Appendix D

AGRICULTURAL COMPLIANCE STATEMENT

CONFIDENTIAL

info@soilza.co.za
www.soilza.co.za
1A Wolfe St Wynberg
Cape Town, 7800
South Africa

SPECIALIST AGRICULTURAL REPORT
PREPARED IN COMPLIANCE WITH THE
"NORM FOR THE EXCLUSION OF THE DEVELOPMENT AND EXPANSION OF SOLAR PHOTOVOLTAIC FACILITIES IN AREAS OF LOW OR MEDIUM ENVIRONMENTAL SENSITIVITY"
PUBLISHED ON 27 MARCH 2024, GOVERNMENT GAZETTE NR 50388
FOR THE
MERAFONG SOLAR PHOTOVOLTAIC FACILITY
NEAR CARLETONVILLE, GAUTENG PROVINCE

Report by
Johann Lanz

2 May 2025

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1 PURPOSE OF THIS REPORT

In terms of the solar exclusion norm, a specialist report for the agricultural theme is required to:

1. Determine the sensitivity of the proposed facility footprint and linear infrastructure corridor and confirm or dispute their sensitivity rating by the screening tool.
2. Confirm that the "allowable development limits" set for solar photovoltaic technology on agricultural land in the Agricultural Specialist Assessment Protocol, are not exceeded.
3. Consider the cumulative agricultural effects and provide a discussion on possible cumulative impacts, the ability to mitigate such impacts and a statement of environmental acceptability of any cumulative impacts after mitigation.
4. Provide mitigation measures for inclusion in the EMPr.

2 PROJECT DESCRIPTION

The Solar PV facility has a total footprint of 217ha and will have a total generating capacity of up to 140 megawatts (MW). The proposed solar PV Facility will consist of the following infrastructure:

- Solar Arrays, modules and mounting structures
- Inverters and transformers
- Battery Energy Storage System (BESS) (to be included as part of a separate norms registration process)
- Operation & Maintenance building including a gate house, ablution facilities, security building, control centre, offices, warehouses and workshops for storage and maintenance.
- Temporary and permanent laydown area
- Laydown Area
- Facility grid connection infrastructure including:
- 33kV cabling to connect the solar arrays to the IPP Substation
- 33kV/132kV IPP substation
- Internal service and maintenance roads
- Perimeter fencing

A Loop-in Loop-out (LILO) grid connection is proposed which will be subject to a separate registration process.

The following farm portions are affected by the proposed project:

Farm Name	Portion Number	sg 21 code
Driefontein	355	T0IQ00000000035500008
Driefontein	355	T0IQ00000000035500015
Driefontein	355	T0IQ00000000035500013
Driefontein	355	T0IQ00000000035500010
Driefontein	355	T0IQ00000000035500011
Driefontein	355	T0IQ00000000035500012
Driefontein	355	T0IQ00000000035500004
Smallplaats	353	T0IQ00000000035300000
Vlakplaats	112	T0IQ00000000011200000

The exact nature and layout of the different infrastructure within the boundary fence of a solar energy facility has absolutely no bearing on the significance of agricultural impacts. All that is of relevance is simply the total footprint of the facility that excludes agricultural land use. For a solar facility, this is the area within the facility fence. The total relevant footprint of the facility, as shown in Figure 1 is 217 hectares.

3 METHODOLOGY OF STUDY

The assessment was based on an on-site investigation of the soils and agricultural conditions conducted on 7 August 2024. It was also informed by existing climate, soil, and agricultural potential data for the site (see references). The aim of the on-site assessment was to assess and determine the cropping potential across the site. Soils were assessed by an investigation of auger samples distributed across the site. Soils were classified according to the South African soil classification system (Soil Classification Working Group, 2018).

An assessment of soils and long-term agricultural potential is in no way affected by the season in which the assessment is made, and therefore the date on which this assessment was done has no bearing on its results. The level of agricultural assessment is considered entirely adequate for an understanding of on-site agricultural production potential for the purposes of this assessment.

4 BASELINE DESCRIPTION OF THE AGRO-ECOSYSTEM

The purpose of this section is firstly to present the baseline information that controls the agricultural production potential of the site and then, most importantly, to assess that potential. Agricultural production potential, and particularly cropping potential, directly determines the true agricultural sensitivity of the land and therefore informs the site sensitivity verification.

All the important parameters that control the agricultural production potential of the site are given in Table 1. Data from soil auger samples taken on site are given in Appendix 3. A satellite image map of the development site is given in Figure 1 and photographs of site conditions are shown in Figures 2 to 5.

Table 1: Parameters that control and/or describe the agricultural production potential of the site.

	Parameter	Value
Climate	Köppen-Geiger climate description (Beck *et al*, 2018)	Temperate, dry winter, warm summer
	Mean Annual Rainfall (mm) (Schulze, 2009)	632
	Reference Crop Evaporation Annual Total (mm) (Schulze, 2009)	1361
	Climate capability classification (Ranges from 3 to 8) (DAFF, 2017)	5 (moderate)
Terrain	Terrain type	Highveld plains
	Terrain morphological unit	Flat plains
	Slope gradients (%)	0 to 3
	Altitude (m)	1725
	Terrain capability classification (Ranges from 2 to 8) (DAFF, 2017)	6 (moderate-high) to 8 (high-very high)
Soil	Geology (DAFF, 2002)	Dolomite and chert of the Chuniespoort Group; sporadic occurrence of Black Reef quartzite and shale, Ecca shale and sandstone, Ventersdorp lava and Karoo dolerite.
	Land type (DAFF, 2002)	Ab7
	Description of the soils	Very shallow to moderately deep, medium textured, red, well-drained soils on underlying hardpan
	Dominant soil forms	Lichtenburg
	Soil capability classification (Ranges from 1 to 8) (DAFF, 2017)	3 (low) to 5 (moderate)
	Soil limitations	Limited soil depth
Land use	Agricultural land use surrounding the site	Cropland and non-agricultural land uses
	Agricultural land use on the site	One area of cropland, which is avoided by the footprint. The rest of the site is not used for agriculture.
Gene	Long-term grazing capacity (ha/LSU) (DAFF, 2018)	5.5

	Parameter	Value
	Land capability classification (Ranges from 1 to 13) (DAFF, 2017)	7 (low-moderate) to 9 (moderate-high)
	Within Protected Agricultural Area (DALRRD, 2020)	No
	Within Renewable Energy Development Zone (REDZ)	No

This assessment of the agricultural production potential is based on an integration of the different parameters in Table 1 above and the on-site soil investigation. The dryland cropping potential of the entire footprint of the site is limited by soil depth constraints (see Appendix 3). This means that the soil can only hold an insufficient soil moisture reservoir to carry a crop reliably through the season. Because of this constraint, all the land occupied by the facility footprint is unsuitable for viable rainfed crop production and its viable agricultural use is limited to grazing.

Although rain-fed cropping may have been done on or surrounding the site in the past, it is no longer economically viable. It should be noted that cropping potential changes with a changing agricultural economy over time. Poorer lands that may have been cropped with economic viability in the past, are abandoned as cropland because they become too marginal for viable crop production in a more challenging agricultural economy, with increased input costs.

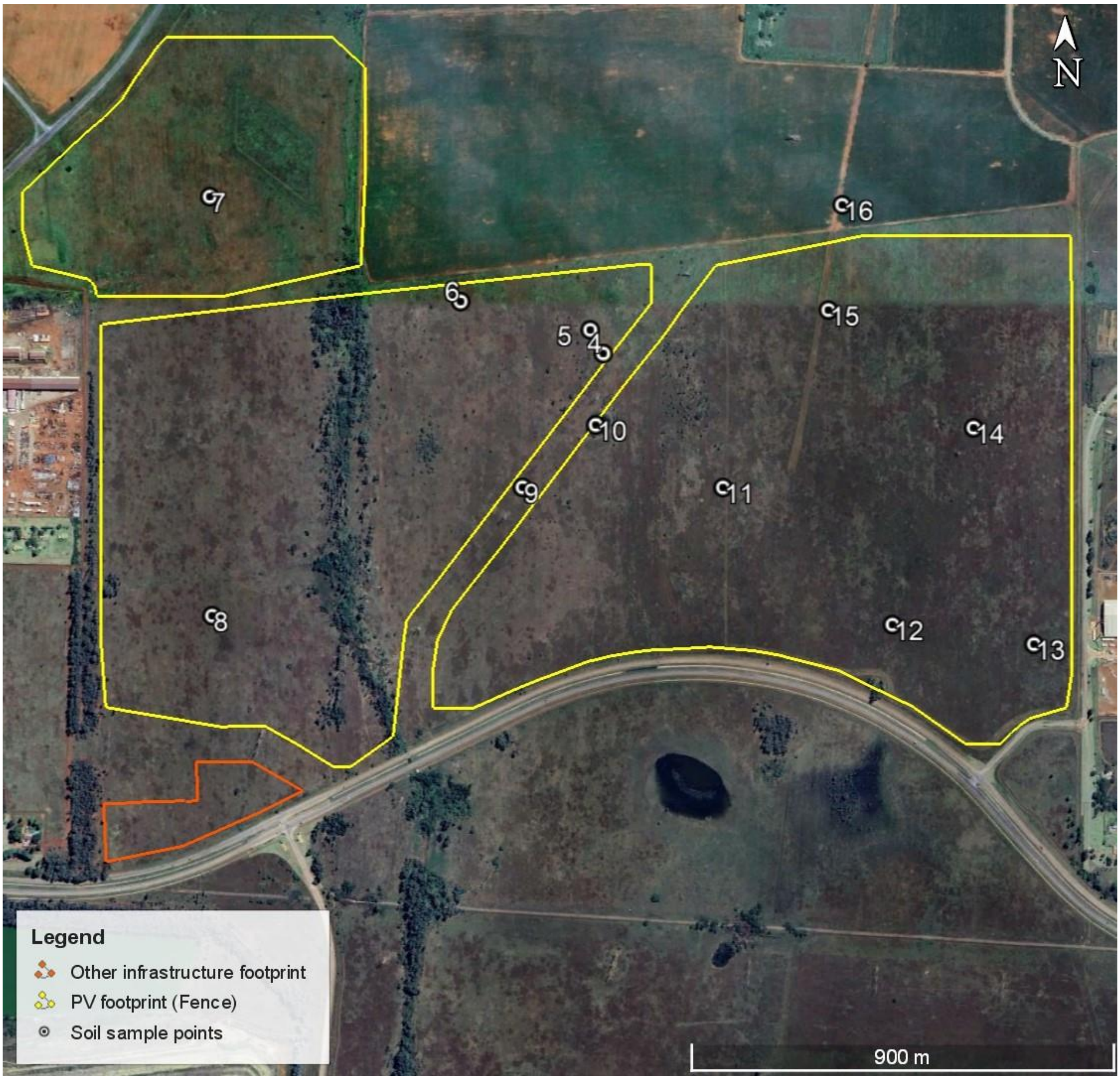

Figure 1. *Satellite image map of the development footprint.*


Figure 2. *Typical site conditions.*


Figure 3. *Typical site conditions.*

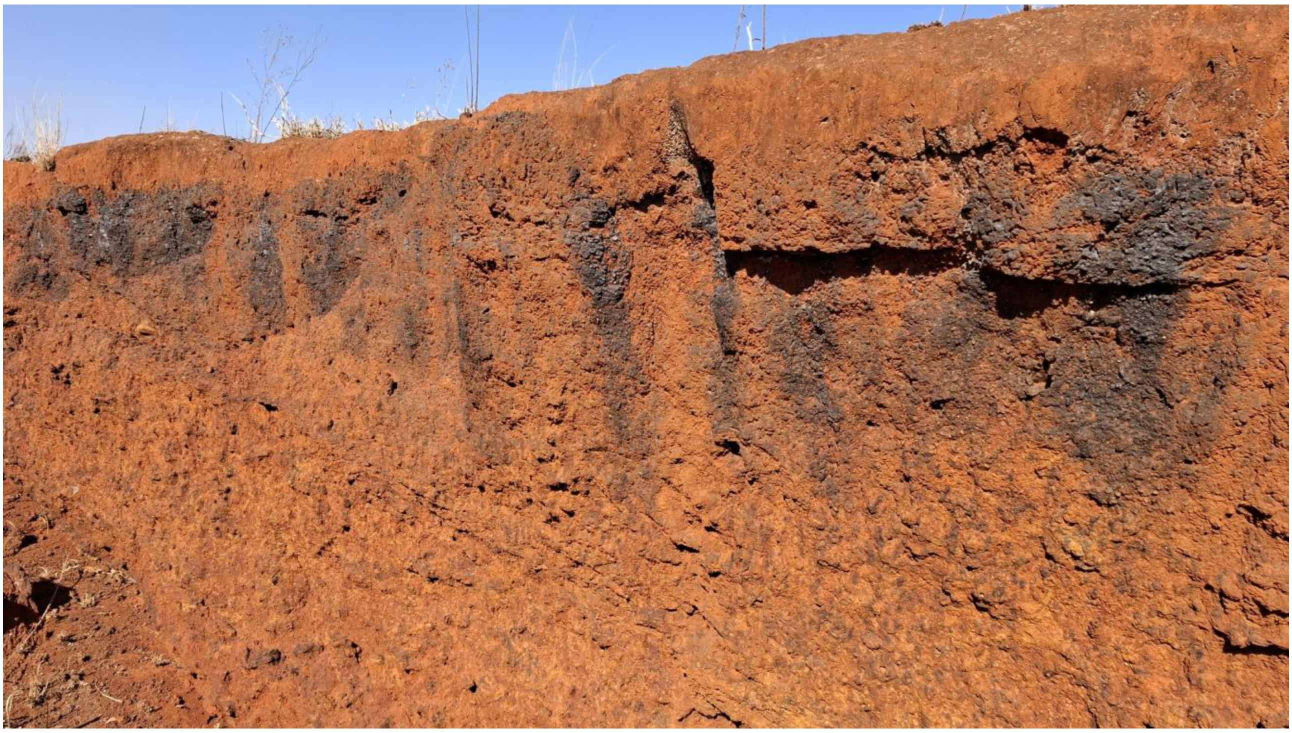

Figure 4. *Typical Lichtenburg soil profile from site.*

Figure 5. *Typical site conditions.*

5 SITE SENSITIVITY VERIFICATION

This assessment is required to include a verification of the agricultural sensitivity of the development site as per the sensitivity categories used by the web-based environmental screening tool of the Department of Forestry, Fisheries and the Environment (DFFE). The screening tool's classification of sensitivity is merely an initial indication of what the sensitivity of a piece of land might be, as indicated by the only data that is available. What the screening tool attempts to indicate is whether the land is suitable for crop production (high and very high sensitivity) or unsuitable for crop production (low and medium sensitivity). To do this, the screening tool uses three independent criteria, from three independent data sets, which are all indicators of suitability for crop production but are limited and were not designed for this purpose. The three criteria are:

1. Whether the land is classified as cropland or not on the field crop boundary data set (Crop Estimates Consortium, 2019). All classified cropland is, by definition, either high or very high sensitivity.
2. Its land capability rating as per the Department of Agriculture's updated and refined, country-wide land capability mapping (DAFF, 2017). Land capability is defined as the combination of soil, climate, and terrain suitability factors for supporting rain-fed agricultural production. The direct relationship between land capability rating, agricultural sensitivity, and rain-fed cropping suitability is summarised by this author in Table 2.
3. Whether the land is classified as a protected agricultural area (PAA) or not (DALRRD, 2020). All classified PAAs are, by definition, either high or very high sensitivity.

The limitations for determining cropping suitability based on these data are as follows:

1. The field crop boundary data set used by the screening tool is very outdated
2. Land capability mapping is fairly coarse, modelled data which is not accurate at site scale.
3. PAAs are demarcated broadly, not at a fine scale, and there is therefore much variation of cropping suitability within a PAA. All land within these demarcated areas is not necessarily of sufficient agricultural potential to be suitable for crop production, due to finer scale terrain, soil, and other constraints.

These three inputs operate independently, and the screening tool's agricultural sensitivity is simply determined by whichever of these gives the highest sensitivity rating. The agricultural sensitivity of the site, as classified by the screening tool, is shown in Figure 6.

The true agricultural sensitivity of any land is equivalent to its actual suitability for crop production on the ground, rather than being determined by a parameter that serves as a proxy for crop suitability in a dataset. The land's suitability for cropping directly determines how important it is to conserve that land as agricultural production land. To determine suitability for crop production, and hence sensitivity, requires a site-specific assessment, as has been conducted in this assessment, rather than a reliance on data sets that have significant limitations.

Table 2: Relationship between land capability, agricultural sensitivity, and rain-fed cropping suitability.

<table>
<tr><th rowspan="2">Land capability value</th><th rowspan="2">Agricultural sensitivity</th><th colspan="2">Rain-fed cropping suitability</th></tr>
<tr><th>Summer rainfall areas</th><th>Winter rainfall areas</th></tr>
<tr><td>1 - 5</td><td>Low</td><td rowspan="3">Unsuitable</td><td rowspan="2">Unsuitable</td></tr>
<tr><td>6</td><td rowspan="2">Medium</td></tr>
<tr><td>7</td><td rowspan="3">Suitable</td></tr>
<tr><td>8 - 10</td><td>High</td><td rowspan="2">Suitable</td></tr>
<tr><td>11 - 15</td><td>Very High</td></tr>
</table>

Note: There is an error in the screening tool whereby a land capability of 8 is classified as medium sensitivity, but according to NEMA's agricultural protocol, should in fact be classified as high sensitivity. This assessment follows the agricultural protocol definition and classifies a value of 8 as high sensitivity.

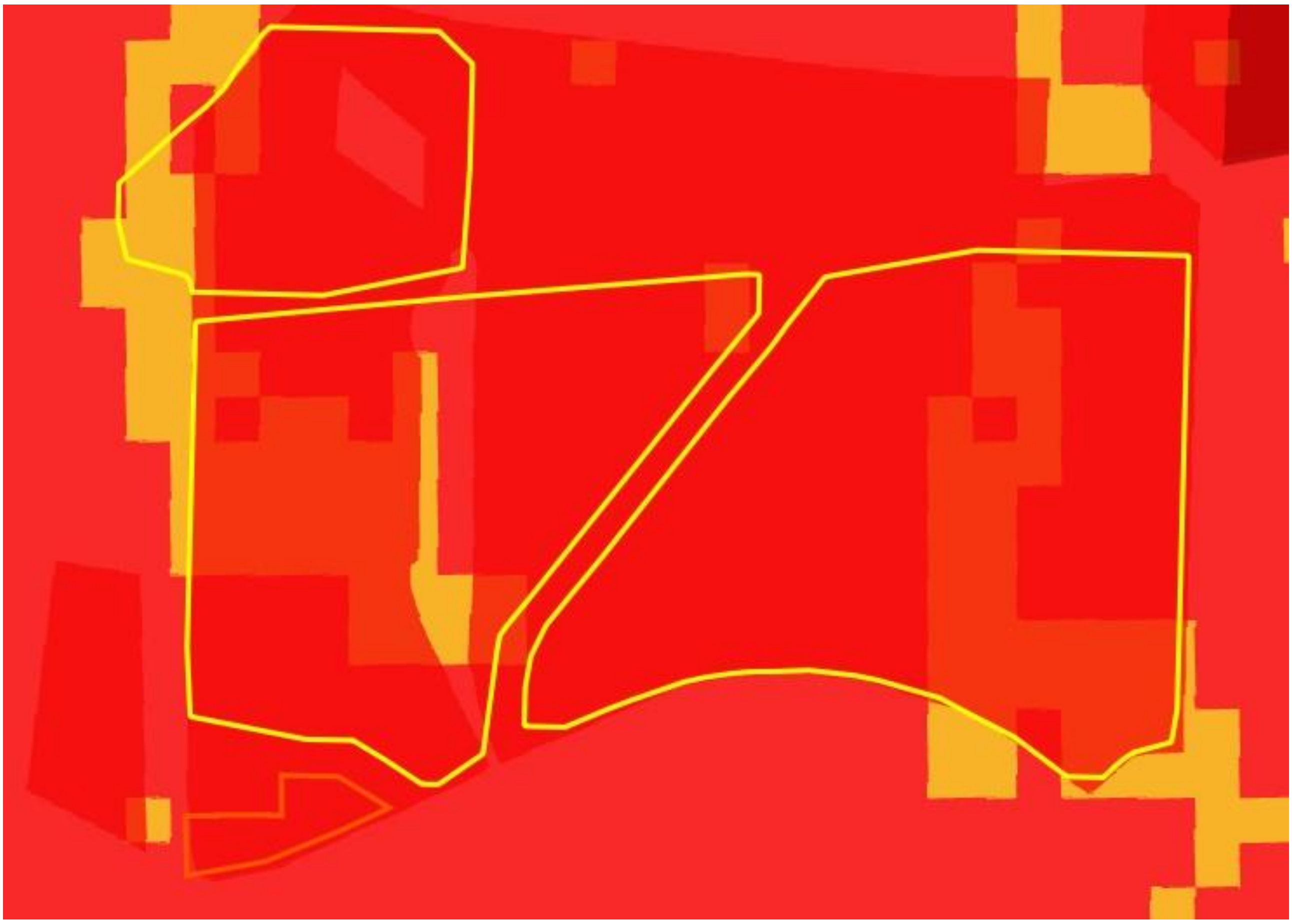

Figure 6. *The development footprint overlaid on agricultural sensitivity, as classified by the screening tool (green = low; yellow = medium; red = high; dark red = very high).*

Despite the detail in this section above, the determinants of agricultural sensitivity are actually very straightforward and may be summed up as follows. If land is suitable for viable crop production - that is if it has the capability to deliver an above break-even crop yield on a sustainable basis - then it is of high or very high agricultural sensitivity. If it has limitations that prevent it from being able to deliver an above break-even crop yield on a sustainable basis, then it is of medium or low agricultural sensitivity.

The screening tool classifies the assessed PV site as being almost entirely high agricultural sensitivity and therefore classifies the overall site sensitivity, which is the highest sensitivity encountered across the site, as high. The high sensitivity classification by the screening tool is due to a combination of some land being classified as cropland (high sensitivity) and some land being classified as high sensitivity because of its land capability rating (see Table 2). However, as shown in the previous section, the site has been assessed as not suitable for viable crop production due to soil depth limitations and its true sensitivity, as assessed on the ground, is therefore medium. This assessment therefore disputes the high sensitivity classification of the site by the screening tool and verifies the entire site as being of medium agricultural sensitivity because of its assessed cropping potential.

6 MITIGATION

The most important and effective mitigation of agricultural impacts for any development is avoidance of viable, potential cropland. This development has already applied this mitigation by deliberately locating the facility where it avoids all viable, potential cropland in the area.

Generic mitigation measures that are effective in preventing soil degradation are all inherent in the engineering of such a project and/or are standard, best-practice for construction sites. These include:

- A system of storm water management, which will prevent erosion on and downstream of the site, will be an inherent part of the engineering design on site. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there.
- Any excavations done during the construction phase, in areas that will be re-vegetated during or at the end of the construction phase, must separate the upper 30 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it remains at the surface. Topsoil should only be stripped in areas that are excavated. Across most of the site, including construction lay down areas, it will be much more effective for rehabilitation, to retain the topsoil in place. It will be advantageous to have topsoil and vegetation cover below the panels during the operational phase to control dust and erosion.

7 CUMULATIVE IMPACTS

In terms of the solar exclusion norm, a specialist report is required to address cumulative impacts. The cumulative impact of a development is the impact 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 of future agricultural production potential. The defining question for assessing the cumulative agricultural impact is this: Will the loss of future agricultural production potential associated with the proposed development, when considered in the context of all past, present or reasonably foreseeable future impacts, cause an acceptable level of future agricultural production potential loss to be exceeded?

Agricultural land throughout South Africa is under inevitable pressure from various non-agricultural land uses. The cumulative impact of agricultural land loss is significant. However, the agricultural priority should be to conserve future agricultural production, not simply agriculturally zoned land. The threshold, above which it is a priority to conserve land for agricultural production, is determined by the scarcity of arable crop production land in South Africa (approximately only 13% of the country's surface area) and the relative abundance of the rest of agricultural land across the country that is only good enough to be used for grazing.

As has been shown above, the entire footprint has significant limitations that make the land unsuitable as viable cropland. The loss of this land will therefore not contribute to the cumulative loss of future crop production potential. The cumulative agricultural impact of the proposed development is therefore assessed as being of low significance and acceptable.

8 COMPLIANCE WITH THE ALLOWABLE DEVELOPMENT LIMITS

The agricultural protocol stipulates allowable development limits for renewable energy developments of > 20 MW. Allowable development limits refer to the area of a particular agricultural sensitivity category that can be directly impacted (i.e. taken up by the physical footprint) by a renewable energy development. The agricultural footprint is defined in the protocol as the area that is directly occupied by all infrastructures, including roads, hard standing areas, buildings, substations etc., that are associated with the renewable energy facility during its operational phase, and that result in the exclusion of that land from potential cultivation or grazing. It excludes all areas that were already occupied by roads and other infrastructure prior to the establishment of the energy facility but includes the surface area required for expanding existing infrastructure (e.g. widening existing roads). It excludes the corridor underneath overhead power lines but includes the pylon footprints. It therefore represents the total land that is actually excluded from agricultural use as a result of the renewable energy facility (the agricultural footprint).

For a solar energy facility, the footprint is considered to be the total area inside the security fence of the facility.

The allowable development limit on land of medium agricultural sensitivity, as this site has been verified to be, is 2.5 ha per MW. This would allow the proposed facility with a total generating capacity of 140 MW to occupy an agricultural footprint of up to 140 X 2.5 = 350 hectares. The total assessed footprint, as shown in Figure 1, is 217 hectares. It is therefore confirmed that the facility is in line with the allowable development limits contained in the agricultural protocol.

9 CONCLUSION

In conclusion, this assessment disputes the high sensitivity classification of the footprint by the screening tool and verifies it as being entirely of medium agricultural sensitivity because of the assessed cropping potential. There are no parts of the footprint in which development is not permitted due to agricultural sensitivity. The cumulative agricultural impact of the proposed development is assessed as being of low significance and acceptable. Any remaining environmental impact is acceptable after avoidance and mitigation have been applied.

10 REFERENCES

Beck, H.E., N.E. Zimmermann, T.R. McVicar, N. Vergopolan, A. Berg, E.F. Wood. 2018. Present and future Köppen-Geiger climate classification maps at 1-km resolution, Nature Scientific Data. Available at: https://gis.elsenburg.com/apps/cfm/.

Crop Estimates Consortium, 2019. *Field Crop Boundary data layer, 2019*. Pretoria. Department of Agriculture, Forestry and Fisheries.

Department of Agriculture Forestry and Fisheries (DAFF). 2018. Long-term grazing capacity map for South Africa developed in line with the provisions of Regulation 10 of the Conservation of Agricultural Resources Act, Act no 43 of 1983 (CARA), available on Cape Farm Mapper. Available at: https://gis.elsenburg.com/apps/cfm/

Department of Agriculture, Forestry and Fisheries (DAFF). 2017. National land capability evaluation raster data layer, 2017. Pretoria.

Department of Agriculture, Forestry and Fisheries (DAFF). 2002. National land type inventories data set. Pretoria.

Department of Agriculture, Land Reform and Rural Development (DALRRD). 2020. Protected agricultural areas – Spatial data layer. 2020. Pretoria.

Schulze, R.E. 2009. South African Atlas of Agrohydrology and Climatology, available on Cape Farm Mapper. Available at: https://gis.elsenburg.com/apps/cfm/

Soil Classification Working Group. 2018. Soil Classification: A Natural and Anthropogenic System for South Africa. ARC-Institute for Soil, Climate and Water, Pretoria.

APPENDIX 1: SPECIALIST CURRICULUM VITAE

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**

Within the 23 years of running my soil and agricultural consulting business, I have completed more than 1000 agricultural assessments (EIAs, SEAs, EMPRs) in all 9 provinces for renewable energy, mining, electrical grid infrastructure, urban, and agricultural developments. I was the appointed agricultural specialist for the nation-wide SEAs for wind and solar PV developments, electrical grid infrastructure, and gas pipelines. My regular clients include: Zutari; CSIR; SiVEST; SLR; WSP; SRK; Environamics; Royal Haskoning DHV; ABO; Enertrag; WKN-Windcurrent; JG Afrika; Mainstream; Redcap; G7; Mulilo; and Tiptrans. 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.*

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

APPENDIX 2: SACNASP REGISTRATION CERTIFICATE

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Johan Lanz

Registration Number: 400268/12

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003 (Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Soil Science (Professional Natural Scientist)

Effective **15 August 2012** Expires **31 March 2026**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

APPENDIX 3: SOIL DATA

Table 3: Soil data from investigated auger samples on site.

Sample no.	Latitude	Longitude	Soil form & family	Depth (mm)	Clay % A horizon	Clay % B horizon	Depth limiting layer
4	-26.3511980139	27.5146226026	Lichtenburg 2210	400	12	16	Hard plinthic horizon
5	-26.3507465646	27.5143465027	Lichtenburg 2210	550	12	16	Hard plinthic horizon
6	-26.3502051774	27.5115878507	Lichtenburg 2210	500	12	16	Hard plinthic horizon
7	-26.3482024893	27.5062520988	Bainsvlei 2210	800	12	15	Soft plinthic horizon
8	-26.3561995793	27.506298786	Vaalbos 2212	550	10	12	Hard rock
9	-26.3537510578	27.5129038934	Vaalbos 2212	300	12	12	Hard rock
10	-26.3525599893	27.5144624244	Dresden 2000	300	12	12	Hard plinthic horizon
11	-26.3537555002	27.5171705335	Lichtenburg 2210	550	12	12	Hard plinthic horizon
12	-26.3563719951	27.5207764283	Glencoe 2210	500	12	12	Hard plinthic horizon
13	-26.3567450736	27.5237880461	Avalon 2210	>1200	8	10	Soft plinthic horizon
14	-26.3526161481	27.5225036032	Lichtenburg 2210	500	10	12	Hard plinthic horizon
15	-26.3503689598	27.5194140337	Lichtenburg 2210	500	10	12	Hard plinthic horizon
16	-26.3483610749	27.5197087415	Bainsvlei 2210	>1200	12	15	Soft plinthic horizon

APPENDIX 4: GPS DATA

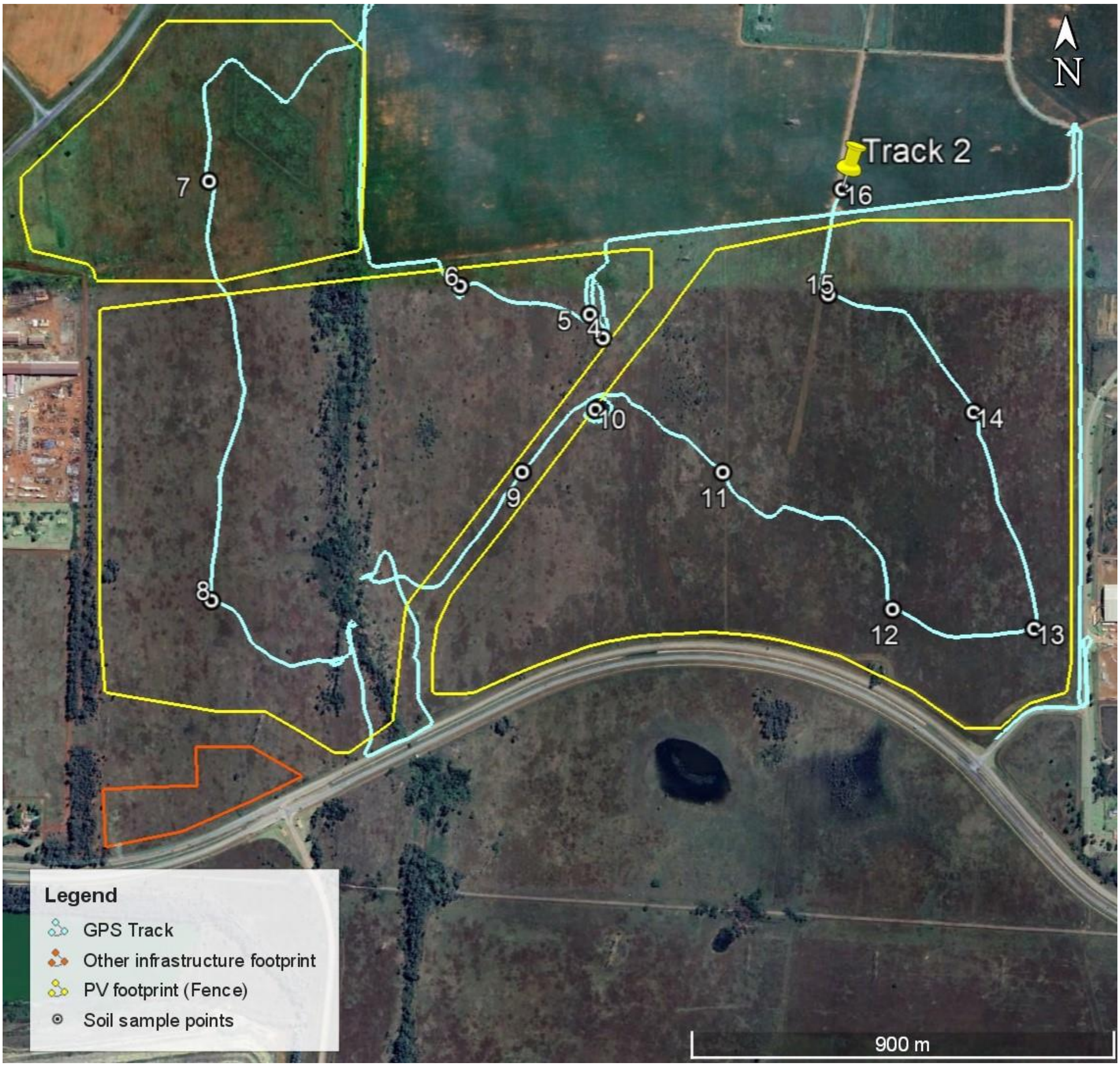

Figure 7. *Satellite image map of GPS track of soil assessment.*