*ENVIRONMENTAL IMPACT ASSESSMENT:*
*AMENDMENT OF ENVIRONMENTAL AUTHORISATION*

# PROPOSED CONSTRUCTION AND OPERATION OF HOTAZEL SOLAR, NORTHERN CAPE

## APPLICANT:

**ABO WIND HOTAZEL PV (PTY) LTD**

REVISED AGRICULTURAL ASSESSMENT REPORT
JUNE 2020


*STUDY CONDUCTED AND*
*REPORT COMPILED BY: C R LUBBE*

ABO Wind Hotazel PV (Pty) Ltd
Reg. No. 2008/004627/07
*Unit B1 Mayfair Square*
*Century Way, Century City*
*Western Cape, 7441*

**AGRICULTURAL SPECIALIST:**
C R Lubbe
*Telephone: 082 853 1274*
*4 Protea Street*
*RIVERSDALE*
*6670*

# TABLE OF CONTENTS

## List of Tables



## List of Figures

# 1. INTRODUCTION

ABO Wind Hotazel PV (Pty) Ltd. wish to amend the existing environmental authorisation for Hotazel Solar (14/12/16/3/3/2/1086) by moving the project footprint further west to make sufficient space for a potential second solar development (which will be applied for in a separate EIA process) on the eastern side of the Remaining Extent (Portion 0) of Farm York A 279. The moved footprint will remain within the same property (York A, 279). Three grid connection options have been proposed, two of which were previously assessed in the Hotazel Solar EIA.

# 2. APPROACH AND METHODOLOGY

The approach was to:

- Undertake a scoping study for the changed footprint;
- Assess the possibility of any impacts that may arise due to the proposed amendments;
- Determine if there are any advantages or disadvantages associated with the proposed amendments.

The original field study was conducted on 5 and 6 of June 2018 to collect in-situ data for the original footprint. This data was supported by information from the Agricultural Geographic Information System (AGIS). For the proposed changed footprint information from the 2018 field study, other studies done in the surrounding area and AGIS was used.

# 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 obtained was verified, as far as possible, during the field survey.

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

# 4. DESCRIPTION OF THE PROPOSED PROJECT

ABO Wind Hotazel PV (Pty) Ltd is applying to amend the Environmental Authorisation (EA) for Hotazel Solar. The proposed amendments include a shift of the authorized project footprint (< 1km) towards the western boundary of the Remaining Extent (Portion 0) of the Farm York A279. This will allow for a potential second solar development (which will be applied for in a separate EIA process) on the eastern side of the Remaining Extent (Portion 0) of Farm York A279.

Hotazel Solar will consist of solar photovoltaic (PV) technology with fixed, single or double axis tracking mounting structures, with a net generation (contracted) capacity of 100 $MW_{AC}$ (MegaWatts). Associated infrastructure will include:

- On-site substation / collector switching station;
- 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;
- There are two options for the location of the proposed laydown area:
    - Option 1: Is located south-west of the proposed substation, between the R31 and the proposed PV Panels.
    - Option 2: Is located north-east of the proposed substation, between the R31 and the proposed PV Panels.
- There are three options proposed to connect Hotazel Solar to the Eskom Hotazel Substation:
    - Option 1: (Preferred, as previously authorised): Via a loop in loop out (LILO) into the Hotazel-Eldoret 132kV line.
    - Option 2: Overhead 132kV powerline from the Hotazel Solar on-site substation/ collector switching station to the Eskom Hotazel substation.
    - Option 3: Overhead 132kV powerline from the Hotazel Solar on-site substation/ collector switching station to the Hotazel 2 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 proposed amendment.

### 5.1 Locality

Hotazel Solar is proposed on the Remaining Extent of the Farm York A279, in the Joe Morolong Local Municipality and John Taolo Gaetsewe District Municipality, in Northern Cape Province. The project is located approximately 3km south-east of the town of Hotazel – see Figure 1.

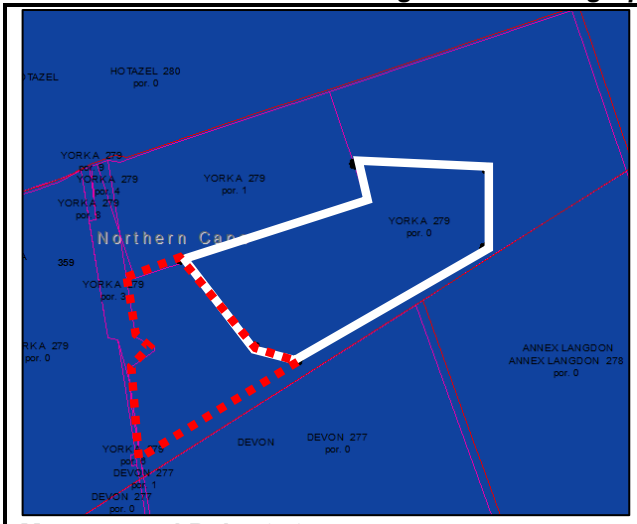

***Figure 1: Locality of the proposed new footprint for Hotazel Solar***

## 5.2 Physical description

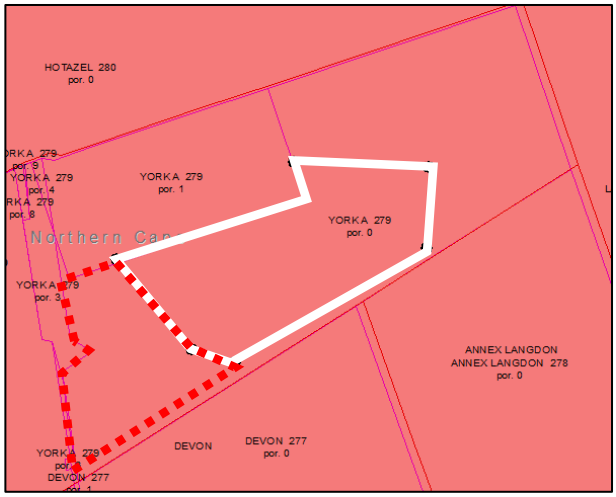
The resource data in Table 1 were extracted from AGIS to search for any differences that may intervene with the inclusion of the proposed western side to the new footprint.

The solid white line depicts the Remainder of Hotazel Solar (14/12/16/3/3/2/1086), while the red dot line mark the area now to be included in the new footprint.

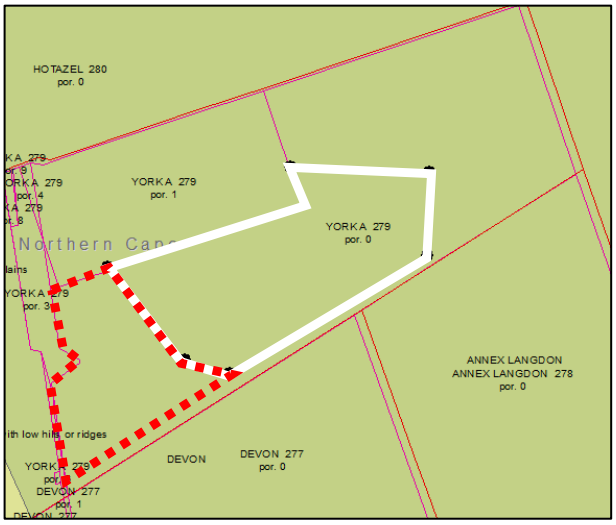
***Table 1: Information from the Agricultural Geographic Information System (AGIS)***



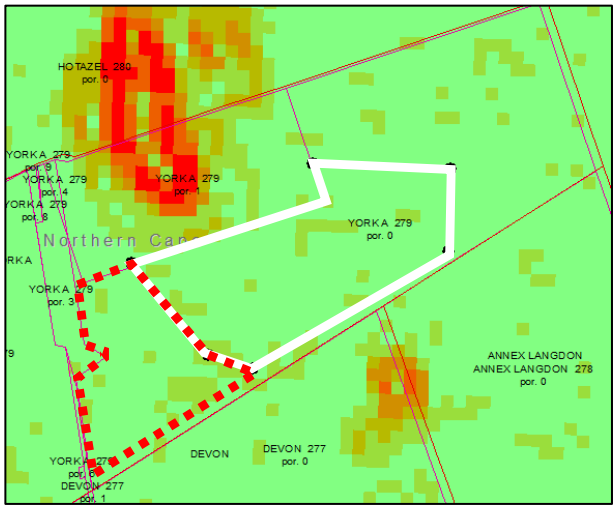

**Mean annual Rain: 359 mm**



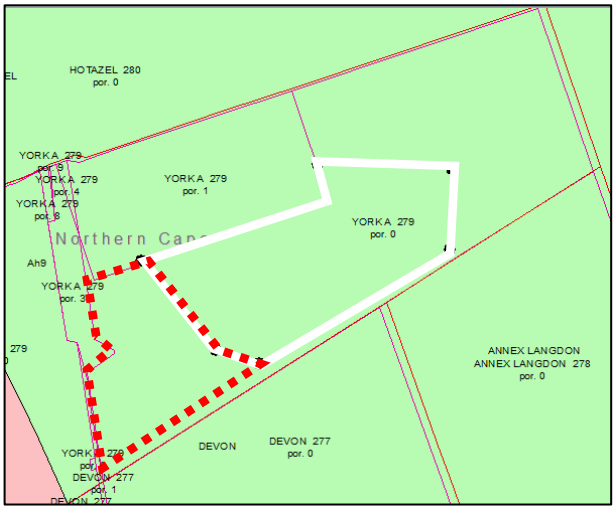

**Moisture Availability: Severe**



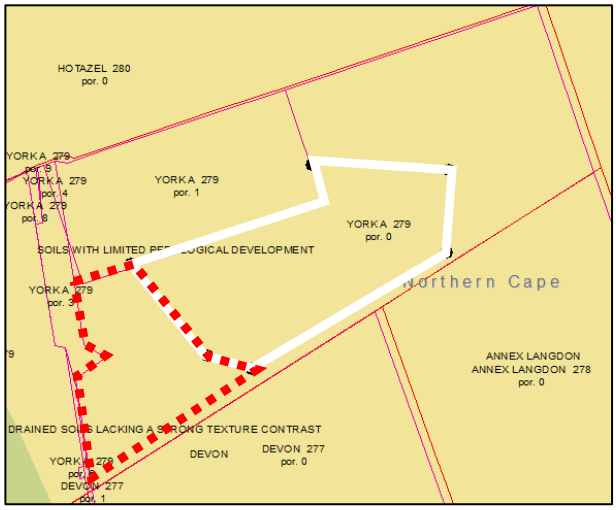

**Terrain type: Level plains**



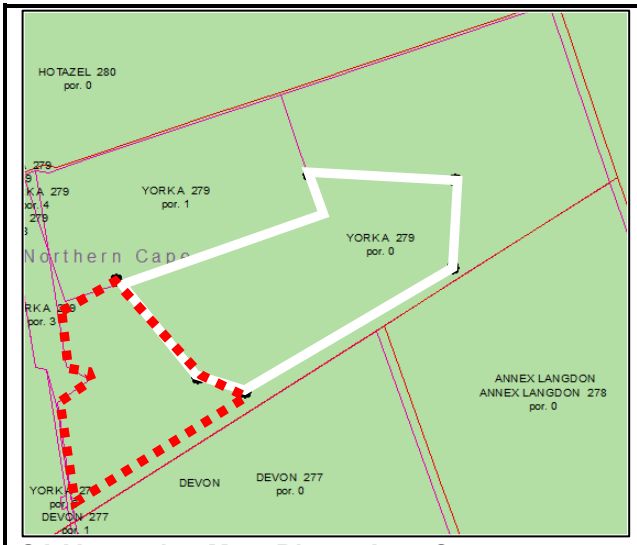

**Average slope: <2 % - 5%**



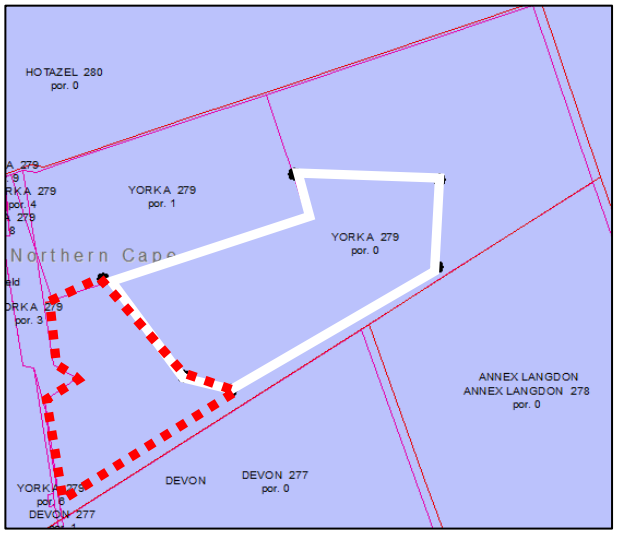

**Land Type: Ah 9**



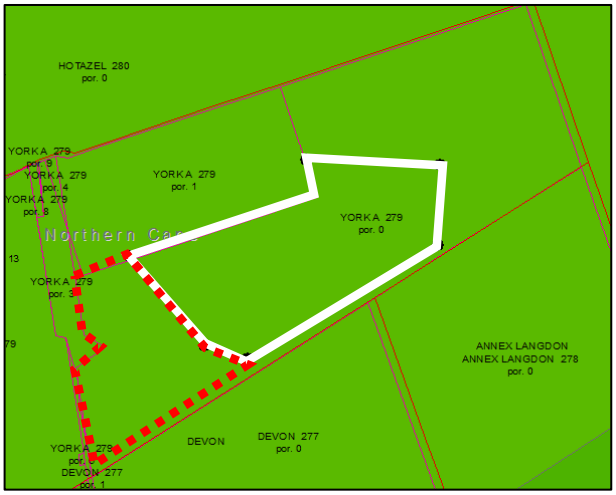

**Soils with limited pedological development**



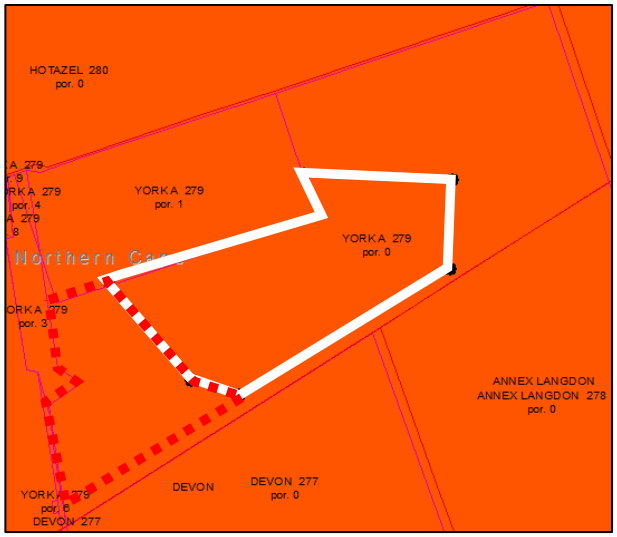

**SA Vegetation Map, Biome Area:Savanna**



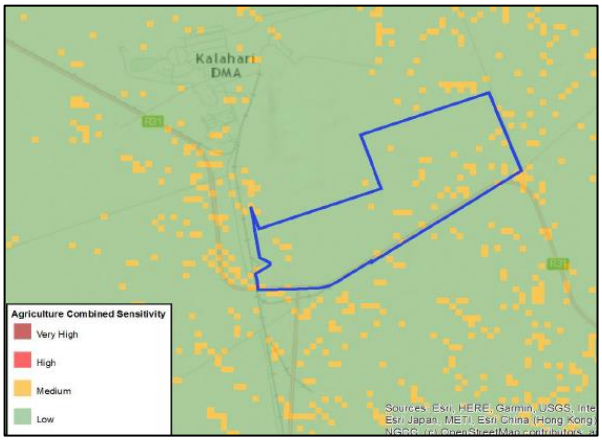

**SA Vegetation Map, Vegetation Type: Kathu Bushveld**




**Grazing capacity: 13 LSU/ ha**




**Land capability: Class VII**




**Agricultural combined sensitivity: Low**


**Development zone: Strategic Transmission Corridor**

## 5.3 Climate

The Kalahari Ecozone has consistent temperatures with summer and early autumn rainfall. Winters are very dry. The wettest part appears in the east, with a mean annual precipitation (MAP) of 500 mm/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 to the farm are set out in Table 2.

***Table 2: 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) indicated on the Geological map (Figure 2) refers to the primary outcrop as Sand and Limestone (T- Qk) and the sub outcrop (Vvo) 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.

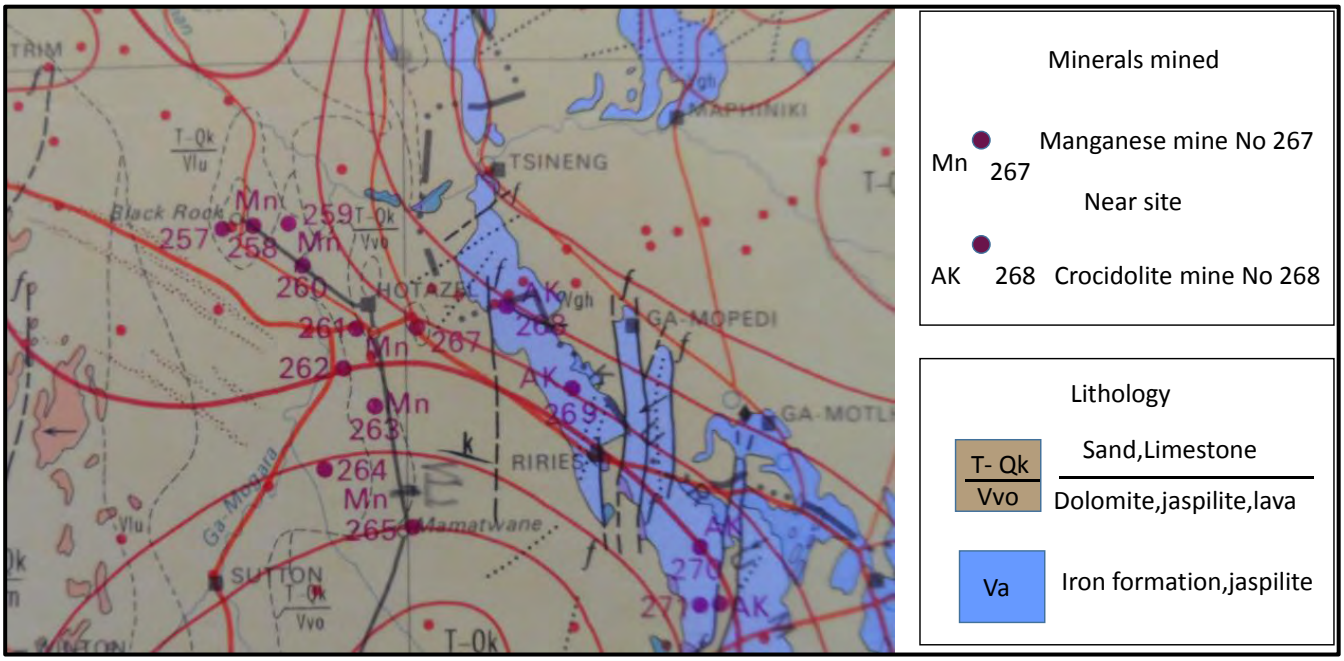



***Figure 2: Geological Map 1984 Gravity Edition***

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 byprecipitation and the action of algae. The band of dolomite formed is interspersed with shale and minerals.

The map also indicates some manganese mines in the vicinity of the proposed PV facility.

## 5.5 Vegetation

The site is classified by Acocks (1988) as tropical bush and savannah bushveld. According to the SA Vegetation Map classification, the Biome Area is savanna and the vegetation type is Kathu Bushveld. 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. Indicator grasses are listed in Table 3.

***Table 3: 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 Remaining Extent (Portion 0) of Farm York A279 is located approximately 3km south-west from the mining town of Hotazel. Due to its proximity to the town and several mines, the associated infrastructures of these developments converge around the farm.

Features captured on Figure 3 include the town Hotazel, Arterial road R31, Main road R320, Railway station and railway lines, power lines, a wind pump, a communication tower, mine dumps and excavations, prominent rock outcrops, erosion and sand, a narrow gauge track, a hiking trail, cadastral and internal fences.

The terrain type is level plains with an average slope of <2 %.

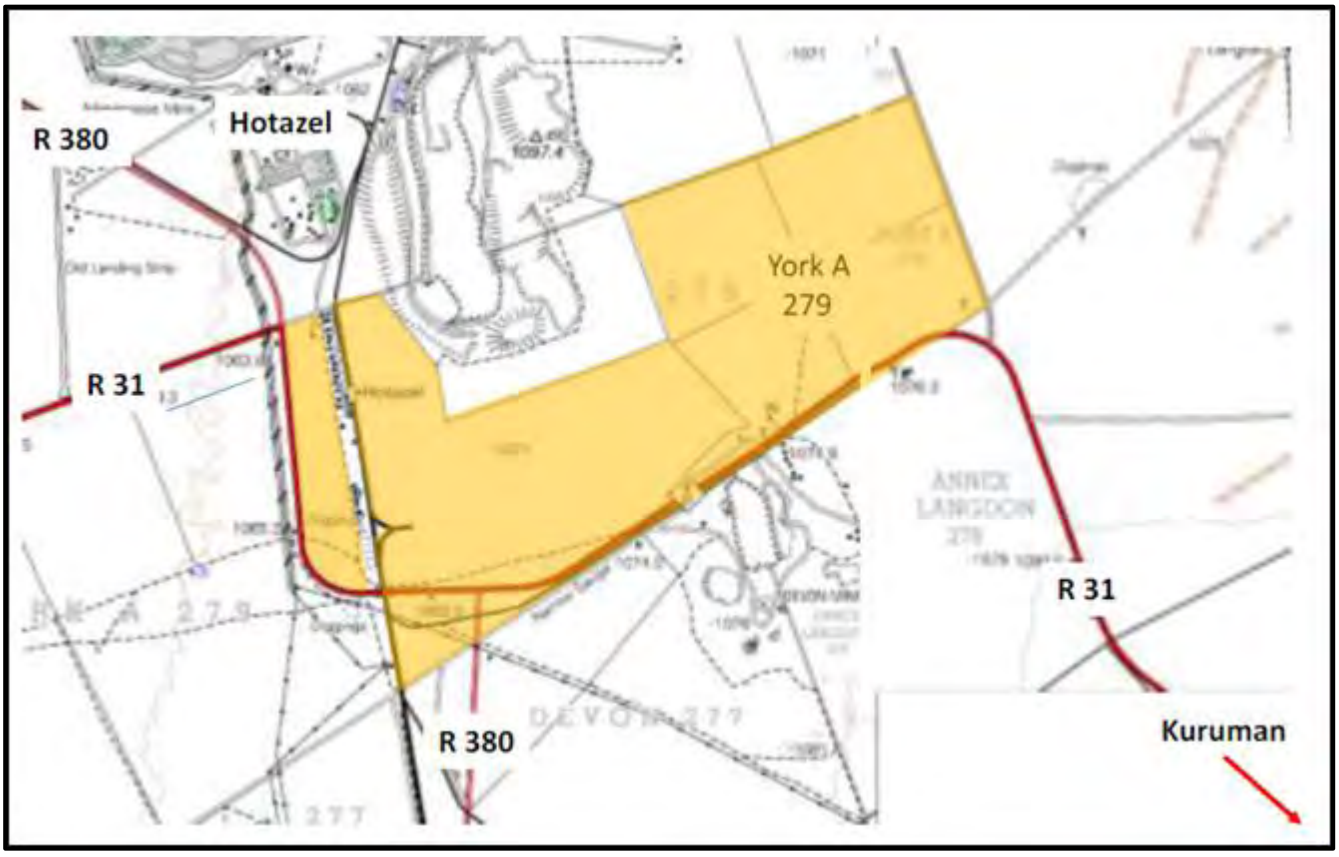



***Figure 3: Topo-cadastral map 2722 BB HOTAZEL***

The cross section in Figure 4 provides information regarding the slope and shape of the landscape surrounding the proposed development. It shows a straight shape on a 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.

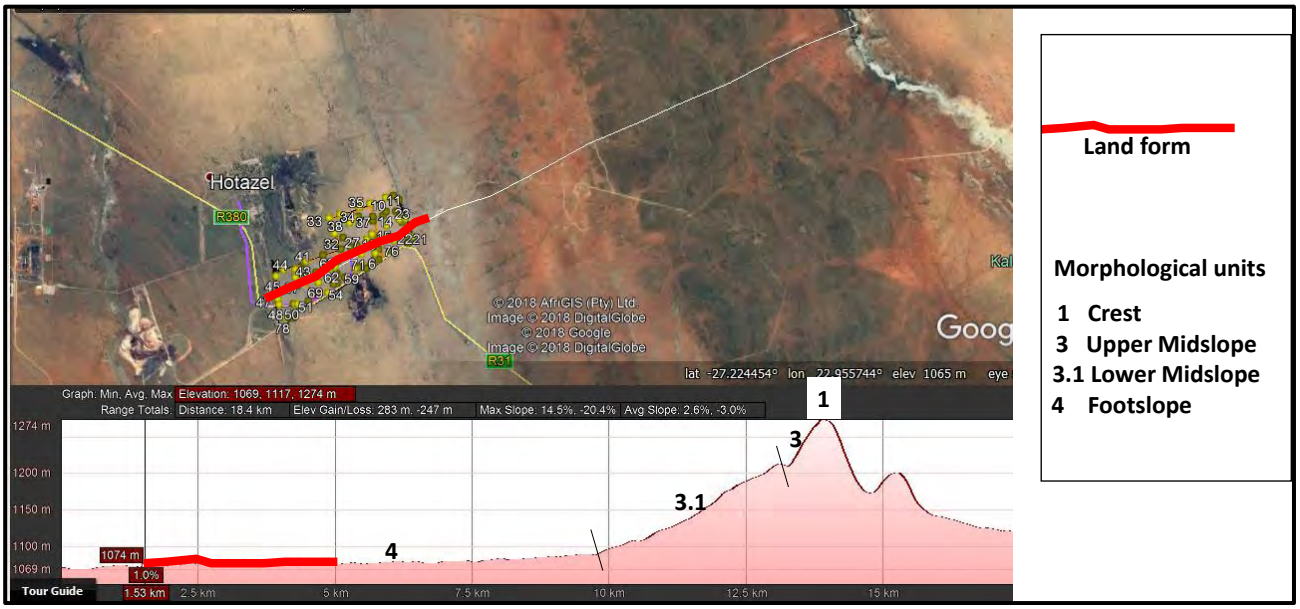



***Figure 4: Terrain form***

## 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 amendments.

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, 2722 Kuruman shows that the pedosystem **Ah9** was allocated to the Remaining Extent (Portion 0) of Farm York A279.

**Ah** refers to red or yellow high base status soils.

The pedosystem is predominately located on a Footslope (95%) which has a slope gradient of <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.

***Table 4: Inventory for pedosystem Ah 9***

**LAND TYPE / *LANDTIP*** ..... : **Ah9**

CLIMATE ZONE *KLIMAATSONE* ..... : 5S

Area / *Oppervlakte* ..... : 89190 ha

Estimated area unavailable for agriculture

*Beraamde oppervlakte onbeskikbaar vir landbou* : 1080 ha

Occurrence (maps) and areas *Voorkoms (kaarte) en oppervlakte* :

2722 Kuruman (89190 ha)

Inventory by *Inventaris deur* :

J F Eloff en A T P Bennie

Modal Profiles *Modale profiele* :

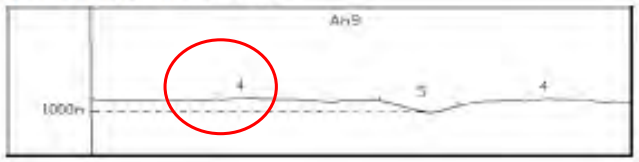
None / Geen

| | | |
|---|---|---|
| **Terrain unit** *Terreineenheid* ..... : | 4 | 5 |
| % of land type *% van landtipe* ..... : | 95 | 5 |
| Area *Oppervlakte (ha)* ..... : | 84730 | 4460 |
| Slope / *Helling (%)* ..... : | 0 - 1 | 1 - 3 |
| Slope length *Hellingslengte (m)* ..... : | 00 - 10000 | 200 - 1200 |
| Slope shape *Hellingsvorm* ..... : | Z | Z |
| MB0, MB1 (ha) ..... : | 83883 | 1784 |
| MB2 - MB4 (ha) ..... : | 847 | 2676 |

| **Soil series or land classes** *Grondseries of landklasse* | **Depth** *Diepte* (mm) | MB | | ha | % | ha | % | **Total** *Totaal* ha | % | **Clay content %** *Klei-inhoud %* A | E | **Texture** *Tekstuur* B21 | Hor | Class / *Klas* | **Depth limiting material** *Diepte-beperkende materiaal* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sunbury Cv30 | >1200 | 0 | : | 35587 | 42 | | | 35587 | 39.9 | 2-4 | | 3-6 | B | fiSa | |
| Mangano Hu33 | >1200 | 0 | : | 15251 | 18 | | | 15251 | 17.1 | 3-6 | | 6-10 | B | fiSa | |
| Annandale Cv33 | >1200 | 0 | : | 15251 | 18 | | | 15251 | 17.1 | 3-6 | | 6-10 | B | fiSa | |
| Roodepoort Hu30, Gaudam Hu31 | >1200 | 0 | : | 10168 | 12 | | | 10168 | 11.4 | 2-4 | | 3-6 | B | fi/meSa | |
| Sandspruit Cv31 | >1200 | 0 | : | 6778 | 8 | | | 6778 | 7.6 | 2-4 | | 3-6 | B | meSa | |
| Mispah Ms10, Kalkbank Ms22 | 100-250 | 3 | : | 847 | 1 | 2230 | 50 | 3077 | 3.5 | 6-10 | | | A | fiSa | R,ka |
| ~~Maputa Fw10, Motopi Fw20,~~ | | | : | | | | | | | | | | | | |
| Fernwood Fw11, Langebaan Fw21 | >1200 | 0 | : | 847 | 1 | 1338 | 30 | 2185 | 2.5 | 3-6 | | 4-8 | B | fiSa | |
| Shorrocks Hu36 | >1200 | 0 | : | | | 446 | 10 | 446 | 0.5 | 7-10 | | 15-18 | B | fiSaLm | |
| Pans/Panne | | 4 | : | | | 446 | 10 | 446 | 0.5 | | | | | | |

**Terrain type** *Terreintipe* : A1

Terrain form sketch/*Terreinvormskets*




For an explanation of this table consult LAND TYPE INVENTORY (table of contents)

*Ter verduidelikking van hierdie tabel kyk LANDTIPE - INVENTARIS (inhoudsopgawe)*

Geology: Aeolian sand of Recent age with a few outcrops of Tertiary Kalahari beds (surface limestone, silcrete and sandstone) in the riverbeds.

*Geologie* Eoliese sand van Resente ouderdom met enkele dagsome van Tersiere Kalaharilae (oppervlakkalksteen, silkreet en sandsteen) in die rivierlope.

### *Assessment of soil potential for the new footprint*

The proposed amendment includes a shift of the approved facility to the west of the farm (as shown in Figure 5).

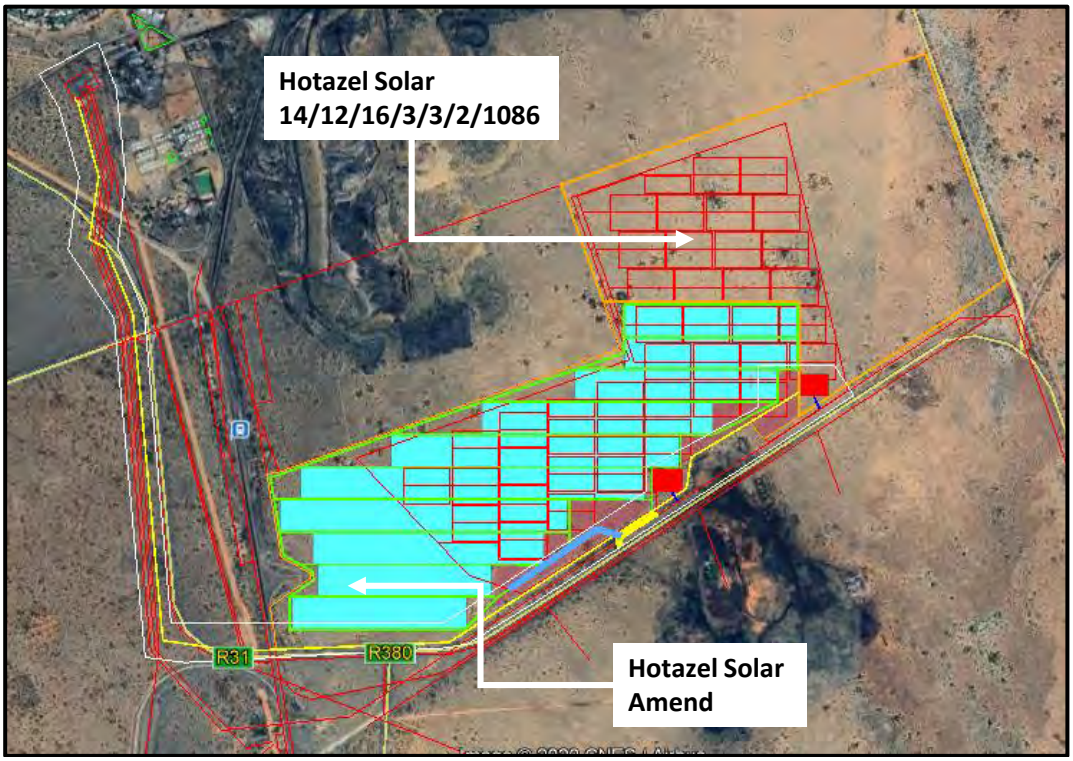



***Figure 5: Locality of altered segments for amendment***

Survey data, captured in June 2018, were used for the assessment of soil potential of the new footprint (Figure 6).

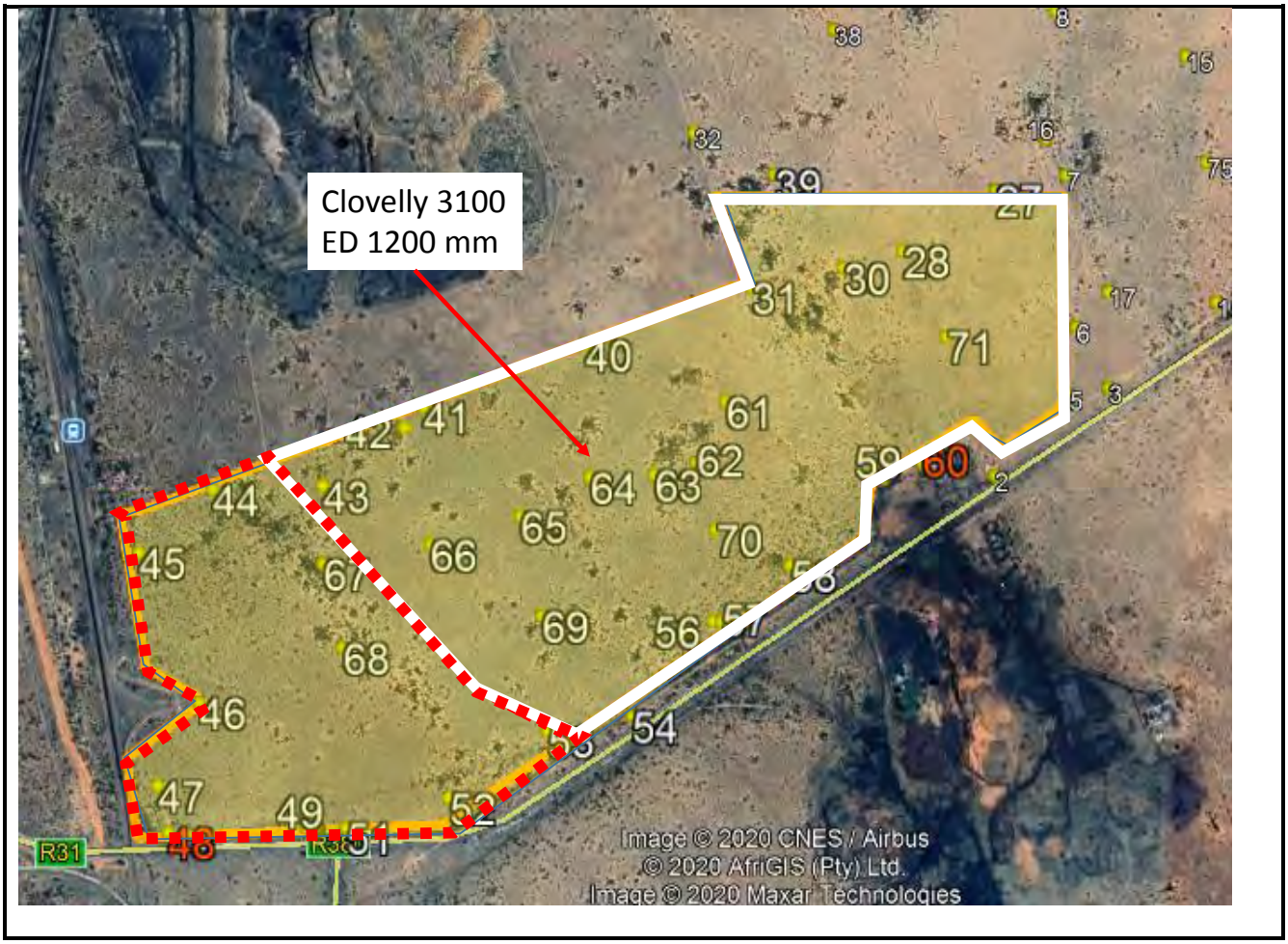



***Figure 6: Soil map.***

A profile description of the soil appears in Table 5.

***Table 5: Profile description of the soil***

**Clovelly Setlagole**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OBS | 68 | COMMENT | | | | | MOISTURE | L | | | | | | |
| LAT | 27.222900 | SLOPE GRAD | | 1 | | | EROSION | L | | | | | | |
| LONG | 22.982810 | SLOPE SHAPE | R | | | | | | | | | | | |
| | 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 | | | | | | | | |
| | L.COVER/USE: | Natural Grazing | | | | | | | | | | | | | |

| **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% |
| 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 |

Photographs associated with the observation points in Figure 6 are shown in Figure 7.

## 5.8 Veld condition

A veld condition assessment, by visual acknowledgement, was conducted simultaneously with the soil survey. The photos in Figure 7 show the veld condition. The vegetation type is Kathu Bushveld which is part of the Savanna Biome). The composition of the grazing varies from open grass with low to medium encroachment. The grasses observed were of low grazing value, except Sand Quick (*Schmidtia pappophorroides),* which has high grazing value and is a good sand binder.

Medium size trees and bushes were observed. The trees were mainly Black Thorn acacia (*Acacia mellifera*), Candle–pod Acacia (*Acacia hebeclada*), Grey Camel-thorn (*Acacia haemataxylon*), and Camel-thorn (*Acacia erioloba*).

**49 Medium sized bush, low encroachment**

**47 High encroachment, disturbed area**

**46 Sparse basal cover, low encroachment**

**45 Access road to mine**

**67 Medium height Acacia and sparse veld**

**44 Access to mine**

**68 Low tree dencity, sparse veld**

**52 Medium encroachment. Transmission line exit farm**

***Figure 7: Photo imaginary of observation points and vegetation.***

# 6. AGRICULTURAL SUITABILITY OF THE SITE

## 6.1 Agricultural potential of the site

Any plant needs three basic elements to grow successfully, namely air, moisture and nutrients. The occurrence of deep soils mean that the soil potential is high. However the combination of climate (low rainfall, high temperatures, and evaporation) in combination with the very sandy deep soil (low water holding capacity) is evaluated as low agricultural potential.

This soil has a 6% clay content with fine sand grade, which has the ability to retain 97 mm/1000mm.

Figure 8 shows the water cycle. The plant absorbs water, but only a small part is taken up by the plant cells while the largest part is released back to atmosphere by transpiration. At the same, time water evaporate from the soil into the atmosphere. This combined loss of water is known as evapotranspiration. The figure also shows the distribution of plant roots in general.

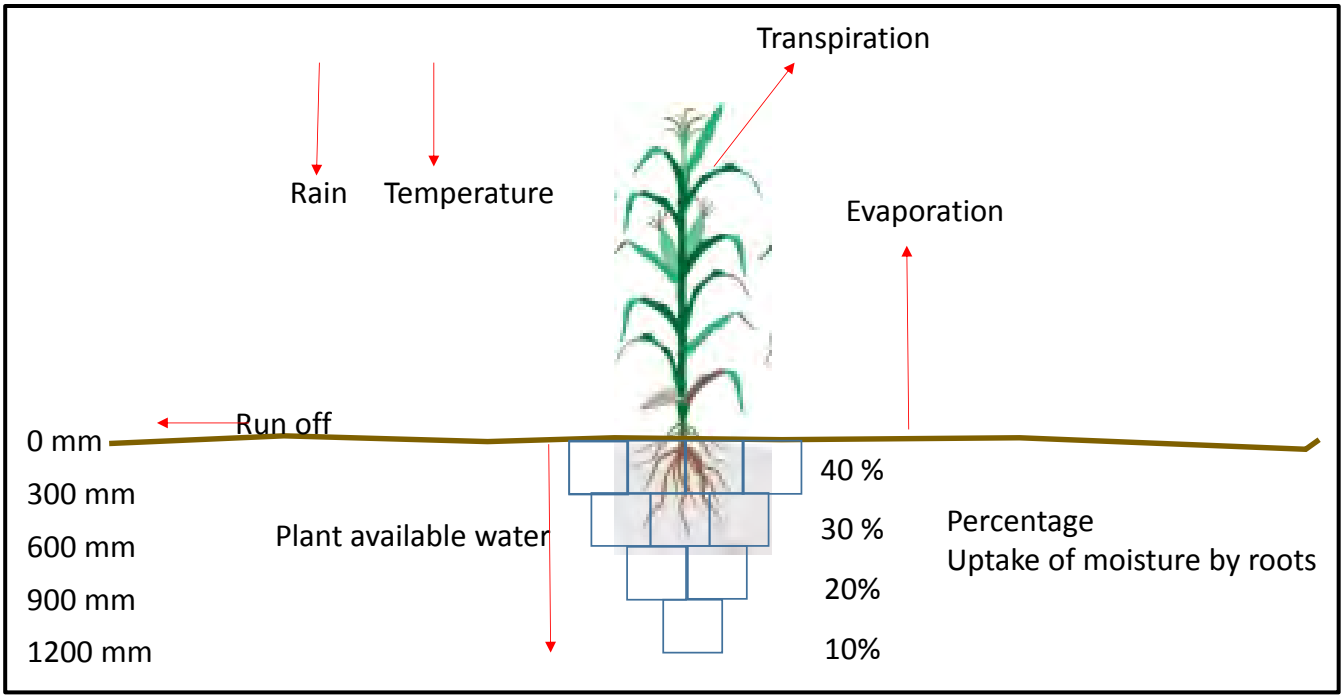



***Figure 8: Water cycle in crop production***

There are many ways to determine evapotranspiration, the one commonly used is the A-pan evaporation with crop factors.

***Table 6: Crop factors for Maize in summer rainfall areas***

| Month | Dec | Jan | Feb | Mrt | Apr |
|---|---|---|---|---|---|
| Crop factor | 0.4 | 0.75 | 0.75 | 0.6 | 0.5 |

The root system depth of each crop determines the soil water reservoir size or total available water in normal deep soils. For maize, this depth is 600 + mm with 90% in the top 900 mm. Plant available water is then 87.3 mm (97* 900). Water replacement is required when 50% of the reservoir is depleted to avoid plant stress. This means when 43.6mm have been used, it should be replaced.

If it is in the second month after planting, the crop factor to use would be the one for January, namely 0.75. The amount of evaporation allowed before water has to be replaced is then determined by dividing the required water (43.6 mm) with the crop factor (0.75), which is 58.1 mm.

The frequency of rain/irrigation for the replacement is calculated by dividing the allowable evaporation with the daily evaporation of 8.7 mm/day for January. The result is to replace 43.6 mm every seven days.

This soil profile is in excess of 1200 mm, but effective use of the soil depth, is restricted by its structure and texture for poor water retention. The arid climate conditions of very low annual rainfall, extreme evaporation and temperatures, is not a preferable combination for sustainable crop production.

## 6.2 Land Capability and Suitability for Agriculture

The classification of land in capability classes is conservation orientated and involves the consideration of: (i) risks of land damage from erosion and other causes, and (ii) difficulties in land use owing to physical land characteristics and climate. Land capability classification has the particular purpose of allowing the most intensive agricultural use of land without the risk of soil degradation.

There are eight classes; with the first four considered as arable and the next four non-arable. The land for this site 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

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 7.

The DEA Screening tool identifies the following sensitivity themes of the site, which are the same for both the authorised and proposed amended layout.

***Table 7: Sensitivity rating***

| **Agricultural Sensitivity** | **Screening tool rating** | |
|---|---|---|
| | **Approved site** | **Proposed new Site** |
| Development zone | Strategic Transmission Corridor | Strategic Transmission Corridor |
| Agricultural combined sensitivity | Medium | Medium |
| Relative animal species | Low | Low |
| Aquatic biodiversity combined | Low | Low |
| Relative landscape (Solar) theme | Medium | Medium |
| Relative plant species theme | Low | Low |
| Relative RFI | Low | Low |
| Relative terrestrial biodiversity | Low | Low |
| Relative defence combined | Low | Low |

# 7. ASSESSMENT OF PROPOSED AMENDED DEVELOPMENT

The development proposed is to construct a commercial photovoltaic (PV) solar energy facility (SEF) on ± 270 ha of agricultural land. The proposed new footprint for the facility will be on the western portion of the Remaining Extent of Farm York A 279 – see Figure 9.

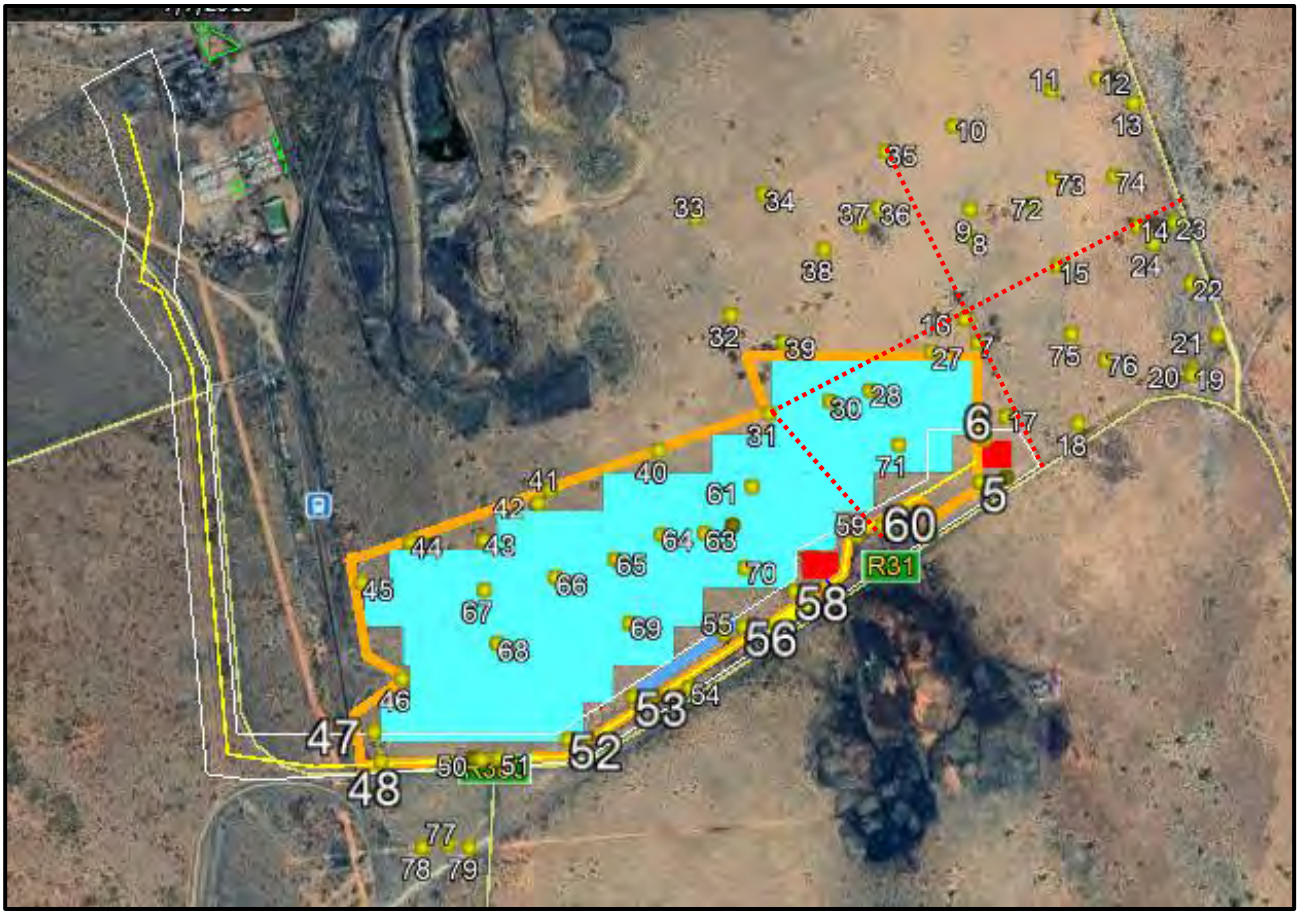



***Figure 9 New layout for Hotazel Solar***

### *Change of footprint area*

The fenced area (orange border) is approximately 270 ha.

PV arrays (Turquoise) will cover a maximum area of 245 ha.

### *Change of access roads*

Access to the facility will be direct from the R31, with two access point options:

- Option 1 Blue line which, enters at **56**,then turn west for 1 km up to **53**
- Option 2 Yellow line which enters at **56** then turn east for 300 m up to **58.**

Length of internal roads is ±20 km.

### *Change of grid connections*

Three alternative routes for the grid connection line are considered:

- Option 1 at **58** (Preferred, as previously authorised): ±100m overhead 132kV powerline 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 2: (Yellow line in corridor) ±5.8km overhead 132kV powerline line from the on-site substation / collector **58** switching station to the Eskom Hotazel substation. 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.
- Option 3: ±1km overhead 132kV powerline from the Hotazel Solar on-site substation / collector switching station **58** to the Hotazel 2 collector switching station **5** (which is being proposed in a separate EIA process). The powerline will have a maximum height of 32m and a servitude width of between 31m and 36m.

From the particulars in Figure 9, the potential impacts that the facility may have on agricultural development of the farm include the following:

## 7.1 Loss of agricultural land

The farm is used as a grazing unit for cattle, but with the field visit, only three cows were spotted in the kraal (point 60). Apparently, there is a high rate of stock theft in the area. The farm is bordered by mining activities to the north and south, roads on the south and east side and a railroad on the west side. The unit is divided in five grazing camps with handling facilities near the homestead (observation point 60) and a diversion kraal (observation point 16).

The developments surrounding the farm restricts the usable area to 509 ha .With a suggested carrying capacity of 13 ha/LSU, a herd of 39 LSU can be allowed to graze the area.

With the establishment of a SEF, 270 ha will be lost for agriculture.

The loss of 270 ha grazing will mean a potential loss of 21 large stock units. However, this is not significant as the capacity on the current manageable area is already not an economical unit.

### *Mitigation proposed*

The loss of area can also be calculated as loss of grazing for 21 LSU. It is assumed that an animal eats the equivalent of 3% of its body mass per day. The mass of an LSU is estimated as 450 kg; therefore, one LSU requires 13.5 kg roughage/day. The loss due to the footprint size is then 21 x 13.5 kg, which is 284 kg /day.

It is possible to produce 500 kg of fresh fodder in seven days from 50 kg cereal grain seed in a container measuring 8m x 4m x 2m. Once in production, 500 kg fodder can be harvested daily. The requirement for such production is to control the temperature between 20°C and 28°C and artificial (fluorescent) lighting. The seed is sprayed with a hydroponic nutrient three times a day.

The fodder is fed directly to the animals: tray, roots and all.

The 234 ha remaining land with the additional fodder will be able to carry the 39 LSU.

From a fire protection viewpoint this would be a very good prospect as the animals can graze arrowed the facility keeping the vegetation short, erasing the fire hazard.

## 7.2 Impairment of land capability due to construction

### *7.2.1 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;
- Guinia Grass (*Panicum maximum*), a very palatable good cultivated pasture; and
- Wool Grass (*Anthephora pubescens*).

*Operational phase*

This is the longest phase (25-30 years). During this phase, the re-vegetated surface must be conserved and used for maintaining the livelihood of the owner and workers. 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.

### *7.2.2 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.

### 7.3 Possibe spillages of concrete and fuel may impact the soil.

During construction and decomisioning phases 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.

## 8. REVIEW OF CHANGES

### 8.1 Change of footprint area

The footprint is of same size (270ha opposed to 275ha) and on the same premises. With the new location, the management from a land use perspective; is more efficient. This is so because all the available grazing is in one unit (as opposed to separation in the approved outlay). The camping system is almost intact. Refer to Figure 9. Only two fences would need to be demolished (Red dotted lines that connects **60, 31** and **16).** The fence **31 - 16** will be replaced with the northern fence of the SEF. The diversion kraal **16** and borehole and pump at **5** will also not be effected.

The soil potential of the amended portion is identical to that of the approved SEF as with the basal cover.

### 8.2 Change of access road

The access road will be moved east, but still directly from the R31 in the corridor occupied by the transmission lines. This will have no new impact on agricultural land.

### 8.3 Change of grid connections

The gridline routing remains the same, following the existing alignment of transmission lines. The approved facility connected at 53, which was closer to the Hotazel substation than the new proposed connection at **58** or **5**. The loss of soil and vegetation will have a low impact on agricultural land in both cases.

# 9 CONCLUSION

Geology and climate dictates the soil characteristics, namely a sandy textured soil with low cohesive structure. The soil will have a high base status due to low leaching that took place.

The soil and climate combination restricts cash crop production, due to low water retention and excessive drainage. Because of the low rainfall, the soils are not highly leached, therefore high base status (high Ca Mg etc. soil content) conditions exist. The limiting crop production factor is not nutrient related (nutrients can be managed) but climate related.

The arid conditions further restrict the choice of crops.

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 agricultural character of the farm is already changed with all the industrial activities surrounding it and the site lies within the Strategic Transmission Corridor.

Changing the footprint location, access road and transmission routings does not add any additional possible impacts or change mitigation measures as set out in the approved environmental authorisation for Hotazel Solar (14/12/16/3/3/2/1086). *All mitigation measures identified in the original Agricultural Assessment are still valid for this amendment request.*

The reason for requesting the amendment is to make space for a potential second solar PV facility (which will be applied for in a separate EIA process). This will mean that the total farm area will be occupied by solar facilities. However, the farm is surrounded by mining activities and its supporting infrastructure, which handicapped the management of normal cattle farming activities. Simultaneously, the farm has a low agricultural potential.

The mines are located in such a way that a corridor, traversing through them is 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 farm York included in the zoned area.

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

From an agricultural and land use perspective, the amendment should be authorised.

Christo Lubbe

C R LUBBE 18 June 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.

# REFERENCES

AGIS, 2018. Agricultural Geo-Referenced Information System.

Agricultural Research Council, 2003. *Crop Water Relationships and climate*. ARC, Silverton

Ashman MR and Puri G, 2002. *Essential Soil Science*. Blackwell, Oxford.

Department of Agriculture and Water Supply, 1989. *Land Types of the Maps: Memoirs on the Agricultural Natural Resources of South Africa.* Soil and Irrigation Research Institute, Pretoria

Fey, M, 2010. *Soils of South Africa*. Cambridge, Cape Town.

Hudson, N, 1995. *Soil Conservation*. B.T Batsford, London

Kynoch, 2005. *Weidingshandleiding*. Kajafa, Cape Town

Macintosh EK, 1983. *Rocks, Minerals and Gemstones of Southern Africa*. Struik, Cape Town

Munsell Color, 2009. *Munsell Soil-Color Charts*. Munsell, Washington.

Soil Classification Working Group, 1991. *Soil Classification: A Taxonomic System for South Africa.* Department of Agricultural Development, Pretoria.

Thomas V, Moll E and Grant R, 2008. *Sappi Tree Spotting: Cape –From Coast to Kalahari.* Jacana, Johannesburg

Van der Walt, HvH and Van Rooyen, TH, 1995. *A Glossary of Soil Science*. Soil Science Society of SA, Pretoria

Van Oudtshoorn F, 1994. *Gids tot Grasse van Suid-Afrika*. Briza, Arcadia

**Appendix A**

# Curriculum Vitae - Christiaan Rudolf Lubbe

## KEY QUALIFICATIONS:

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

## OTHER EDUCATION:

- Certificate in Turf Grass Management, Technikon Pretoria, 1987
- Certificate in Landscape Management, Technikon Pretoria, 1988
- Cultivated pastures (Mod 320), University of Pretoria, 1995
- NOSA Health and Safety Certificate, 1996
- FSC Auditors Course (Woodmark, UK) Sappi Ltd, 2003
- Certificate of Competence: Civil Designer - Design Centre and Survey and Design (Knowledge Base, August 2005)

## SUMMARY

Work experience of 49 years were progressively gained whilst working as a land use planner (1971-1979 - Extension technician); Lecturer in agricultural engineering and conservation subjects (1980- 1997) and Agricultural Consultant (1998 onwards). Always striving to find the equilibrium in using the natural resources for agricultural production.

## CHRONOLOGICAL EMPLOYMENT

| | |
|---|---|
| **Period** | 1971-1980 |
| **Company** | Department of Agriculture Transvaal region |
| **Position occupied** | Final: Senior Extension Technician |
| **Farm planning, technical support, general agricultural extension.** | |
| • Resource potential analyses, Soil classification, Veld evaluation.<br>• Conservation practices on arable land: Include water runoff planning, surveying and design of conservation works. Demonstration of building and inspection of completed structures.<br>• Conservation practices on non-arable land. Veld classification evaluation and management planning.<br>• Survey and design of stock watering systems. Inspection of completed system.<br>• Participated in the development of target areas which included soil survey and water run off planning<br>• Assistance with experimental conservation and agronomy trials. | |

| | |
|---|---|
| **Period** | 1980-1996 |
| **Company** | Technicon Pretoria |
| **Position occupied** | Lecturer |
| Lecture subjects required to obtain a National Diploma in Agriculture. | |
| **Subjects lectured**<br>Land use planning<br>Soil conservation techniques<br>Agricultural mechanisation<br>Pasture science 1 A<br>Drainage | |

| | |
|---|---|
| **Period** | January 1997 – May 2004 |
| **Company** | Self employed |
| **Position occupied** | Agricultural Consultant (Land use planner) |
| **Soil and veld survey for land capability classification**. | |

- Physical audit and stock taking of Irrigation Scheme infrastructure at Loskop Dam, Hartebeespoort Dam, Buffelspoort Dam, Bospoort Dam, Roodekopjes Dam and Vaalkop Dam.
- Potential assessments and land use plans for four new upcoming farmers in the Limpopo Province.
- Undertook reconnaissance soil surveys on various plantations and farms.
- GPS survey and alien identification for mapping of Jukskei and Swartspruit areas, as part of the Working for Water Program.
- Participated in a due diligence audit on various plantations in the Limpopo and Mpumalanga Provinces as part of the preparation for a British company's tender to purchase these plantations.
- 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.
- Lectures Basic Farm Planning short courses in Limpopo and Gauteng.

| | |
|---|---|
| **Period** | June 2004 – June 2006 |
| **Company** | Gauteng Department of Agriculture Conservation and Environment |
| **Position occupied** | Acting Assistant Director Resource planning and Utilization |
| **Site classification, evaluation, land use planning and farming extension in general.** | |
| • Plan the utilization of agricultural resources in the Province for sustainable agricultural production and economic development<br>• Provide advanced scientific and practical information, advice and training (formal and informal) pertaining to land use planning to stakeholders, in order to maximise their ability to utilise their farm land effectively.<br>• Irrigation design and technical support.<br>• Evaluate Scoping Reports for development and exemption for EIA application.<br>• Capability surveys for Land Reform for Agricultural Development Land<br>• Member of technical working group for the zonation of high potential land in Gauteng | |

| | |
|---|---|
| **Period** | July 2006 to date |
| **Company** | Self employed |
| **Position occupied** | Land Use Consultant |
| **Period of employment** | 14 years |
| **Compile agricultural potential studies** | |
| Land capability classification and evaluation as part of<br>• Environmental Impact Assessments<br>• Motivation report for change in land use<br>• Verification of desktop studies.<br>• Specialised agricultural ventures. | |
| Agricultural impact studies for Scoping and EIA relating to :<br>• Construction of renewable energy facilities (Various solar as well as wind and hydro electrical)<br>• Rezoning municipal boundary (Witsand)<br>• Construction packaging facility (Augrabies)<br>• Construction desalination plant (Witsand)<br>• Establish new graveyard (Zoar)<br>• Feasibility study feedlot (Sudan)<br>• Mapping potential agricultural land (Kongo)<br>• Verifying desktop studies | |

**Appendix B**

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

| |
|---|
| |
| |
| |

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

| | (For official use only) |
|---|---|
| File Reference Number: | 12/12/20/ or 12/9/11/L |
| NEAS Reference Number: | DEA/EIA |
| Date Received: | |

Application for integrated environmental authorisation and waste management licence in terms of the-

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

(2) National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 921, 2013

PROJECT TITLE

| | | | |
|---|---|---|---|
| Specialist: | C R Lubbe | | |
| Contact person: | Christo Lubbe | | |
| Postal address: | 4 Protea Street, Riversdale | | |
| Postal code: | 6670 | Cell: | 082 853 1274 |
| Telephone: | -- | Fax: | -- |
| E-mail: | macquarrie@vodamail.co.za | | |
| Professional affiliation(s) (if any) | None | | |

| | | | |
|---|---|---|---|
| Project Consultant: | Cape Environmental Assessment Practitioners (Pty) Ltd | | |
| Contact person: | Dale Holder | | |
| Postal address: | PO Box 2070, George | | |
| Postal code: | 6530 | Cell: | 082448 9225 |
| Telephone: | 044 874 0365 | Fax: | 044 874 0432 |
| E-mail: | dale@cape-eaprac.co.za | | |

4.2 The specialist appointed in terms of the Regulations_

I, Christiaan Rudolf Lubbe, declare that –

General declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

C R Lubbe
Name of company (if applicable):

17 June 2020
Date: