Appendix G.7

AGRICULTURAL REPORT

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AGRO ECOSYSTEMS REPORT
FOR
THE PHEFUMULA GRID INFRASTRUCTURE CORRIDOR
NEAR ERMELO IN MPUMALANGA PROVINCE

Report by
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EXECUTIVE SUMMARY

The overall conclusion of this assessment is that the proposed grid infrastructure development, which is an integral part of the associated wind farms, and cannot therefore be seen in isolation of them, is desirable from an agricultural perspective because the entire wind farm development offers a valuable, win-win opportunity for a renewable energy facility to be integrated with agricultural production in a way that provides benefits to agriculture and leads to some loss of agricultural land with some loss of future agricultural production potential.

The screening tool classifies the assessed area as ranging from low to very high agricultural sensitivity. This assessment confirms the high and very high sensitivity of the screening tool. The verified areas of high sensitivity across the site differ somewhat from those classified as high sensitivity by the screening tool. This assessment verifies those parts of the MTS' footprints on which there are currently viable croplands, as being of high and very high agricultural sensitivity and the rest of the site as being of medium agricultural sensitivity with a land capability of <8. Three preferred substation footprints are verified as being of very high agricultural sensitivity.

In general, the soils across much of the site have insufficient capability for viable crop production while certain patches within it are suitable for viable cropping. Soil limitations that prevent crop production are predominantly the result of limited depth due to underlying bedrock, clay, or hardpan, or the result of poor drainage. The crop-suitable versus unsuitable soils have been identified over time through trial and error. All the deep, well-drained, suitable soils are generally cropped, and uncropped soils that are used for grazing can fairly reliably be considered to have various limitations that make them unsuitable for crop production. The site is within an area that makes a significant contribution to food production in the country. Due to the favourable climate, crop yields are high on the suitable soils with average maize yields of around 7 tons per hectare according to the farmers on site.

In this case the viable cropland, which is rated as high sensitivity, is considered to be above the threshold for needing to be conserved as agricultural production land and has been designated as an agricultural no-go area for substation footprints. The non-cropland, however, which is rated as medium sensitivity, is considered to be below the threshold. The use of rainfed and irrigated cropland for the substations will result in some loss of agricultural production potential in terms of national food security.

An agricultural impact is a change to the future agricultural production potential of land. This is primarily caused by the exclusion of agriculture from those parts of the land that are directly occupied by the infrastructure of the development. In the case of grid connection infrastructure, the amount of land excluded from agriculture is so small that the total extent of the loss of future agricultural production potential is insignificantly small, regardless of how much production

potential the land has. Furthermore, wind farms, of which the grid connection is an integral part, have both positive and negative effects on the production potential of land, and it is the net sum of these positive and negative effects that determines the amount of change in future production potential. The positive effects include increased financial security for farming operations; improved security; and an improved road network.

From an agricultural impact point of view, it is recommended that the proposed alternative layout 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 implementation of the proposed mitigation measures.

1 INTRODUCTION

Environmental authorisation is being sought for the grid connection infrastructure associated with the Phefumula Wind energy facility near Ermelo, 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, based on the verified high and very high agricultural sensitivity of the DX substations and MTS respectively (see Section 7), the level of agricultural assessment required by NEMA's agricultural protocol is an Agricultural Agro-Ecosystem Specialist Assessment.

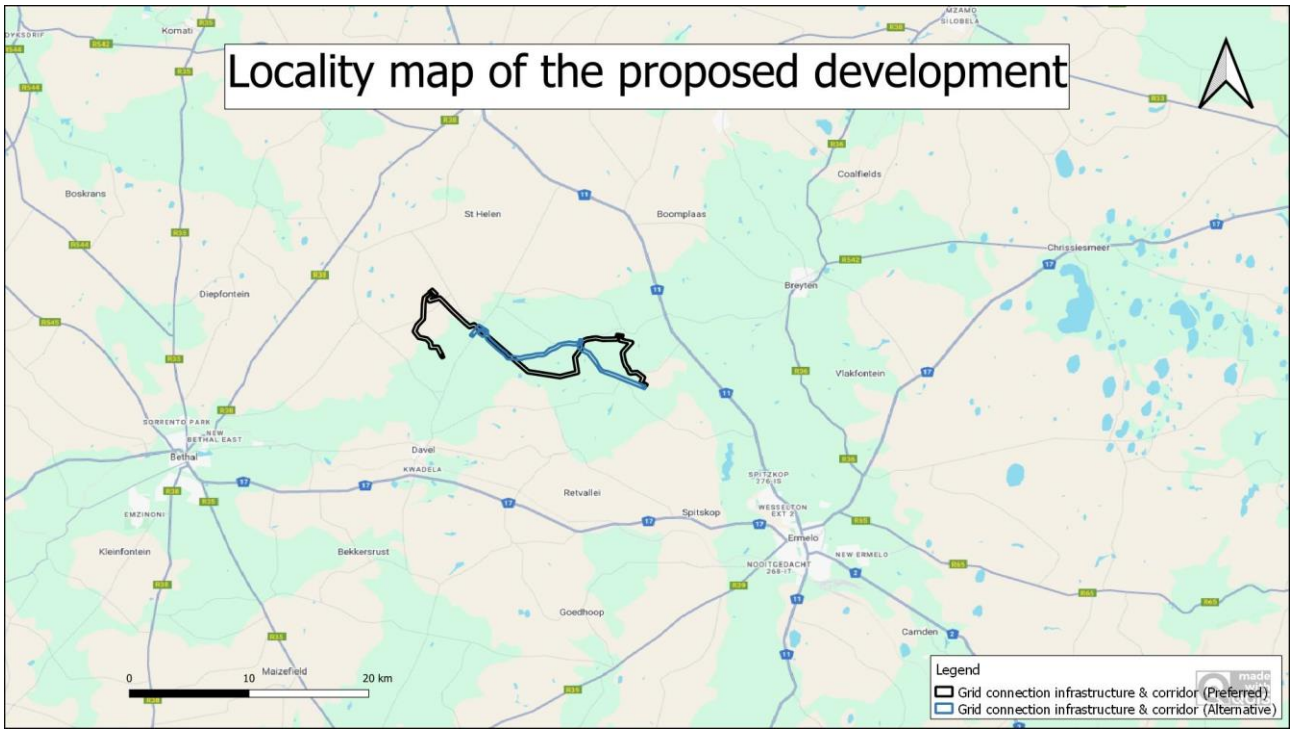

Figure 1. *Locality map of the proposed grid corridors & MTS, northwest of the town of Ermelo.*

The purpose of an agricultural assessment is to answer the question:

> Will the proposed development cause a significant reduction in agricultural production potential, and most importantly, will it result in a loss of arable land?

Section 9 of this report unpacks this question, particularly with respect to what constitutes a significant reduction. To answer the above question, it is necessary to determine the existing agricultural production potential of the land that will be impacted, and specifically whether it is viable arable land or not. This is done in Section 8 of this report. Section 8, 9, and the conclusion of this report directly address the above question and therefore contain the essence of the agricultural impact assessment.

2 PROJECT DESCRIPTION

The proposed project is for the overhead powerline corridors, main transmission substation (MTS) and DX substations associated with the Phefumula renewable energy facility that is located northwest of the town of Ermelo.

The preferred MTS and DX substation locations will cause the permanent exclusion of any potential future agricultural production from the entire site (as shown in Figures 2 and 3). Once agriculture is excluded from the site, there can be no further on-site agricultural impact. There is also no off-site agricultural impact. The design and layout of the development within the footprint is therefore of no relevance to agricultural impacts and it is unnecessary to consider it any further in this assessment. All that is of relevance is the loss of the total site to potential future agricultural production.

3 TERMS OF REFERENCE

The terms of reference for this study are 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 terms of reference for an Agricultural Agro-Ecosystem Specialist 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.

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 3**)
2. The assessment must be undertaken on the preferred site and within the proposed development footprint. (**Figures 2 and 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:
    a. the extent of the impact of the proposed development on the agricultural resources (**Section 9.1**);
    b. whether or not the proposed development will have an unacceptable negative impact on the agricultural production capability of the site (**Section 12**), 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:

a. The soil form/s, soil depth (effective and total soil depth), top and sub-soil clay percentage, terrain unit and slope (**Section 8**);

b. Where applicable, the vegetation composition, available water sources as well as agro-climatic information (**Section 8**);

c. 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**);

d. The current employment figures (both permanent and casual) for the land for the past 3 years, expressed as an annual figure (**Section 8**);

e. Existing impacts on the site, located on a map where relevant (e.g. erosion, alien vegetation, non-agricultural infrastructure, waste, etc **Section 8**).

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:

a. 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 9.1**);

b. Change in employment figures (both permanent and casual) for the past 5 years expressed as an annual figure (**Section 9.1**);

c. 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 9.3**).

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:

a. 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);**

b. A signed statement of independence by the specialist (**Appendix 2**);

c. The duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment (**Section 4**);

d. A description of the methodology used to undertake the on-site assessment inclusive of the equipment and models used, as relevant (**Section 4**);

e. 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**);

f. 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 9.1**);

g. 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 11.3**);

h. Additional environmental impacts expected from the proposed development based on the current status quo of the land including erosion, alien vegetation, waste, etc. (**Section 11.4**);

i. Information on the current agricultural activities being undertaken on adjacent land parcels (**Section 8**);

j. an identification of any areas to be avoided, including any buffers (Section 9);

k. 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 9.3**);

l. 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 11.1**);

m. 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 12**);

n. Any conditions to which this statement is subjected (**no conditions**);

o. Where identified, proposed impact management outcomes or any monitoring requirements for inclusion in the Environmental Management Programme (EMPr) (**Section 10**);

p. A description of the assumptions made and any uncertainties or gaps in knowledge or data (**Section 5**).

4 METHODOLOGY OF STUDY

The assessment was based on an on-site investigation of the soils and agricultural conditions conducted on 20 April 2023. It was also informed by existing climate, soil, and agricultural potential data for the site (see references). The aim of the on-site assessment was to:

1. ground-truth cropland status;
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.

Soils were assessed based on the investigation of existing soil exposures in combination with indications of the surface conditions and topography. Soils were classified according to the South African soil classification system (Soil Classification Working Group, 2018).

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

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

This section identifies all applicable agricultural legislation and permit requirements over and above what is required in terms of NEMA.

If the MTS' are part of the facility footprint that has already obtained change of land use authorisation, then no further approval from the National Department of Agriculture, Land Reform and Rural Development (DALRRD) should be needed. 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 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.

7 SITE SENSITIVITY VERIFICATION

A specialist agricultural assessment is required to include a verification of the agricultural sensitivity

of the development site as per the sensitivity categories used by the web-based environmental screening tool of the Department of Forestry, Fisheries and the Environment (DFFE). Agricultural sensitivity is an indication of the capability of the land for agricultural production, based only on its climate, terrain, and soil capabilities. The different categories of agricultural sensitivity indicate the priority by which land should be conserved as agricultural production land. However, the screening tool's agricultural sensitivity is often of very limited value for assessing agricultural impact. What is of importance to an agricultural assessment, rather than the site sensitivity verification, is its assessment of the cropping potential and its assessment of the impact significance, both of which are not necessarily correlated with sensitivity.

The screening tool classifies agricultural sensitivity according to two independent criteria, from two independent data sets, both of which may be indicators of the land's agricultural production potential but are limited in that the first is outdated and the second is fairly course, modelled data. The two criteria are:

1. whether the land is classified as cropland or not on the field crop boundary data set (Crop Estimates Consortium, 2019), and
2. its land capability rating on the land capability data set (DAFF, 2017)

These two inputs operate independently, and agricultural sensitivity is simply determined by whichever of these two gives the highest sensitivity rating. All classified cropland is, by definition, either high or very high sensitivity. Land capability is defined as the combination of soil, climate, and terrain suitability factors for supporting rain-fed agricultural production. It is rated by the Department of Agriculture's updated and refined, country-wide land capability mapping (DAFF, 2017). The higher land capability values (≥8 to 15) are likely to indicate suitability as arable land for crop production, while lower values (<8) are likely to only be suitable as non-arable grazing land, although application to the winter rainfall areas differs. The direct relationship between land capability rating, agricultural sensitivity, and rain-fed cropping suitability is shown in Table 1, including differences between the summer and winter rainfall areas.

Table 1. Relationship between land capability, agricultural sensitivity, and rain-fed cropping suitability.

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

11 - 15	Very High		

Note: There is an error in the screening tool whereby a land capability of 8 is classified as medium sensitivity, but according to NEMA's agricultural protocol (GN R 320 of 2020), should in fact be classified as high sensitivity. This assessment follows the agricultural protocol (GN R 320 of 2020) definition and classifies a value of 8 as high sensitivity.

The agricultural sensitivity of the site, as classified by the screening tool, is shown in Figure 2. The screening tool sensitivity requires specialist verification because of the limitations of the data sets on which it is based.

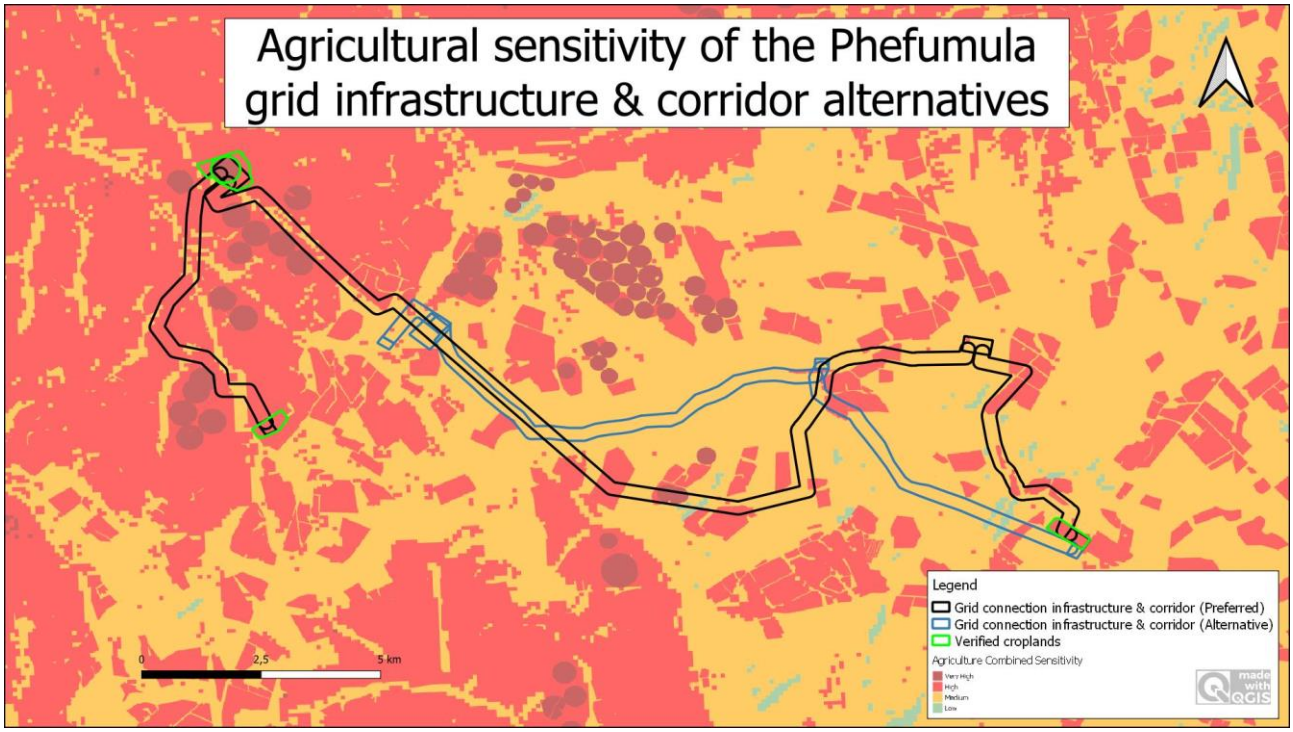

Figure 2. *The preferred and alternative assessed corridors, MTS' and the verified rainfed & irrigated croplands overlaid on agricultural sensitivity, as given by the screening tool (green = low; yellow = medium; red = high; dark red = very high). Note that the MTS and two of the DX substations of the preferred layout are on land verified as being of high & very high agricultural sensitivity.*

This verification of sensitivity addresses both components that determine it, namely cropping status and land capability. The screening tool classifies the assessed area as ranging from low to high agricultural sensitivity. The high sensitivity classification is due to a combination of some land being classified as cropland and some being classified with a land capability of 9. This assessment confirms the high and very high sensitivity rating by the screening tool that is based on cropping status.

The classified land capability of the site ranges from 4 to 9. The rating of land capability used by the screening tool is determined by an average soil capability value attributed to each land type. However, there are a range of soil capabilities within each land type, the detail of which the land capability data is unable to take account of and map. On the ground, the soils (and therefore the

land capability) vary in a complex pattern across the landscape, which is not reflected at the scale of the land capability data. The most reliable indication of soil cropping potential or soil capability at a landscape scale in this environment is current and historical land use. 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. Cropped soils have a real land capability of ≥8 because the relationship between land capability and agricultural production potential is such that a land capability of ≥8 should denote land that is suitable for viable rainfed crop production. Uncropped soils can fairly reliably be considered to have limitations that make them unsuitable for crop production with the result that their real land capability is less than 8.

In conclusion, this assessment confirms the high and very high sensitivity of the screening tool. The verified areas of high sensitivity across the site differ somewhat from those classified as high sensitivity by the screening tool. This assessment verifies those parts of the site on which there are currently viable croplands, as being of high and very high agricultural sensitivity and the rest of the site as being of medium agricultural sensitivity with a land capability of <8. Three preferred substation footprints are verified as being of very high agricultural sensitivity.

8 BASELINE DESCRIPTION OF THE AGRO-ECOSYSTEM

The purpose of this section is firstly to present the baseline information that controls the agricultural production potential of the site and then to assess that potential. Agricultural production potential, and particularly cropping potential, is one of three factors that determines the significance of an agricultural impact, together with size of footprint and duration of impact (see Section 9).

All the important parameters that control the agricultural production potential of the site are given in Table 2. Soil data is given in Appendix 4. A satellite image map of the development site is given in Figure 3 and site photographs are shown in Figures 4 to 6.

The site falls inside of an area that is classified as a Protected Agricultural Area (PAA). A PAA is a demarcated area in which the climate, terrain, and soil are generally conducive for agricultural production and which, historically, or in a regional context, has made important contributions to the production of the various crops that are grown across South Africa. Within PAAs, the protection of arable land, is considered a priority for the protection of food security in South Africa. However, PAAs are demarcated broadly, not at a fine scale, and there may therefore be much variation of agricultural production potential within a PAA. All land within these demarcated areas is not necessarily of sufficient agricultural potential to be suitable for crop production, due to finer scale terrain, soil, and other constraints.

Table 2: Parameters that control and/or describe the agricultural production potential of the site.

	Parameter	Value
Climate	Köppen-Geiger climate description (Beck *et al*, 2018)	Temperate, dry winter, hot summer
	Mean Annual Rainfall (mm) (Schulze, 2009)	632
	Reference Crop Evaporation Annual Total (mm) (Schulze, 2009)	1219
	Climate capability classification (out of 9) (DAFF, 2017)	Between 5 (moderate) and 6 (moderate-high)
Terrain	Terrain type	Low hills
	Terrain morphological unit	Varied
	Slope gradients (%)	0-20
	Altitude (m)	1700
	Terrain capability classification (out of 9) (DAFF, 2017)	Between 3 (low) and 8 (high-very high), but predominantly 6 (moderate-high)
Soil	Geology (DAFF, 2002)	Dolerite; sandstone, grit and shale of the Ecca Group, Karoo Sequence.
	Land type (DAFF, 2002)	Ea23
	Description of the soils	Predominantly very shallow to deep, very heavy textured, dark coloured soils on underlying rock, clay, or hardpan.
	Dominant soil forms	Arcadia, Mayo, Milkwood
	Soil capability classification (out of 9) (DAFF, 2017)	5 (moderate)
	Soil limitations	Limited soil depth, drainage
Land use	Agricultural land use in the surrounding area	dry land crop production, grazing
	Agricultural land use on the site	Pivot irrigation, dry land crop production, grazing
General	Long-term grazing capacity (ha/LSU) (DAFF, 2018)	4
	Land capability classification (out of 15) (DAFF, 2017))	4 (low-very low) to 9 (moderate-high)
	Within Protected Agricultural Area (DALRRD, 2020)	Yes

8.1 Assessment of the agricultural production potential

This assessment of the agricultural production potential of the site is based on an integration of the different parameters in Table 2 above and the on-site soil investigation.

In general, the soils across much of the site have insufficient capability for viable crop production while certain patches within it are suitable for viable cropping. Soil limitations that prevent crop production are predominantly the result of limited depth due to underlying bedrock, clay, or hardpan, or the result of poor drainage. The crop-suitable versus unsuitable soils have been identified over time through trial and error. All the deep, well-drained, suitable soils are generally cropped, and uncropped soils that are used for grazing can fairly reliably be considered to have various limitations that make them unsuitable for crop production.

In general, the site is within an area that makes a significant contribution to food production in the country. Due to the favourable climate, crop yields are high on the suitable soils with average maize yields of around 7 tons per hectare according to the farmers on site.

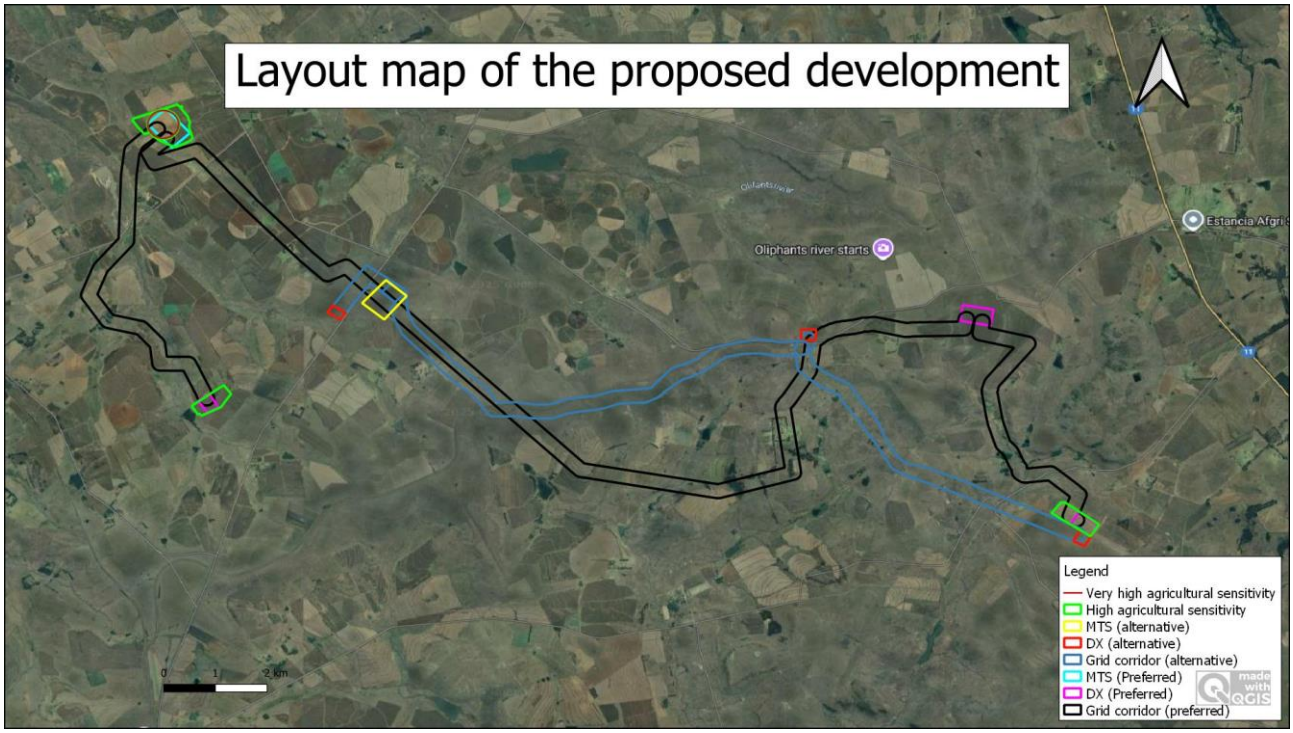

Figure 3. *Satellite image map of the proposed development.*

Figure 4. *Photograph of typical site conditions.*

Figure 5. *Photograph of typical site conditions.*

Figure 6. *Typical soil profiles on site from a location in close proximity to the site, showing the subsoil bedrock that limits soil depth.*

9 ASSESSMENT OF AGRICULTURAL IMPACT

9.1 Impact identification and assessment

It should be noted that an Agricultural Compliance Statement is not required to formally rate agricultural impacts by way of impact assessment tables.

There is only ever a single agricultural impact of any development, and it is a net change to the future agricultural production potential of land. It occurs as a result of different mechanisms, some of which decrease production potential and some of which increase it. In most developments the decrease in production potential is primarily caused by the exclusion of agriculture from the footprint of the development. Soil erosion and degradation may also contribute to loss of agricultural production potential, but these can be managed so as not to cause impact. The significance of a loss of agricultural production potential is a direct function of the following three factors:

1. the size of the footprint of land from which agriculture will be excluded (or the footprint that will have its potential decreased)
2. the baseline production potential (particularly cropping potential) of that land
3. the length of time for which agriculture will be excluded (or for which potential will be decreased).

In this case the viable cropland, which is rated as high sensitivity, is considered to be above the threshold for needing to be conserved as agricultural production land and has been designated as an agricultural no-go area for substation footprints. The non-cropland, however, which is rated as medium sensitivity, is considered to be below the threshold. The use of rainfed and irrigated cropland for the substations will result in some loss of agricultural production potential in terms of national food security.

The proposed overhead power lines, as opposed to the substations, can cross croplands because they have no agricultural impact on them, and cropping can continue unaffected under the lines. The pylons are recommended to be located, wherever possible, outside of or on the edges of cropland, so that they cause minimal interference to crop production. This is easily achievable because the croplands can be spanned. The only potential source of impact of the power line is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). This impact can be completely prevented with standard, generic mitigation measures that are all inherent in the project engineering and/or are standard, best-practice for construction sites, and are included in the generic EMPrs for transmission and substation infrastructure. The power line component of the grid connection development will result in negligible loss of future agricultural production potential.

At the farm level, the wind farm development, of which the grid connection is an integral part, will provide a positive agricultural economic impact. The income generated by the farming enterprises through the lease of the land to the energy facility will diversify the farm's income sources and provide reliable and predictable income that is independent of variable agricultural economic factors such as weather, agricultural markets and agricultural input costs. This is a big economic advantage for a farmer. It will increase financial security and may thereby improve farming operations and productivity through increased investment into farming.

It is almost impossible to quantify a potential reduction in production. In a worst-case scenario, the total production from 5 hectares would be lost.

9.2 Cumulative impact assessment

Specialist assessments for environmental authorisation are required to assess cumulative impacts. The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present, or reasonably foreseeable future activities that will affect the same environment.

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level

of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

The potential cumulative agricultural impact of importance is a regional loss (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?

The Department of Forestry, Fisheries and the Environment (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.

Due to the fact that the assessed power line contributes negligibly to a loss of agricultural land it cannot cause acceptable levels of change in terms of agricultural land loss to be exceeded. The substation footprints are located on land that is currently utilized for rainfed and irrigated crop production. They will therefore contribute to some loss of agricultural production potential. The cumulative impact of the alternative power line and MTS' layout can confidently be assessed as being of very low significance and therefore as acceptable. It will not have an unacceptable negative impact on the agricultural production capability of the area, and it is therefore recommended, from a cumulative agricultural impact perspective, that the grid connection be approved.

The loss of agricultural potential by soil degradation can effectively be prevented for this development by generic mitigation measures that are all inherent in the project engineering and are standard, best-practice for construction sites. Soil degradation does not therefore pose a cumulative impact risk.

9.3 Assessment of alternatives

Specialist assessments for environmental authorisation are required to include a comparative impact assessment of alternatives, including the no-go alternative. Because of the insignificant agricultural impact of the power line, there can be no material difference between the agricultural impacts of any route alternatives within the corridor. However, the preferred MTS' locations re located on land currently utilized for rainfed and irrigated croplands. Therefore, from an agricultural

perspective, the alternative layout should be considered for approval.

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 this is not significantly different from the very low impact of the development, and so from an agricultural impact perspective, there is no preferred alternative between the no-go and the development. However, the no-go option would prevent the proposed development plus the dependent renewable energy development, which cannot operate without a grid connection, from contributing to the environmental, social, and economic benefits associated with the development of renewable energy in South Africa.

10 MITIGATION

The most important and effective mitigation of agricultural impacts for any development is avoidance of viable, potential cropland. A required site-specific mitigation measure is to avoid the agricultural no-go area identified in Figure 3 as high and very high agricultural sensitivities.

There is one additional mitigation measure required, over and above what has already been included in the *Generic Environmental Management Programme (EMPr) For The Development And Expansion For Overhead Electricity Transmission And Distribution Infrastructure* and the *Generic Environmental Management Programme (EMPr) For Substation Infrastructure For The Transmission And Distribution Of Electricity,* as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019.

- This is a micro-siting aspect, and it is that pylons be located, wherever possible, outside of cropland. If spanning distances require pylons to be within croplands, the pylons must, wherever possible, be located as close to the edges of any breaks in cultivation, such as roads, breaks between fields, or contour banks, so that they cause minimal interference to agricultural traffic within the croplands.
- All MTS' must be located outside of the land that is currently being utilized for rainfed and irrigated agricultural production.

11 ADDITIONAL ASPECTS REQUIRED IN AN AGRICULTURAL ASSESSMENT

11.1 Micro siting

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. The micro-siting of pylons for the overhead power line and MTS' within croplands is addressed under mitigation

in Section 10, above.

11.2 Confirmation of linear activity exclusion

If linear infrastructure has been given exclusion from complying with certain requirements of the agricultural protocol because of its linear nature, the protocol requires confirmation that the land impacted by that linear infrastructure can be returned to the current state within two years of completion of the construction phase. The overhead power line is the only linear component of the project, to which this provision is applicable. It is hereby confirmed that the land under the overhead power line, where it is not occupied by other facility infrastructure, can be returned to the current state of agricultural production potential within two years of construction, with the obvious disclaimer that the pylons will continue to be present for the duration of the operational lifetime of the power line.

11.3 Long term benefits versus agricultural benefits

The overall development will generate a significant and reliable additional income for the farming enterprises. It will also generate additional income and employment in the local economy. In addition, it will contribute to the country's urgent need for energy generation, particularly renewable energy that has lower environmental and agricultural impact than existing, coal powered energy generation.

12 CONCLUSION

The overall conclusion of this assessment is that the proposed grid infrastructure development, which is an integral part of the associated wind farms, and cannot therefore be seen in isolation of them, is desirable from an agricultural perspective because the entire wind farm development offers a valuable, win-win opportunity for a renewable energy facility to be integrated with agricultural production in a way that provides benefits to agriculture and leads to some loss of agricultural land with some loss of future agricultural production potential.

The screening tool classifies the assessed area as ranging from low to very high agricultural sensitivity. This assessment confirms the high and very high sensitivity of the screening tool. The verified areas of high sensitivity across the site differ somewhat from those classified as high sensitivity by the screening tool. This assessment verifies those parts of the MTS' footprints on which there are currently viable croplands, as being of high and very high agricultural sensitivity and the rest of the site as being of medium agricultural sensitivity with a land capability of <8. Three preferred substation footprints are verified as being of very high agricultural sensitivity.

In general, the soils across much of the site have insufficient capability for viable crop production

while certain patches within it are suitable for viable cropping. Soil limitations that prevent crop production are predominantly the result of limited depth due to underlying bedrock, clay, or hardpan, or the result of poor drainage. The crop-suitable versus unsuitable soils have been identified over time through trial and error. All the deep, well-drained, suitable soils are generally cropped, and uncropped soils that are used for grazing can fairly reliably be considered to have various limitations that make them unsuitable for crop production. The site is within an area that makes a significant contribution to food production in the country. Due to the favourable climate, crop yields are high on the suitable soils with average maize yields of around 7 tons per hectare according to the farmers on site.

In this case the viable cropland, which is rated as high sensitivity, is considered to be above the threshold for needing to be conserved as agricultural production land and has been designated as an agricultural no-go area for substation footprints. The non-cropland, however, which is rated as medium sensitivity, is considered to be below the threshold. The use of rainfed and irrigated cropland for the substations will result in some loss of agricultural production potential in terms of national food security.

An agricultural impact is a change to the future agricultural production potential of land. This is primarily caused by the exclusion of agriculture from those parts of the land that are directly occupied by the infrastructure of the development. In the case of grid connection infrastructure, the amount of land excluded from agriculture is so small that the total extent of the loss of future agricultural production potential is insignificantly small, regardless of how much production potential the land has. Furthermore, wind farms, of which the grid connection is an integral part, have both positive and negative effects on the production potential of land, and it is the net sum of these positive and negative effects that determines the amount of change in future production potential. The positive effects include increased financial security for farming operations; improved security; and an improved road network.

From an agricultural impact point of view, it is recommended that the proposed alternative layout 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 implementation of the proposed mitigation measures.

13 REFERENCES

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

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

APPENDIX 1: SPECIALIST CURRICULUM VITAE

Johann Lanz
Curriculum Vitae

Education

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

Professional work experience

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

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

Within the 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*.

forestry, fisheries & the environment
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Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

Private Bag X447, Pretoria, 0001, Environment House, 473 Steve Biko Road, Pretoria, 0002 Tel: +27 12 399 9000, Fax: +27 86 625 1042

APPENDIX 2: SPECIALIST DECLARATION FORM AUGUST 2023

Specialist Declaration form for assessments undertaken for 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)

REPORT TITLE: THE PHEFUMULA GRID INFRASTRUCTURE CORRIDOR NEAR ERMELO IN MPUMALANGA PROVINCE

Kindly note the following:

1. This form must always be used for assessment that are in support of applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting, where this Department is the Competent Authority.
2. This form is current as of August 2023. 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.dffe.gov.za/documents/forms.
3. An electronic copy of the signed declaration form must be appended to all Draft and Final Reports submitted to the department for consideration.
4. The specialist must be aware of and comply with '*the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the act, when applying for environmental authorisation - GN 320/2020)'*, where applicable.

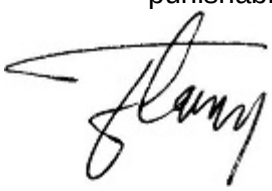
1. SPECIALIST INFORMATION

Title of Specialist Assessment	Agricultural Assessment
Specialist Company Name	SoilZA (sole proprietor)
Specialist Name	Johann Lanz
Specialist Identity Number	6607045174089
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
Telephone	Not applicable
Cell phone	+27 82 927 9018
E-mail	johann@soilza.co.za

2. DECLARATION BY THE SPECIALIST

I, **Johann Lanz** declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols") and in Government Notice No. 1150 of 30 October 2020.
- 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 NEMA Act.



Signature of the Specialist

SoilZA (sole proprietor)

Name of Company:

20 January 2025

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

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

Signature of the Specialist

SoilZA – sole proprietor

Name of Company

20/01/2025

Date

5864179-2
CST
Sergeant

Signature of the Commissioner of Oaths

SUID-AFRIKAANSE POLISIEDIENS
HOUT BAY
20 JAN 2025
COMMUNITY SERVICE

2025-01-20

Date

APPENDIX 3: SACNASP REGISTRATION CERTIFICATE

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Johan Lanz

Registration Number: 400268/12

is a registered scientist

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

Soil Science (Professional Natural Scientist)

Effective **15 August 2012** Expires **31 March 2025**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

Appendix 4: Soil data

Table 3: of land type soil data

Land type	Soil series (forms)	Depth (mm)	Clay % A horizon	Clay % B horizon	Depth limiting layer	% of land type
Ea23	Ar	300 - 900	40 - 70		so,lc	19,5
Ea23	My	200 - 500	30 - 55	20 - 45	so,lc	14,8
Ea23	My	300 - 500	30 - 55	20 - 45	so,lc	14,8
Ea23	Mw	200 - 400	30 - 45		H	10,5
Ea23	Sw	250 - 400	20 - 30	35 - 45	so,lc	8,5
Ea23	R					6,3
Ea23	Rg	600 - 1000	40 - 70		gc	5,5
Ea23	Va	250 - 400	20 - 30	35 - 50	vp	4,3
Ea23	Kd	500 - 1000	15 - 30	40 - 60	gc	4,3
Ea23	Bo	700 > 1200	30 - 55	25 - 50	so,lc	3,3
Ea23	Av	600 - 1000	25 - 35	35 - 45	sp	2,8
Ea23	Hu	400 > 1200	25 - 35	35 - 45	so,lc	2,8
Ea23	Ms	100 - 300	20 - 30		H,P	2,0
Ea23	S					1,0