ENVIRONMENTAL IMPACT ASSESSMENT

PROPOSED CONSTRUCTION AND OPERATION OF HOTAZEL 2, NORTHERN CAPE

Applicant: Hotazel Solar Facility 2 (Pty) Ltd

AGRICULTURAL SCOPING REPORT

MAY 2020

STUDY CONDUCTED AND REPORT COMPILED BY: C R LUBBE

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TABLE OF CONTENTS

List of Tables

List of Figures

1. INTRODUCTION

Cape EAPrac has been appointed, by Hotazel Solar Facility 2 (Pty) Ltd, as independent environmental assessment practitioners (EAP) to conduct a Full Scoping and Environmental Impact Assessment (S&EIA) for a 100 megawatt (MW) solar photovoltaic (PV) facility and associated infrastructure, known as Hotazel 2, on the Remaining Extent (Portion 0) of Farm York A 279, near Hotazel in the Northern Cape Province.

One of the potential environmental issues that has been identified, is the impact of the proposed development on the existing land use and agricultural activities.

This Agricultural Impact Assessment therefore provides specialist input to assess land use and agricultural impacts that may result from the construction and operation of Hotazel 2The objectives of this study were to consider possible temporary and permanent impacts on agricultural production that may result from the proposed construction and operation of Hotazel 2.

2. APPROACH AND METHODOLOGY

The approach was to compile a natural resource database for the study area. This would include all necessary information to determine the agricultural potential and risks for farming on this land unit. The proposed development would then be considered in terms of possible impacts it may impose on agricultural production of the unit and on the surrounding area.

The resource data was obtained from the Agricultural Geo-referenced Information System (AGIS) and then compared to a field survey that was conducted on 5th and 6th of June 2018.

3. ASSUMPTIONS AND UNCERTAINTIES

A desktop study was conducted to obtain regional information. Climatic conditions, land use, land type and terrain are readily available from a number of sources, including published literature, GIS information and satellite imagery. This information that was collected was confirmed, as far as possible, during the field survey.

The site visit was conducted during the winter season. Therefore, information on the summer conditions could not be verified and remains the result of the desktop study.

4. DESCRIPTION OF THE PROPOSED PROJECT

Hotazel 2 is to consist of solar photovoltaic (PV) technology with fixed, single or double axis tracking mounting structures, with a net generation (contracted) capacity of 100 MW, as well as associated infrastructure, which will include:

- On-site switching-station / substation;
- Auxiliary buildings (gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Inverter-stations, transformers and internal electrical reticulation (underground cabling);
- Access and internal road network;

- Laydown area;
- There are three options proposed to connect Hotazel 2 to the Eskom Hotazel Substation:
    - Option 1 (Preferred): Overhead 132kV powerline from the Hotazel 2 on-site substation/ collector switching station to the Eskom Hotazel substation.
    - Option 2: Via a loop in loop out (LILO) into the Hotazel-Eldoret 132kV line.
    - Option 3: Overhead 132kV powerline from the Hotazel 2 on-site substation/ collector switching station to the Hotazel Solar collector switching station.
- Rainwater tanks; and
- Perimeter fencing and security infrastructure.

5. THE POTENTIALLY AFFECTED ENVIRONMENT

This section provides a general description of the immediate surrounding environment, potentially affected by the construction, operation and closure of the proposed Hotazel 2.

5.1 Locality

Hotazel 2 is proposed on the Remaining Extent (Portion 0) of the Farm York A 279, in the Joe Morolong Local Municipality, in Northern Cape Province. The project is located approximately 3km south-east of the town of Hotazel. Access to the site is gained directly from the R31 provincial road – see Figure 1.

The site coordinates are as follows:

Corner Beacon	Latitude	Longitude
North-West Corner	27°12’36.73’’S	22°59’0.83’’E
North-East Corner	27°12’14.59’’S	23°0’9.84’’E
South-West Corner	27°13’15.81’’S	22°59’45.94’’E
South-East Corner	27°12’52.61’’S	23°0’25.18’’E

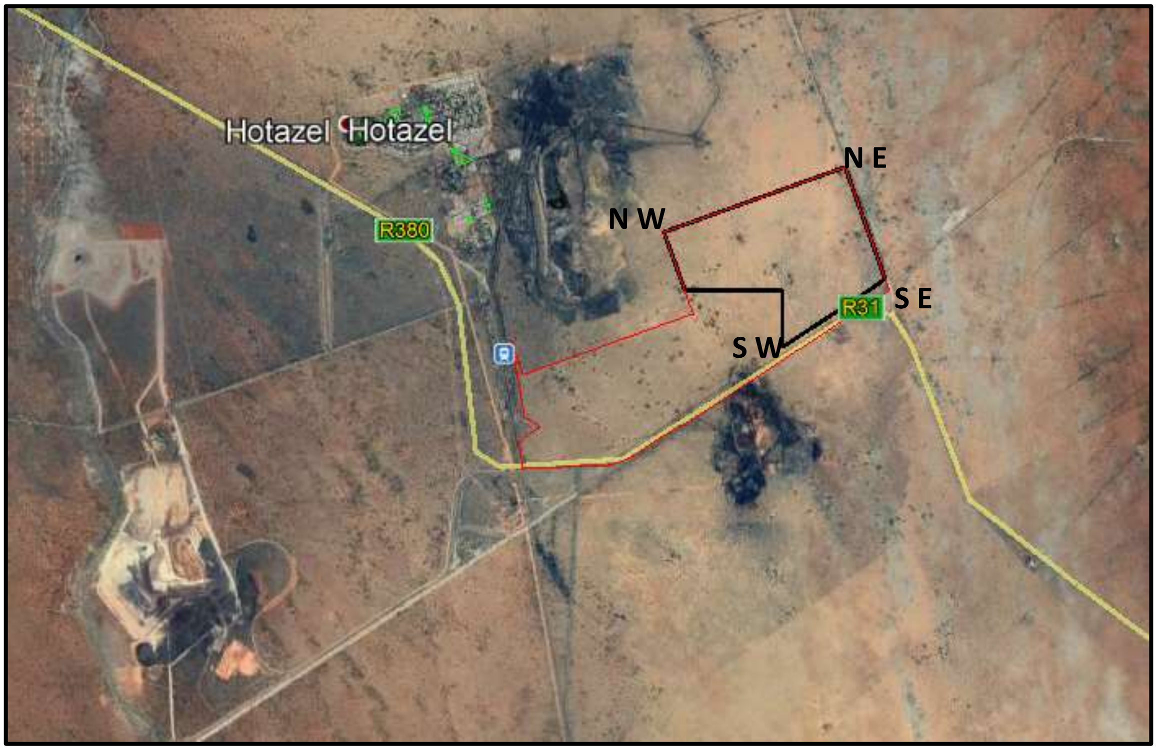
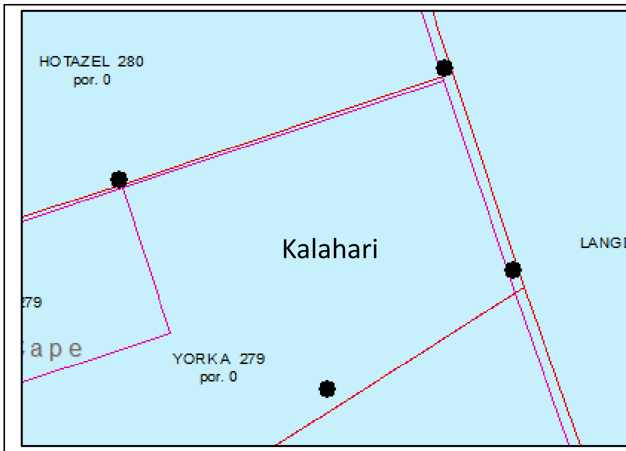


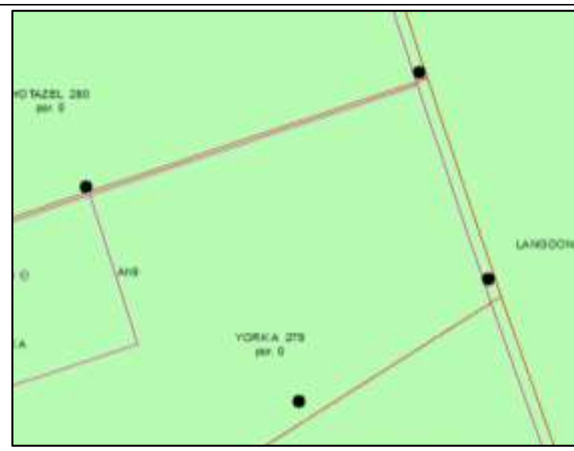
Figure 1: Location of the site (in black) on the Remaining Extent (Portion 0) of Farm York A 279

5.2 Physical description

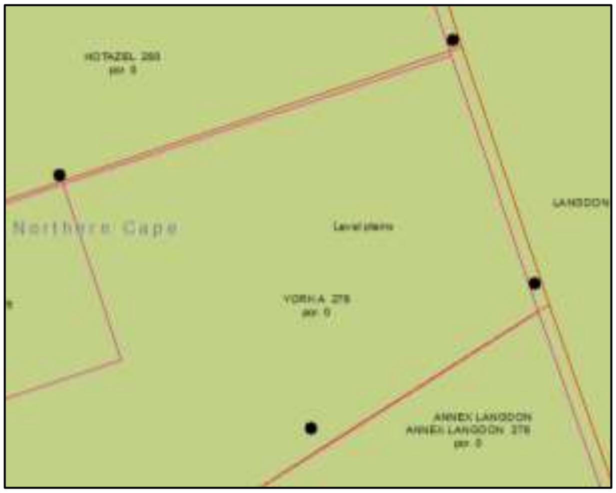
The natural resource theme maps contained in Figure 2, give an overall view of the site.



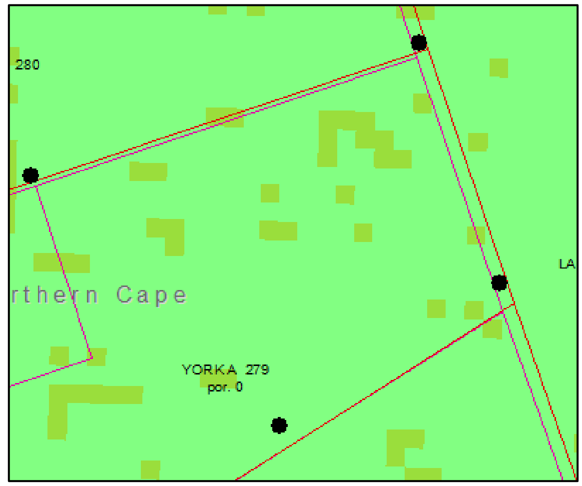
Geology: Kalahari



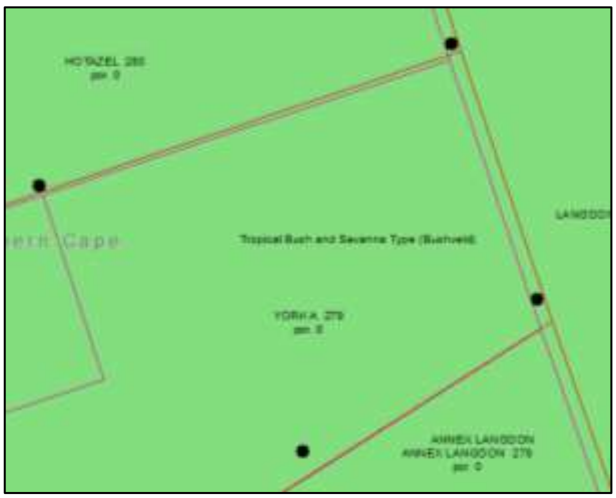
Land Type: Ah 9



Terrain type: Level plains

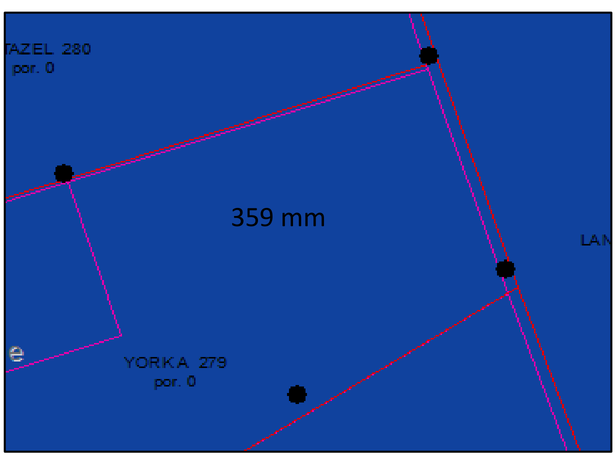


Slope: light green - <2%; dark green - 2.1–5%

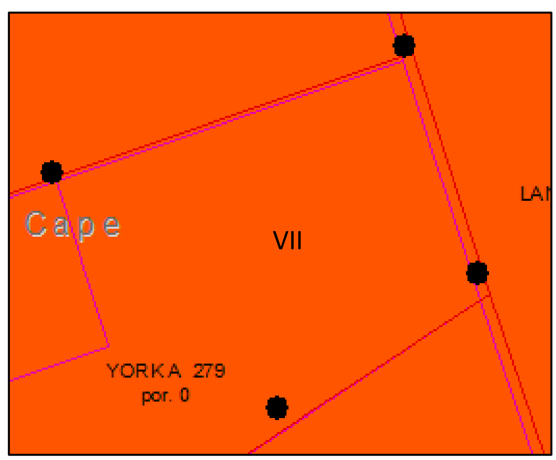


Acocks veld type: Tropical Bush and Savanna type (Bushveld)

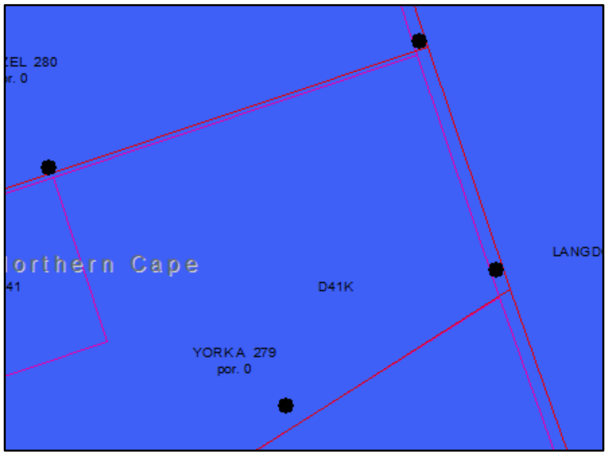
Vegetation type: Kathu Bushveld



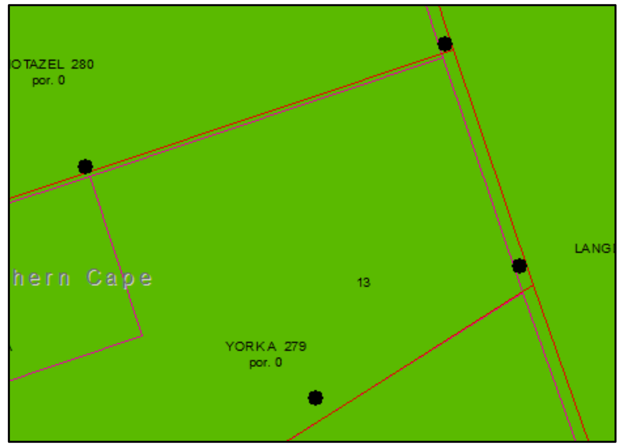
Annual rain fall: 359 mm



Land capability class: VII



Water management area: Vaal river D41K



Carrying capacity:13 ha/Large Stock Unit

Figure 2: Natural resource data (AGIS)

5.3 Climate

The Kalahari region has consistent temperatures with summer and early autumn rainfall. Winters are very dry. The wettest part of the Kalahari region appears in the east, with a mean annual precipitation (MAP) of 500mm/annum, and driest in the west, with a MAP of 120 mm/annum. The MAP for the whole Ecozone is 250 mm/annum. The region is classified as an arid zone with a desert climate. The specific parameters applicable are set out in Table 1.

Table 1: Climatic information

Climate						
Rainfall		Evaporation	Temperature			
Month	**Monthly mm**	**Monthly mm**	**Max °C**	**Min °C**	**Mean °C**	**Heat units**
January	63	270	33.7	18.5	26.1	499.1
February	60	284	32.4	17.9	25.1	422.8
March	79	294	29.7	15.8	22.7	393.7
April	33	277	25.7	11	18.8	264
May	21	210	23.2	6.1	14.6	142.6
June	08	193	20.6	2.3	11.4	33
July	00	144	20.4	2	11.2	37.2
August	03	115	23.1	4	13.6	111.6
September	06	91	23.6	8.7	17.4	222
October	16	106	29.7	12.5	21.1	344.1
November	30	154	31.7	15.2	23.4	402
December	43	213	33.0	17.4	25.2	471
Total/Mean	**362**	**2351**	27.2	10.95	19.2	

5.4 Geology

The geology belongs to the super group KALAHARI with the occurrence of the Transvaal Rooiberg and Griqualand–West sequences.

Lithology (parent material) refers to the primary outcrop as Sand and Limestone and the sub outcrop as Dolomite, Jaspilite and Lava.

The Sand is also known as loess, which is sediment made up from silt sized particles of sand and clay, normally highly calcareous, deposited by wind.

Limestone is a sedimentary rock consisting largely of calcium carbonate, which is usually derived from shells of minute marine or fresh water animals. Sand clay and minerals such as magnesia or iron oxide are also present.

Dolomite consists of carbonate of calcium and magnesium. Dolomite usually occurs as invisible crystals, but in very large rock masses. The origin of dolomite is partly biochemical as it was formed by precipitation and the action of algae. The band of dolomite formed is interspersed with shale and minerals. As with limestone, dolomite is soluble in water and can be released into the soil profile with the clay of the shale and nutrients of minerals.

5.5 Vegetation

This site is classified by Acocks (1988) as tropical bush and savannah bushveld within the Kathu Bushveld vegetation type. Typical trees include Camel thorn Acacia (*Acacia erioloba),* Umbrella Acacia (*Acacia tortilis)* and Black thorn Acacia (*Acacia mellifera).* Indigenous and alien Mesquite *Prosopis* species are invasive in degraded and disturbed areas. The indicator grasses are listed in the table below.

Table 2: Indicator Grasses

Common name	**Botanical name**	**Gazing value**	**Ecological value**
Small Bushman Grass	Stipagrostis Obtusa	Very high	Decreaser
Lemann's Love Grass	Eragrostis Lehmanniana	Medium	Advancer
Tassel Three-awn	Aristida Congesta	Very low	Advancer
Carrying Capacity	13 ha/ Large Stock Unit (LSU))		
Land Use	Livestock and Game farming		

5 6 Topography

The site has an almost level topography with the straight shape and slope gradient of 0.5%.

The cross section in Figure 3 provides information regarding the shape of the slope within the development footprint. It shows a straight shape for the foot slope (4).

This information is valuable when interpreting the land type data, as this will indicate what soil forms can be expected in each terrain unit. It is expected to find deeper soils on concave soils with water locked soils at foot slopes and valley bottoms.

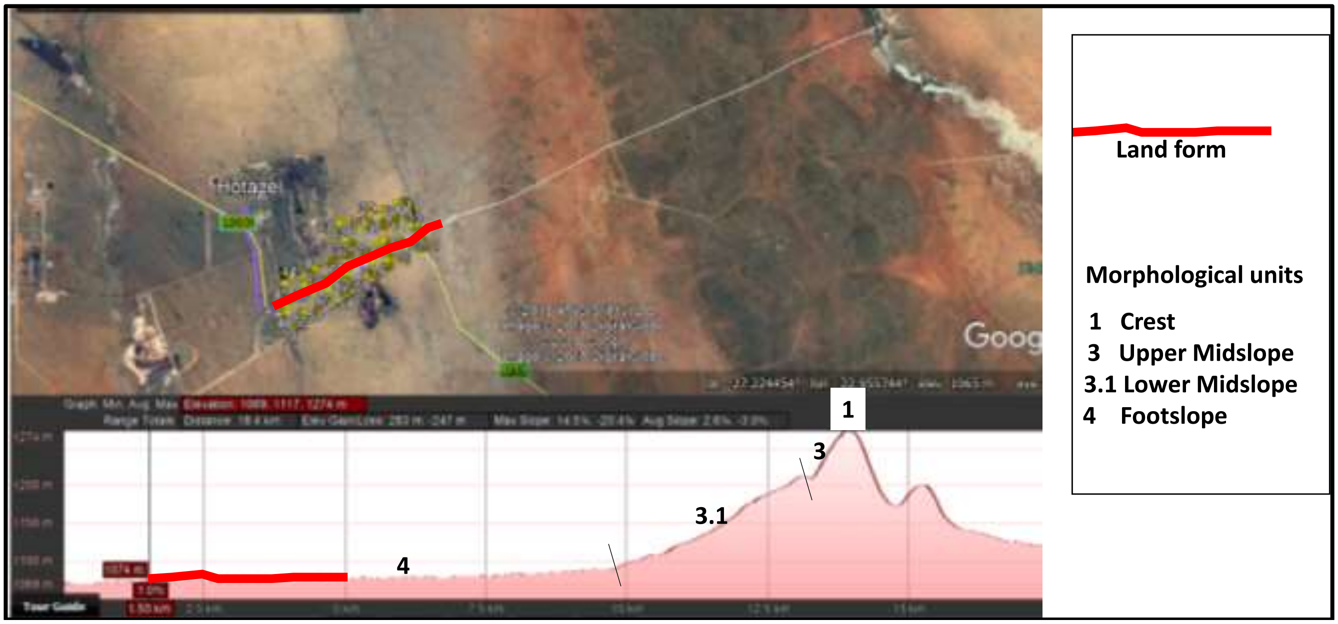


Figure 3: Slope cross section.

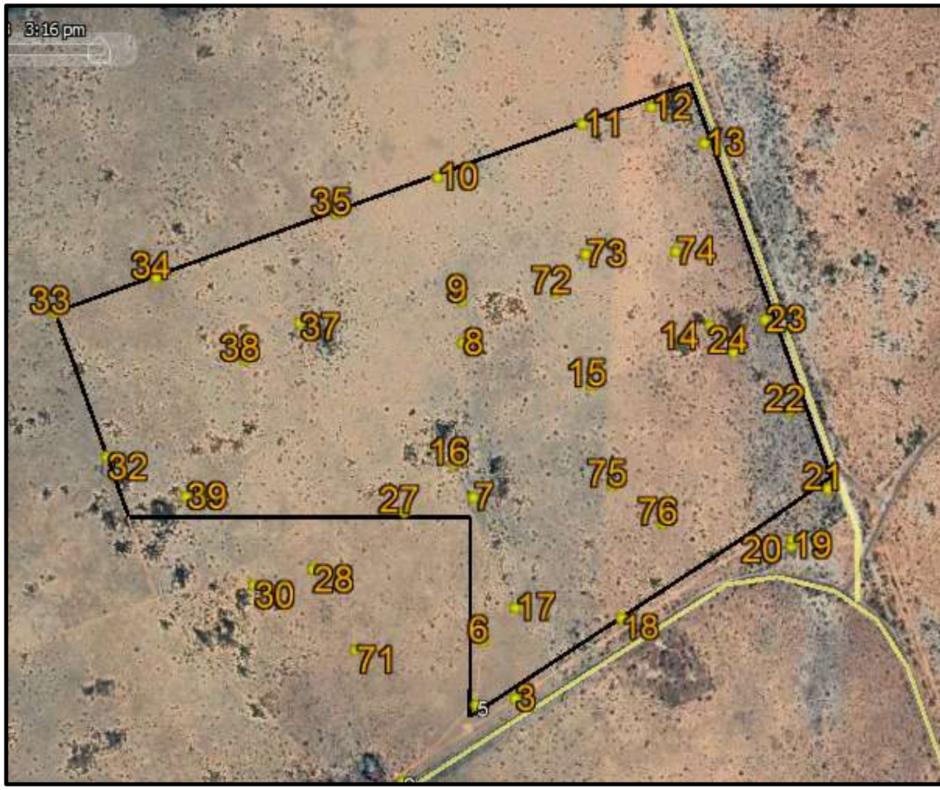
5.7 Soil

Soil and terrain information was obtained from the Land Type database. The desktop review provided a baseline agricultural and land use profile, focusing on the specific geographical area potentially impacted by the proposed project.

Land type refers to an area with similar climate, topography and soil distribution patterns, which can be demarcated on a scale of 1:250 000.

The Land Type map in Figure 2 shows that the pedosystem **Ah 9** was allocated to the Remaining Extent (Portion 0) of Farm York A 279. This refers to red or yellow high base status soils >300 mm deep. The pedosystem is predominately located on a Footslope (95%) which has a slope gradient of less than 1 %. The dominant soil type predicted is an apedal, fine sandy textured soil with effective soil depth in excess of 1200 mm. Very low mechanical limitations are predicted.

On 5th and 6th of June 2018, the site was visited to conduct a soil survey. An augering survey was carried out, assigning a unique number to each augering point and capturing the physical and morphological information on an observation coding sheet. The observation points and their coordinates are shown in Figure 4.



Points	Latitude	Longitude	Points	Latitude	Longitude
3	27.82057	22.99747	24	27.211262	23.004053
6	27.21903	22.99651	25	27.22196	22.99313
7	27.21518	22.39621	27	27.21555	22.99412
8	27.211011	22.995886	28	27.2171	22.99137
9	27.21102	22.99589	30	27.21953	22.98953
10	27.20989	22.99585	32	27.21409	22.98514
11	27.20514	22.99949	33	27.21033	22.98366
12	27.20468	23.01157	34	27.20928	22.98663
13	27.20565	23.03317	35	27.20755	22.99206
14	27.21056	23.00335	37	27.21242	22.99341
15	27.21215	22.99977	38	27.22012	22.98908
16	27.21426	22.99561	39	27.215157	22.987523
18	27.2184	23.00068	71	27.21827	22.99744
19	27.21646	23.0058	72	27.2179	22.99841
20	27.21215	23.00335	73	27.21626	22.99831
21	27.21215	22.99977	74	27.21509	22.9982
22	27.21426	22.99561	75	27.21403	22.99821
23	27.21039	23.00501	76	27.22267	22.99389

Figure 4: Soil survey Hotazel

Table 3 gives a summary of the soil physical properties. Three field observation forms are copied in the table and represent all observation points on site.

Table 3: Soil physical properties

OBS	16	COMMENT													
LAT	27.214260	SLOPE GRAD		1			MOISTURE		L						
LONG	22.995610	SLOPE SHAPE		R			EROSION		L						
	FORM	Cv	TSD	120	WET	0	HOR	TYPE	DEPTH	COL	CLAY	S-GR	CONS	STRUC	STONE
	FAM	3100	ESD	120	C	I	1	A	30	7.5YR5/6	6	Vf	5	sg	0
	ROUGH	1	ASD		GEO	L2	2	B	120	7.5YR5/8	6	Vf	5	a	0
	TERR_POS	6	LTN		PHOTO		3								

Soil Properties	A Horizon Topsoil	B Horizon Sub-soil	C-Horizon Sub-strata
Texture	Very fine sand	Very fine sand	Not specified
Consistency	Loose to very loose	Loose to very loose	
Structure	Single grain	Apedal	
Colour	Strong Brown	Strong Brown	
Horizon Depth	300mm	>1200mm	>1500 mm
Depth limitation	None < 1500 mm		
Effective Depth	1200 mm		
Carbon content	Low <3%		
Consistency	Loose		
Terrain position	Foot Slope		
Geology	Dolomite formations/Aeolian sand		
Slope shape	Strait		
Slope gradient	1%		
Moisture availability	Low		
Erosion potential	Low. Susceptible to wind erosion if vegetation is altered.		
Leaching status	Eutrophic		
Transition	Non Luvic		
Soil Form	Clovelly		
Soil Family	Setlagole		

OBS	20	**COMMENT**		geel Fw											
LAT	27.210560	**SLOPE GRAD**		1			**MOISTURE**		L						
LONG	23.003350	**SLOPE SHAPE**		R			**EROSION**		L						
	FORM	Fw	**TSD**	120	**WET**	0	**HOR**	**TYPE**	**DEPTH**	**COL**	**CLAY**	**S-GR**	**CONS**	**STRUC**	**STONE**
	FAM	1210	**ESD**	120	**C**	l	**1**	**A**	30	10YR5/4	6	Vf	5	sg	0
	ROUGH	1	**ASD**		**GEO**	L2	**2**	**B**	120	10YR5/6	6	Vf	5	sg	0
	TERR_POS	6	**LTN**		**PHOTO**		**3**								

Soil Properties	A Horizon Topsoil	B Horizon Sub-soil	C-Horizon Sub-strata
Texture	Very fine sand	Very fine sand	Not specified
Consistency	Loose to very loose	Loose to very loose	
Structure	Single grain	Single grain	
Colour	Yellowish Brown	Yellowish Brown	
Horizon Depth	300mm	>1200mm	>1500 mm
Depth limitation	None < 1500 mm		
Effective Depth	1200 mm		
Carbon content	Low <3%		
Consistency	Loose		
Terrain position	Foot Slope		
Geology	Dolomite formations/Aeolian sand		
Slope shape	Strait		
Slope gradient	1%		
Moisture availability	Low		
Erosion potential	Low. Susceptible to wind erosion if vegetation is altered.		
Leaching status	Eutrophic		
Transition	Non Luvic		
Soil Form	Fernwood		
Soil Family	Hopefield		

OBS	19	COMMENT		ou pad lyk soos Cg											
LAT	27.216460	SLOPE GRAD			1		MOISTURE		L						
LONG	23.005800	SLOPE SHAPE		R			EROSION		L						
	FORM	Wb	TSD	20	WET	0	HOR	TYPE	DEPTH	COL	CLAY	S-GR	CONS	STRUC	STONE
	FAM	1000	ESD	20	C	l	1	A	20	10YR4/4	6	F	5	sg	20
	ROUGH	1	ASD		GEO	L2	2								
	TERR_POS	6	LTN	ma	PHOTO		3								

Soil Properties	A Horizon Topsoil	B Horizon Sub-soil	C-Horizon Sub-strata
Texture	Very fine sand		Not specified
Consistency	Loose to very loose		
Structure	Single grain		
Colour	Strong Brown		
Horizon Depth	200mm		>1500 mm
Depth limitation	Man-made soil deposit		
Effective Depth	200 mm		
Carbon content	Low <3%		
Consistency	Loose		
Terrain position	Foot Slope		
Geology	Dolomite formations/Aeolian sand		
Slope shape	Strait		
Slope gradient	1%		
Moisture availability	Low		
Erosion potential	Low. Susceptible to wind erosion if vegetation is altered.		
Leaching status	Eutrophic		
Transition	Non Luvic		
Soil Form	Witbank		
Soil Family	Thornlea		

The dominant soil form on site is Clovelly with an effective depth of 1200+ mm. The sub-dominant is Fernwood and is closely related to Clovelly, with the same texture, colour and soil depth.

The Witbank soil was found on an existing road within the property of the facility.

Although the soil depth is in excess of 1500 mm, the effective wetting depth is limited by the texture of the soil and the amount of rainfall. This is mainly because of the excessive drainage and poor water holding capacity of the soil (sand can only retain 12% of rainfall). Low carbon and clay content lead to low nutrient availability to plants. Consistency is the degree of cohesion and adhesion within the soil mass or its resistance to deformation. With a loose consistency, the soil is very vulnerable if not covered with vegetation.

5.9 Veld Condition

A veld condition assessment, by visual acknowledgement, was conducted simultaneously with the soil survey. The photos in Figure 4 show the veld condition. The vegetation type is Kathu Bushveld (Savannah biome). The composition of the grazing varies from open grass with low to heavy encroachment of Black Thorn acacia (*Acacia mellifera*), as can been seen in Figure 4. Encroachment takes place when veld is over-grazed or where the soil has been disturbed.

Outside site East of OBS 21

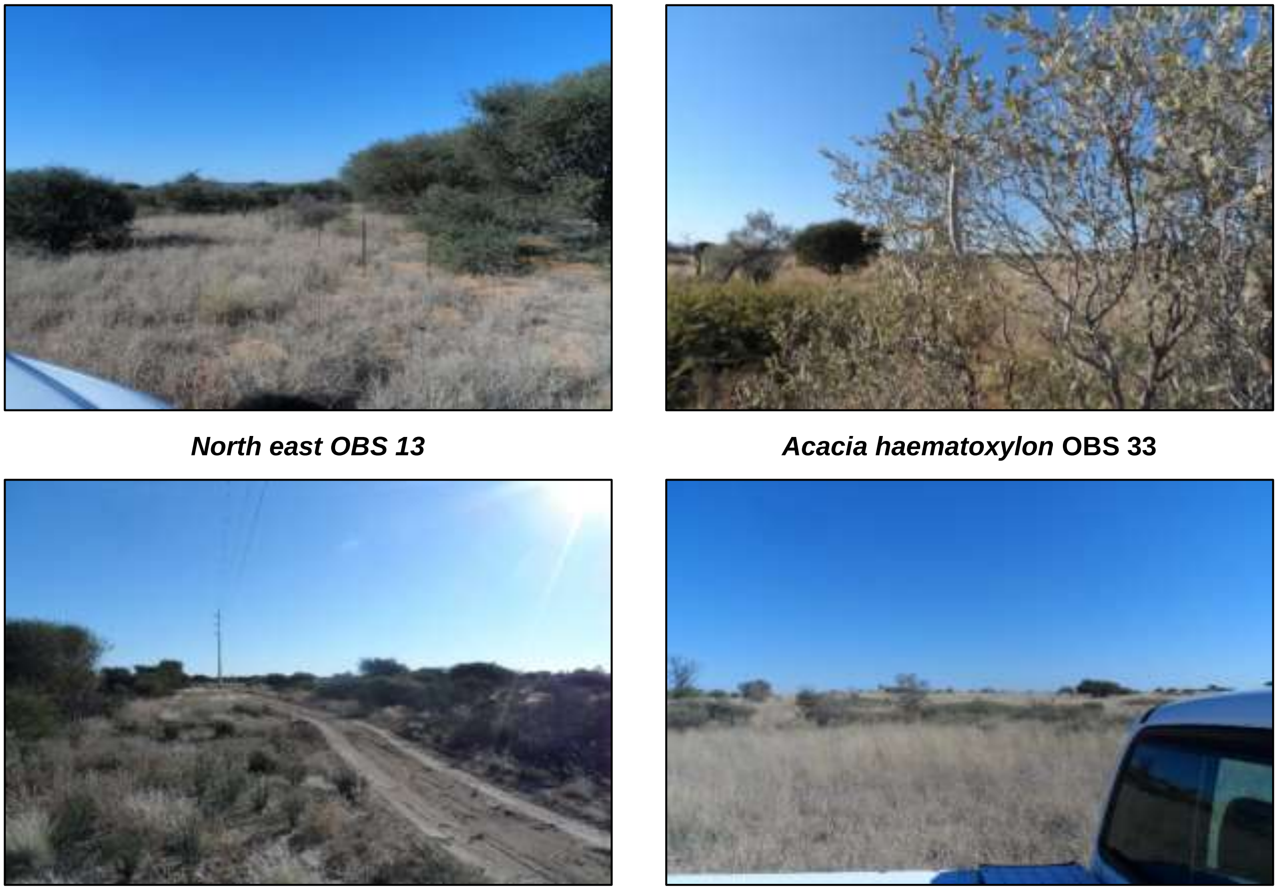
Fernwood OBS 23

Open savanah veld OBS 76

***Savanah with medium acacia* OBS 08**

Borehole and pump OBS 05

***South border* OBS 18**



North east OBS 13

***Acacia haematoxylon* OBS 33**

Close to access postion OBS 03

***North west boundry* OBS 39**

Figure 4: Typical Vegetation and Existing Infrastructure

5.10 Infrastructure on the Farm

The farm is used for extensive grazing with cattle. The infrastructure, demonstrated in Figure 5, consist of a cattle handling facility at point 16, house and handling facilities at point 60 (not inside footprint) and internal fencing, shown as white lines. Point 5 marks the position of a borehole and pump. Point 20 shows the position where an antenna is erected as well as a windpump (not inside footprint). Red lines on the map represent existing transmission and railway lines traversing the farm as well as the cadastral boundaries.

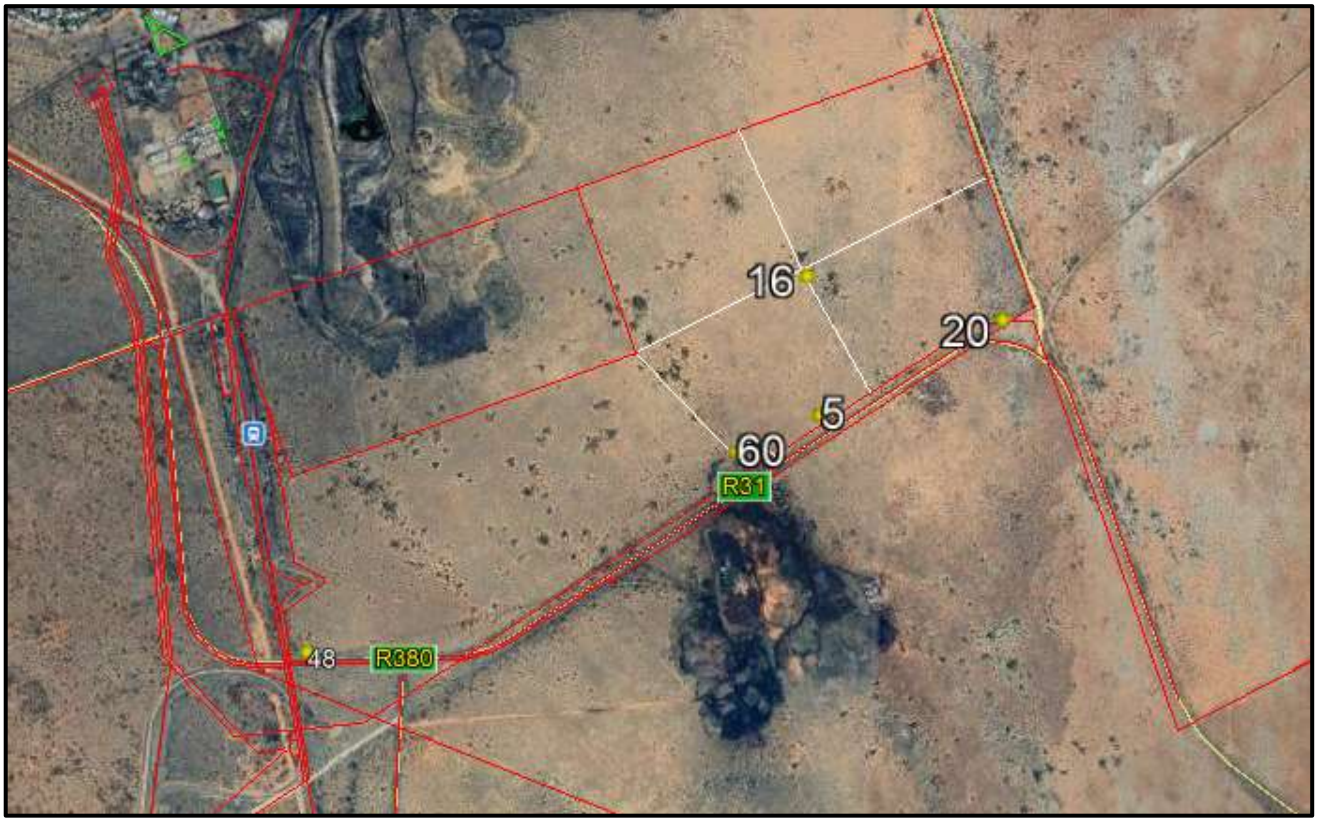


Figure 5: Infrastructure on Farm

6. AGRICULTURAL POTENTIAL OF THE SITE

6.1 Soil potential

Effective rooting depth

Any plant needs three basic elements to grow successfully, namely air, moisture and nutrients. Normally, a 1.2m deep soil profile is adequate to provide the required air and moisture for growth, with plant nutrition added as required. However, some layers in the soil prevent plant roots development. These include wetness, stone layers, compaction, and abrupt change in soil texture or structure. The nearer to the top this restrictive layer occurs, the more negative the effect on the plant.

The very loose consistency, single grain structure, fine to very fine sand grade and low clay content all contribute to a very fast permeability. The result is a very low plant available water regime with short (Rainfall/irrigation) intervals required for effective crop production. Although the soils are in excess of 1.2m deep, the capability is restricted by the texture and climate for production.

Texture

Soil texture, in its simplest way, is grouped into three broad textural groups: sandy soils (<20% clay), loamy soils (20-35% clay) and clayed soils (>35% clay). Sand grade plays an important role in sandy soil in terms of the tendency towards compaction and water storage capacity. See Table 4 for the influence of texture on soil potential.

Table 4: Influence of soil texture on its potential

PROPERTIES	SANDY SOILS	LOAMY SOILS	CLAYED SOILS
Fertility relations			
Nutrient adsorption	Low	Medium	High
Fertilizer recommendations	High	Medium	Low
Water relations			
Water infiltration	Rapid	Medium	Rapid if cracks appear
Drainage and leaching	Excessive	Good	Fair – Poor
Water storage	Very Low	Medium	High
Aeration	Very Low	Moderate	Poor
Erosion relations			
Wind erosiveness	High	Low	Moderate
Water erosiveness	Low	High	Low-Medium

The agricultural potential is graded low to very low. Soils on site have a sandy texture. This causes low retention and availability of soil nutrients and plant available water, while it increases the possibility of erosion.

Leaching Status

Leaching involves the movement of ions such as Ca^2, Mg^2 and Na dissolved in ground water down the soil profile. Depending on the amount of rainfall, leaching can be high (Dystrophic), medium (Mesotrophic) or, as in this case, low (Eutrophic).

Eutrophic refers to soil that has suffered little or no leaching, such that the sum of the exchangeable Ca, Mg, K and Na is more than 15 cmol /kg clay. Such a soil has a high base status.

Simultaneously with leaching, eluviation (or movement of insoluble particles such as clay minerals) takes place when water moves through the profile. Again, in this case, the low movement is because of low rainfall.

The leached ions (positively charged) are adsorbed by the clay, which is negatively charged to store nutrients in the profile. The ability to adsorb cations is referred to as cation exchange capacity (CEC).

Soils identified in this study were formed under eutrophic conditions and have a high base status. The agricultural potential is low because of the low nutrient availability and buffering capacity status of the soil because of the sandy texture.

Climate

A crop requires specific elements to yield successfully at the end of its growing season, of which heat units and moisture are the most important. The time when these elements are required, are of significant importance.

The climate conditions and their relation to soil properties and plant physiology, determine the agricultural capability of a specific land unit. The climatic conditions are shown in Figure 6.

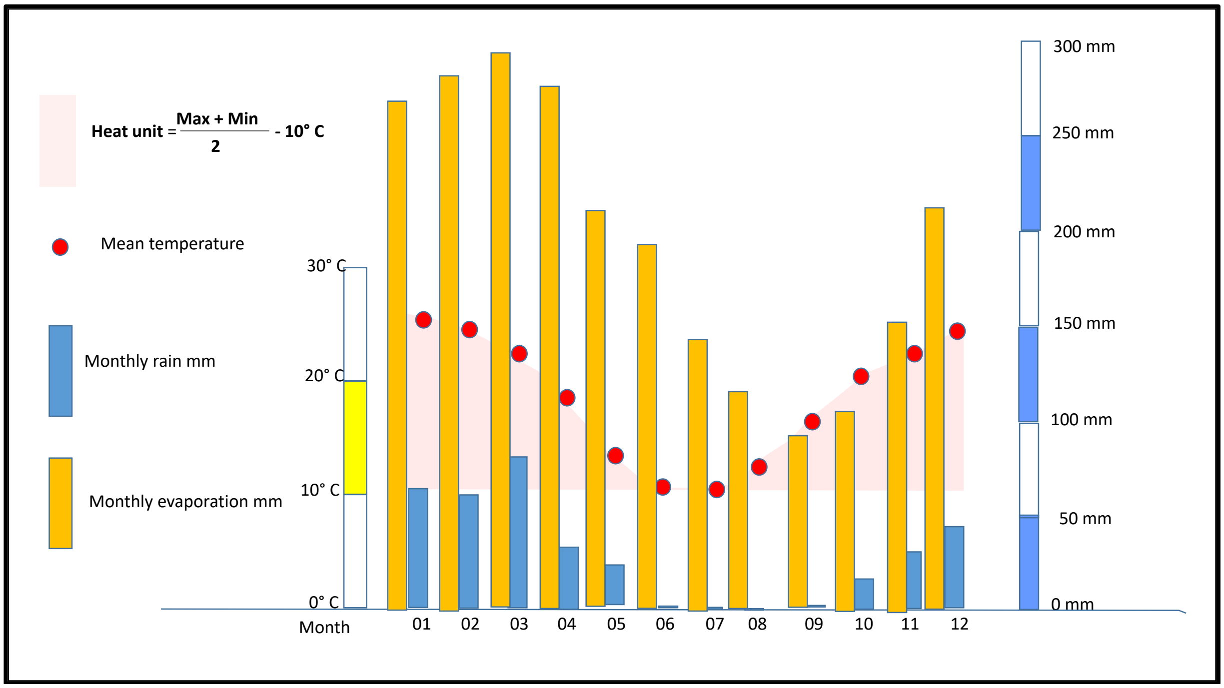


Figure 6: Climatic conditions applicable on the proposed site

The growing season for a crop is determined by the available heat units and predicted rainfall.

Plant water requirements are determined by the combined loss of water through evaporation from the ground surface and through plant transpiration (known as evapotranspiration). A crop factor is used to distinguish the specific crop water requirements during the growing phase through the season.

For example, maize, planted on the 4th of December, will have a crop factor of 0.6 in March. With an evapotranspiration rate of 294 mm in March, the required precipitation is 176 mm as opposed to the 79 mm predicted on site.

Sustainable cash crop production is not recommended under these conditions.

6.2 Land Capability and Suitability for Agriculture

The land is classified as capability class VII.

Land in Class VII has continued limitations that cannot be corrected, such as:

- Severe erosion hazard
- Low water holding capacity
- Severe climate

These limitations make it generally unsuited for cultivation and limit its use largely to pasture, range and woodland.

6.3 Agricultural Sensitivity

The sensitivity screening with the DEA tool is an indicator for agricultural potential. High sensitivity will refer to high agricultural potential. The results of applying the screening tool are shown in Table 5. Note that the combined agricultural sensitivity reflected in the screening tool, was medium.

The DEA Screening tool identifies the following sensitivity themes of the site.

Table 5: Sensitivity rating

Agricultural Sensitivity	**Screening tool rating**
Development zone	Strategic Transmission Corridor
Agricultural combined sensitivity	Medium
Relative animal specie	Low
Aquatic biodiversity combined	Low
Relative landscape (Solar) theme	Medium
Relative plant species theme	Low
Relative RFI	Low
Relative terrestrial biodiversity	Low
Relative defence combined	Low

7. ASSESSMENT OF ACCESS ROAD AND GRID CONNECTION

7.1 Access Road

Access to the site is at point 3 in the figure below. The access is directly from the R 31 provincial road which connects Hotazel with Kuruman.

The main access road will have a width of 8 m and length of ± 100m.

Internal access roads, shown in green in Figure 7 below, will have a length of approximately 17 km and a maximum width of 5m.

The dominant soil is a Clovelly 3100 with a soil depth of >1200 mm. The soil is valued as low potential, due to the low clay content (<10%), loose consistency of top and sub-soil and arid climate. Black thorn Acacia is prominent.

Precautionary measures must be taken to mitigate the risk of ground disturbances with the construction of the access roads. Attention should be given to drainage, water flow, erosion and the existence of *Acacia eriloba.*

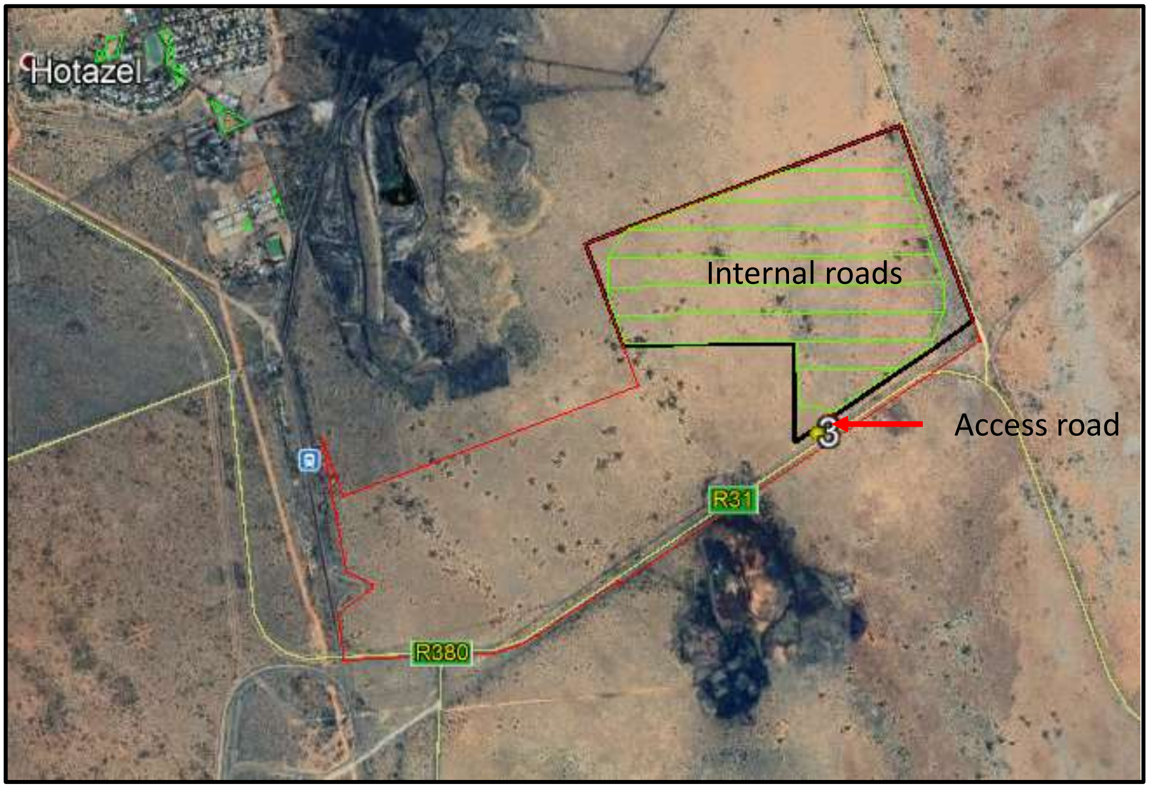


Figure 7: Access and internal roads

7.2 Connection to the Grid

Three options are considered.

Option 1 (preferred) is a ±6.7km overhead 132kV electrical transmission line. To assess the route, the line is buffered by 150 m (i.e. a 300 m corridor) in order to allow for micro-siting. The powerline will have a maximum height of 32m and a servitude width of between 31m and 36m.

The on-site substation/collector switching station will collect the power from Hotazel 2 and transform it from low voltage level (up to 33kV) to 132 kV level. A 132 kV electrical line will transmit the electricity from the Hotazel 2 on-site substation/ collector switching station to the Eskom Hotazel substation.

The overhead line stretches from the Hotazel 2 on-site substation/ collector switching station (OBS 3), and exits the farm near OBS 48 from where it follows the existing alignment of Eskom power lines to the Eskom Hotazel substation (Figure 8).

The dominant soil is Clovelly 3100 with a soil depth of >1200 mm. The soil is of low potential because of the low clay content (<10%), loose consistency of top and sub soil and arid climate.

At **OBS 59** and **48,** the land is disturbed. Possibly soil was borrowed at point 48 for rehabilitating mining area at 59. Precautionary measures must be taken to mitigate the risk of erosion during construction of the overhead line.

Option 2 is a 100m overhead 132kV electrical transmission line from the Hotazel 2 on-site substation/ collector switching station (OBS 3) which will connect via a Loop in Loop out connection into the existing

Hotazel/Eldoret 132kV line. The powerline will have a maximum height of 32m and maximum servitude width of 52m.

Option 3 is a ±1km overhead 132kV powerline from the Hotazel 2 on-site substation/ collector switching station to the Hotazel Solar collector switching station (which has undergone a Part 2 Amendment process). Option 3 follows the same corridor as Option 1, but only up until it reaches the Hotazel Solar collector switching station. The powerline will have a maximum height of 32m and a servitude width of between 31m and 36m.

All options of the overhead line will have a low impact on agricultural production, as grazing can continue and the lines are in a compact, narrow gauge.

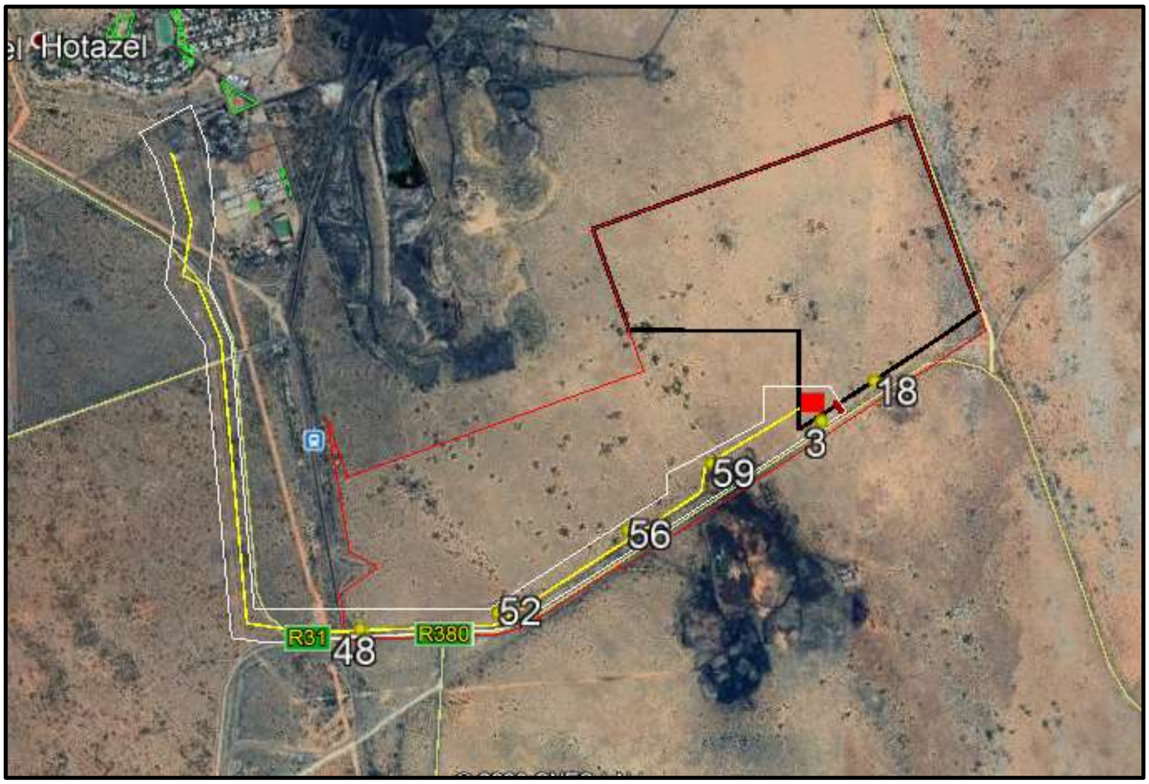


Figure 8: Grid connection (with photo reference points) – The yellow line represents the indicative routing of option 1.

Overhead line under construction **OBS 18**

Near on-site switching / substation OBS 3

Degraded veld near kraal **OBS 59**

Low bush and sparse grazing **OBS 56**

New constructed line exit farm **OBS 52**

Former borrowing pit **OBS 48**

Figure 9: Grid connection photos

8. ASSESSMENT OF PROPOSED DEVELOPMENT

The development proposed is to construct a commercial photovoltaic (PV) solar energy facility (SEF) on ± 230 ha agricultural land. The approximate area that each component of the SEF will occupy is summarised in Table 6.

Table 6: Components of the development

SEF Component	Estimated Area	% of Development Area (230 ha)	% of Farm Area (636.7946 ha)
PV Structures/modules	±210 ha	91.3%	33%
Internal roads	±9 ha	3.91%	1.41%
Auxiliary buildings	±1 ha	0.43%	0.16%
Substation	±2 ha	0.87%	0.31%
Other	±8 ha	3.47%	1.26%

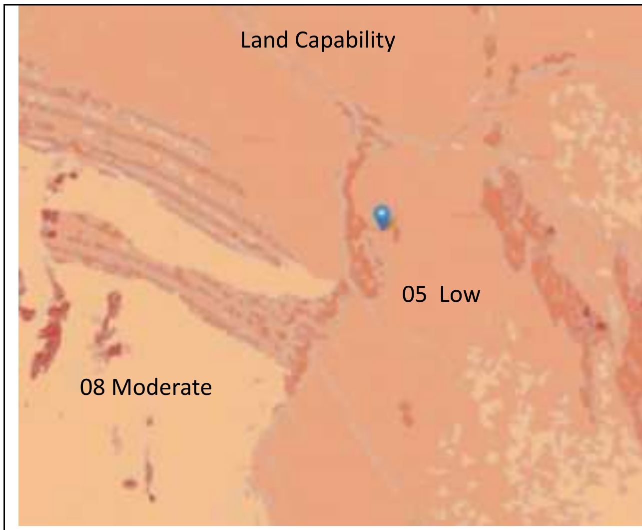
From the detail above, the potential impacts that the facility may have on agricultural development of the farm are discussed next.

8.1 Loss of agricultural land

Figure 10: Footprints of Hotazel Solar and Hotazel 2

The loss of agricultural land has to be assessed with the knowledge that the entire farm (Remaining Extent of Farm York A 279) could be transformed, by the development of the proposed Hotazel 2 facility and the adjacent Hotazel Solar facility (Figure 10).

The two maps in Figure 11 show the land capability for agriculture and restrictions caused by mining activities and its supporting infrastructure in the immediate vicinity of the site.



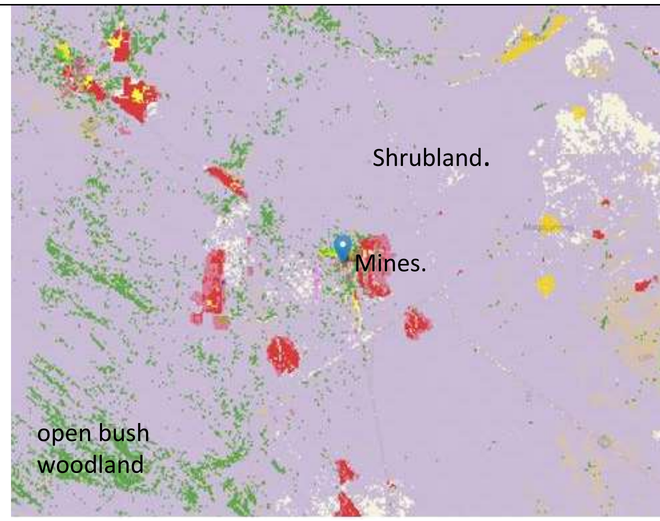


Figure 11: Land capability and landcover maps of the area (AGIS)

The locality of the Remaining Extent (Portion 0) of Farm York A 279, fall in the Strategic Transmission Corridor Development zone. This is mainly because of the mining enterprises that surround it. The land capability is low with open bush, wood- and shrubland as the effective natural resources in an arid climate. There are no cultivated fields noted. The farm and its surrounding area are utilized as grazing for cattle. The Remaining Extent (Portion 0) of Farm York A 279, with a farm size of 636 ha and a carrying capacity of 13 ha /LSU, can only support 48 large stock units (LSU) with sustainable grazing, which does not qualify as an economical enterprise. The infrastructure associated with the mining activities, namely transmission and railway lines and roads confine the farm to a secluded entity.

The loss of the whole farm to the proposed solar PV facilities will be low, considering the low contribution of livestock raised.

8.2 Removal of vegetation

The development of the proposed facility will take place in three phases, namely construction, operation and decommissioning. During each of these phases, vegetation will be exposed to impacts caused by mechanical disturbance.

Construction phase

During this phase, vegetation is stripped, topsoil is removed and stock piled, access roads are constructed, structures are erected and vegetation resettled. Where soil conditions allow, topsoil should be left in situ as far as possible.

The stripping should be executed in a selective way. Only the bushes and trees should be removed, leaving the grass intact. Only where trenches for cabling are needed, top soil should be removed and piled up for reuse with rehabilitation.

The resettlement of vegetation form the basis on which the last two phases shall perform. Therefore, this is the starting point of the rehabilitation process.

When veld is re-established after construction, the seed of climax grasses adapted for the site should be used. Grass species recommended are:

- Tassel Three–awn (*Aristida congesta*), which has low grazing value but is important to cover bare patches, thus preventing erosion;
- Small Bushman Grass (*Stipagrostis obtusa)*, which has high grazing value and good binder of sand;
- Tall Bushman Grass (*Stipagrostis clliata*) a palatable grass with high grazing value and good binder of sand;
- Lehmann's Love Grass (*Eragrostis lehmanniana*), which is moderately palatable and good for stabilizing eroded soil;
- Guinea Grass (*Panicum maximum*), a very palatable good cultivated pasture; and
- Wool Grass (*Anthephora pubescens*).

Operational phase

This is the longest phase (25-30 years). Adaption to new methods of operating must be incorporated in the management plan.

Decommissioning phase

When the facility reaches the end of its economic lifespan, decommissioning will take place. The area must then be restored to its natural stage.

8.3 Altering of drainage patterns with construction of roads support buildings and PV panels

The facility will be constructed on a footslope with a regular shape, a slope gradient of <1% and no defined waterway.

The solar panels will be supported by posts without reaching the soil surface. There will be very low obstruction of run-off. The run-off water will flow in a lateral way without concentration into furrows or depressions. When re-vegetation starts, these strips will slow down the flow speed on surface and enhance the infiltration rate.

The facility will have a very low effect on the drainage pattern of the site.

8.4 Possibe spillages of concrete and fuel may impact the soil.

During construction there could be spillages of concrete or fuel that can contiminate soil. With the neccesesary precausion and mitigation this impact will be of low significance.

9. POTENTIAL IMPACTS ON THE AGRICULTURAL ENVIRONMENT

9.1 Methodology to assess impacts

Potential impacts of the proposed project on agriculture were identified and evaluated. Impacts identified through the study were rated in terms of the following criteria:

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected.

- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The duration, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) –assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) -assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long-term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5;
- The magnitude, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment
  - 2 is minor and will not result in an impact on processes
  - 4 is low and will cause a slight impact on processes
  - 6 is moderate and will result in processes continuing but in a modified way
  - 8 is high (processes are altered to the extent that they temporarily cease)
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes
- The probability of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen)
  - Assigned a score of 2 is improbable (some possibility, but low likelihood)
  - Assigned a score of 3 is probable (distinct possibility)
  - Assigned a score of 4 is highly probable (most likely)
  - Assigned a score of 5 is definite (impact will occur regardless of any
  - prevention measures)
- the significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- the status, which will be described as either positive, negative or neutral,
- 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.
- The significance is calculated by combining the criteria in the following formula:

S = (E+D+M)P

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

- The significance weightings for each potential impact are as follows:
  - <30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
  - 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
  - >60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

9.2 Possible impacts during construction

Soil pollution

Soil pollution with contaminants during the construction phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the construction of all facets of the facility: laydown area, concrete foundations of the auxiliary buildings, inverter stations subterranean cabling, main access and internal service roads.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Medium Term (2)	Very short (1)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (21)**	**Low (12)**
Status (Positive or negative)	Negative	Negative
Reversibility	Partly reversible	Fully reversible
Irreplaceable loss of Resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes

Mitigation: Refuelling normally takes place in the laydown area. Proactive measures must be taken which include constructing a designated area where refuelling can take place. This area must have an impervious floor with low wall that will keep the spillage inside. This area should be cleaned with absorbent material on a regular basis. The use of cut-off drains must be incorporated to divert upslope clean storm water around the site into a natural drainage system. On the down slope, polluted water must be collected via a cut-off drain into a leachate collection and recovery system. When spillage accidently takes place, it should be removed and replaced with unpolluted soil. The clean soil can be sourced from excavations nearby. The polluted soil must be piled at a temporary storage facility with a firm waterproof base and is protected from inflow of storm water. It must have an effective drainage system which drains to a waterproof spillage collection area. Contaminated soil must be disposed of at a hazardous waste storage facility.

The following is handy to have available

Ultra-Drain Guard

Oil-Dri Bucket Spill Kit

Cumulative impacts: No, site-bound
Residual Risks: Yes, it is impossible to clear the affected area completely.

Loss of agricultural land

The establishment of the PV Solar facility will be done at the expense of agricultural land. The area to be lost for agricultural development would be 230 ha in size. This includes the area under PV panels, internal service roads and temporary laydown area.

	Without mitigation	**With mitigation**
Extent	Local – Regional (3)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (39)**	**Low (20)**
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes

Mitigation:

The general objective is to position the PV facilities on the lowest potential soil and not in places that may have impact on agricultural activities, drainage lines and places with a sensitive nature, such as protected tree species. Existing road alignments should be followed where possible..

Cumulative impacts:

Impact is low due to the low agricultural potential of the area. However, with increasingly adding facilities, the impact may become more significant if the facilities don't adhere to mitigation measures.

Residual Risks:

No, after decommissioning this impact will be reversed when rehabilitation has been completed.

Risk of erosion

The construction of a PV Solar facility will cause impairment of the land capability with the potential risk of erosion.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)

Magnitude	Low (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Medium(30)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: Clear trees and bushes selectively, leaving grass un-disturbed. Use mechanised machinery when installing posts to eliminate need for foundations. Construct on alternate strips to combat possible erosion.		
Cumulative impacts: No cumulative impacts are expected to occur, as all impacts will be site bounded.		
Residual Risks: No. Effected areas will be rehabilitated, as the impact will only be applicable during construction phase.		

Change in drainage patterns

The establishment of the PV Solar facility may alter drainage patterns with construction and cause erosion.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (1)
Duration	Long term (2)	Long term (2)
Magnitude	Low (2)	Low (2)
Probability	Probable (2)	Probable (2)
Significance	**Low (12)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: Establish structures on the contour. Use grass strips to regulate flow speed		
Cumulative impacts: No, all impacts will be site bounded.		
Residual Risks: No. Effected areas will be rehabilitated when operation has ceased.		

9.3 Possible impacts during operational phase

Soil pollution

Soil pollution with contaminants during the operational phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the maintenance of the facility.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long Term (4)	Long Term (4)

Magnitude	Low (2)	Minor (2)
Probability	Probable (2)	Probable (2)
Significance	**Low (14)**	**Low (14)**
Status (Positive or negative)	Negative	Negative
Reversibility	Partly reversible	Fully reversible
Irreplaceable loss of Resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: Refuelling normally takes place in the workshop of the control building. A designated area for refuelling must be constructed with an impervious floor and low wall that will keep the spillage inside. Any spillage must be cleaned with absorbent material as soon as possible and disposed into clearly marked containers. Where spillage takes place, contaminated soil must be excavated and replaced with unpolluted soil. The contaminated soil should be collected by a licenced landfill contractor.		
Cumulative impacts: No, site-bound.		
Residual Risks: Yes, It is impossible to clear the affected area completely.		

9.4 Possible impacts during decommissioning phase

All components of the facility should be dissembled and roads demolished. Rehabilitation should focus on:

- Demolish and removal of structures;
- Demolish related roads;
- Establish cultivation environment;
- Stabilisation of erosion; and
- Reinstall camp fences and stock watering.

Soil pollution Soil pollution with contaminants during the decommissioning phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the decommissioning of all facets of the facility: laydown area, demolished concrete foundations of the auxiliary buildings, inverter stations subterranean cabling, main access and internal service roads.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Medium Term (2)	Very short (1)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (21)**	**Low (12)**
Status (Positive or negative)	Negative	Negative
Reversibility	Partly reversible	Fully reversible
Irreplaceable loss of Resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: All structures used to contain any fuels or Hazardous substances must be totally decommissioned / removed in compliance with the approved EMPr.		
Cumulative impacts: No, site-bound.		

Residual Risks: Yes, It is impossible to clear the affected area completely.

10. CUMULATIVE IMPACT ASSESSMENT

To assess the cumulative impacts, an overview map showing the land capability, drainage and grazing capacity is used to identify possible impacts that may accumulate as similar developments are developed in a 30 km radius from this facility (Figure 12). There are seven proposed PV power facilities within in a 30km radius, including Hotazel Solar and Hotazel 2. (See map in Figure 12).

Map Reference	Name of Solar Unit	Status
1	Farm Rhodes	To be reviewed
	East Solar Park	Approved 2015
2	Tshepo Solar	Approved 2016
	Kagiso Solar	Approved 2016
	Perth Solar	Approved 2016
3	Adams Solar	Approved 2011
4	Portion farm Shirley	Review
5	Roma	Lapsed
H	Hotazel Solar	Authorised
H	Hotazel 2	Application

When investigating the cumulative impact of similar developments, the most common concerns are:

- Loss of agricultural land
- Altering drainage patterns
- Changing agricultural character to industrial

10.1 Loss of agricultural land

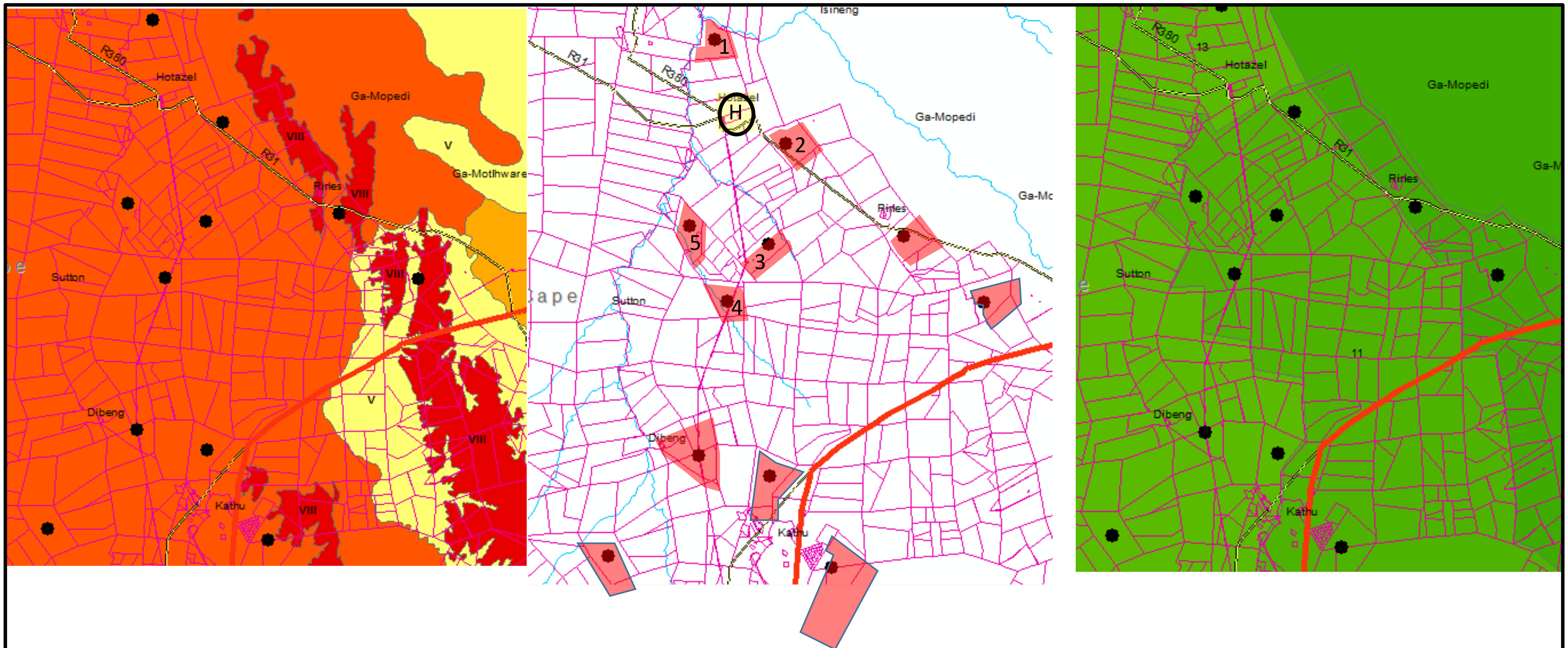
The total area in which these facilities will be erected is classified as land only suitable for grazing, woodland or wildlife (Class VII). The suggested grazing capacity is 11-13 ha/Large Stock Unit.

With every facility added, the loss in land use will escalade with 220 ha or 20 LSU on average.

The land loss will only be temporary (for the time it is leased for the facility). Thereafter it will be returned to the owner, hopefully in a rehabilitated condition.

10.2 Altering drainage patterns

The facilities are located in a low rainfall area with level topography and on soil with a very fast infiltration rate, from which a low runoff is expected. Units 1, 3, 4 and 5 on the map in Figure 12 are positioned on the lowest point in the relief sequence and close to the river, therefore not effecting any drainage patterns. Hotazel 2 and unit 2 also would have no influence on the drainage patterns of the mines, due to the topography and their locality.



LAND CAPABILITY **DRAINAGE** **GRAZING CAPACITY**

Figure 12: Proposed similar developments in the region

10.3 Changing agricultural character to industrial

The region already has an industrial character because of the mining activities, railway infrastructure and electrical infrastructure. The increasing intensified farming methods influence the perspective on "agricultural character". With their low height above soil level, the solar panels could be mistakenly perceived as a horticultural venture under shade net. If sheep were allowed to graze among the panels, the character would be close to agricultural.

Figure 13: Completed facility

The quantity of available soil for agricultural production decreases as result of the footprints of these facilities. The quality of soil decreases in the way the construction of these structures alters the workability of the soil. This includes the physical deformation in the soil profile.		
	Overall impact of proposed project considered in isolation	**Cumulative impact (with mitigation) of the projects in the area**
Extent	Local – Regional (1)	Regional(2)
Duration	Long Term (4)	Long Term (4)
Magnitude	Low(4)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Medium (36)**
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: Ensure that most infrastructure features are erected on transformed or non-arable land. Implement stormwater management as an integral part of planning and as a guideline for the positioning of structures. Use existing roads and conservation structures, as far as possible, in the planning and operation phases. Rehabilitate disturbed areas as soon as possible after construction. Implementation of the EMPr for the facility.		

Clearing of vegetation increases flow speed and a lower infiltration tempo increases silt transport.		
	Overall impact of proposed project considered in isolation	**Cumulative impact of the projects in the area**
Extent	Local (1)	Regional(2)
Duration	Long Term (4)	Long Term (4)
Magnitude	low (4)	Low (4)
Probability	Improbable (2)	Probable (3)
Significance	**Low (18)**	**Medium (30)**
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: Erosion and sediment control with proper water run-off control planning.		

Chemicals, hazardous substances and waste used or generated during live span of the facility accumulate and Pollute soil.		
	Overall impact of proposed project considered in isolation	**Cumulative impact of the projects in the area**
Extent	Local (1)	Regional(2)
Duration	Long Term (4)	Long Term (4)
Magnitude	low (4)	Low (4)
Probability	Improbable (2)	Probable (3)
Significance	**Low (18)**	**Medium (30)**
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: Appropriate handling and storage of chemicals and hazardous substances and waste should be done.		

11. ENVIRONMENTAL MANAGEMENT PROGRAMME

The following should be included in the Environmental Management Programme:

Objective: Prevent and clean up soil pollution		
Project components	• PV energy facility; • On-site substation/ collector switching station; • Access roads; • Power line; and • All other infrastructure.	
Potential impact	Pollution of soil by fuel, cement and other toxic materials	
Activity/risk source	Soil will become contaminated	
Mitigation: Target/Objective	All solid waste must be collected at a central location at each construction site and stored temporary until it can be removed to an appropriate landfill site in the vicinity. The target should be to minimise spillages and soil contamination.	
Mitigation: Action/control	**Responsibility** Construction manager Maintenance team	**Timeframe** Lifespan of facility
Performance Indicator	No spillages	
Monitoring	Regular inspections of terrain and various infrastructure units.	

Objective: Conservation of soil		
Project components	• PV energy facility • On-site substation/ collector switching station; • Access roads; • Power line; • All other infrastructure.	
Potential impact	Erosion of revegetated land	
Activity/risk source	Soil may become unusable and unproductive.	
Mitigation: Target/Objective	Apply soil conservation measures detailed in the EMPr	
Mitigation: Action/control	**Responsibility** Construction Manager Maintenance team Environmental manager	**Timeframe** Lifespan of facility
Performance Indicator	No water run-off problems / erosion	
Monitoring	Regular inspections of terrain	

12. CONCLUSION

Hotazel 2 is planned on a site with a high coincidence of natural and manmade features that determine the feasibility of the development.

Geology and climate dictates the soil characteristics, which is a sandy textured soil with low cohesive structure. The soil has a high base status due to low leaching.

The soil and climate combination restricts cash crop production, due to low water retention, excessive drainage, low nutrient adsorption with high fertilizer requirements and high susceptibility to wind erosion.

The arid conditions also restrict the choice of crops to cultivate.

Due to the limiting conditions set out above, including continual stock theft, the site is classified as Class VII capability, in terms of which it is unsuited for cultivation and restricts utilisation to grazing, woodland or wildlife.

The concentration of mines in the area increases the need for infrastructure to support the mining activities. These include urbanisation, railways, roads and electricity provision. These all impact on agricultural land.

The construction of Hotazel 2 in combination with Hotazel Solar , will occupy the entire property (Remaining Extent (Portion 0) of Farm York A 279). However, the farm is surrounded by mining activities and supporting infrastructure, which handicapped the management of normal cattle farming activities. In addition, the farm has a low agricultural potential.

The mines are located in such a way that a corridor, traversing through them has already been established. This corridor can be seen as a conduit for the entire infrastructure required to maintain development. This corridor is zoned as a Strategic Transmission Corridor with the Remaining Extent (Portion 0) of Farm York A 279included in the zoned area.

It is better to lose agricultural land of low potential in a region, which is already disturbed, than to lose high potential agricultural land in an undisturbed highly productive farming area.

From an agricultural and land use perspective, no fatal flaws are associated with the proposed facility, if the mitigation measures recommended in this report are applied.

It is therefore concluded that Hotazel 2 will have a low impact on agriculture and currently land use practices and should therefore be authorised..

Christo Lubbe

C R LUBBE 30 April 2020

AGRICULTURAL SPECIALIST

LIMITATIONS

This Document has been provided subject to the following limitations:

(i) This Document has been prepared for the particular purpose outlined in it. No responsibility is accepted for its use in other contexts or for other purpose.

(ii) CR Lubbe did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document. Conditions may exist which were undetectable at the time of this study. Variations in conditions may occur from time to time.

(iii) Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted for incomplete or inaccurate data supplied by others.

(iv) This Document is provided for sole use by the client and its professional advisers and is therefore confidential. No responsibility for the contents of this Document will be accepted to any person other than the Client.

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National Higher Diploma in Agriculture (Irrigation), Technikon Pretoria, 1982
Certificate in Stereoscopic Interpretation, Geology and Resource Classification and Utilisation, Department of Agriculture, 1979
National Diploma in Agriculture, Technikon Pretoria, 1976

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Certificate in Landscape Management, Technikon Pretoria, 1988
Cultivated pastures (Mod 320), University of Pretoria, 1995
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June 2004-June 2006	**Gauteng Department of Agriculture Conservation and Environment** (Component: Technology Development and Support) **Acting Assistant Director: Resource Planning and Utilization**	**Johannesburg, SA**
Jan 1997 – May 2004	**CR LUBBE** **Self employed** Involved in various projects (See Project related experience below)	**Pretoria, SA**
1980 to 1996	**Technikon Pretoria** **Lecturer** Teaching Agricultural Engineering and Land Use Planning subjects. Teaching included practical courses, examination and moderation	**Pretoria, SA**
1974 - 1979	**Department of Agriculture (Transvaal Region)** **Senior Extension Technician** Farm Planning, Surveying, Design of soil conservation systems, Agricultural Extension.	**Carolina and Ermelo, SA**

SUMMARY OF EXPERIENCE

Has 42 years of experience in planning and managing natural resources to ensure optimal utilisation, without exploiting such resources to the detriment of future generations.

Fourteen years experience as a soil consultant, doing mainly soil surveys, terrain classification and agricultural potential studies. Reports include a variety of maps and GIS aspects thus play a large role in these surveys and studies.

Seventeen years of lecturing agricultural engineering subjects: Soil Conservation Techniques I, II and III, which dealt with the surveying, design and drawing of soil conservation structures; Farm Planning, which dealt with optimal resource utilization and Agricultural Mechanization, which dealt with the implements and machinery used to mechanize farming.

Ten years experience in the survey, design and supervising the construction of soil conservation structures in the agricultural field, mainly for farm planning.

PROJECT RELATED EXPERIENCE

PROJECTS UNDERTAKEN IN INDIVIDUAL CAPACITY

Cape EA — **Apr 2015**
Agricultural Impact Assessment : EIA for the Construction and Operation of two Photovoltaic Power Stations at Kathu in the Northern Cape.

Savannah Environmental — **Mar 2015**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Wind Farm near Moorreesburg, Western Cape.

Department of Agriculture, Forestry and Fisheries — **Mar 2015**
Eastern Cape Land Capability Verification Survey

Department of Agriculture, Forestry and Fisheries — **Dec 2014**
Western Cape Land Capability Verification Survey

Cape EA **Aug 2014**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Upington (RE Cap 5)in the Northern Cape.

Cape EA **Aug 2014**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Postmasburg (RE Cap 5)in the Northern Cape.

Cape EA **Aug 2014**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Upington (Joram) in the Northern Cape.

Cape EA **Aug 2014**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Copperton (RE Cap 5) in the Northern Cape.

Cape EA **Aug 2014**
Agricultural Impact Assessment : EIA for the Establishment of a Cemetery at Zoar, near Ladismith in the Western Cape. .

Cape EA **Aug 2014**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Copperton (RE Cap 5) in the Northern Cape.

Macroplan **Jun 2014**
Agricultural Impact Assessment: Application for rezoning of Agricultural land at Upington (Sweet Sensation), Northern Cape

Macroplan **Mar 2014**
Agricultural Potential Study: Application for change of land use at Upington (McTaggarts), Northern Cape

Agricultural Development Corporation **Jan to March 2014**
Design of Feedlot infrastructure and stock watering systems for Kenana Sugar in Sudan.

Cape EA **Nov 2013**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station in the Richtersveld, Western Cape.

Cape EA **Jul 2013**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Upington in the Northern Cape.

Cape EA **Oct 2012**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station near Danielskuil in the Northern Cape.

Senter360 **Oct 2012**
Agricultural Potential Study for a Food Security Development Units in the Democratic Republic of the Congo.

Africa Livestock Project Development Consortium **Aug 2012**
Agricultural Impact Assessment for the Construction and Operation of a Beef Cattle Handlings Facility for a Sugar Company in Northern Sudan

Van Zyl Environmental Consultants **Mar 2012**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station in the Northern Cape.

Bushveld Eco Services **Nov 2011**
Design and cost estimate of a stock watering system in the Lephalale disctrict.

WSM Leshika **Sep 2011**
Soil suitability survey for two new upcoming farmers at Vhuawela & Tshoga in the Limpopo Province.

National Department of Agriculture **Aug 2011**
Soil survey investigating soil potential for change of land use at the Levendal Development in the Paarl district, Western Cape.

Van Zyl Environmental Consultants **Mar 2011**
Agricultural Impact Assessment : EIA for the Construction and Operation of four Photovoltaic Power Stations in the Northern Cape.

WSM Leshika **Nov 2010**
Potential assessments and land use plans for four new upcoming farmers in the Limpopo Province.

FP Botha **Apr 2010**
Potential assessments and land use plans for various new Limpopo agricultural development hubs

Golder Associates Africa (Pty) Ltd **May 2009 – Apr 2010**
Potential assessments and Landuse plans for the resettlement of land tenants at Mafube Coal Mine in the Belfast district of the Mpumalanga Province

Sappi **Vryheid, RSA**
Undertook reconnaissance soil surveys on various plantations and farms in the Vryheid and Piet Retief districts to establish forestation potential and evaluation for species choice (covering a total area of 5173 ha).

Environmentek, CSIR **Nelspruit, RSA**
Undertook soil and terrain classification surveys on the Jessievale (8313 ha) and New Agatha (1 700 ha) plantations.

Safcol (Komatieland) **Limpopo Province**
Undertook environmental, soil and terrain classification surveys on the Thatevondo (4 500 ha), Mafela (920 ha) and Mmamatola (1 263 ha) plantations.

Measured Farming **Gabon, Swaziland & RSA**
Undertook soil and terrain classification surveys on Ranch Lope and Ranch Suba in Gabon, Kubuta Farm in Swaziland and on the farms Madikwe in the Limpopo Province and Stoffelsrus in the Free State, South Africa.

Loxton Venn and Associates **Potgietersrus, RSA**
Assess comparative soils and area for relocating Village Ga-Sekhaolelo on Overysel 815LR to Rooibokfontein 812LR and Village Ga-Puka on Swartfontein 818 LR to Armoed on Potgietersrus Platinum Mine.

Department of Water Affairs and Forestry **Gauteng**
GPS survey and alien identification for mapping of Jukskei and Swartspruit areas, as part of the Working for Water Program.

Sustainable Forestry Management Ltd **Limpopo and Mpumalanga**
Participated in a due diligence audit on various SAFCOL plantations in the Limpopo and Mpumalanga Provinces as part of the preparation of a British company's tender to purchase these plantations.

Mustek Engineering Ghana
Survey to provide a detailed inventory of the forest resources in 17 specified Forest Reserves in Ghana to develop a practical and operationally sound methodology for monitoring the natural forest resources in Ghana, based on satellite imagery for the Ghana Forestry Commission.

Afrigis Environmental Solutions, Pretoria
Various Soil Surveys and Landuse Plannings – Domestic and Neighbouring Countries

Rural Integrated Engineering, Pretoria
Various Soil Surveys and Landuse Plannings

Africa Land-Use Training, Modimole
Lectures at Basic Farm Planning Course (Limpopo and Gauteng)

Appendix B

Declaration of Independence

CR Lubbe was appointed by Hotazel Solar Facility 2 (Pty) Ltd via Cape Environmental Assessment Practitioners (Pty) Ltd, the EAP, to conduct an independent agricultural scoping study for the proposed Hotazel Solar 2 in the Northern Cape.

He is not a subsidiary or in any way affiliated to Hotazel Solar Facility 2 (Pty) Ltd.

CR Lubbe also does not have any interest in secondary developments that may arise from the authorisation of the proposed project.

CR Lubbe

30 April 2020