation:		
» None.		
Residual Impacts:		
No mitigation possible so same as impacts without mitigation		

1.3. Conclusion

The overall impacts of the proposed facility on agriculture and soil conditions will be low, principally because of the climatic conditions and the low agricultural and grazing potential of the site. This site is considered suitable for the development as a result of the low agricultural potential of the site which renders it unsuitable for commercial agricultural activities.

2. Cumulative Impact

The overall cumulative impacts of the proposed facility on agriculture and soil conditions will be low, principally because of the local climatic conditions and the low agricultural and grazing potential of the site. There have never been any substantial farming practices (agriculture or grazing) on the property because of the dominant climatic conditions and prevailing soil conditions. Very low rainfall, along with other soil-related factors led to low vegetative cover throughout the area. The soil and rock type properties tend to be very homogenous in the area and the whole site can be better utilised for development (such as power generation) in comparison to any other practise. This project site is not regarded as a viable commercial farming site and would be suited to house the facilities.

The main potential cumulative impact would be soil removal due to wind erosion caused by developments off site. Due to the nature of the soil removal process, once topsoil is taken up into the atmosphere, wind action can deposit it over a large area and at a considerable distance, depending on the strength and duration of the wind acting upon the soils. Where a large number of developments occur in close proximity to one another, some sort of co-ordinated mitigation plan would be required to ensure that poor soil management procedures on one site do not lead to impacts on another site that actually has implemented mitigation measures correctly.

Nature of impact: Cumulative impacts on wind erosion potential in the area (resulting in transfer of topsoil sediments by wind action).		
	Without mitigation	With mitigation
Extent	Local (3)	Local (2)
Duration	Long Term (4)	Long Term (4)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	Low (16)	Low (16)
Status	Negative	Negative
Reversibility	Irreversible	Reversible
Irreplaceable loss of resources?	Possible	Possible
Can impacts be mitigated?	Yes	Yes
Mitigation: Mitigation measures as defined in the table above. In addition: regular consultation and reporting by responsible officers for any and all developments in the area, as improper management at one site could well cause problems at other site, due to unpredictable and possibly widespread sediment transport by wind, especially under the prevailing dry climate.		

Conclusion

Cumulative impacts on soil and agricultural potential as a result of the proposed project are expected to be low as a result of the climatic conditions and the low agricultural and grazing potential in the area. The contribution of the project to cumulative impacts is therefore expected to be low to negligible. As a result, there are no fatal flaws or impacts that cannot be mitigated that should prevent the development from being approved.