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**SITE SENSITIVITY VERIFICATION  
AND  
AGRICULTURAL AGRO-ECOSYSTEM SPECIALIST ASSESSMENT  
FOR  
THE PROPOSED COLLECTOR SUBSTATION; MAIN TRANSMISSION SUBSTATION  
AND 400KV GRID CONNECTION  
FOR THE CAMDEN 1 WIND ENERGY FACILITY  
NEAR ERMELO IN MPUMALANGA PROVINCE**

**Report by  
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**21 August 2022**

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## EXECUTIVE SUMMARY

The purpose of the agricultural component in the Environmental Authorisation process is to ensure that South Africa balances the need for development against the need to ensure the conservation of the natural agricultural resources, including land, required for agricultural production and national food security.

It is important to assess the agricultural impact of this grid connection within the context of the net overall agricultural impact of the whole Camden renewable energy project of which it is an integral part. Within this context, the conclusion of this assessment is that the agricultural impact of the proposed development will be acceptable because:

1. The proposed development will exclude only a very small area of land (5 ha) from future agricultural production.
2. The proposed grid connection is a necessary part of the greater Camden renewable energy project which offers a valuable opportunity for renewable energy facilities to be integrated with agricultural production in a way that provides renewable energy to the country as well as benefits to agriculture with very little loss of future agricultural production potential. The agricultural benefits are increased economic viability for agricultural operations on site, security benefits against stock theft and other crime, an improved road network, with associated storm water handling system, and that the project will decrease the need for coal power and thereby contribute to reducing the large agricultural impact that open cast coal mining has on highly productive agricultural land in the area.

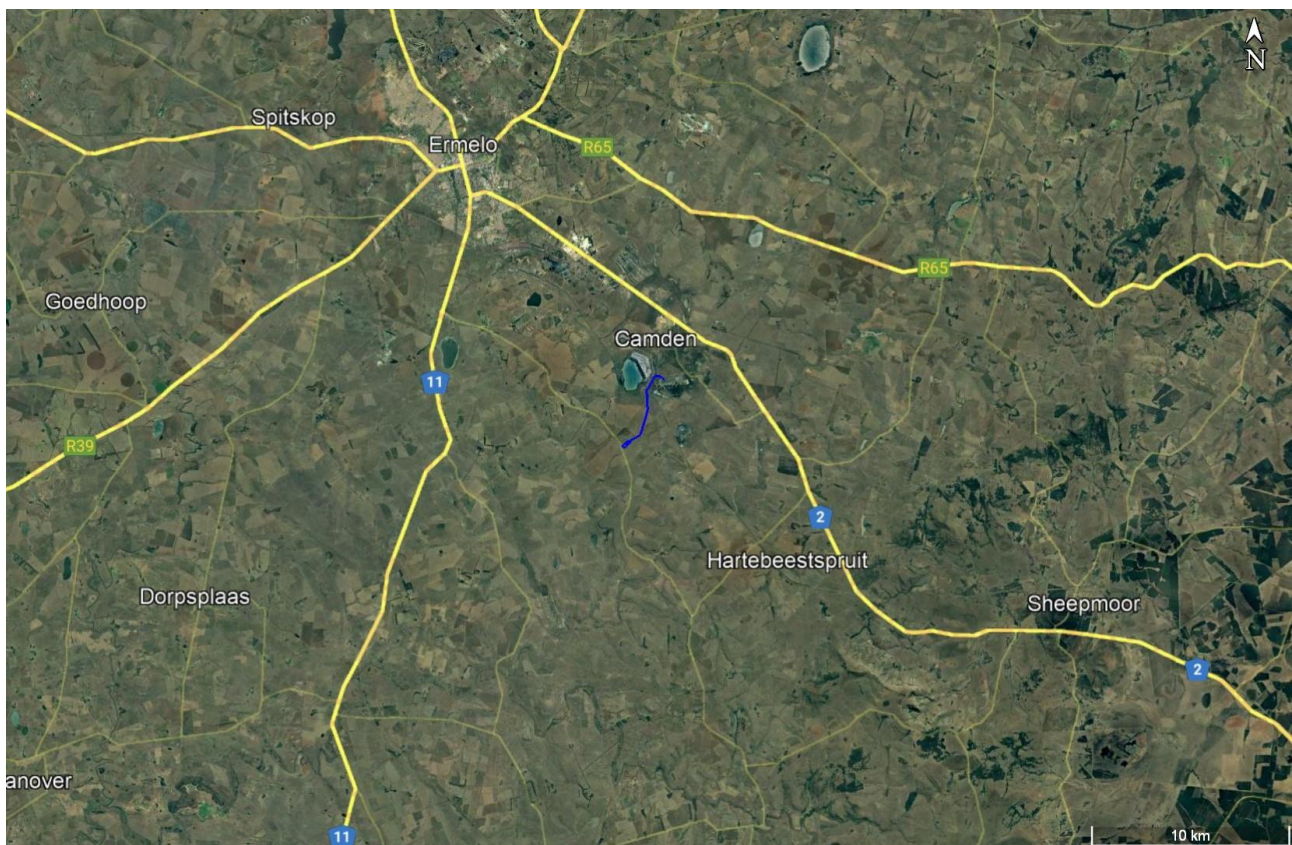
Therefore, from an agricultural impact point of view, it is recommended that the development be approved.

Of the two proposed alternatives, the location for the substation in alternative 1 has lower agricultural impact than the preferred location and is therefore preferred from an agricultural impact point of view.

## 1 INTRODUCTION

Environmental authorisation is being sought for the proposed collector substation; main transmission substation and 400kV grid connection for the Camden 1 Wind Energy Facility near Ermelo in Mpumalanga Province (see location in Figure 1). In terms of the National Environmental Management Act (Act No 107 of 1998) (NEMA), an application for environmental authorisation requires an agricultural assessment, in this case an Agricultural Agro-Ecosystem Specialist Assessment.

Johann Lanz was appointed as an independent agricultural specialist to conduct the agricultural assessment. The objective and focus of an agricultural assessment is to assess whether or not the proposed development will have an unacceptable agricultural impact by assessing the potential agricultural impacts of the proposed development, and based on this, to make a recommendation on whether or not it should be approved.



**Figure 1.** Locality map of the proposed grid connection in blue, south-east of the town of Ermelo.

The purpose of the agricultural protocol of NEMA is primarily to preserve the agricultural production potential of scarce arable land by ensuring that development does not exclude agricultural production from such land or impact it to the extent that the crop production potential is reduced.

The grid connection is obviously an integral part of the Camden 1 Wind Energy Facility and there is no point in one existing without the other. For all intents and purposes, and especially from an environmental impact perspective where it is necessary to consider things holistically and in relation to each other, it makes no sense to assess the grid connection separately from the rest of the facility.

## **2 PROJECT DESCRIPTION**

The proposed project is for a 400kV connection of the Camden Renewable Energy Complex to the Eskom grid. It comprises:

1. 1 x up to 400kV transmission line
2. common collector substation, with a footprint of approximately 5ha
3. access road to substation
4. Expansion by 1 hectare of the existing Eskom Camden MTS Substation

Two collector substation locations with their transmission lines are proposed as alternatives. A Loop-In-Loop-Out alternatives into the existing Eskom Camden-Incandu 400kV powerline line are also proposed.

Of the four project components listed above only the second and third have any agricultural impact. The agricultural impact of a power line is totally insignificant because agriculture is not excluded from the land underneath a power line. The expansion of the existing Eskom Camden MTS Substation has no agricultural impact because it will be on land within the power station that could and would never be used for agricultural production. In terms of project components two and three, the exact nature and layout of the different infrastructure within the boundary fence of the substation has absolutely no bearing on the significance of agricultural impacts. All that is of relevance is simply the total footprint of the facility that excludes agricultural land use.

## **3 TERMS OF REFERENCE**

The terms of reference for this study is to fulfill the requirements of the *Protocol for the specialist assessment and minimum report content requirements of environmental impacts on agricultural resources*, gazetted on 20 March 2020 in GN 320 (in terms of Sections 24(5)(A) and (H) and 44 of NEMA, 1998).

The site includes land that is classified by the national web-based environmental screening tool as high sensitivity for impacts on agricultural resources. The level of agricultural assessment required in terms of the protocol (and hence in terms of NEMA) is therefore an Agricultural Agro-Ecosystem

Specialist Assessment. The terms of reference for such an assessment, as stipulated in the protocol, are listed below, and the section number of this report which fulfils each stipulation is given after it in brackets. The protocol also requires that a Site Sensitivity Verification be done.

1. The assessment must be undertaken by a soil scientist or agricultural specialist registered with the South African Council for Natural Scientific Professions (SACNASP) **(Appendix 1)**.
2. The assessment must be undertaken on the preferred site and within the proposed development footprint **(Figure 3)**.
3. The assessment must be undertaken based on a site inspection as well as an investigation of the current production figures, where the land is under cultivation or has been within the past 5 years, and must identify:
  1. the extent of the impact of the proposed development on the agricultural resources **(Section 9.11)**;
  2. whether or not the proposed development will have an unacceptable negative impact on the agricultural production capability of the site (Section 11), and in the event where it does, whether such a negative impact is outweighed by the positive impact of the proposed development on agricultural resources.
4. The status quo of the site must be described, including the following aspects which must be considered as a minimum in the baseline description of the agro-ecosystem:
  1. The soil form/s, soil depth (effective and total soil depth), top and sub-soil clay percentage, terrain unit and slope **(Sections 8.1 & 8.2)**;
  2. Where applicable, the vegetation composition, available water sources as well as agro-climatic information **(Sections 8.3, 8.4 & 8.5)**;
  3. The current productivity of the land based on production figures for all agricultural activities undertaken on the land for the past 5 years, expressed as an annual figure and broken down into production units **(Section 8.7)**;
  4. The current employment figures (both permanent and casual) for the land for the past 3 years, expressed as an annual figure **(Section 8.8)**;
  5. Existing impacts on the site, located on a map where relevant (e.g. erosion, alien vegetation, non-agricultural infrastructure, waste, etc.)**(Section 8.9)**.
5. Assessment of Impacts, including the following which must be considered as a minimum in the predicted impact of the proposed development on the agro-ecosystem:
  1. Change in productivity for all agricultural activities based on the figures of the past 5 years, expressed as an annual figure and broken down into production units **(Section 9.11)**;
  2. Change in employment figures (both permanent and casual) for the past 5 years expressed as an annual figure **(Section 9.11)**;
  3. Any alternative development footprints within the preferred site which would be of “medium” or “low” sensitivity for agricultural resources as identified by the screening tool and verified through the site sensitivity verification **(Section 9.6)**.

6. The findings of the Agricultural Agro-Ecosystem Specialist Assessment must be written up in an Agricultural Agro-Ecosystem Specialist Report that contains as a minimum the following information:
  1. Details and relevant experience as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the assessment including a curriculum vita **(Appendix 1)**;
  2. A signed statement of independence by the specialist **(Appendix 2)**;
  3. The duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment **(Section 4.1)**;
  4. A description of the methodology used to undertake the on-site assessment inclusive of the equipment and models used, as relevant **(Section 4.1)**;
  5. A map showing the proposed development footprint (including supporting infrastructure) with a 50 m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool **(Figure 2)**;
  6. An indication of the potential losses in production and employment from the change of the agricultural use of the land as a result of the proposed development **(Section 9.11)**;
  7. an indication of possible long-term benefits that will be generated by the project in comparison to the benefits of the agricultural activities on the affected land **(Section 9.7)**;
  8. Additional environmental impacts expected from the proposed development based on the current status quo of the land including erosion, alien vegetation, waste, etc. **(Section 9.8)**;
  9. Information on the current agricultural activities being undertaken on adjacent land parcels **(Section 8.6)**;
  10. an identification of any areas to be avoided, including any buffers **(Section 9.10)**;
  11. a motivation must be provided if there were development footprints identified as per point 5.3 above that were identified as having a medium or low agricultural sensitivity and that were not considered appropriate **(Section 9.6)**;
  12. Confirmation from the soil scientist or agricultural specialist that all reasonable measures have been considered in the micro-siting of the proposed development to minimise fragmentation and disturbance of agricultural activities **(Section 9.9)**;
  13. A substantiated statement from the soil scientist or agricultural specialist with regards to agricultural resources on the acceptability or not of the proposed development and a recommendation on the approval or not of the proposed development **(Section 11)**;
  14. Any conditions to which this statement is subjected **(Section 11)**;
  15. Where identified, proposed impact management outcomes or any monitoring requirements for inclusion in the Environmental Management Programme (EMPr) **(Section 10)**;
  16. A description of the assumptions made and any uncertainties or gaps in knowledge or data **(Section 5)**.

## 4 METHODOLOGY OF STUDY

### 4.1 Methodology for assessing soils and agricultural potential

The assessment was based on an on-site investigation of the soils and agricultural conditions and was also informed by existing soil and agricultural potential data for the site. The following sources of existing information were used:

- Soil data was sourced from the land type data set, of the Department of Agriculture, Forestry and Fisheries (DAFF). This data set originates from the land type survey that was conducted from the 1970's until 2002. It is the most reliable and comprehensive national database of soil information in South Africa and although the data was collected some time ago, it is still entirely relevant as the soil characteristics included in the land type data do not change within time scales of hundreds of years.
- Land capability data was sourced from the 2017 National land capability evaluation raster data layer produced by the DAFF, Pretoria.
- Field crop boundaries were sourced from Crop Estimates Consortium, 2019. *Field Crop Boundary data layer, 2019*. Pretoria. Department of Agriculture, Forestry and Fisheries
- Rainfall and evaporation data was sourced from the SA Atlas of Climatology and Agrohydrology (2009, R.E. Schulze) available on Cape Farm Mapper. Note that Cape Farm Mapper includes national coverage of climate, grazing and certain other data.
- Grazing capacity data was sourced from the 2018 DAFF long-term grazing capacity map for South Africa, available on Cape Farm Mapper.
- Satellite imagery of the site and surrounds was sourced from Google Earth.

The aim of the on-site Site Sensitivity Verification was to:

1. ground-truth cropland status and consequent agricultural sensitivity;
2. ground truth the land type soil data and achieve an understanding of the general range and distribution patterns of different soil conditions across the site;
3. gain an understanding of overall agricultural production potential across the site.

This was achieved by a drive and walk-over investigation across the site. The site investigation was conducted on 29 March 2022. An interview was also conducted with farmer, Louis Reyneke, to get details of farming practices on the site.

The soil investigation was conducted on the entire wind farm site. It was based on the investigation of existing excavations and exposures, soil auger samples as well as indications of the surface



conditions and topography. Soils were classified according to the South African soil classification system (Soil Classification Working Group, 1991). This level of soil assessment is considered entirely adequate for an understanding of on-site soil potential for the purposes of a wind farm assessment.

An assessment of soils and long-term agricultural potential is in no way affected by the season in which the assessment is made, and therefore the fact that the assessment was done in autumn has no bearing on its results.

## **5 ASSUMPTIONS, UNCERTAINTIES OR GAPS IN KNOWLEDGE OR DATA**

There are no specific assumptions, uncertainties or gaps in knowledge or data that affect the findings of this study.

## **6 APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS**

A substation requires approval from the National Department of Agriculture, Land Reform and Rural Development (DALRRD) if the facility is on agriculturally zoned land. There are two approvals that apply. The first is a No Objection Letter for the change in land use issued by the Deputy Director General (Agricultural Production, Health and Food Safety, Natural Resources and Disaster Management). This letter is one of the requirements for receiving municipal rezoning. It is advisable to apply for this as early in the renewable development process as possible because not receiving this DALRRD approval is a fatal flaw for a project. Note that a positive EA does not assure DALRRD's approval of this. This application requires a motivation backed by good evidence that the development is acceptable in terms of its impact on the agricultural production potential of the development site. This assessment report serves that purpose.

The second required approval is a consent for long-term lease in terms of the Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA). If DALRRD approval for the development has already been obtained in the form of the No Objection letter, then SALA approval should not present any difficulties. Note that SALA approval is not required if the lease is over the entire farm portion, i.e. no subdivision is applicable. SALA approval (if required) can only be applied for once the Municipal Rezoning Certificate and EA is in hand.

Power lines require the registration of a servitude for each farm portion crossed. In terms of the Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA), the registration of a power line servitude requires written consent of the Minister unless either of the following two conditions apply:

1. if the servitude width does not exceed 15 metres; and

2. if Eskom is the applicant for the servitude.

If one or both of these conditions apply, then no agricultural consent is required. The second condition is likely to apply, even if another entity gets Environmental Authorisation for and constructs the power line, but then hands it over to Eskom for its operation. Eskom is currently exempt from agricultural consent for power line servitudes.

Rehabilitation after disturbance to agricultural land is managed by the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA). A consent in terms of CARA is required for the cultivation of virgin land. Cultivation is defined in CARA as “any act by means of which the topsoil is disturbed mechanically”. The purpose of this consent for the cultivation of virgin land is to ensure that only land that is suitable as arable land is cultivated. Therefore, despite the above definition of cultivation, disturbance to the topsoil that results from the construction of a renewable energy facility and its associated infrastructure does not constitute cultivation as it is understood in CARA. This has been corroborated by Anneliza Collett (Acting Scientific Manager: Natural Resources Inventories and Assessments in the Directorate: Land and Soil Management of the Department of Agriculture, Land Reform and Rural Development (DALRRD)). The construction and operation of the facility will therefore not require consent from the Department of Agriculture, Land Reform and Rural Development in terms of this provision of CARA.

## **7 SITE SENSITIVITY VERIFICATION**

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

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

However, the verification of agricultural sensitivity of the power line route has very little relevance to this assessment because the agricultural impacts of a power line are insignificant in such an agricultural environment, regardless of the level of agricultural sensitivity of the land which it traverses. In this assessment, only the footprint of the collector substation is of relevance.

Agricultural sensitivity is a direct function of the capability of the land for agricultural production. All arable land that can support viable crop production, is classified as high (or very high) sensitivity. This is because there is a scarcity of arable production land in South Africa and its conservation for agricultural use is therefore a priority. Land which cannot support viable crop production is much less of a priority to conserve for agricultural use, and is rated as medium or low

agricultural sensitivity.

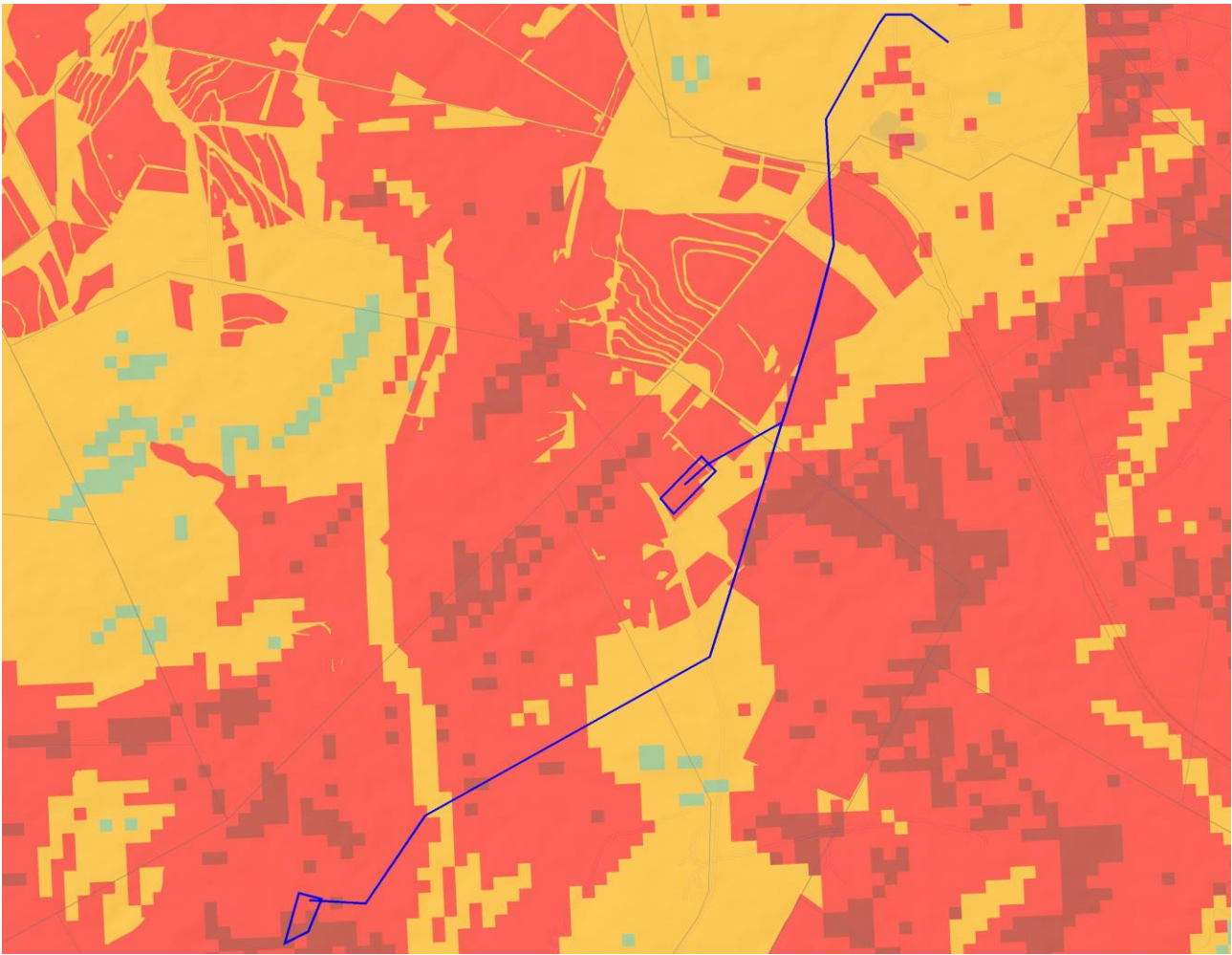
The screening tool classifies agricultural sensitivity according to only two independent criteria – the land capability rating and whether the land is used for cropland or not. All cropland is classified as at least high sensitivity, based on the logic that if it is under crop production, it is indeed suitable for it, irrespective of its land capability rating.

The screening tool sensitivity categories in terms of land capability are based upon the Department of Agriculture's updated and refined, country-wide land capability mapping, released in 2016. The data is generated by GIS modelling. Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land, based on its soil, climate and terrain. The higher land capability values ( $\geq 8$  to 15) are likely to be suitable as arable land for crop production, while lower values are only likely to be suitable as non-arable grazing land.

A map of the proposed development area overlaid on the screening tool sensitivity is given in Figure 2. For the preferred alternative (northern alternative in Figure 2), the classified land capability of the substation site is 7 to 8, which translates to a medium agricultural sensitivity. The site is however rated as high agricultural sensitivity because it is classified as cropland. For alternative 1 (southern alternative in Figure 2), the classified land capability of the substation site is 10 to 11. A value of 10 translates to a high agricultural sensitivity and a value of 11 translates to a very high agricultural sensitivity. The site is however not on cropland.

The small scale differences in land capability across the project area are not very accurate or significant at this scale and are more a function of how the land capability data is generated by modelling, than actual meaningful differences in agricultural potential on the ground. Historical land use is actually the most reliable indication of soil cropping potential. The suitable versus the unsuitable soils have been identified over time through trial and error. In an agricultural environment like the one being assessed, all the suitable soils are generally cropped, and uncropped soils can therefore fairly reliably be considered to be unsuitable for crop production. Cropped areas are shown in Figure 3.

Therefore, in contrast to what the screening tool and land capability data indicate, the southern site is actually the lower potential site and should be classified as medium agricultural sensitivity because it is unsuitable for crop production. The preferred (northern) site is confirmed as being of high agricultural sensitivity because it is viable cropland.

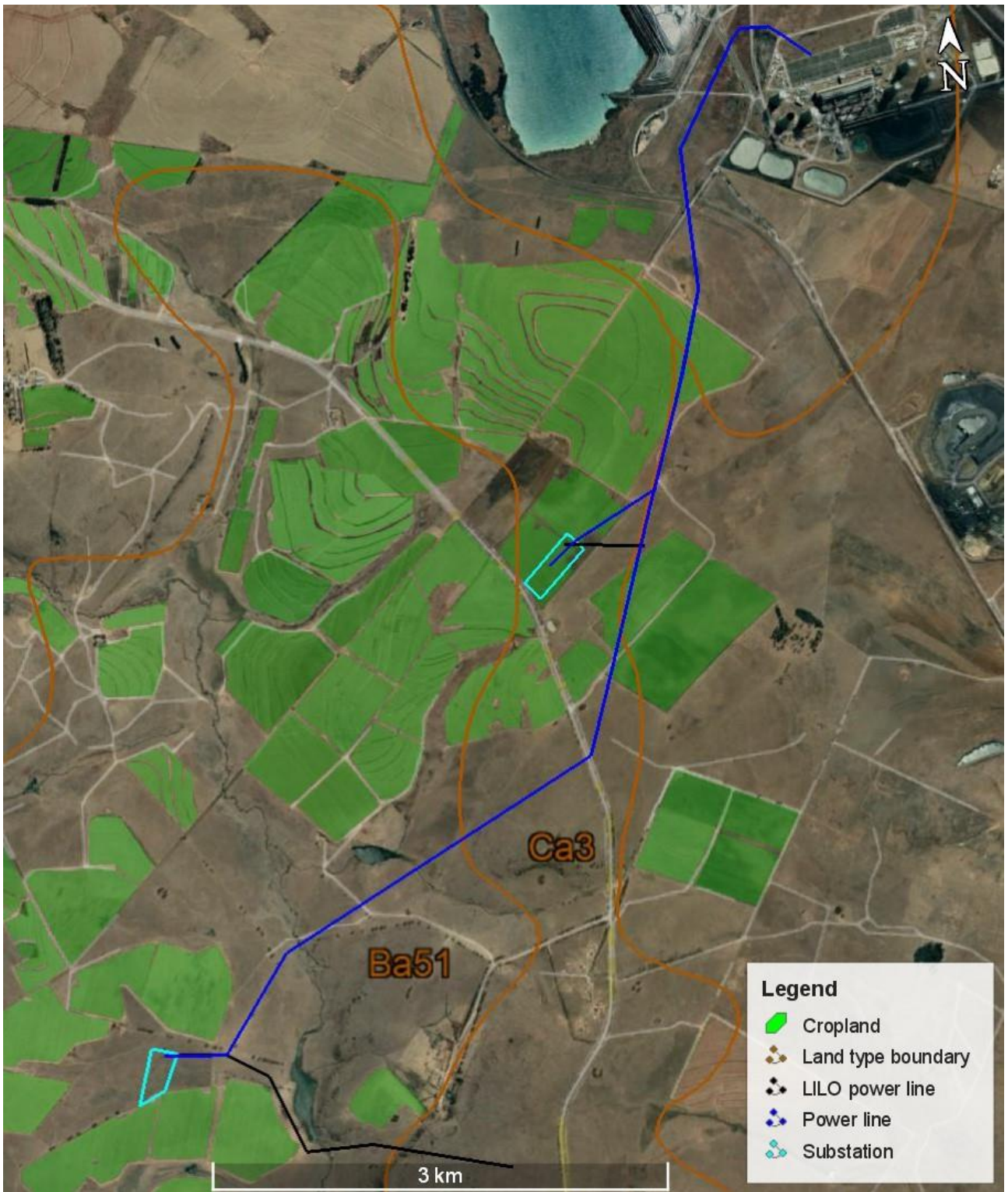


**Figure 2.** The proposed development footprint (blue outlines indicate substation sites. Blue lines indicate transmission lines) overlaid on agricultural sensitivity, as given by the screening tool (green = low; yellow = medium; red = high; dark red = very high). The northern substation site is the preferred alternative.

## 8 BASELINE DESCRIPTION OF THE AGRO-ECOSYSTEM

The aim of this section of the report is to present the baseline information that controls the agricultural production potential of the site and then, based on that information, to make an assessment of the production potential. That assessment is provided near the end of this section in sub-section 8.7.

A satellite image map of the agricultural footprint of the proposed project is shown in Figure 3 and photographs of site conditions and soils are shown in Figures 4 and 5.



**Figure 3.** Satellite image map of the proposed grid connection. The northern substation site is the preferred alternative.



**Figure 4.** *View of the preferred substation site on the left.*



**Figure 5.** *View of alternative 1 substation site.*

## **8.1 Soils**

The preferred substation alternative is on land type Ca3 and the alternative is on Ba51 (see table of soil data in Appendix 4). The geology is predominantly shale and sandstone of the Ecca Group of the Karoo Supergroup and includes dolerite. Approximately half of both land types comprise deep, red and yellow, reasonably-drained, loamy soils of the Avalon, Hutton, Glencoe, and other soil forms that are good for crop production. The other half comprises other soils that have various limitations for crop production, which are predominantly the result of poor drainage or limited depth due to underlying clay or bedrock. These soils are of the Mispah and Glenrosa soil forms (shallow bedrock) and the Kroonstad, Estcourt Valsrivier, Longlands, and other soil forms (poor drainage and underlying clay).

## **8.2 Terrain and slope**

The wind farm site is situated on elevated, slightly hilly terrain, with all aspects, at an altitude of between 1,600 and 1,700 metres and slopes up to about 7%, but the actual substation sites are much flatter.

## **8.3 Available water sources**

There is no significant irrigated crop production anywhere across the site (as per Figure 3 above) because water for irrigation is generally not available in the area.

## **8.4 Vegetation**

Natural vegetation of the site is Eastern Highveld Grassland and Amersfoort Highveld Clay Grassland, which has been disturbed by agricultural and other anthropogenic activities.

## **8.5 Agro-climatic information**

The site has a summer rainfall with a mean annual rainfall of between 722 and 754 mm and a mean annual evaporation of approximately 1,210 mm (Schulze, 2009).

## **8.6 Land use and development on and surrounding the site**

The development is located in a grain and cattle farming agricultural region, but the soils vary in their suitability for crop production. Crops in the area include mainly maize and soya beans. Farmers generally utilise all suitable soil as cropland. Only soil that is not suitable for crop production is used for grazing of cattle and sheep. Limitations that render the soil unsuitable for crop production are poor drainage and depth limitations due to rock or dense clay in the subsoil.

The preferred substation site is on cropland while the alternative is on land not used for crops and therefore presumed to be unsuitable.

Coal-fired electricity generation and mining take place in the surrounding area.

### **8.7 Agricultural potential and productivity**

Because of the favourable climate and suitable soils on the croplands, crop yields are fairly high with average maize yields of around 7 to 8 tons per hectare according to the farmers on site. The long-term grazing capacity of the area is fairly high at 4.5 hectares per large stock unit (DAFF, 2018).

### **8.8 Agricultural employment**

The farm on which the substation sites are located employs members of two households who reside on the farm.

### **8.9 Existing impacts on the site**

There are no existing impacts on the site that are relevant to agricultural impact.

## **9 ASSESSMENT OF AGRICULTURAL IMPACT**

### **9.1 What constitutes and agricultural impact?**

An agricultural impact is a temporary or permanent change to the future production potential of land. If a development will not change the future production potential of the land, then there is no agricultural impact. A decrease in future production potential is a negative impact and an increase is a positive impact. The significance of the agricultural impact is directly proportional to the extent of the change in production potential.

### **9.2 The significance of agricultural impact and the factors that determine it**

The purpose of the agricultural component in the Environmental Authorisation process is to ensure that South Africa balances the need for development against the need to ensure the conservation of the natural agricultural resources, including land, required for agricultural production and national food security.

When the agricultural impact of a development involves the permanent or long term non-



agricultural use of potential agricultural land, as it does in this case, the focus and defining question of the agricultural impact assessment is to determine the importance, from an agricultural production point of view, of that land not being utilised for the development and kept solely for agriculture.

In other words, the significance of an agricultural impact should be evaluated by asking the question: Does the loss of future agricultural production potential that will result from this development, justify keeping the land solely for agricultural production and therefore not approving the development? If the loss is small, then it is unlikely to justify non approval. If the loss is big, then it is likely to justify it.

The extent of the loss is a direct function of two things, firstly the amount of land that will be lost and secondly, the production potential of the land that will be lost. In this case the loss is of 5 hectares of land, which on the preferred site is cropland and on the alternative is not.

Another aspect to consider is the scale at which the significance of the agricultural impact is assessed. The change in production potential of part of a farm is likely to be more significant at the scale of that farm, than at larger scales. This assessment considers a regional and national scale to be the most appropriate one for assessing the significance of the loss of agricultural production potential because, as has been discussed above, the purpose is to ensure the conservation of agricultural land required for national food security.

### **9.3 Impact identification**

The only impact of this development is the loss of 5 hectares of agricultural land on the site of the collector substation. The other components of the development have no agricultural impact. The agricultural impact of a power line is totally insignificant because agriculture is not excluded from the land underneath a power line. The expansion of the existing Eskom Camden MTS Substation has no agricultural impact because it will be on land within the power station that could and would never be used for agricultural production.

### **9.4 Cumulative impacts**

The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect the same environment. It is important to note that the cumulative impact assessment for a particular project, like what is being done here, is not the same as an assessment of the impact of all surrounding projects. The cumulative assessment for this project is an assessment only of the impacts associated with this project, but seen in the context of all surrounding impacts. It is concerned with this project's contribution to the overall impact, within

the context of the overall impact, but it is not simply the overall impact itself.

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of future agricultural production potential. The defining question for assessing the cumulative agricultural impact is this:

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

DFFE requires compliance with a specified methodology for the assessment of cumulative impacts. This is positive in that it ensures engagement with the important issue of cumulative impacts. However, the required compliance has some limitations and can, in the opinion of the author, result in an over-focus on methodological compliance, while missing the more important task of effectively answering the above defining question.

This development is an integral part of the Camden wind energy facilities. A cumulative impact assessment needs to consider it as such and not in isolation. DFFE compliance for wind energy facilities requires considering all renewable energy project applications within a 30 km radius. According to the DFFE database, the Camden 1 and 2 wind energy facilities are the only renewable energy projects within a 30 km radius. In quantifying the cumulative impact, the area of land taken out of agricultural use as a result of these 2 projects (total generation capacity of up to 500 MW) will amount to a total of approximately 150 hectares. This is calculated using the industry standards of 2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per the Department of Environmental Affairs (DEA) Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015). As a proportion of the total area within a 30km radius (approximately 282,700 ha), this amounts to only 0.05% of the surface area. That is considered to be within an acceptable limit in terms of loss of agricultural land.

Due to all of the considerations discussed above, the cumulative impact of loss of agricultural land use will not have an unacceptable negative impact on the agricultural production capability of the area. The proposed development is therefore acceptable in terms of cumulative impact, and it is

therefore recommended that it is approved.

### **9.5 Impacts of the no-go alternative**

The no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. There are no agricultural impacts of the no-go alternative but it would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of renewable energy in South Africa. It should be noted that any future coal mining on the site will have a significant and much greater agricultural impact than the proposed grid connection with its associated wind energy facility.

### **9.6 Alternative development footprints and comparative assessment of alternatives**

The agricultural protocol requires identification of any alternative development footprints within the preferred site which would be of “medium” or “low” sensitivity for agricultural resources as identified by the screening tool and verified through the site sensitivity verification.

As discussed in Section 7, the alternative location of the substation compared to the preferred location is on lower potential agricultural land that is not suitable for crop production. The alternative location is therefore preferred from an agricultural impact point of view.

### **9.7 Long term project benefits versus agricultural benefits**

The subject of this assessment, the grid connection, should be considered as an integral part of the wind energy facilities rather than being assessed in unrealistic isolation. The entire development will generate a significant (at the scale of an individual farm), reliable, and predictable additional income for the directly affected farming enterprises, without compromising the existing farming income. It will also generate additional income and employment in the local economy. In addition, it will contribute to the country's need for energy generation, particularly renewable energy that has lower environmental and agricultural impact on a national scale than existing, coal powered energy generation.

### **9.8 Additional environmental impacts**

There are no additional environmental impacts of the proposed development that are relevant to agriculture.

### **9.9 Micro-siting to minimize fragmentation and disturbance of agricultural activities**

The agricultural protocol requires confirmation that all reasonable measures have been taken

through micro-siting to minimize fragmentation and disturbance of agricultural activities. As has been noted in Section 9.6 above, the alternative location for the substation has lower agricultural impact than the preferred location.

**9.10 Areas to be avoided including buffers**

No buffers are required for agricultural impacts. No parts of the proposed sites need to be avoided for agricultural impacts. However, as has been noted in Section 9.6 above, the alternative location for the substation has lower agricultural impact than the preferred location.

**9.11 Impact assessment**

An Agricultural Agro-Ecosystem Specialist Assessment is required by the protocol to identify the extent of the impact of the proposed development on agricultural resources. The assessment of impacts in an environmental impact assessment is done according to a prescribed, semi-quantitative rating methodology that is supposed to cover all specialist disciplines and allow comparison of the impacts across them. However, the system was designed for biological components of the ecosystem such as plants and animals and does not rate agricultural impacts in a sensible or particularly useful way. As has been discussed above, the significance of the agricultural impact is simply the degree to which the future agricultural production potential of the site will be changed and that is predominantly a function of the size of the area of land that is impacted and the production potential of that impacted land. The dominant factor in this case is the small size of the area of land that is impacted (5 ha) which is a very small proportion of the affected farm. The prescribed methodology is presented below for compliance purposes but is not really an effective indication of the significance of the agricultural impact.

Furthermore, it is important to assess the agricultural impact within the context of the whole Camden renewable energy project. It does not make sense to consider the agricultural impacts of the different components of the project in isolation from each other, in the way that the rating methodology forces one to do. The context of the net overall agricultural impact of the greater project is important to take into account.

<b>Aspect:</b>	Agricultural production potential
<b>Description:</b>	Decrease in agricultural production potential due to occupation of 5 hectares of land by the collector substation.
<b>Stage:</b>	There is only one agricultural impact and it occurs for the duration of the project life time. To differentiate between the different phases of the project does not really make sense, but for compliance purposes the impact, as

	assessed below, can be considered to be identical across the construction, operation and decommissioning phases of the project.
<b>Character:</b>	Negative
<b>Ease of mitigation:</b>	Loss of substation site cannot be mitigated

	<b>Without mitigation</b>	
<b>Magnitude (M)</b>	Low (2)	
<b>Extent (E)</b>	Site only (1)	
<b>Reversibility (R)</b>	Recoverable (3)	
<b>Duration (D)</b>	Long term (4)	
<b>Probability (P)</b>	Definite (5)	
<b>Significance (S)</b>	N1 – Moderate (50)	

The agricultural protocol requires an indication of the potential losses in production and employment from the change of the agricultural use of the land as a result of the proposed development. The development will result in production losses of 5 hectares of annual crops. No losses of agricultural employment are expected because the site occupies only a small proportion of a much larger farming operation and the cessation of cropping on the site will not significantly reduce the farm's labour requirement.

## 10 ENVIRONMENTAL MANAGEMENT PROGRAMME INPUTS

There are no additional mitigation measures required, over and above what has already been included in the generic environmental programme relevant to an application for environmental authorisation for substation and overhead electricity transmission and distribution infrastructure as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019.

## 11 CONCLUSIONS

The conclusion of this assessment is that the agricultural impact of the proposed development is acceptable because:

1. The proposed development will exclude only a very small area of land (5 ha) from future agricultural production.
2. The proposed grid connection is a necessary part of the greater Camden renewable energy project which offers a valuable opportunity for renewable energy facilities to be integrated with agricultural production in a way that provides renewable energy to the country as well

as benefits to agriculture with very little loss of future agricultural production potential. The agricultural benefits are increased economic viability for agricultural operations on site, security benefits against stock theft and other crime, an improved road network, with associated storm water handling system, and that the project will decrease the need for coal power and thereby contribute to reducing the large agricultural impact that open cast coal mining has on highly productive agricultural land in the area.

Therefore, from an agricultural impact point of view, it is recommended that the development be approved.

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

## 12 REFERENCES

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

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

DEA, 2015. Strategic Environmental Assessment for wind and solar photovoltaic development in South Africa. CSIR Report Number CSIR: CSIR/CAS/EMS/ER/2015/001/B. Stellenbosch.

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

Soil Classification Working Group. 1991. Soil classification: a taxonomic system for South Africa. Soil and Irrigation Research Institute, Department of Agricultural Development, Pretoria.

## APPENDIX 1: SPECIALIST CURRICULUM VITAE

### Johann Lanz Curriculum Vitae

#### Education

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

#### Professional work experience

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

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

Within the past 5 years of running my soil and agricultural consulting business, I have completed more than 170 agricultural assessments (EIAs, SEAs, EMPRs) in all 9 provinces for renewable energy, mining, electrical grid infrastructure, urban, and agricultural developments. I was the appointed agricultural specialist for the nation-wide SEAs for wind and solar PV developments, electrical grid infrastructure, and gas pipelines. My regular clients include: Zutari; CSIR; SiVEST; SLR; WSP; Arcus; SRK; Environamics; Royal Haskoning DHV; ABO; Enertrag; WKN-Windcurrent; JG Afrika; Mainstream; Redcap; G7; Mulilo; and Tiptrans. Recent agricultural clients for soil resource evaluations and mapping include Cederberg Wines; Western Cape Department of Agriculture; Vogelfontein Citrus; De Grendel Estate; Zewenwacht Wine Estate; and Goedgedacht Olives.

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

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

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

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

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

#### Publications

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

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





## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

### APPENDIX 2: DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

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

#### PROJECT TITLE

**THE PROPOSED COLLECTOR SUBSTATION; MAIN TRANSMISSION SUBSTATION AND 400KV GRID CONNECTION FOR THE CAMDEN 1 WIND ENERGY FACILITY NEAR ERMELO IN MPUMALANGA PROVINCE**

#### Kindly note the following:

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

#### Departmental Details

**Postal address:** Department of Environmental Affairs, Attention: Chief Director: Integrated Environmental Authorisations, Private Bag X447, Pretoria, 0001

**Physical address:** Department of Environmental Affairs, Attention: Chief Director: Integrated Environmental Authorisations, Environment House, 473 Steve Biko Road, Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:  
Email: [EIAAdmin@environment.gov.za](mailto:EIAAdmin@environment.gov.za)

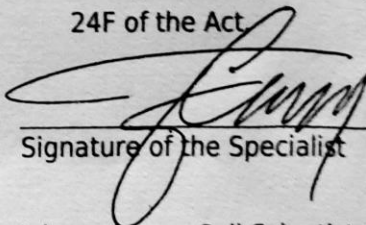
**1. SPECIALIST INFORMATION**

Specialist Company Name:	Johann Lanz – Soil Scientist		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
Specialist name:	Johann Lanz		
Specialist Qualifications:	M.Sc. (Environmental Geochemistry)		
Professional affiliation/registration:	Registered Professional Natural Scientist (Pr.Sci.Nat.) Reg. no. 400268/12 Member of the Soil Science Society of South Africa		
Physical address:	1a Wolfe Street, Wynberg, Cape Town, 7800		
Postal address:	1a Wolfe Street, Wynberg, Cape Town, 7800		
Postal code:	7800	Cell:	082 927 9018
Telephone:	082 927 9018	Fax:	Who still uses a fax? I don't
E-mail:	johann@johannlanz.co.za		

**2. DECLARATION BY THE SPECIALIST**

I, **Johann Lanz**, declare that -

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



Signature of the Specialist

Johann Lanz - Soil Scientist (sole proprietor)

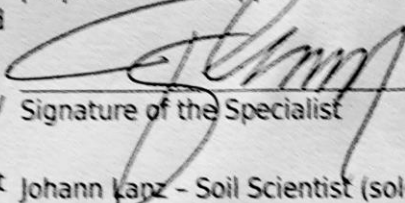
Name of Company:

19 July 2022

Date

**3. UNDERTAKING UNDER OATH/ AFFIRMATION**

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



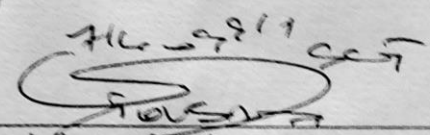
Signature of the Specialist

Johann Lanz - Soil Scientist (sole proprietor)

Name of Company

19 July 2022

Date



Signature of the Commissioner of Oaths

2022-07-19

Date



**APPENDIX 3: SOIL DATA OF LAND TYPE**

Land type	Soil series (forms)	Depth (mm)	Clay % A horizon	Clay % B horizon	Depth limiting layer	% of land type
Ba51	Hu	900 - 1200	20 - 30	25 - 40	so,hp	26,8
Ba51	Ms / Gs	300 - 450	15 - 30	0 0 0	R,lc	16,5
Ba51	Av	900 > 1200	20 - 30	25 - 40	sp	13,3
Ba51	Lo	900 > 1200	15 - 30	35 - 45	sp	8,8
Ba51	Gf	0 > 1200	20 - 30	25 - 40	0	6,0
Ba51	Sw / Va	350 - 500	30 - 40	35 - 55	vp	6,0
Ba51	Sd	900 > 1200	30 - 35	30 - 45	so	5,8
Ba51	Kd	750 - 1200	15 - 30	40 - 50	gc	5,0
Ba51	Gc	800 - 1200	15 - 30	20 - 35	hp	4,5
Ba51	Bo	0 > 1200	35 - 45	35 - 50	0	3,0
Ba51	Ka / Wo	350 - 600	25 - 40	0 0 0	gc	2,0
Ba51	S	0 0 0	0 0 0	0 0 0	0	1,5
Ba51	Du	0 > 1200	10 - 25	0 0 0	0	1,0
Ca8	Va / Sw	200 - 450	12 - 18	35 - 45	vr	17.9
Ca8	Hu	450 - 900	12 - 18	15 - 25	pr,gc	12.0
Ca8	Hu	450 - 900	12 - 20	25 - 35	pr,gc	11.2
Ca8	Sd	0 > 1200	15 - 25	40 - 55	0	7.5
Ca8	Bv	450 - 900	12 - 15	15 - 25	sp	7.2
Ca8	Bv	450 - 900	12 - 15	25 - 35	sp	7.2
Ca8	Ss	100 - 350	12 - 18	40 - 55	pr	7.0
Ca8	Hu	600 - 1200	10 - 15	10 - 25	ka	6.4
Ca8	R	0 0 0	0 0 0	0 0 0	0	5.8
Ca8	Va	100 - 350	12 - 18	40 - 55	vp	5.5
Ca8	Hu	600 - 1200	12 - 18	25 - 35	ka	4.6
Ca8	Ms/Gs	100 - 250	12 - 18	0 0 0	R,ka	2.6
Ca8	Oa / Ka	600 > 1200	12 - 20	35 - 60	R	1.7
Ca8	Av / Pn	450 - 900	12 - 18	15 - 25	sp	1.6

<b>Land type</b>	<b>Soil series (forms)</b>	<b>Depth (mm)</b>	<b>Clay % A horizon</b>	<b>Clay % B horizon</b>	<b>Depth limiting layer</b>	<b>% of land type</b>
Ca8	Hu	50 - 200	12 - 18	15 - 30	R	1.0
Ca8	Sd	100 - 300	12 - 20	30 - 45	R	0.8