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AGRICULTURAL AND SOILS IMPACT ASSESSMENT FOR PROPOSED DE AAR 2 SOUTH WEF ON-SITE SUBSTATION AND BATTERY ENERGY STORAGE SYSTEM (BESS) SITE AND ITS ASSOCIATED INFRASTRUCTURE IN NORTHERN CAPE PROVINCE

BA PHASE REPORT

Report by
Johann Lanz

Prepared for
Arcus Consultancy Services South Africa (Pty) Ltd
Cape Town

20 August 2020

Johann Lanz
Curriculum Vitae

Education

M.Sc. (Environmental Geochemistry)	University of Cape Town	1996 - 1997
B.Sc. Agriculture (Soil Science, Chemistry)	University of Stellenbosch	1992 - 1995
BA (English, Environmental & Geographical Science)	University of Cape Town	1989 - 1991
Matric Exemption	Wynberg Boy's High School	1983

Professional work experience

I have been registered as a Professional Natural Scientist (Pri.Sci.Nat.) in the field of soil science since 2012 (registration number 400268/12) and am a member of the Soil Science Society of South Africa.

Soil & Agricultural Consulting **Self employed** **2002 - present**

In the past 5 years of running my soil and agricultural consulting business, I have completed more than 120 agricultural assessments (EIAs, SEAs, EMPRs) in all 9 provinces for renewable energy, mining, urban, and agricultural developments. My regular clients include: Aurecon; CSIR; SiVEST; Arcus; SRK; Environamics; Royal Haskoning DHV; Jeffares & Green; JG Afrika; Juwi; Mainstream; Redcap; G7; Mulilo; and Tiptrans. Recent agricultural clients for soil resource evaluations and mapping include Cederberg Wines; Western Cape Department of Agriculture; Vogelfontein Citrus; De Grendel Estate; Zewenwacht Wine Estate; and Goedgedacht Olives.

In 2018 I completed a ground-breaking case study that measured the agricultural impact of existing wind farms in the Eastern Cape.

Soil Science Consultant **Agricultural Consultors International (Tinie du Preez)** **1998 - 2001**

Responsible for providing all aspects of a soil science technical consulting service directly to clients in the wine, fruit and environmental industries all over South Africa, and in Chile, South America.

Contracting Soil Scientist **De Beers Namaqualand Mines** **July 1997 - Jan 1998**

Completed a contract to advise soil rehabilitation and re-vegetation of mined areas.

Publications

- Lanz, J. 2012. Soil health: sustaining Stellenbosch's roots. In: M Swilling, B Sebitosi & R Loots (eds). *Sustainable Stellenbosch: opening dialogues*. Stellenbosch: SunMedia.
- Lanz, J. 2010. Soil health indicators: physical and chemical. *South African Fruit Journal*, April / May 2010 issue.
- Lanz, J. 2009. Soil health constraints. *South African Fruit Journal*, August / September 2009 issue.
- Lanz, J. 2009. Soil carbon research. *AgriProbe*, Department of Agriculture.
- Lanz, J. 2005. Special Report: Soils and wine quality. *Wineland Magazine.*

Further, I am a reviewing scientist for the *South African Journal of Plant and Soil*.

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

PROPOSED DE AAR 2 SOUTH WEF ON-SITE SUBSTATION AND BATTERY ENERGY STORAGE SYSTEM (BESS) SITE AND ITS ASSOCIATED INFRASTRUCTURE IN NORTHERN CAPE PROVINCE

Kindly note the following:

- This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
- This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
- A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
- All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
- All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address: Department of Environmental Affairs, Attention: Chief Director: Integrated Environmental Authorisations, Private Bag X447, Pretoria, 0001
Physical address: Department of Environmental Affairs, Attention: Chief Director: Integrated Environmental Authorisations, Environment House, 473 Steve Biko Road, Arcadia
Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	Johann Lanz – Soil Scientist			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
Specialist name:	Johann Lanz			
Specialist Qualifications:	M.Sc. (Environmental Geochemistry)			
Professional affiliation/registration:	Registered Professional Natural Scientist Member of the Soil Science Society of South Africa			
Physical address:	1a Wolfe Street, Wynberg, Cape Town, 7800			
Postal address:	1a Wolfe Street, Wynberg, Cape Town, 7800			
Postal code:	7800	Cell:	082 927 9018	
Telephone:	082 927 9018	Fax:	Who still uses a fax? I don't	
E-mail:	johann@johannlanz.co.za			

2. DECLARATION BY THE SPECIALIST

I, **Johann Lanz**, declare that –

- 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

Johann Lanz – Soil Scientist (sole proprietor)

Name of Company:

01/07/2020

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, **Johann Lanz**, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this ~~application~~ is true and correct.

Signature of the Specialist

Johann Lanz – Soil Scientist (sole proprietor)

Name of Company

01/07/2020

Date

Signature of the Commissioner of Oaths

2020-07-01

Date

SUID-AFRIKAANSE POLISIEDIENS
STATION COMMANDER
WYNBERG KP
01-07-2020
STATION COMMANDER
WYNBERG CP
SOUTH AFRICAN POLICE SERVICE

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List of Acronyms

BA	Basic Assessment
BESS	Battery Energy Storage Facility
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
DAFF	Department of Agriculture, Forestry and Fisheries
EA	Environmental Authorisation
ECO	Environmental Control Officer
EMPr	Environmental Management Program
NEMA	National Environmental Management Act
SACNASP	South African Council for Natural Scientific Professionals

Executive Summary

The key findings of this study are:

- The low rainfall of the area is a significant agricultural constraint that seriously limits the level of agricultural production (including grazing) which is possible across the site.
- As a result of this limitation, the study area is unsuitable for cultivation and agricultural land use is limited to low density grazing.
- The dominant soils are shallow, calcareous, sandy loam soils on underlying rock, of the Mispah, Glenrosa and Swartland soil forms. The shallow, rocky soils are a further agricultural limitation.
- The project site is classified with a predominant land capability evaluation value of 5 (low). The site has a fairly low grazing capacity of 20 hectares per large stock unit.
- No agriculturally sensitive areas occur within the proposed development area and no part of it is therefore required to be set aside from the development.
- Two potential negative agricultural impacts were identified as the loss of agricultural land use; and soil degradation. Both impacts were assessed as having low significance, with mitigation.
- The cumulative negative impact was also assessed as having low significance.
- The recommended mitigation measures are implementation of an effective system of storm water run-off control; maintenance of vegetation cover, where possible; and striping, stockpiling and re-spreading of topsoil.
- Due to the low agricultural potential of the site, and the mitigation of low negative agricultural impacts, the development will not have an unacceptable negative impact on the agricultural production capability of the site. From an agricultural and soils impact point of view, the development can be approved.

2 INTRODUCTION

Mulilo De Aar 2 South (Pty) Ltd (Mulilo) are seeking approval for a 400 kV substation and the clearing of vegetation from an 8.6 hectare site for the establishment of a Battery Energy Storage Facility (BESS) and its associated infrastructure, approximately 25 kilometres east-north-east of De Aar in the Northern Cape Province (see Figure 1).

The entire substation facility will cover an area of approximately 1.4 hectares (approximately 140m X 100m). The BESS will cover the rest of the 8.6 hectare site. Battery modules are normally packaged inside shipping containers (or similar housing structures) and these containers are delivered pre-assembled to the project site. The BESS will comprise of multiple battery units each housed in shipping containers with approximate dimension ranges; height 2 m - 5 m, width 1.5 m - 3 m, length 7 m - 20 m.. The containers are raised slightly off the ground and can be stacked vertically to a maximum height of 10m.

Environmental authorisation is being sought for a footprint of 8.6 hectares, although the final constructed site is likely to be approximately only 4 hectares in extent.

The objectives of this study is to identify and assess all potential impacts of the proposed development on agricultural resources, including soils, and agricultural production potential, and to provide recommended mitigation measures and rehabilitation guidelines for all identified impacts. Johann Lanz was appointed by Arcus Consultancy Services as an independent specialist to conduct this Agricultural Impact Assessment.

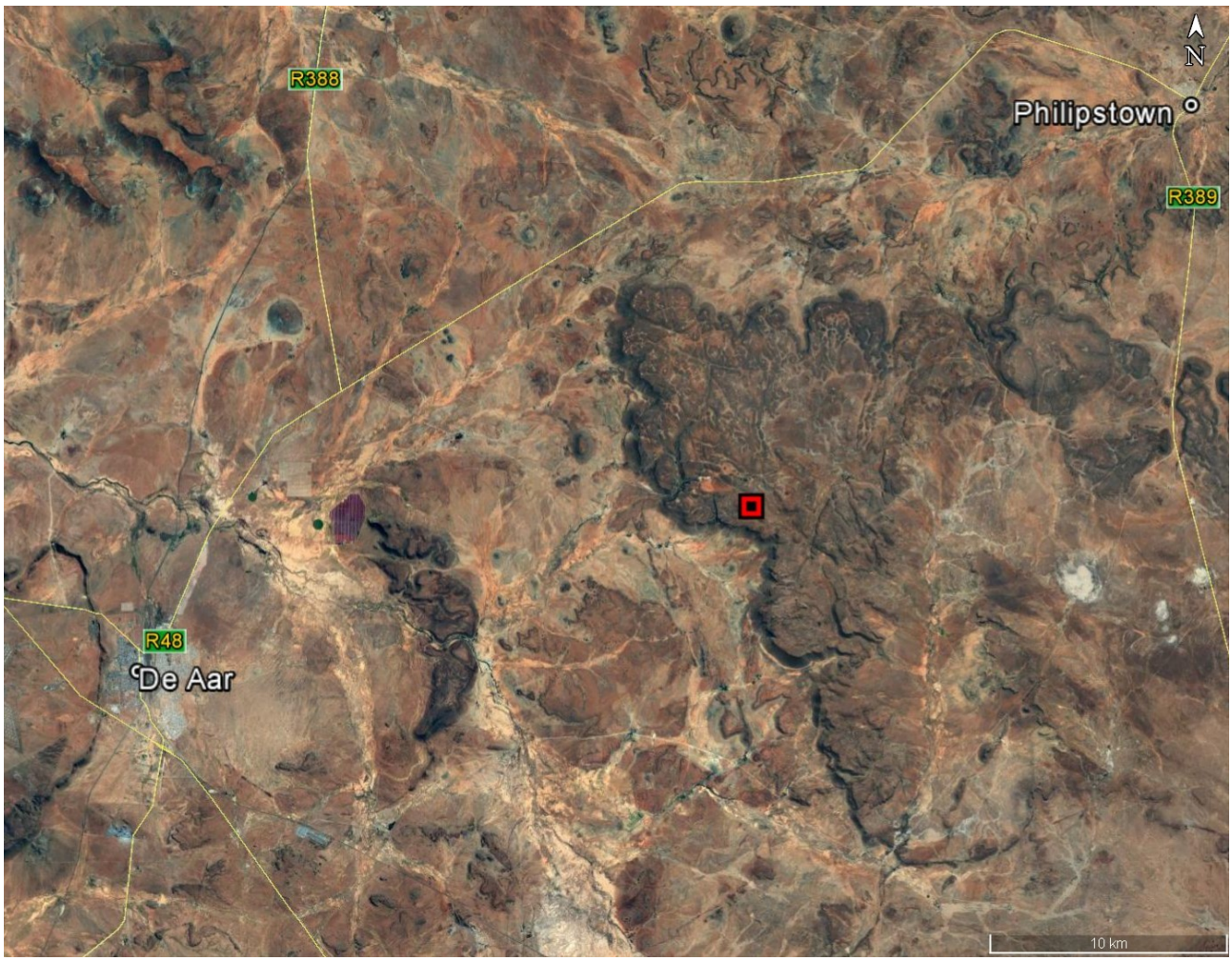

Figure 1. *Location map of the proposed project site (red), east-north-east of the town of De Aar.*

3 TERMS OF REFERENCE

The terms of reference for this study is to fulfill the requirements of the *Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources*, gazetted on 20 March 2020 (Sections 24(5)(A) and (H) and 44 of NEMA, 1998).

The proposed site is identified by the national web-based environmental screening tool as being of low and medium sensitivity for agricultural resources, and the protocol therefore requires that the level of agricultural assessment be an Agricultural Compliance Statement. The protocol also requires that a Site Sensitivity Verification be done.

The protocol states that an Agricultural Compliance Statement must be prepared by a competent soil scientist/agricultural specialist registered with the South African Council for Natural Scientific Professionals (SACNASP).

The compliance statement must:

(The section of the report that fulfils each requirement is given in brackets after it)

1. be applicable to the preferred site and proposed development footprint;
2. confirm that the site is of “low” or “medium” sensitivity for agriculture (Section 6.7); and
3. indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site (Section 9).

It must contain, as a minimum, the following information:

1. contact details and relevant experience as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the statement including a curriculum vita (following title page);
2. a signed statement of independence (following CV);
3. a map showing the proposed development footprint (including supporting infrastructure) with a 50 m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool (Figure 3);
4. confirmation from the specialist that all reasonable measures have been taken through micro-siting to avoid or minimize fragmentation and disturbance of agricultural activities (Section 7.4);
5. a substantiated statement from the soil scientist or agricultural specialist on the acceptability, or not, of the proposed development and a recommendation on the approval, or not of the proposed development (Section 9);
6. any conditions to which this statement is subjected (Section 9);
7. in the case of a linear activity, confirmation from the agricultural specialist or soil scientist, that in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase (not applicable);
8. where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr (Section 8); and
9. a description of the assumptions made and any uncertainties or gaps in knowledge or data (Section 4).

4 METHODOLOGY OF STUDY

4.1 Methodology for assessing soils and agricultural potential

This report adheres to the process and content requirements of the gazetted agricultural protocol as outlined in Section 2 above. As per the requirement, the assessment was based on a desktop analysis of existing soil and agricultural potential data for the site.

The following sources of information were used:

- Soil data was sourced from the land type data set, of the Department of Agriculture, Forestry and Fisheries. This data set originates from the land type survey that was conducted from the 1970's until 2002. It is the most reliable and comprehensive national database of soil information in South Africa and although the data was collected some time ago, it is still entirely relevant as the soil characteristics included in the land type data do not change within time scales of hundreds of years.
- Land capability data was sourced from the 2017 National land capability evaluation raster data layer produced by the Department of Agriculture, Forestry and Fisheries, Pretoria.
- Field crop boundaries were sourced from the national web-based environmental screening tool.
- Rainfall and temperature data was sourced from The World Bank Climate Change Knowledge Portal, dated 2015.
- Grazing capacity data was sourced from the 2018 Department of Agriculture, Forestry and Fisheries long-term grazing capacity map for South Africa, available on Cape Farm Mapper.
- Satellite imagery of the site and surrounds was sourced from Google Earth.

4.2 Methodology for determining impact significance

The potential impacts identified in this specialist study were assessed based on the criteria given in the table below. The ratings of impacts were based on the specialist's knowledge and experience of the field conditions of the environment in which the proposed development is located, and of the impact of disturbances on that agricultural environment.

Criteria	**Rank**		
	Low	*Medium*	*High*
Intensity	Minor deterioration in land capability.	Partial loss of land capability. Soil alteration resulting in a	Complete loss of land capability.

Criteria	Rank		
	Low	*Medium*	*High*
	Soil alteration resulting in a low negative impact on one of the other environments (e.g. ecology).	moderate negative impact on one of the other environments (e.g. ecology).	Soil alteration resulting in a high negative impact on one of the other environments (e.g. ecology).
Extent	Localised Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/national
Duration	Quickly reversible Less than the project life Short-term	Reversible over time Life of the project Medium-term	Permanent Beyond closure Long-term

The consequence of impacts is a function of the intensity, extent and duration. The significance of impacts = probability x consequence

5 CONSTRAINTS AND LIMITATIONS OF STUDY

The assessment rating of impacts is not an absolute measure. It is based on the subjective considerations and experience of the specialist, but is done with due regard and as accurately as possible within these constraints.

The study makes the assumption that water for irrigation is not available across the site. This is based on the assumption that a long history of farming experience in an area will result in the exploitation of viable water sources if they exist, and none have been exploited in this area.

There are no other specific constraints, uncertainties and gaps in knowledge for this study.

6 APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

Rehabilitation after disturbance to agricultural land is managed by the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA). No application is required in terms of CARA. The BA process covers the required aspects of this.

7 DESCRIPTION OF THE SOILS AND AGRICULTURAL CAPABILITY OF THE AFFECTED ENVIRONMENT

7.1 Climate and water availability

Rainfall for the development area is given as 337 mm per annum (The World Bank Climate Change Knowledge Portal, undated). The average monthly distribution of rainfall is shown in Figure 2. The low rainfall and high evapotranspiration is a severe limitation to all agriculture, including grazing.

7.2 Terrain, topography and drainage

The proposed development is located on a Karoo plateau, with low slope gradients (<4%), at an altitude of 1,490 metres. The footprint avoids the arid-area, non-perennial water courses that occur on the plateau.

The underlying geology is shales, mudstone and sandstone of the Beaufort Group and the Karoo Supergroup. Dolerite intrusions are frequent.

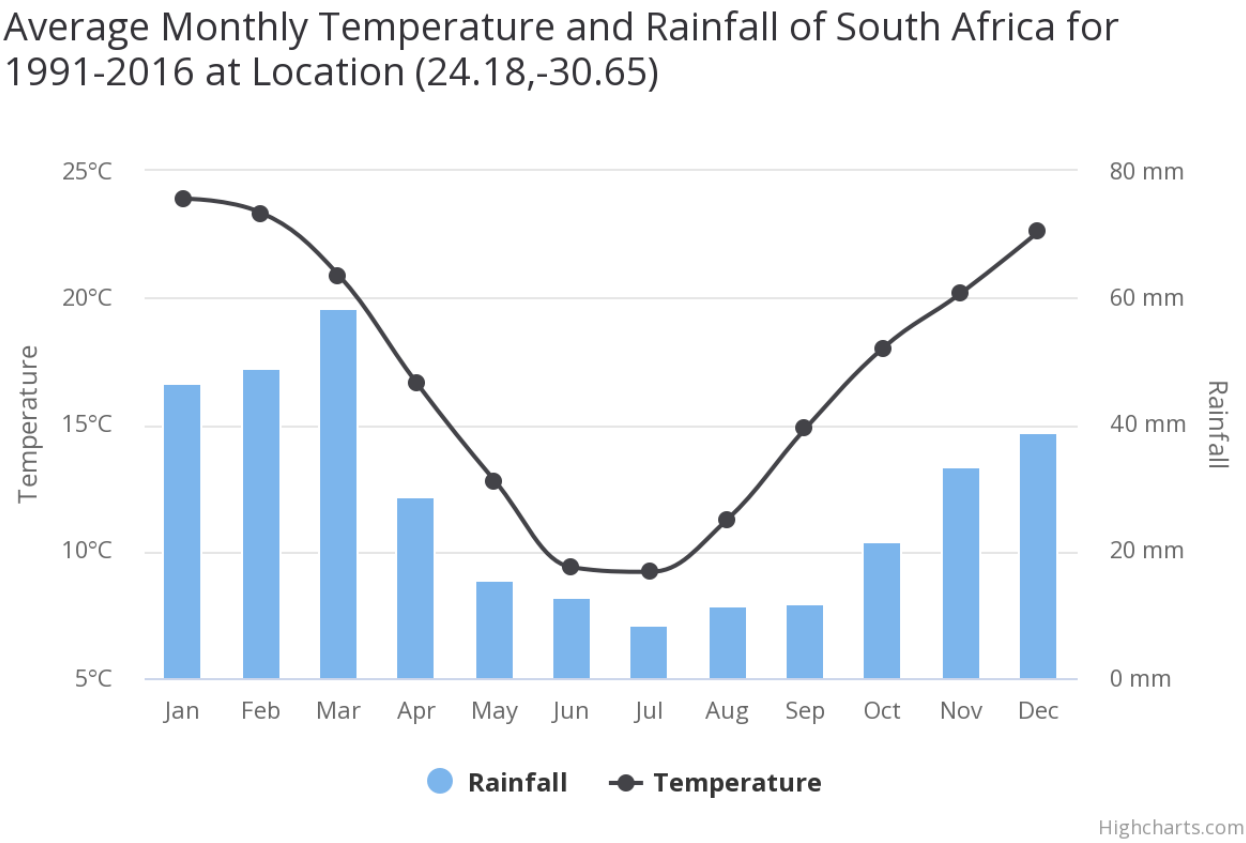

Figure 2. *Average monthly temperature and rainfall for the site (The World Bank Climate Change Knowledge Portal, 2020).*

7.3 Soils

The dominant soils are shallow, calcareous, sandy loam soils on underlying rock, of the Mispah, Glenrosa and Swartland soil forms. The shallow soil depth limits the agricultural potential.

7.4 Agricultural capability

Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rainfed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability classes are suitable as arable land for the production of cultivated crops, while the lower suitability classes are only suitable as non-arable grazing land, or at the lowest extreme, not even suitable for grazing. In 2017, DAFF released updated and refined land capability mapping across the whole of South Africa. This has greatly improved the accuracy of the land capability rating for any particular piece of land anywhere in the country. The new land capability mapping divides land capability into 15 different categories with 1 being the lowest and 15 being the highest. Values below 8 are generally not suitable for production of any cultivated crop. Detail of this land capability scale is shown in Table 2.

Land capability evaluation values range from 4 to 6 across the project area – predominantly 5. Agricultural limitations that result in the low land capability classification are predominantly due to the very limited climatic moisture availability. The shallow, stony soils are a further limitation. These factors render the site unsuitable for any kind of mainstream cultivation without irrigation, and limit it to low density grazing only.

The long-term grazing capacity of the site is fairly low at 20 hectares per large stock unit.

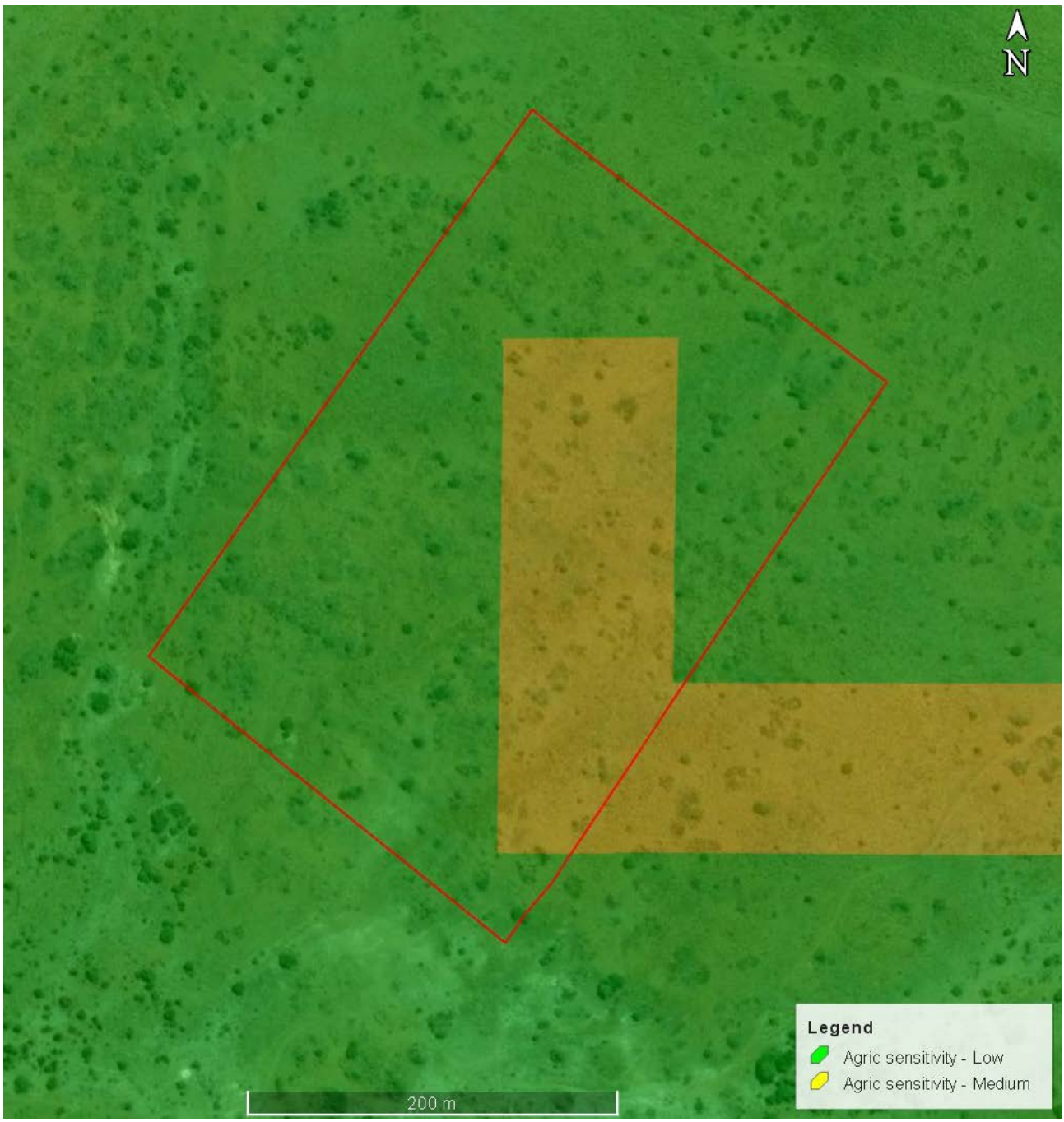

Figure 3. *Satellite image map of the proposed site overlaid onto the screening tool agricultural sensitivity. The differences between the low sensitivity and medium sensitivity areas are a function of the way the land capability data is generated per pixel and have no practical meaning for this site.*

Table 2. Details of the 2017 Land Capability classification for South Africa.

Land capability evaluation value	Description
1	Very Low
2	
3	Very Low to Low
4	
5	Low
6	Low to Moderate
7	
8	Moderate
9	Moderate to High
10	
11	High
12	High to Very High
13	
14	Very High
15	

***Green shading represents the general land capability classification across the project site**

7.5 Land use and development on and surrounding the site

The development is located within a sheep farming agricultural region and currently used only for grazing. There is no cultivation across the project area. The only agricultural infrastructure is fencing into grazing camps, wind pumps and stock watering points.

7.6 Possible land use options for the site

Predominantly because of the climate limitations, the site is totally unsuitable for cultivated crops, and viable agricultural land use is limited to grazing only.

7.7 Agricultural sensitivity

Agricultural sensitivity is a direct function of the capability of the land for agricultural production. This is because a negative impact on land of higher agricultural capability is more detrimental to agriculture than the same impact on land of low agricultural capability. A general understanding of agricultural sensitivity, in terms of loss of agricultural land in South Africa, considers arable land that can support viable production of cultivated crops, to have high sensitivity. This is because

there is a scarcity of such land in South Africa, in terms of how much is required for food security. However, there is not a scarcity in the country of land that is only suitable as grazing land and such land is therefore not considered to have high agricultural sensitivity.

The national web-based environmental screening tool identifies the site of the proposed development as being of low and medium agricultural sensitivity. This is confirmed by this assessment.

Agricultural potential and conditions are very uniform across the site, and the choice of placement of all facility infrastructure therefore has no influence on the significance of agricultural impacts.

No agricultural high sensitivity areas occur within the investigated site and no parts of it therefore need to be avoided by the development. There are no required buffers.

7.7.1 Site sensitivity verification

In terms of the gazetted agricultural protocol, a site sensitivity verification must be submitted that:

1. confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc;
2. contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity.

The agricultural sensitivity, as identified by the screening tool, is confirmed by this assessment. The motivation for confirming the sensitivity is that land of the site, without doubt, corresponds to the definitions of the different sensitivity categories in terms of its land capability and cultivation status. The entire Section 6 above is dedicated to providing evidence of that.

8 IDENTIFICATION AND ASSESSMENT OF IMPACTS ON AGRICULTURE

8.1 Direct impacts

The focus and defining question of an agricultural impact assessment is to determine to what extent a proposed development will compromise (negative impacts) or enhance (positive impacts) current and/or future agricultural production. The significance of an impact is therefore a direct function of the degree to which that impact will affect current or future agricultural production. If there will be no impact on production, then there is no agricultural impact. Impacts that degrade

the agricultural resource base pose a threat to production and therefore are within the scope of an agricultural impact assessment

For agricultural impacts, the exact nature of the different infrastructure within the facility has very little bearing on the significance of impacts. What is of most relevance is simply the occupation of the land, and whether it is being occupied by a battery container or a substation makes no difference. What is of most relevance therefore is simply the total footprint of the facility.

The components of the project that can impact on agriculture are:

1. Occupation of the land by the total, direct, physical footprint of the proposed project including all its infrastructure.
2. Construction activities that may disturb the soil profile and vegetation, for example for levelling, excavations, etc.

The significance of all potential agricultural impacts is kept low by the fact that the proposed site is on land of extremely limited agricultural potential that is only viable for low density grazing.

Two potential agricultural impacts have been identified and are assessed in table format below. Mitigation recommendations are included in the table for each impact. Monitoring recommendations are given in the following section.

Impact Phase: Construction							
Potential impact description: **Loss of Agricultural land use** Agricultural land directly occupied by the development infrastructure will become unavailable for agricultural use. Note: This impact is only relevant to the construction phase, because no further loss of agricultural land use occurs after the construction phase.							
	Intensity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Low	Low	Medium	Negative	High	Low	High
With Mitigation	Low	Low	Medium	Negative	High	Low	High
Can the impact be reversed?			Yes, once the facility is decommissioned, the footprint of the infrastructure can again be utilised as agricultural land.				
Will impact cause irreplaceable loss of resources?			No, because a very small amount of agricultural land is impacted and such land is not of high potential.				
Can impact be avoided, managed or			No				

mitigated?	
Mitigation measures to reduce residual risk or enhance opportunities: None	
Residual impact: Yes, there is a small loss of agricultural land, but it is acceptable as it is of low significance.	

The intensity is considered low because of the very small amount of impacted land and because of its relatively low agricultural potential. The extent is low because the impact is limited to within the small project area. The duration is medium because the impact lasts for the life of the project. The probability is considered high, because the footprint will definitely be lost to agriculture.

Impact Phase: Construction & Decommissioning							
Potential impact description: **Soil degradation** Soil degradation can result from erosion and topsoil loss. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance and vegetation removal. Loss of topsoil can result from poor topsoil management during construction related soil profile disturbance. Soil degradation will reduce the ability of the soil to support vegetation growth.							
	Intensity	Extent	Duration	Status	Probability	Significance	Confidence
Without Mitigation	Medium	Low	Medium	Negative	Medium	Medium	High
With Mitigation	Low	Low	Medium	Negative	Low	Low	High
Can the impact be reversed?			Serious soil degradation can be reversed only to some extent and only with substantial inputs over a significant period of time.				
Will impact cause irreplaceable loss of resources?			No, because a very small amount of grazing land is impacted and such land is not a scarce resource.				
Can impact be avoided, managed or mitigated?			Yes, see below.				
Mitigation measures to reduce residual risk or enhance opportunities: - Implement an effective system of storm water run-off control using bunds and ditches, where it is required - that is at all points of disturbance where water accumulation might occur. The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and it must prevent any potential down slope erosion. - Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion. - If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.							

The intensity is considered medium without mitigation because unchecked erosion would cause a partial loss of land capability. With effective mitigation, degradation can be prevented and the intensity is therefore considered low. The extent is low because the impact is limited to within the project area and only to parts of it. The duration is low because the impact will only last for the short term after disturbance.

8.2 Cumulative impacts

The cumulative impact of a development is the impact that that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect the same environment. The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of agricultural land, with a consequent decrease in agricultural production. The defining question for assessing the cumulative agricultural impact is this:

> What level of loss of agricultural land use and associated loss of agricultural production is acceptable in the area, and will the loss associated with the proposed development, when considered in the context of all past, present or reasonably foreseeable future impacts, cause that level in the area to be exceeded?

Because of the low agricultural impact of the proposed development in such an agricultural environment, far more renewable energy infrastructure than currently exists, or is currently proposed, can be accommodated before acceptable levels of change are exceeded.. For the above reasons, the cumulative agricultural impact of the proposed development can confidently be assessed as low without entering into a more formal assessment.

8.3 Impacts of the no-go alternative

The no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. The one identified potential such impact is that due to continued low rainfall in the area, which is likely to be exacerbated by climate change, in addition to other economic and market pressures on farming, the agricultural enterprises will come under

increased pressure in terms of economic viability, with a resultant potential decrease in productivity.

The development does exclude agriculture from the impacted land. Therefore the agricultural impact of the no-go alternative, which does not exclude agriculture, is less than the agricultural impact of the development, and so purely from an agricultural impact perspective the no-go is the preferred alternative between the development and the no-go. However, the difference is minimal because of the low agricultural impact.

8.4 Micro-siting to minimize fragmentation and disturbance of agricultural activities

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. This is hereby confirmed. Because of the agricultural uniformity and low agricultural potential of the environment, the exact positions of all infrastructure will make no significant difference to agricultural impacts.

9 ENVIRONMENTAL MANAGEMENT PROGRAMME INPUTS

The environmental management programme inputs for the protection of soil resources are presented in the tables below for each phase of the development.

Table 1: Management plan for the planning and design phase

Impact	Mitigation / management objectives and outcomes	Mitigation / management actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
Aspect: Protection of soil resources					
Erosion	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Design an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and it must prevent any potential down slope erosion.	Ensure that the storm water run-off control is included in the engineering design.	Once-off during the design phase.	Holder of the EA

Table 2: Management plan for the construction phase

Impact	Mitigation / management objectives and outcomes	Mitigation / management actions	Monitoring		
			Methodology	**Frequency**	**Responsibility**
Aspect: Protection of soil resources					
Erosion	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and it must prevent any potential down slope erosion.	Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.	Monthly	Environmental Control Officer (ECO)

	That vegetation clearing does not pose a high erosion risk.	Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.	Undertake a periodic site inspection to record the occurrence of and re-vegetation progress of all areas that require re-vegetation.	Every 3 months	Environmental Control Officer (ECO)
Topsoil loss	That no topsoil is lost	If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. Topsoil stockpiles should be vegetated as much as possible to control erosion. During	Record GPS positions of all occurrences of below-surface soil disturbance (eg excavations). Record date of topsoil stripping and replacement. Check that topsoil covers entire disturbed area.	As required, whenever areas are disturbed.	Environmental Control Officer (ECO)

		rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.			

Table 3: Management plan for the operational phase

Impact	Mitigation / management objectives and outcomes	Mitigation / management actions	Monitoring		
			Methodology	Frequency	Responsibility
Aspect: Protection of soil resources					
Erosion	That existence of hard surfaces causes no erosion on or downstream of the site.	Maintain the storm water run-off control system. Monitor erosion and remedy the storm water control system in the event of any erosion occurring.	Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or	Bi-annually	Facility Environmental Manager

			downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.		
	That denuded areas are re-vegetated to stabilise soil against erosion	Facilitate re-vegetation of denuded areas throughout the site	Undertake a periodic site inspection to record the progress of all areas that require re-vegetation.	Bi-annually	Facility Environmental Manager

Table 4: Management plan for the decommissioning phase

Impact	**Mitigation / management objectives and outcomes**	**Mitigation / management actions**	**Monitoring**		
			Methodology	**Frequency**	**Responsibility**
Aspect: Protection of soil resources					
Erosion	That disturbance and existence of hard	Implement an effective system of storm water	Undertake a periodic site inspection to verify	Monthly	Environmental Control Officer (ECO)

	surfaces causes no erosion on or downstream of the site.	run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and it must prevent any potential down slope erosion.	and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring.		
Erosion	That vegetation clearing does not pose a high erosion risk.	Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.	Undertake a periodic site inspection to record the occurrence of and re-vegetation progress of all areas that require re-vegetation.	Every 3 months	Environmental Control Officer (ECO)

Topsoil loss	That no topsoil is lost	If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. Topsoil stockpiles should be vegetated as much as possible to control erosion. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.	Record GPS positions of all occurrences of below-surface soil disturbance (eg excavations). Record date of topsoil stripping and replacement. Check that topsoil covers entire disturbed area.	As required, whenever areas are disturbed.	Environmental Control Officer (ECO)

10 **CONCLUSION AND RECOMMENDATIONS**

The site has very low agricultural potential, is unsuitable for cultivation and agricultural land use is limited to low density grazing.

The main conclusion of the assessment is that:

> *Due to the low agricultural potential of the site, and the consequent low, negative agricultural impacts, the development will not have an unacceptable negative impact on the agricultural production capability of the site. From an agricultural and soils impact point of view, the development can be approved.*

The recommended mitigation measures are implementation of an effective system of storm water run-off control; maintenance of vegetation cover where possible; and striping, stockpiling and re-spreading of topsoil.

The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions.

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