SOIL, LAND USE, LAND CAPABILITY AND AGRICULTURAL POTENTIAL SCOPING REPORT:

KAROSHOEK SOLAR PARK ADDITIONAL CSP FACILITIES ON SITE 1.3, 1.4, 3, 4 and 5 NEAR UPINGTON, NORTHERN CAPE

SEPTEMBER 2015

Prepared for:

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EXECUTIVE SUMMARY

FG Emvelo (Pty) Ltd, an independent power developer of concentrating solar power (CSP) plants, is in the process of investigating additional CSP facilities immediately adjacent to authorised CSP sites (1.3, 1.4, 3, 4 & 5) within the Karoshoek Solar Valley Development on sites located approximately 30 km east of Upington within the Khara Hais Local Municipality in the Northern Cape. The facilities are proposed on the following farm portions:

- Lot 944 Karos Settlement (Portion 0 of Zandemm 944);
- Portion 3 of Matjiesrivier (Annashoek) 41;
- Portion 2 of Matjiesrivier 41; and
- Portion RE of Matjiesrivier (Hanskopfontein Estate) 41

The purpose of the additional CSP facilities to be investigated is to facilitate the increase in capacity of each authorised facility to 150MW in order to meet the generating capacity thresholds specified by the Department of Energy's (DoE) in its Expedited Bid Window of the Renewable Energy Independent Power Producers Procurement (REIPPP) Programme (Tender No: DOE/003/13/14 – as amended from time to time). Currently all the sites mentioned above are authorised for 100MW or 50MW each. Therefore, the new facilities will each be 50MW and 100MW in capacity.

This report discusses the approach, findings and conclusion of a desktop study carried out for the proposed area. The main objective of this scoping investigation is to assess the likelihood of soil and agricultural sensitivities occurring on the project site in an effort to identify any issues regarding land use, land capability and erosion potential that may arise from the proposed development and to make recommendations regarding any further study which may be required.

The purpose of the study is to:

- Provide a description of the environment that may be affected by the proposed activity
- Provide a description of the potential environmental issues and impacts associated with the proposed facility.
- Reasoned opinion as to whether the proposed activity or portions thereof should be authorised

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SOIL, LAND USE, LAND CAPABILITY AND AGRICULTURAL POTENTIAL SCOPING REPORT:

KAROSHOEK SOLAR DEVELOPMENT ADDITIONAL CSP FACILITIES ASSOCIATED WITH SITES 1.3, 1.4, 3, 4 and 5 NEAR UPINGTON, NORTHERN CAPE

1. INTRODUCTION

FG Emvelo (Pty) Ltd, an independent power developer of concentrating solar power (CSP) plants, is in the process of investigating additional CSP facilities using Parabolic trough technology immediately adjacent to authorised CSP sites (1.3, 1.4, 4 & 5), and Tower technology immediately adjacent to authorised CSP site 3 within the Karoshoek Solar Valley Development on sites located approximately 30 km east of Upington within the Khara Hais Local Municipality in the Northern Cape. The facilities are proposed on the following farm portions:

- Lot 944 Karos Settlement (Portion 0 of Zandemm 944);
- Portion 3 of Matjiesrivier (Annashoek) 41;
- Portion 2 of Matjiesrivier 41; and
- Portion RE of Matjiesrivier (Hanskopfontein Estate) 41

The purpose of the additional CSP facilities to be investigated is to facilitate the increase in capacity of each authorised facility to 150MW in order to meet the generating capacity thresholds specified by the Department of Energy's (DoE) in its Expedited Bid Window of the Renewable Energy Independent Power Producers Procurement (REIPPP) Programme (Tender No: DOE/003/13/14 – as amended from time to time). Currently all the parabolic trough sites mentioned above are authorised for 100MW each. Therefore, the new facilities will each be 50MW in capacity. The Tower site is authorised for a 50MW, and the new proposed facility will therefore be for a 100MW capacity.

The proposed project will be comprised of the following primary elements:

» The solar field comprising parabolic troughs or tower technology
» The power block comprising a conventional steam turbine linked to a generator and a substation
» Cables linking the power block to the on-site substation.
» Power line which will connect the facilities to the electricity grid (to be assessed through a separate EIA process)
» Internal and external access roads
» Temporary waste storage facilities may be required

2. TERMS OF REFERENCE

This report discusses the approach, findings and conclusion of a desktop study carried out for the proposed area. The main objective of this scoping investigation is to assess the likelihood of soil and agricultural sensitivities occurring on the project site in an effort to identify any issues regarding land use, land capability and erosion potential that may arise from the proposed development and should receive further attention during the EIA assessment phase.

The purpose of the study is to:

- Provide a description of the environment that may be affected by the proposed activity
- Provide a description of the potential environmental issues and impacts associated with the proposed facility.
- Reasoned opinion as to whether the proposed activity or portions thereof should be authorised

The National Department of Agriculture's Regulations (September 2011) are followed in this agricultural and soil impact assessment scoping report for the evaluation and review of applications relating to renewable energy on agricultural land with an applicable level of detail for the agricultural suitability and soil variation on site.
This report focuses on all of the proposed sites in one combined scoping. The scoping level assessment includes the following:

- Legislative information
- Collection of all available soil and land use data from sources such as AGRIS
- Land type and topographical interpretation of the site and surrounding area
- Identify and assess all potential direct, indirect and cumulative impacts of the proposed development on soils and agricultural potential.
- Describe the erosion and degradation status of the land.
- Determine the agricultural potential across the site.
- Detailed scoping level assessment results

2.1. Specialist Details

The scoping report was prepared by Jaco Jansen of Savannah Environmental, a Soil Scientist with an Honours degree in Environmental Geology and a BSc. in Geology and Chemistry from the University of the North West.

2.2. Declaration of Independence

A signed declaration of independence for both Jaco Jansen of Savannah Environmental is attached in Appendix A.

3. LEGISLATION

A review of the policy environment provides valuable insight into the government's priorities and plans. The review of the relevant planning and policy documents was undertaken as a part of the process. The key documents reviewed included:

- Conservation of Agricultural Resources (CARA) Act, No 43 of 1983
- Sub-division of Agricultural Land (SALA) Act, No 70 of 1970.

For the long term lease, or consensual use of the properties near the project, even if there is no subdivision of land required for the project, approval in terms of SALA is required. A separate CARA permit application in terms of soil conservation issues is not required for this specific development proposal. The legislative and policy context plays an important role in identifying and assessing the potential soil and agricultural impacts associated with a proposed development. In this regards a key component of the process is to assess the proposed development in terms of its suitability with regards to the key planning and policy documents.

4. METHODOLOGY

This scoping report was conducted as a desktop study without any practical field investigation. The findings and statements are solely based on information from the online Agricultural Geo-Referenced Information System (AGIS) website and the land type data along with its memoirs, produced by the Institute of Soil, Climate and Water (ISCW) which is part of the Agricultural Research Council (http://www.agis.agric.za/), as well as on previous detailed investigations undertaken for the site (Outeniqua Geotechnical Services cc, 2012). Climate data was also obtained from the ISCW.

The soil data is classified according to the Taxonomic and Binomial Systems (Land Type Survey Staff, 1972-2006), used by the ISCW for land type data. All Maps included were attained from google maps. Google earth was used to acquire the most recent aerial photographs of the area and the site layout.

5. DESCRIPTION OF THE AREA

The project site is within the Karoshoek Solar Valley Development on sites located approximately 30 km east of Upington within the Khara Hais Local Municipality in the Northern Cape (refer to Figure 1). The facilities are proposed on the following farm portions:

- Lot 944 Karos Settlement (Portion 0 of Zandemm 944);
- Portion 3 of Matjiesrivier (Annashoek) 41;
- Portion 2 of Matjiesrivier 41; and
- Portion RE of Matjiesrivier (Hanskopfontein Estate) 41

5.1. Terrain

The altitude range across the study area is 800m to 1100m amsl. Numerous natural ephemeral drainage lines traverse the study area, generally flowing in a northerly direction towards the Orange River. The proposed development is located on the terrain type A1: Level plains or plateaus; A2: Level plains or plateaus with some relief and A3: Open plains or plateaus with low hills or ridges. The area has a gradient below 5% (Land Type Survey Staff, 1972-2006).

5.2. Climate

The average annual rainfall for the site falls in the category of ≤ 200mm. This amount of rain coupled with frequent droughts and considered with other environmental factors, gives the area an arid climate.

5.3. Geology

The study area is located within the Namaqualand Metamorphic Belt which comprises very old and very highly deformed (metamorphosed) sedimentary and igneous rocks of the Mokolian and Namibian Erathem that form part of the Southern African Basement Complex. The rocks have undergone both regional and contact metamorphism and the culminating deformation phase has been dated at about 1000Ma. The basement rocks are partially covered by Quaternary sands of the Gordonia Formation and sporadic Tertiary calcrete deposits (Outeniqua Geotechnical Services cc, 2012).

The proposed solar facilities are underlain by both Quaternary unconsolidated sands of the Gordonia Formation and various basement rocks (dominated by migmatite, granite and gneissic rocks). There are several NW-SE trending geological faults traversing the study area. The activity of these faults is considered dormant and the seismic activity of the area is considered low. The maximum anticipated seismic activity is rated as V on the Modified Mercalli Scale (movement felt by all, some damage to plaster, chimneys) and peak horizontal ground accelerations are typically less than 50cm/s with a 10% chance of being exceeded at least once in a 50 year period.

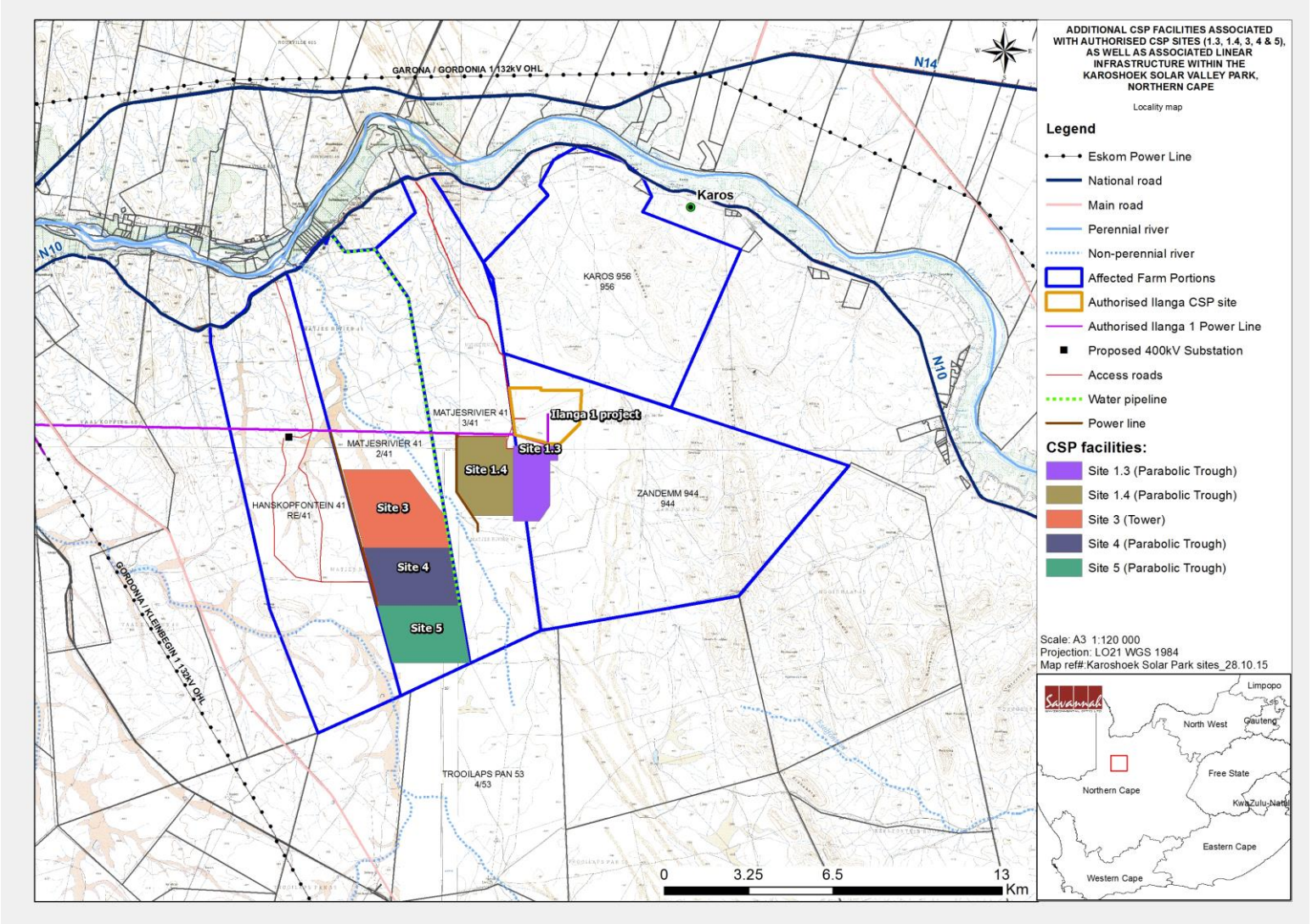

Figure 1: Locality map for the proposed Karoshoek Solar Valley Development – Additional CSP Facilities associated with the authorised CSP sites, 1.3, 1.4, 4 & 5.

No formal mining operations are known to have taken place within the study area.

Rock outcrops are common on the higher relief areas, specifically the northern and eastern portions of the study area. The sand cover is likely to be thickest in the southern, central and western lowland areas where the bulk of the infrastructure is proposed.

5.4. Soils

The generalised soil patterns for the area are Sandy AR2 soils and LP2 soils that have limited pedological development. The dominant soil pattern is however CM which are deeper red soils with a high base status. AR2 soil patterns may be described as red and yellow, sandy well drained soils with high base status. The other soil pattern, LP2, is soil with minimal development, usually shallow on hard or weathering rock, with or without intermittent diverse soils. Calcrete and lime is generally found in large parts or in most of the surrounding landscape.

Soil classes provided by the source indicate that lithosols occur on between 30%-60% of the site. Lithosols are shallow soils on hard or weathering rock. They may receive water runoff from associated rock and are not generally deep because of their association with depth limiting rock layers such as the metamorphic gneiss. Soil horizons associated with the lithic group are lithocutanic B and hard rock, which occur in Glenrosa, Mispah and Cartef soil forms. Freely drained, structureless soils with restricted soil depth, excessive drainage, high erodibility and low natural fertility are common.

Oxidic soils have a B horizon that has a colour directly related to the mineralogy of the area. Freely drained, unstructured soils occur on between 30%-60% of the site. Soil horizons associated of the group are Longlands, Clovelly and Hutton (Fey, 2010).

There are a variety of land types in the broader study area, i.e. Ic, Ae, Af, and Ag land types. The most common land types in the study area are Ae and Af (Land Type Survey Staff, 1987 (Refer to Figure 2)).

Land type Ag5 covers the largest area of the project site. Red and yellow well-drained sandy soil with high base status may occur in places. Deeper Hutton soil forms occur which are clearly distinct from Mispah.

Land type Af25 is found east of the site. This land type is very similar to **Ag5** with the only real difference being that it has a larger percentage of deeper soils when compared to **Ag5**.

Red and yellow well-drained sandy soils with a high base status dominate the area. The main soil form present is Hutton. An Orthic A horizon rarely deeper than 200mm is found directly on top of a Red Apedal B.

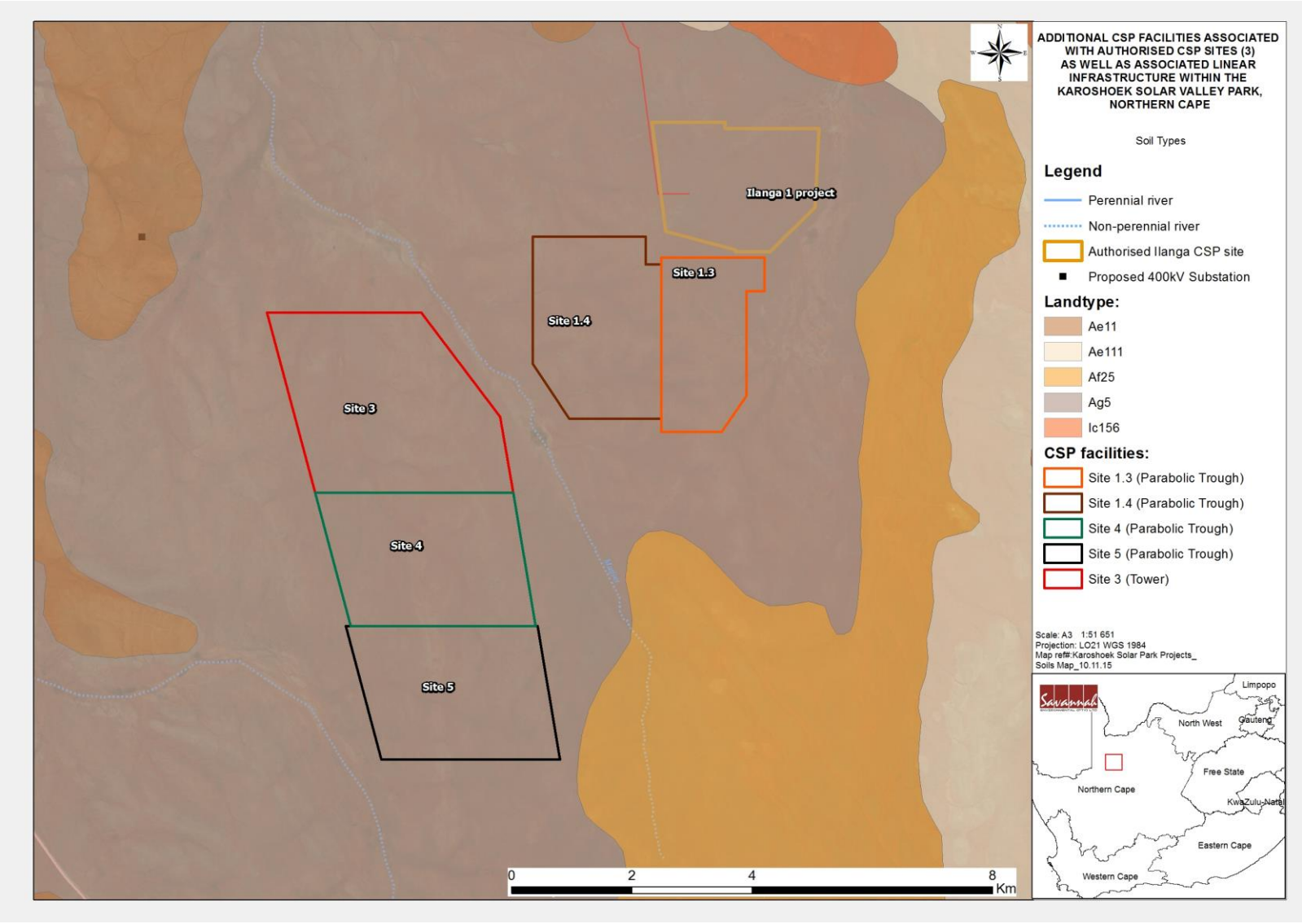

Figure 2: Land types of the study area

The soils contained within land types Ae, Af and Ag can be soils of **high agricultural potential** if irrigation water is available. The low rainfall in the study area, however, inhibits dry-land crop production.

5.5. Agricultural Potential

The eight-class land capability system from Klingebiel & Montgomery which was drafted in 1961 (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.

Table 1: Land Type Survey Staff: Land capability/Agricultural Potential

Class	**Concepts**
I	Land in Class I has few limitations that restrict its use; it may be used safely and profitably for cultivated crops; the soils are nearly level and deep; they hold water well and are generally well drained; they are easily worked, and are either fairly well supplied with plant nutrients or are highly responsive to inputs of fertilizer; when used for crops, the soils need ordinary management practices to maintain productivity; the climate is favourable for growing many of the common field crops.
II	Land in Class II has some limitations that reduce the choice of plants or require moderate conservation practices; it may be used for cultivated crops, but with less latitude in the choice of crops or management practices than Class I; the limitations are few and the practices are easy to apply.
III	Land in Class III has severe limitations that reduce the choice of plants or require special conservation practices, or both; it may be used for cultivated crops, but has more restrictions than Class II; when used for cultivated crops, the conservation practices are usually more difficult to apply and to maintain; the number of practical alternatives for average farmers is less than that for soils in Class II.
IV	Land in Class IV has very severe limitations that restrict the choice of plants, require very careful management, or both; it may be used for cultivated crops, but more careful management is required than for Class III and conservation practices are more difficult to apply and maintain; restrictions to land use are greater than those in Class III and the choice of plants is more limited.
V	Land in Class V has little or no erosion hazard but has other limitations which are impractical to remove that limit its use largely to pasture, range, woodland or wildlife food and cover. These limitations restrict the

Class	Concepts
	kind of plants that can be grown and prevent normal tillage of cultivated crops; it is nearly level; some occurrences are wet or frequently flooded; others are stony, have climatic limitations, or have some combination of these limitations.
VI	Land in Class VI has severe limitations that make it generally unsuited to cultivation and limit its use largely to pasture and range, woodland or wildlife food and cover; continuing limitations that cannot be corrected include steep slope, severe erosion hazard, effects of past erosion, stoniness, shallow rooting zone, excessive wetness or flooding, low water-holding capacity; salinity or sodicity and severe climate.
VII	Land in Class VII has very severe limitations that make it unsuited to cultivation and that restrict its use largely to grazing, woodland or wildlife; restrictions are more severe than those for Class VI because of one or more continuing limitations that cannot be corrected, such as very steep slopes, erosion, shallow soil, stones, wet soil, salts or sodicity and unfavourable climate.
VIII	Land in Class VIII has limitations that preclude its use for commercial plant production and restrict its use to recreation, wildlife, water supply or aesthetic purposes; limitations that cannot be corrected may result from the effects of one or more of erosion or erosion hazard, severe climate, wet soil, stones, low water-holding capacity, salinity or sodicity.

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.

5.6. Susceptibility to 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 susceptibility 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.

6. POTENTIAL ENVIRONMENTAL IMPACTS

According to the NEMA Regulations, a significant impact means an impact that by its magnitude, duration, intensity or probability of occurrence will have a notable effect on one or more aspects on the environment.

In line with the Regulations, and based on qualitative findings of the activities, each potentially significant impact will therefore be assessed with regard to:

- The nature of the impact (status which may be positive, negative or neutral);
- The extent and the duration of the impact;
- The probability of the impact occurring;
- The degree to which the impact can be reversed;
- The degree to which the impact may cause irreplaceable loss of resources;
- The degree to which the impact can be mitigated; and
- Cumulative and residual impacts.

Within this framework, there is a responsibility to propose mitigation or enhancement measures where relevant in order to reduce the significance of the negative impact and increase the significance of a positive impact.

Impact

Potential impacts associated with the proposed development include:

- Soil degradation during the construction phase
- Loss of grazing land due to the direct impact by the infrastructure's footprint during all phases of the project
- Loss of soil resources as a result of erosion during all phases of the project

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Soil degradation during the construction phase	Soil degradation is the negative alteration of the natural soil profile, usually directly or indirectly related to human activity. Soil degradation due to construction activity will negatively affect soil formation,	Local	None

	natural weathering processes, moisture levels and soil stability. This will, in turn, affect biological processes operating in the soil. Soil degradation includes erosion (i.e. due to water and wind), soil removal, mixing, wetting, compaction, pollution, salinisation, crusting, and acidification. Impacts on soil degradation are primarily related to the construction phase with insignificant impacts in the post construction and decommissioning phases.		
Loss of grazing land due to the direct impact by the infrastructure's footprint during all phases of the project	Although likely to occur at the extent of the development footprint, this impact is expected to be of low significance as a result of the limited agricultural potential of the site and limited usage for livestock grazing.	Local	None
Loss of soil resources as a result of erosion during all phases of the project	Soil erosion is a natural process whereby the ground level is lowered by wind or water action and may occur as a result of inter alia chemical processes and/or physical transport on the land surface. Accelerated erosion is a common occurrence on construction sites where soil is loosened and vegetation cover is stripped. This impact can be largely minimised through the implementation of appropriate mitigation measures.	Local	None
Description of expected significance of impact As a result of the limited agricultural potential of the site due largely to local climatic factors, the construction of the proposed projects are expected to be very unlikely to occur and will not result in the irreplaceable loss of resources. Impacts of the proposed projects on agricultural potential are expected to be of very low significance. No mitigation is required in this regard. 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 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.
Gaps in knowledge & recommendations for further study None. As a result of the low significance of impacts, no further studies are required to be undertaken.

7. CONCLUSIONS AND RECOMMENDATIONS

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 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.

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 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.

As a result of the low significance of impacts, no further studies are required to be undertaken. Appropriate mitigation measures to further minimise erosion potential must however be included within the EMPr for the projects. These include the following:

OBJECTIVE: Appropriate management of topsoil

Project Component/s	» Any infrastructure or activity that will result in disturbance to natural areas.
Potential Impact	» Loss of topsoil.
Activity/Risk Source	» Site preparation and earthworks. » Excavation of foundations. » Construction of site access roads. » Site preparation (e.g. compaction). » Foundations or plant equipment installation. » Stockpiling of topsoil, subsoil and spoil material.

Mitigation: Target/Objective	» To minimise footprints of disturbance. » Minimise loss of topsoil.

Mitigation: Action/Control	Responsibility	Timeframe
Topsoil must be stockpiled and appropriately managed to ensure viability for reuse during rehabilitation.	EPC Contractor	Duration of contract
No mixing of topsoil and subsoil must be permitted. Stockpiles must be stored separately and returned for backfilling in the correct soil horizons.	EPC Contractor	Site establishment, during construction
Excavated topsoil must be stockpiled in designated areas separate from base material and covered until replaced during rehabilitation. As far as possible, topsoil must not be stored for longer than 3 months.	EPC Contractor	Site establishment & duration of contract
Topsoil must not be stripped or stockpiled when it is raining or when the soil is wet as compaction will occur.	EPC Contractor	Site establishment Maintenance: for duration of contract
The maximum topsoil stockpile height must not exceed 2m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.	EPC Contractor	Duration of contract
Topsoil is to be stripped to a depth of 300 mm where possible from construction areas will be stockpiled in a designated area, not exceeding a height of 2 m. The stockpile shall be located away from seepage zones, floodlines, water courses and other ecological sensitive areas.	EPC Contractor	Site establishment, during construction

Performance Indicator	» Minimised loss of topsoil. » Appropriate stockpiling and management of topsoil.
Monitoring	» Monitoring of topsoil clearing activities. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE: Minimise soil degradation and erosion

Project Component/s	» CSP facility. » Offices and workshops. » Access roads.
Potential Impact	» Soil and rock degradation. » Soil erosion.

	» Sedimentation of watercourses. » Increased runoff into drainage lines can potentially be associated with accelerated erosion in watercourses.
Activities/Risk Sources	» Removal of vegetation, excavation, stockpiling, compaction, and pollution of soil. » Rainfall - water erosion of disturbed areas. » Wind erosion of disturbed areas. » High velocity discharge of water from construction activity. » Mobile construction equipment movement on site.
Mitigation: Target/Objective	» Minimise extent of disturbance areas. » Minimise activity within disturbance areas. » Minimise soil degradation (mixing, wetting, compaction, etc.). » Minimise soil erosion. » Minimise deposition of soil into drainage lines. » Minimise instability of embankments/excavations. » To minimise damage to vegetation by erosion or deposition. » No increase in runoff into drainage lines as a result of construction of project related infrastructure.

Mitigation: Action/Control	Responsibility	Timeframe
Identify disturbance areas and restrict construction activity to these areas.	EPC Contractor	Before and during construction
Rehabilitate disturbance areas as soon as practicable when construction in an area is complete.	EPC Contractor	During and after construction
Access roads to be carefully planned and constructed to minimise the impacted area and prevent unnecessary excavation, placement, and compaction of soil.	EPC Contractor	Design and construction
Minimise removal of vegetation which adds stability to soil.	EPC Contractor	Construction
Erosion and loss of soil must be prevented by minimizing the construction site exposed to surface water run-off.	EPC Contractor	Construction
Erosion and silt control mechanisms must be in place prior to the onset of construction within any watercourse. This includes the elimination of surface flow through the construction site. Silt fences or hay bales need to be placed near the base of a slope in order to limit the amount of silt entering the watercourse.	EPC Contractor	Construction
The erection of silt barriers along all of the drainage lines must be undertaken to curb any sediment and silt run-off. Ideally, the amount of land that will be disturbed should be kept to an absolute minimal.	EPC Contractor	Construction
Control depth of excavations and stability of cut faces/sidewalls.	EPC Contractor	Before construction and

Mitigation: Action/Control	Responsibility	Timeframe
		Maintenance Duration of contract
No soil is to be stripped from areas within the site that the contractor does not require for construction works.	EPC Contractor	Construction
Erosion control measures to be regularly maintained.	EPC Contractor	Construction
Non-erodible materials should be used for the construction of any berms, coffer dams or any other isolation structures to be used within a flowing watercourse.	EPC Contractor	Construction
Erosion control measures should be inspected regularly during the course of construction and necessary repairs need to be carried out if any damage has occurred.	EPC Contractor	Construction
Stockpile topsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion. All stockpiles must be positioned at least 50 m away from wetlands and drainage lines. Limit the height of stockpiles as far as possible in order to reduce compaction.	EPC Contractor	Construction
Spoil stockpiles should be placed above the high water mark in distinct piles and adequate erosion measures need to be implemented in order to minimise and reduce erosion and siltation into the watercourse from spoil stockpiles.	EPC Contractor	Construction
As far as possible, construction activities should make use of the dry seasonal construction window. This will further reduce the risk associated with erosion/siltation.	EPC Contractor	Construction

Performance Indicator	» No activity outside demarcated disturbance areas. » Limited soil erosion around site. » No increase in siltation in drainage lines as a result of construction activities. » No activity in restricted areas.
Monitoring	» On-going inspections of the site by the ECO. » Monthly inspections of sediment control devices by the ECO. » Monthly inspections of surroundings, including drainage lines by the ECO. » Immediate reporting of ineffective sediment control systems. » An incident reporting system will record non-conformances. » Public complaints register must be developed and maintained on site.

8. REFERENCES

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APPENDIX A: DECLARATION OF INDEPENDENCE

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 environmental authorization:-

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

PROJECT TITLE

ADDITIONAL CSP FACILITIES ASSOCIATED WITH AUTHORISED CSP SITES 1.3, 1.4, 3, 4 and 5 WITHIN THE KAROSHOEK SOLAR VALLEY PARK

Specialist:	Jaco Jansen		
Contact person:	Jaco Jansen		
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Telephone:	011 656 3237	Fax:	086 684 0547
E-mail:	jaco@savannahsa.com		
Professional affiliation(s) (if any)	GSSA		

Project Consultant:	Savannah Environmental		
Contact person:	Jo-Anne Thomas		
Postal address:	First Floor, Block 2, 5 Woodlands Drive Office Park, Cnr of Woodlands Drive		
Postal code:	P.O. Box 148, Sunninghill	Cell:	082 775 5628
Telephone:	011 656 3237	Fax:	086 684 0547
E-mail:	joanne@savannahsa.com		

4.2 The specialist appointed in terms of the Regulations_

I, Jaco Jansen , 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:

Savannah Environmental

Name of company (if applicable):

30 September 2015

Date:

APPENDIX B: DATA SHEETS

SUSCEPTIBILITY TO WATER EROSION

Soil erodibility index

Basic Index	Criterion	Class limits	Value subtracted from basic index
10	Clay Content (%)	0-6	4
		7-15	3
		16-35	2
		36-55	1
		>55	0
	Leaching status	Dystrophic	0
		Mesotrophic	1
		Eutrophic and undifferentiated	2
		Calcareous	3
	Structure and transition	Orthic A	1
		E horizon	1
		Neocutanic B	1
		Clear transition from A to B	1
		Abrupt transition from A to B	2
	Depth (m)	Soil depth >0.4	0
		Soil depth <0.4	1

Erosion susceptibility classes

Class	Class description	Slope gradient (%)	Water Erodibility Index
1	Land with low susceptibility to water erosion. Generally level to gently sloping. Soils have favourable erodibility index.	0-5	8-10
		0-3	5-10
2	Land with low to moderate susceptibility to water erosion. Generally gently to moderately sloping. Soils have low to moderate erodibility.	5-8	8-10
		3-5	5-10
3	Land with moderate susceptibility to water erosion. Generally moderately sloping land. Soils have low to moderate erodibility.	8-12	8-10
		5-8	4-10
4	Land with moderate to high water or wind erosion hazard. Generally moderately to strongly sloping land. Soils have low to moderate erodibility	12-20	8-10
		5-12	3-10
5	Land with low to moderate water or wind erosion hazard. Generally level to gently sloping land; soils may have low to very high erodibility.	0-5	0-10
6	Very steep slopes with soils with low water erodibility Moderately to strongly sloping land with soils of low to high water erodibility Moderately sloping land with soils of very high erodibility.	20-40	8-10
		12-20	0-10
		5-12	0-2
7	Land with very steep slopes, causing severe erosion hazard or past erosion. Soils may have low to very high erodibility.	20-40	0-10
8	Land with extremely steep slopes. Soils may have low to very high erodibility.	40-100	0-10

SUSCEPTIBILITY TO WIND EROSION

Class	Class description	Dominant clay % of qualifying topsoils	Percentage qualifying soil in land type
1a	Pure sands strongly dominant	0-5	75-100
1b	Pure sands dominant		50-75
1c	Pure sands sub-dominant		25-50
1d	Pure sands present		10-25
2a	Sands strongly dominant	6-10	75-100
2b	Sands dominant		50-75
2c	Sands sub-dominant		25-50
2d	Sands present		10-25
3a	Loamy sands strongly dominant	11-15	75-100
3b	Loamy sands dominant		50-75
3c	Loamy sands sub-dominant		25-50
3d	Loamy sands present		10-25
4a	Sandy loams strongly dominant	15-20	75-100
4b	Sandy loams dominant		50-75
4c	Sandy loams sub-dominant		25-50
4d	Sandy loams present		10-25
5	Sandy clay loams to clays	>20	<10

MOISTURE AVAILABILITY

Class	Limitation Rating	Description	Moisture availability class	
			Summer rainfall area: Oct-Mar TMR10. 0.25 $PE10^{-1}$	Winter rainfall area: Apr-Sep TMR10. 0.40 $PE10^{-1}$
1	None to slight	Favourable for growing a wide range of adapted crops.	>50	>58
2	Slight	Less favourable than Class 1 and may limit choice of crops or yields.	36-50	34-58
3	Moderate	Water stress, extremes of temperature and/or damage from frost, wind or hail restrict choice of crops and yield potential.	26-36	24-34

Class	Limitation Rating	Description	Moisture availability class	
			Summer rainfall area: Oct-Mar TMR10. 0.25 $PE10^{-1}$	Winter rainfall area: Apr-Sep TMR10. 0.40 $PE10^{-1}$
4	Moderate to severe	Less favourable than Class 3. Low and unreliable rainfall, extremes in temperature and severe damage from frost or wind restrict regular crop production. Risks in cropping are high.	18-26	16-24
5	Severe	Unfavourable (mainly rainfall) for growing crops.	10-18	10-16
6	Very severe	Unfavorable for plant production. One or more of the following extremes occur: - Severe aridity - Extremes in temperature	<10	<10

GENERALIZED SOIL PATTERNS

Red-yellow well drained soils generally lacking a strong texture contrast	
FR	Red and yellow soils with a humic horizon
AC	Red and yellow, massive or weakly structured soils with low to medium base status
CM	Red, massive or weakly structured soils with high base status
Soils with a plinthic catena	
PT1	Red, yellow and greyish soils with low to medium base status
PT2	Red, yellow and greyish soils with high base status
Well-structured soils generally with a high clay content	
LV1	Soils with a marked clay accumulation, strongly structured and a reddish colour
LV2	Soils with a marked clay accumulation, strongly structured and a non-reddish colour. In addition one or more of vertic, melanic and plinthic soils may be present
Soils with limited pedological development	
VR	Dark coloured, strongly structured soils dominated by cracking and swelling clays (vertic soils). In addition, one or more of melanic and red structured soils may be present
PH/KS	Soils with dark coloured, well-structured topsoil with high base status (melanic soils). In addition, one or more of vertic and red structured soils may be present
NT	Deep, well drained, dark reddish soils having a pronounced shiny, strong blocky structure (nutty), usually fine (red structured soils). In addition, one or more of vertic and melanic soils may be present
Sandy soils	
LP1	Soils with minimal development, usually shallow on hard or weathering rock, with or without intermittent diverse soils. Lime rare or absent in the landscape
LP2	Soils with minimal development, usually shallow on hard or weathering rock, with or without intermittent diverse soils. Lime generally present in part or most of the

	landscape
FL	Soils with negligible to weak profile development, usually occurring on deep deposits
Sandy soils	
AR1	Red, excessively drained sandy soils with high base status - dunes are present
AR2	Red and yellow, sandy well drained soils with high base status
AR3	Greyish, sandy excessively drained soils
Strongly saline soils	
SC	Strongly saline soils generally occurring in deep deposits on flat lands
Podzolic soils	
PZ	Soils with a sandy texture, leached and with sub-surface accumulation of organic matter and aluminum with or without iron oxides, either deep or on hard or weathering rock
Rocky areas	
R	Rock with limited soils