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# Agricultural Assessment for the proposed Aberdeen Wind Facility 1

**Submitted by TerraAfrica Consult cc**

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# 1. Introduction

TerraAfrica Consult cc was appointed by Savannah Environmental (Pty) Ltd to conduct the agricultural assessment as part of the Basic Assessment (BAR) process for the Aberdeen Wind Facility 1 (from here onwards referred to as Aberdeen Wind Energy Facility 1). The project applicant is Aberdeen Wind Facility 1 (Pty) Ltd.

Aberdeen Wind Facility 1 (Pty) Ltd is proposing the development of a commercial Wind Energy Facility and associated infrastructure on a site located approximately 20km west of the town of Aberdeen in the Eastern Cape Province. The site is located within the Dr Beyers Naude Local Municipality in the Sarah Baartman District Municipality. The project site comprises the following farm portions:

- Farm Koppieskraal 157
- Remainder of the Farm Doornpoort 93
- Portion 1 of Farm Doorn Poort 93
- Farm Kraanvogel Kuil 155
- Portion 4 of Farm Sambokdoorns 92

The entire extent of the site falls within the Beaufort West Renewable Energy Development Zones (i.e. REDZ Focus Area 11). The undertaking of a basic assessment process for the project is in-line with the requirements stated in GNR 114 of 16 February 2018.

The project is planned as part of a larger cluster of renewable energy projects, which includes two adjacent up to 240MW Wind Energy Facilities (Aberdeen Wind Facility 2 and Aberdeen Wind Facility 3).

The Aberdeen Wind Facility 1 will have a contracted capacity of up to 240MW and comprise up to 41 wind turbines with a capacity of up to 8MW each. The project will have a preferred project site of approximately 9180 ha, and an estimated disturbance area of up to 62 ha. The Aberdeen Wind Facility 1 project site is proposed to accommodate the following infrastructure:

- Up to 41 wind turbines with a maximum hub height of up to 200m, rotor diameter of up to 200m, blade length of up to 100m and have a rotor tip height of up to 300m. The turbine foundations will have a combined permanent footprint of 6ha and 13ha for all turbine crane hardstands is required.
- Medium-voltage (MV) power lines internal to the wind farm will be trenched and located adjacent to internal access roads, where feasible.
- Up to 132kV on-site facility substation up to 2ha in extent.
- Battery Energy Storage System (BESS) with a footprint of up to 5ha.
- A main access road of approximately 2.5km in length and up to 10m in width[1].

[1] Access to the facility will be via an existing gravel road off the R61. The gravel road is well established (~10m wide excluding road reserve), however it's likely upgrades will be required at the access point off the R61 and potentially at water crossings.

- An internal road network between project components inclusive of stormwater infrastructure. A 12 m wide road corridor may be temporarily impacted during construction and rehabilitated to 6 m wide after construction
- Gate house and security: up to 0.5 ha
- Operation and Maintenance buildings (includes control centre, offices, warehouses, workshop, canteen, visitors centre, staff lockers, etc.): Up to 2 ha
- Site camp up to 1 ha
- Construction laydown areas up to 9ha

The power generated from the project will be sold to Eskom and will feed into the national electricity grid. Ultimately, the project is intended to be a part of the renewable energy projects portfolio for South Africa, as contemplated in the Integrated Resource Plan.

## 2. Details of specialist

Mariné is a scientist registered with the South African Council for Natural Scientific Professions (SACNASP) and is specialised in the fields of Agricultural Science and Soil Science. Her SACNASP Registration Number is 400274/10. Mariné holds a BSc. degree in Agricultural Science (with specialisation in Plant Production) from the University of Pretoria and a MSc. Degree in Environmental Science from the University of the Witwatersrand. She has consulted in the subject fields of soil, agriculture, pollution assessment and land use planning for the environmental sector of several African countries including Botswana, Mozambique, Democratic Republic of Congo, Liberia, Ghana and Angola. She has also consulted on the soil and agricultural assessment of a gas infrastructure project in Afghanistan. Mariné's project experience conducting assessments for renewable energy projects include solar and wind energy facilities in the Western, Northern and Eastern Cape as well as the North West, Free State and KwaZulu Natal Provinces. Her contact details are provided in Appendices 1 and 2 attached.

Jan-Dirk is a candidate scientist registered with the South African Council for Natural Scientific Professions (SACNASP) and is specialized in the fields of Agricultural Science and Soil Science. His SACNASP registration number is 400274/13. Jan-Dirk holds a BSc. Degree in Agricultural Science (with specialization in Soil Science) from the University of the Free State and a MSc. Degree in Soil Science from the University of the Free State.

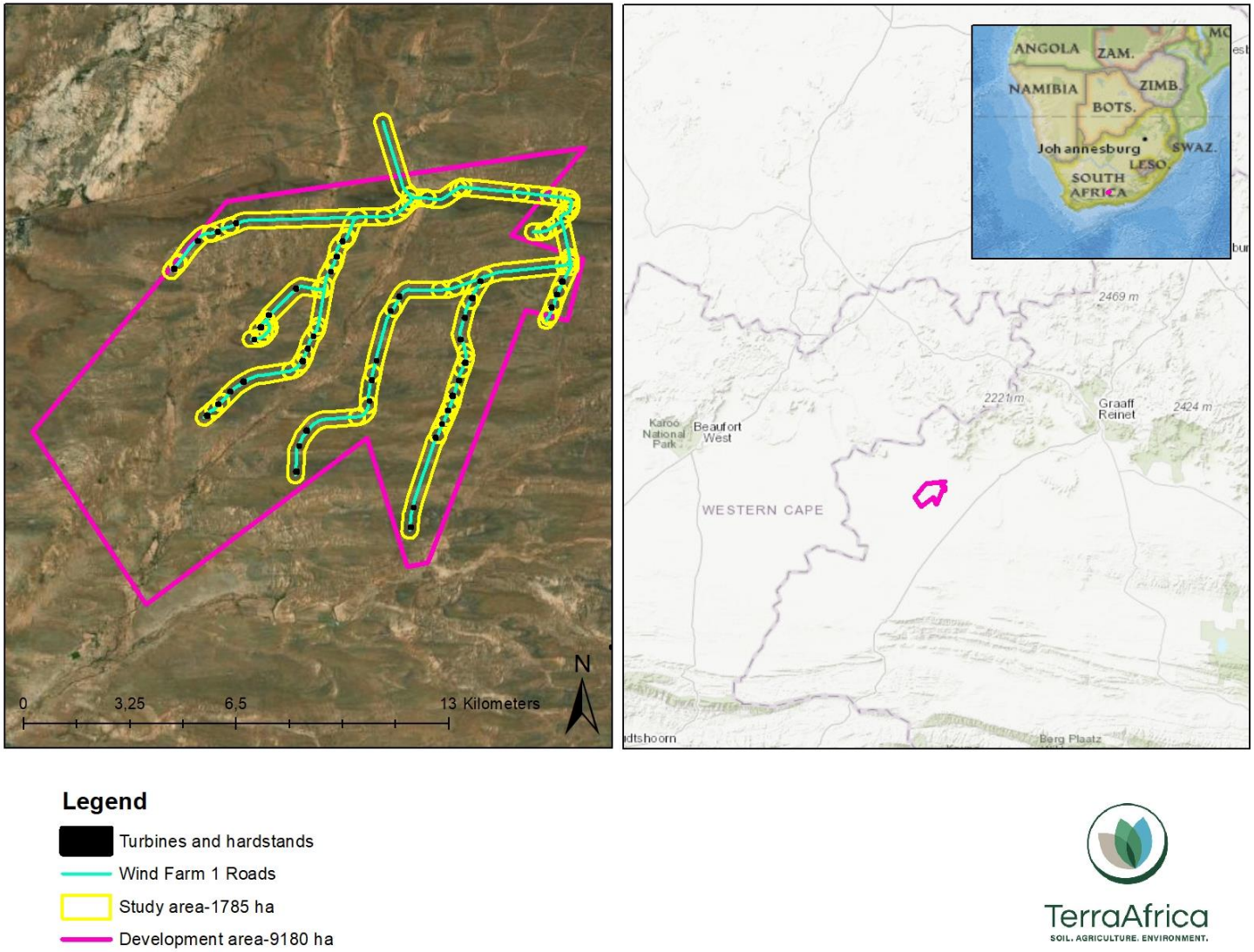


Figure 1: Locality map of the project site of the proposed Aberdeen Wind Energy Facility 1.

# 3. Purpose and objectives of the compliance statement

The overarching purpose of the Agricultural Assessment that will be included in the Basic Assessment Report, is to ensure that the sensitivity of the site from the perspective of agricultural production to the proposed project activities, is sufficiently considered. Also, that the information provided in this report, enables the Competent Authority to come to a sound conclusion on the impact of the proposed project on the agricultural production potential of the study area and development area.

To meet this objective, site sensitivity verification must be conducted of which the results must meet the following objectives:

- It must confirm or dispute the current land use and the environmental sensitivity as was indicated by the National Environmental Screening Tool.
- It must contain proof in the form of photographs of the current land use and environmental sensitivity pertaining to the study field.
- All data and conclusions are submitted together with the Basic Assessment Report (prepared in accordance with the NEMA regulations) for the proposed Aberdeen Wind Energy Facility 1).

According to GN320, the agricultural compliance statement that is submitted must meet the following requirements:

- It must be applicable to the preferred site and the proposed development footprint.
- It has to confirm that the site is of “low” or “medium” sensitivity for agriculture.
- It has to indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site.

The following checklist is supplied as per the requirements of GNR 320, detailing where in the report the various requirements have been addressed:

| **GNR 320 requirements of an Agricultural Compliance Statement (Low to Medium Sensitivity)** | **Reference in this report** |
|---|---|
| 3.1. The compliance statement must be prepared by a soil scientist or agricultural specialist registered with the SACNASP. | Page 2, Appendix 1, and 2 |
| 3.2. The compliance statement must:<br>3.2.1. be applicable to the preferred site and proposed development footprint; | Page 4 and 7 |
| 3.2.2. confirm that the site is of "low" or "medium" sensitivity for agriculture; and | Section 9.3 |
| 3.2.3. indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site. | Section 12 |
| 3.3. The compliance statement must contain, as a minimum, the following information:<br>3.3.1. contact details and relevant experience as well as the SACNASP registration number of the soil scientist or agricultural specialist preparing the assessment including a curriculum vitae; | Page 2 Appendix 1, and 2 |
| 3.3.2. a signed statement of independence; | Appendix 1 |
| 3.3.3. a map showing the proposed development footprint (including supporting infrastructure) with a 50m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool; | Figure 2 |
| 3.3.4. confirmation from the specialist that all reasonable measures have been taken through micro- siting to avoid or minimise fragmentation and disturbance of agricultural activities; | Section 12 |
| 3.3.5. a substantiated statement from the soil scientist or agricultural specialist on the acceptability, or not, of the proposed development and a recommendation on the approval, or not, of the proposed development; | Section 12 |
| 3.3.6. any conditions to which the statement is subjected; | Section 10 |
| 3.3.7. in the case of a linear activity, confirmation from the agricultural specialist or soil scientist, that in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase; | N/A – not a linear activity |
| 3.3.8. where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr; and | Section 10 |
| 3.3.9. a description of the assumptions made as well as any uncertainties or gaps in knowledge or data. | Section 7 |
| 3.4. A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report. | This report forms part of the BA process reports for authorisation |

# 4. Terms of Reference

In addition to the requirements stipulated in GN320, the following Terms of Reference as stipulated by Savannah Environmental (Pty) Ltd applies to the Agricultural Compliance Statement:

- To ensure that the soil properties of the site are characterised and that the current status of soil quality of the project site, is described. This includes a description of any existing soil degradation issues and recommendations on whether the project will result in high-risk impacts on soil quality.
- Identify and assess potential impacts on both agricultural potential as well as soil, resulting from the proposed Aberdeen Wind Energy Facility 1.
- Identify and describe potential cumulative soil, agricultural potential and land capability impacts resulting from the proposed development in relation to proposed and existing developments in the surrounding area.
- Recommend mitigation, management, and monitoring measures to minimise impacts and/or optimise benefits associated with the proposed project.

# 5. Agricultural Sensitivity

The combined Agricultural Sensitivity of the Aberdeen Wind Energy Facility 1 project site was determined by using the National Environmental Screening Tool (www.screening.environment.gov.za). The Agricultural Theme of the screening tool considers a combination of the national land capability raster data as well as the field crop boundaries as compiled by Department of Agricultural, Forestry and Fisheries (DALRRD) (DALRRD 2017, DALRRD 2019).

The screening report was generated by Savannah Environmental (Pty) Ltd on 24 November 2022 for the areas that comprise the proposed project site. (refer to Figure 2). According to the agricultural sensitivity screening illustrated in Figure 2, the development area, consists predominantly of land with Medium sensitivity with areas of Low sensitivity present in the centre. Highly sensitive areas are allocated to areas with annual crops cultivation, planted pasture rotation and soils with a Low-Moderate (Class 06 & 07) and Moderate (Class 08) land capability. Medium sensitive areas are allocated to areas with Low-Moderate (Class 06 & 07) and Moderate (Class 08) land capability, while Low sensitive areas have Very low (Class 02 & 03), Low-Very Low (Class 04) and Low (Class 05) land capability.

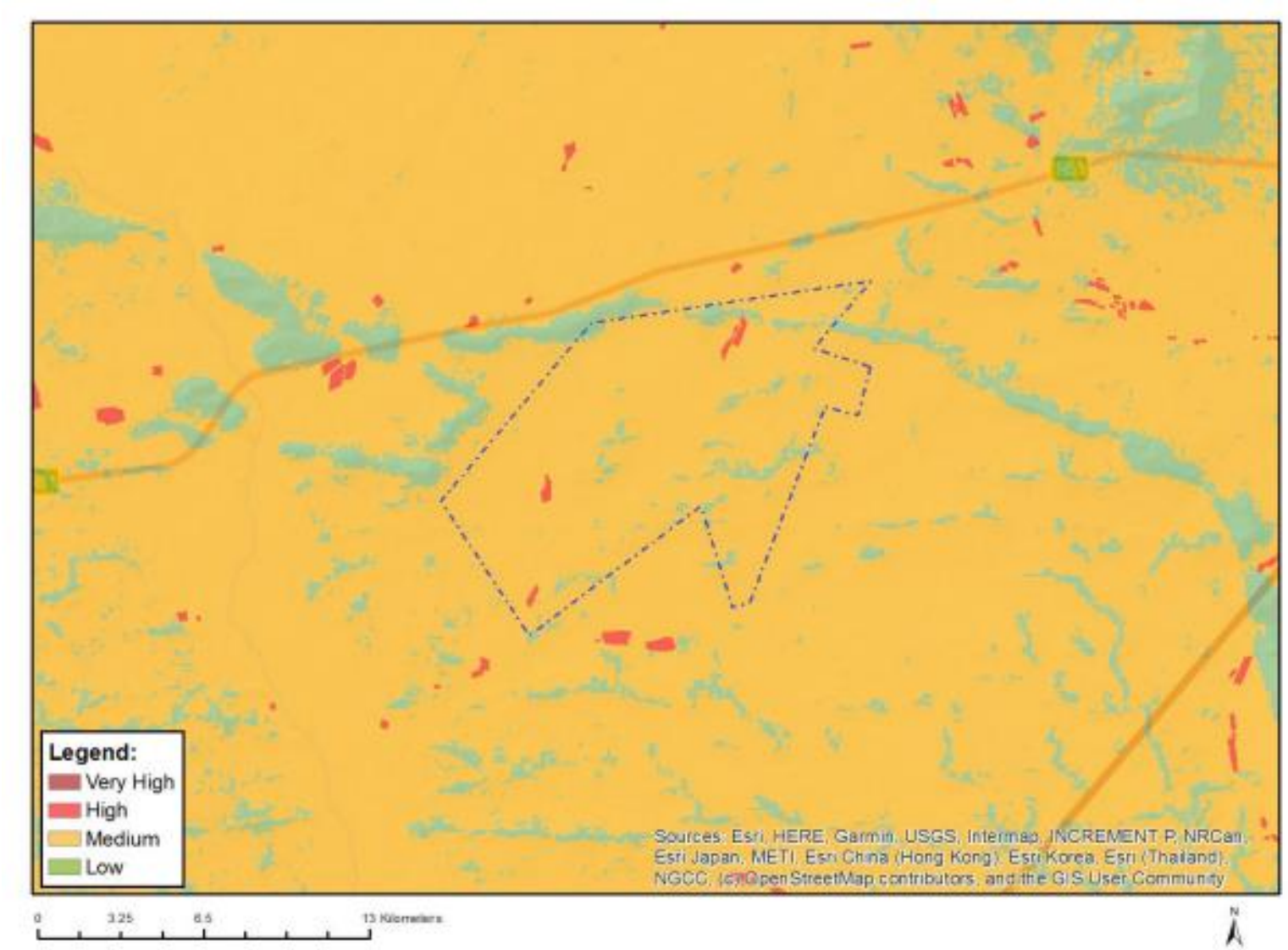


Figure 2: Agricultural Combined Sensitivity of the project site and surrounding area, generated from the Environmental Screening Tool (DFFE, 2023).

# 6. Environmental legislation and soil management guidelines applicable to study

The report follows the protocols as stipulated for agricultural assessment in Government Notice 320 of 2020 (GN320). This Notice provides the procedures and minimum criteria for reporting in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (No. 107 of 1998) (from here onwards referred to as NEMA). It replaces the previous requirements of Appendix 6 of the Environmental Impact Assessment Regulations of NEMA.

Since the results of the environmental screening report indicated that the project site has Medium to Low sensitivity with regards to the combined agricultural theme, an Agricultural Compliance Statement is required as part of the Basic Assessment process. This was confirmed by the desktop assessment of available data and aerial imagery as well as the findings of the site verification visit. In addition to the specific requirements of GN320 for this study, the following South African legislation is also considered applicable to the interpretation of the data and conclusions made with regards to environmental sensitivity and the conservation of soil resources of the project area:

- The Conservation of Agricultural Resources (Act 43 of 1983) states that the degradation of the agricultural potential of soil is illegal. This Act requires the protection of land against soil erosion and the prevention of water logging and salinisation of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.
- Section 3 of the Subdivision of Agricultural Land Act 70 of 1970 may also be relevant to the development since dominant land use of the land portion will change from agriculture to energy generation.
- In addition to this, the National Water Act (Act 36 of 1998) deals with the protection of water resources (i.e. wetlands and rivers) and may be relevant if wetland areas are identified within the project site.

# 7. Methodology

The different steps that were followed to gather the information used for the compilation of this report, is outlined below. The methodology is in alignment with the requirements of GN320.

## 6.1 Desktop analysis of satellite imagery

The most recent aerial photography of the area available from Google Earth was obtained and used together with the contours of the area, to identify different landscape features and terrain units in preparation of the site visit. The satellite imagery was also scanned for any areas where crop production and farming infrastructure may be present. The results of this analysis were used to pre-determine sampling and observation points and the coordinates of these points were transferred to the GPS for the site assessment.

## 6.2 Analysis of all other relevant available information

To ensure a comprehensive analysis of the proposed project site, the following data was also analysed:

- The National Land Capability Evaluation Raster Data Layer was obtained from the DALRRD to determine the land capability classes of the project site according to this system. The data was developed using a spatial evaluation modelling approach (DALRRD, 2016).
- The long-term grazing capacity for South Africa (DALRRD, 2018) was analysed for the area and surrounding area of the project site. The values indicated for the different areas present long term grazing capacity with the understanding that the veld is in a relatively good condition.
- Land type data for the project site was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC) (Land Type Survey Staff, 1972 – 2006). The land type data is presented at a scale of 1:250 000 and entails the division of land into land types, typical terrain cross sections for the land type and the presentation of dominant soil types for each of the identified terrain units.

## 6.3 Site assessment

The project site was assessed on 18 to 22 July 2022. During the site visit, the farm portions of the project site were traversed by vehicle (where road access was available) and in areas of access limitations, observations were made by walking along transects through the different terrain units of the main land types.

For the soil classification, a hand-held bucket soil auger was used to observe soil profiles to a depth of 1.5m or refuse, depending on the effective soil depth of the area. Observations were made regarding soil form, texture, structure, nature and depth of underlying material as well as any signs of existing soil degradation.

Other observations made during the assessment include the agricultural activities of the project site, the quality of the natural vegetation that support livestock farming in the area and the presence of existing farming infrastructure that may be affected by the proposed project. The surrounding farms were also scanned to observe whether there may be other existing or planned developments that will result in cumulative impacts on the soil and agricultural resources of the area.

The development area for the project is associated with the entire footprint and includes the study area and observations inside the boundary. The study area is associated with the area where the wind turbine infrastructure and roads (100m buffer) will be situated.

## 6.4 Impact assessment methodology

Following the methodology prescribed by Savannah Environmental (Pty) Ltd., the direct, indirect and cumulative impacts associated with the project have been assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **duration**, wherein it will be indicated whether:

    - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
    - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
    - medium-term (5–15 years) – assigned a score of 3;
    - long term (> 15 years) - assigned a score of 4; or
    - permanent - assigned a score of 5;

- The **magnitude**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- the **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the *degree* to which the impact can be *mitigated.*

The **significance** is calculated by combining the criteria in the following formula:

S=(E+D+M)P

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),

- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

# 8. Study gaps, limitations and assumptions

- Site access was limited due to the rocky nature and steep slopes present. To address this data gap, contour data, land type data and aerial photography were used together with expert knowledge, to delineate the soil classification units of this area.
- No other uncertainties and gaps have been identified that may affect the conclusions made in this report.

# 9. Results of desktop analysis

## 8.1 Land capability

The land capability as determined by Department of Agriculture, Land Reform and Rural Development (DALRRD) through a spatial delineation process, was shown by overlying the project site boundary on the land capability raster data (DALRRD, 2016). According to DALRRD (2016), land capability is defined as the most intensive long-term use of land for purposed of rainfed farming determined by the interaction of climate, soil and terrain.

The Aberdeen Wind Energy Facility 1 facility includes four different land capability classes according to the land capability data (DALRRD, 2016). Figure 3 shows the position of the different classes within the farm portions that form the proposed development area. Most of the development area largely consists of land with Low-Moderate-High (Class 06 and 07) land capability. Moderate (Class 08) land capability is found in small patches throughout the development area. Low-Very low (Class 04) land capability is found in the northern and eastern parts of the development area.

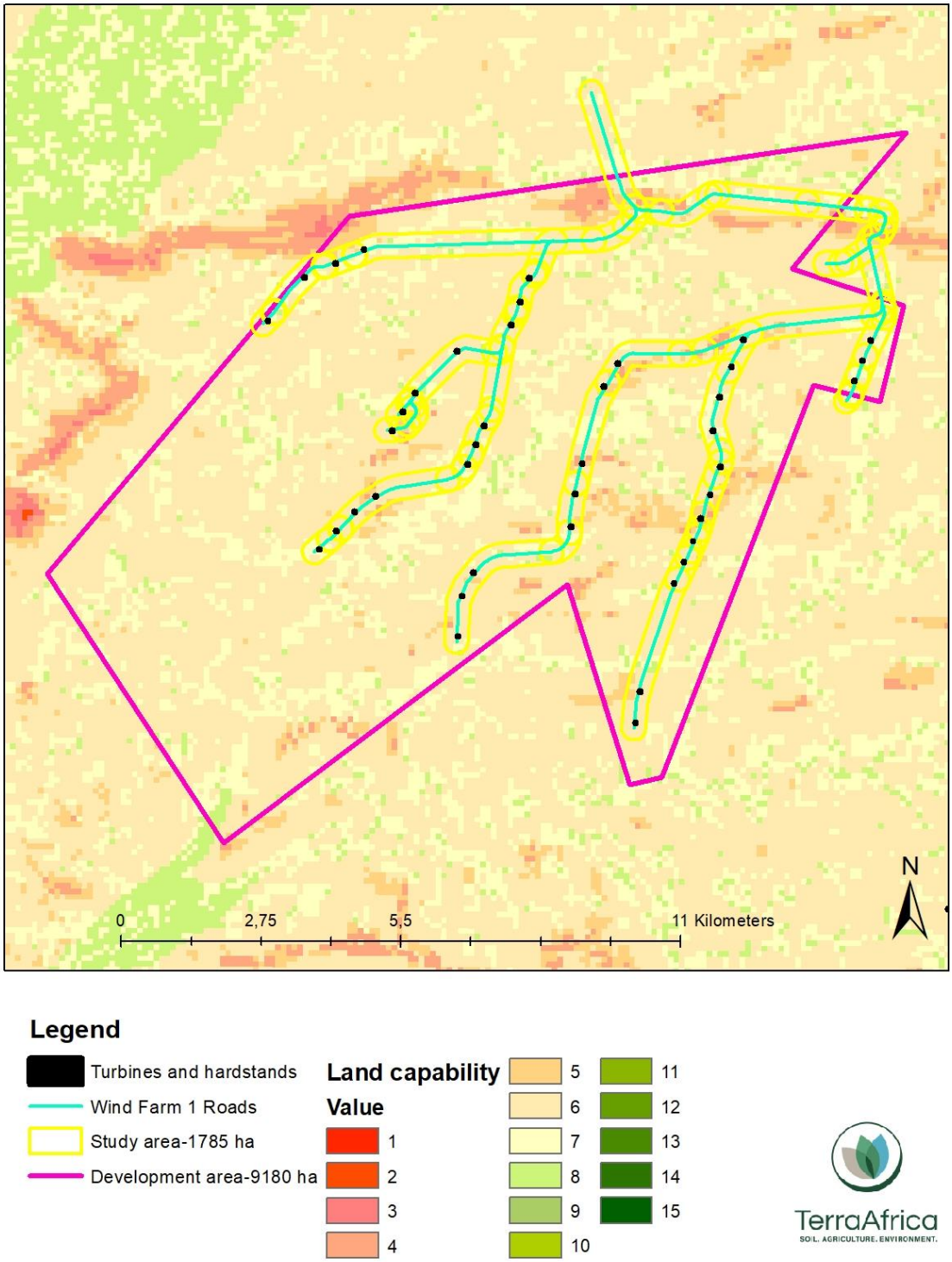


Figure 3: Land capability classification of the Aberdeen Wind Energy Facility 1 project site and the surrounding area (data source: DALRRD, 2016).

### 8.3 Grazing capacity

Following the metadata layer obtained from DALRRD, the grazing capacity of the entire study area, is 24 ha/LSU (refer to Figure 4). The development area has a grazing capacity of 20 ha/LSU in the far southwestern boundary, while the remaining ha/LSU is 24.

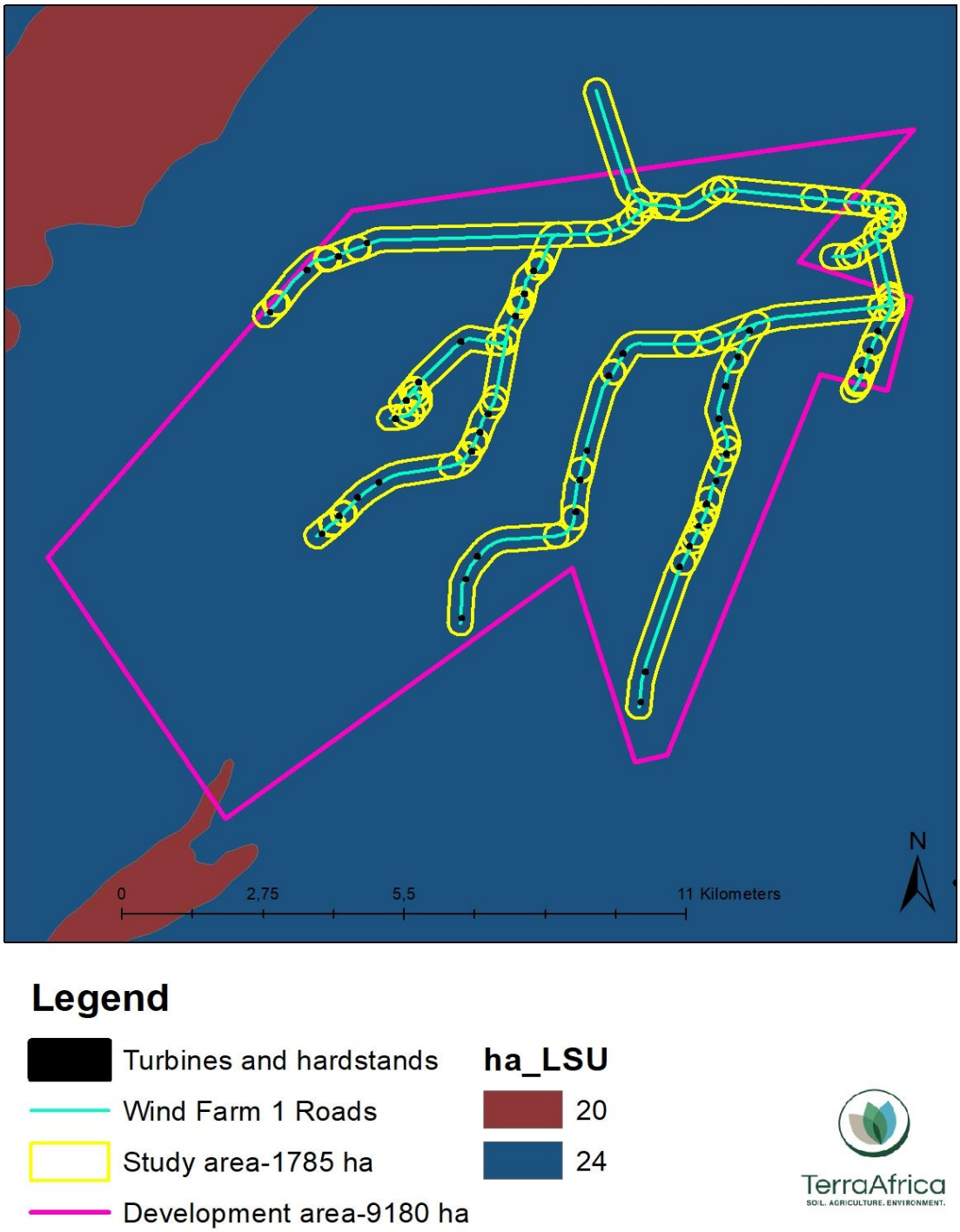


Figure 4: Grazing capacity of the proposed Aberdeen Wind Energy Facility 1 project site and surrounding area (data source: DALRRD, 2018).

The ideal grazing capacity of a specified area is an indication of the long-term production potential of the vegetation layer growing there to maintain an animal with an average weight of 450 kg (defined as 1 Large Stock Unit (LSU)) with an average feed intake of 10 kg dry mass per day over the period of approximately a year. This definition includes the condition that this feed consumption should also prevent the degradation of the soil and the vegetation. The grazing capacity is therefore expressed in several hectares per LSU (ha/LSU) (South Africa, 2018).

This unit used for large animals such as cattle can be converted to small animal units or small stock units (SSU). The conversion factor is 4 small stock units that equates one large stock unit. Since livestock farming in the region within which the project site is located is dominated by small stock farming, the grazing capacity can be converted to 6 ha/SSU. The entire project site therefore can be used to farm with approximately 1530 sheep or goats and 340 head of cattle if large livestock is used at a grazing capacity of 24 ha/LSU.

## 8.4 Land types

The entire study area consists of the Ag8 landtype while two different land types (Ag8 and Ia43) are found in the development area. The terrain units, slope and soil forms within each land type is described below while Figure 6 illustrates the distribution pattern of the land types.

Land Type Ag8

Approximately 75% of the total area consisting of this land type, are long flat toe-slopes (Terrain unit 4) with slopes ranging between 1 to 4% and slopes of 2000 to 5000 m. These areas consist of a combination of soil forms including Oakleaf, Hutton, Swartland, Glenrosa and Mispah forms. The mid-slopes (Terrain unit 3) have slope between 6 and 15% where approximately 80% of soils consist of shallow Glenrosa and Hutton soils as well as solid rock. The crests (Terrain unit 1) mainly consist of solid rock (not deeper than 0.35m). The landscape depressions or valley bottoms (Terrain unit 5) consist of medium-deep to deep (0.5 to 1.2m) soils of the Oakleaf soil forms or the shallow Hutton soil. The typical terrain form of Land Type Ag8 is illustrated in Figure 5**Error! Reference source not found.**

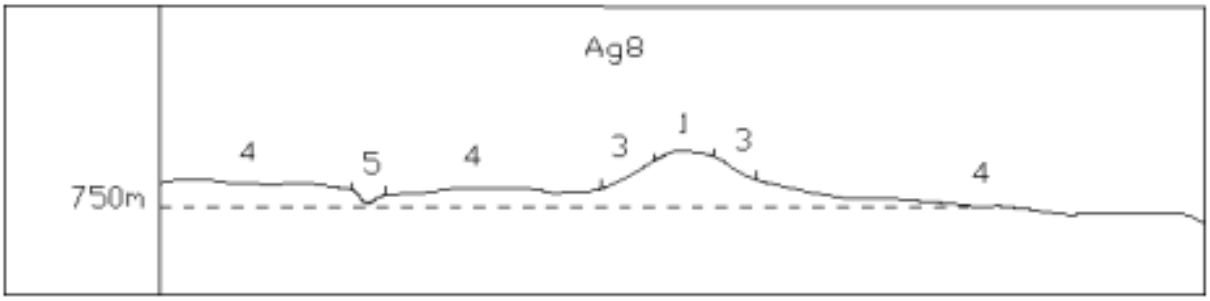


Figure 5: Terrain form sketch of Land Type Ag8.

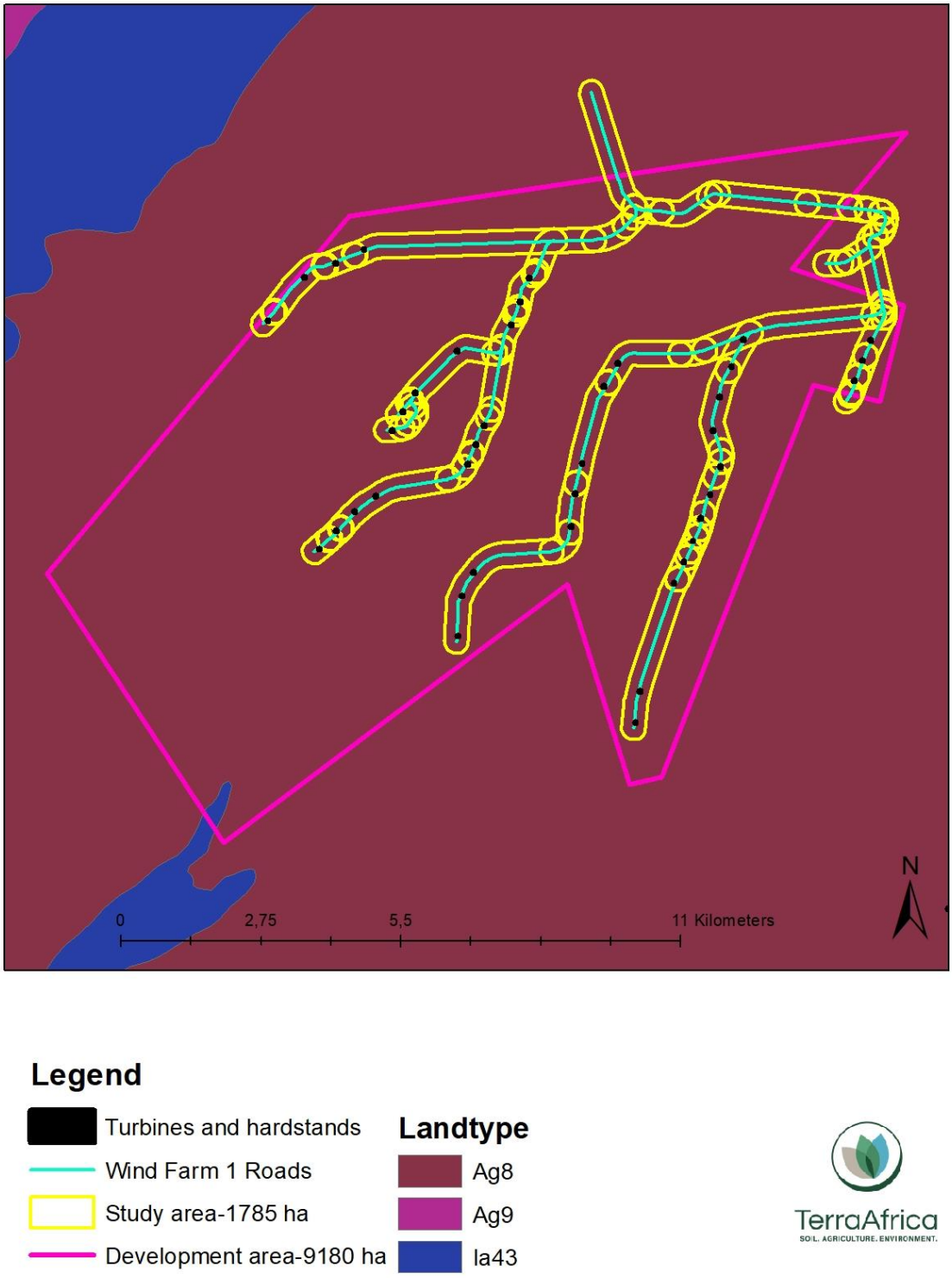


Figure 6: Land type classification of the proposed Aberdeen Wind Energy Facility 1 and the surrounding area.

# 10. Results of the on-site sensitvity verification

## 9.1 Soil forms

Three different soil forms were identified within the proposed project site. The soil forms include the Glenrosa, Nkonkoni and Olienhout soil forms. The position of these soil groups within the project site are illustrated in **Error! Reference source not found.**

Glenrosa

Most of the study area consists of the Glenrosa soil form (1656.4 ha). The depths of these soil did not reach 200 mm and in some observation solid rock was found (Figure 7). The lithic horizon was saprolithic (weathered in place from igneous or metamorphic rock and usually overlain by soil and exhibiting some properties of rock.)**.** The saprolithic could easily be broken as one small area was cultivated, indicating that water would drain through the lithic. The A-horizon was either chromic or bleached depending on the elevation of the observation. Low elevation observations had bleached topsoils while higher elevation observation had chromic topsoils.

Figure 7: Glenrosa soil form found in natural veld **(Left)** and cultivated area **(Right).**

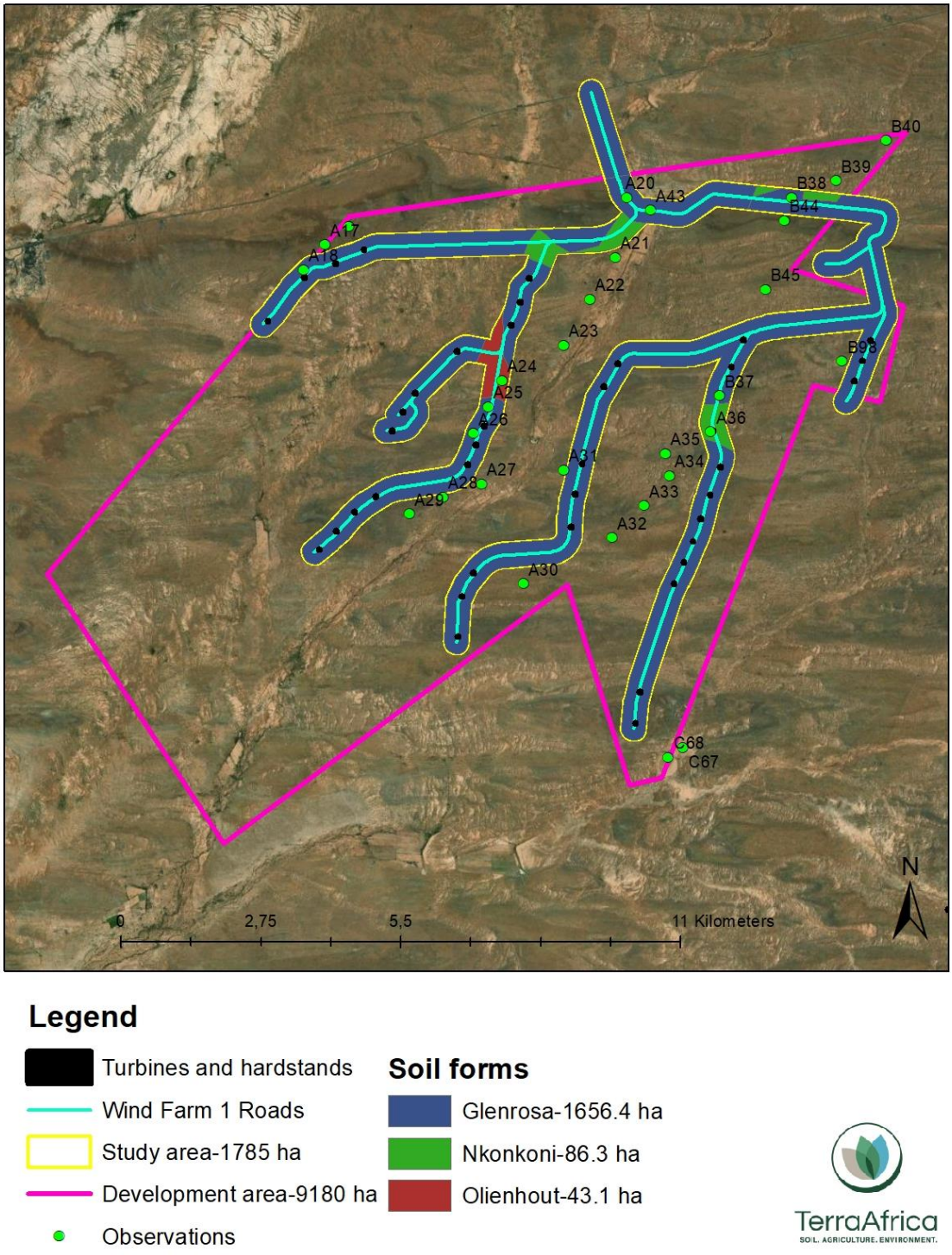


Figure 8: Soil classification map of the Aberdeen Wind Energy Facility 1 project site.

Nkonkoni

The Nkonkoni soil form covered the second most of the study area, although only small areas had the Nkonkoni soil form. The Nkonkoni consists of an orthic A, overlying a red apedal with a lithic underneath (Figure 9). The Nkonkoni had a moderate depth of 0.8m and thus classified as a medium agricultural sensitive soil. The lithic horizon was also saprolthic (as defined for the Glenrosa) as most of the area consist of rock of the Adelaide Sbgrp, Beaufort grp which are Siliciclastic rocks.

Figure 9: Nkonkoni soil form.

Olienhout

The Olienhout soil form was found in one area of the study area and covered approximately 41.3 ha. The Olienhout soil form consist of a soft carbonate overlying a hard carbonate (Figure: 10). The soft carbonate only reached a depth of 0.5 m whereafter the hard carbonate was reached.

Figure: 10 Olienhout soil form.

## 9.2 Land capability classification

Following the soil classification and the consideration of the climate conditions of the area within which the proposed project will be located, the project site can be classified into three land capability class (refer to Figure 11).

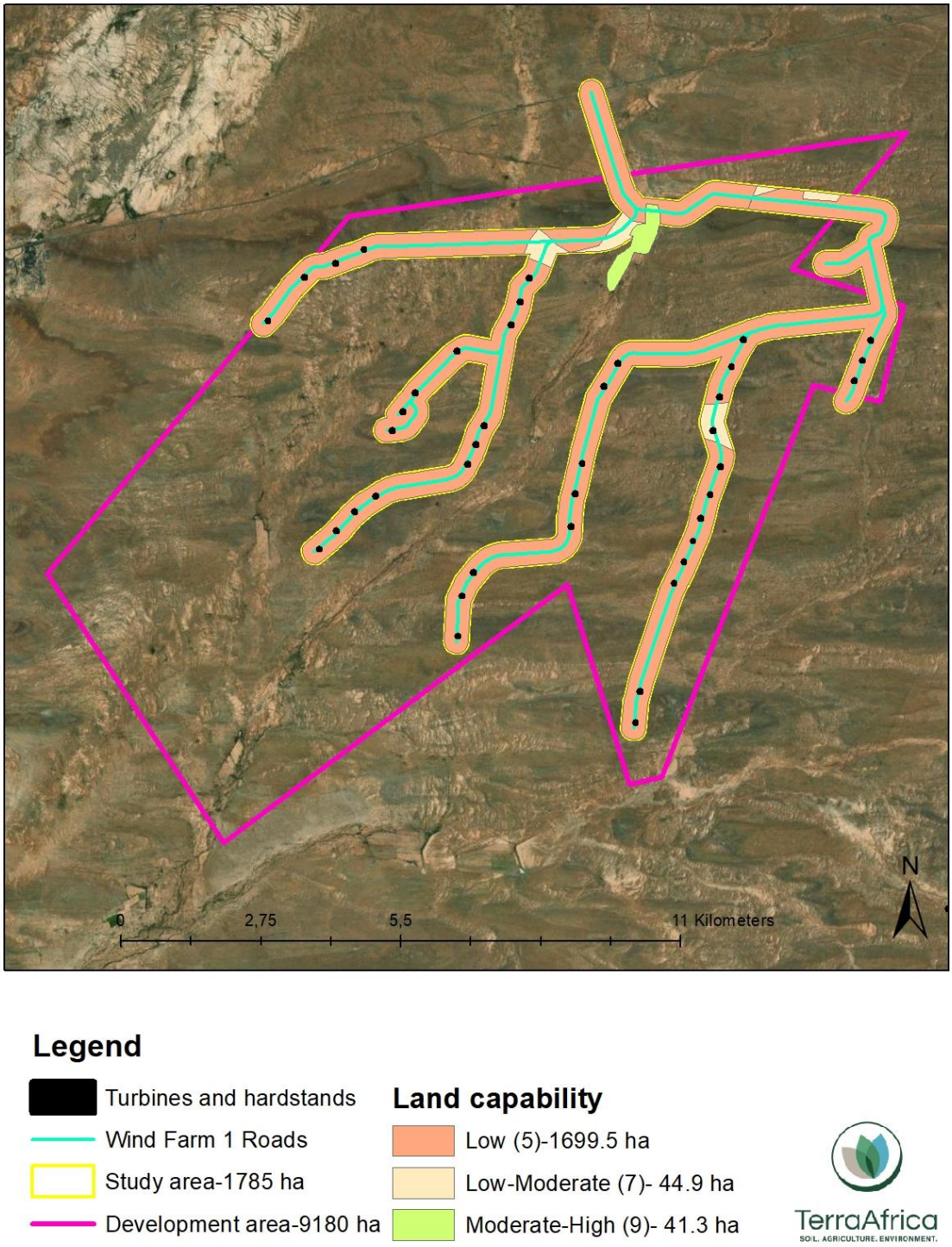


Figure 11: Land capability classification of the Aberdeen Wind Energy Facility 1 project site.

The Low (5) land capability was associated with the Glenrosa and Olienhout soil form and is mainly due to the shallow depth of the Glenrosa and the of presence of carbonate in the Olienhout. Additionally, the climate capability is Low-Moderate for the development area (Class 04) further decreasing the land capability. The absence of cultivated land within most the study area also lowers the land capability. The area with Moderate-High (Class 09) land capability is associated with a Glenrosa soil form found within a cultivated land. The Low-Moderate (Class 07) is allocated to the Nkonkoni soil form due the drainable depth (0.8m) of the red apedal.

### 10.3 Land use and agricultural activities

A small area of approximately 49.71 ha is cultivated within the development area (Figure 12). Only a very small area of this falls within the study area (see Figure 14). The rest of the area is mainly used for livestock grazing of sheep and goats.

Figure 12: Cultivated land within the development area.

Figure 13: Water crib for livestock.

## 9.3 Sensitivity analysis and allowable development limits

Following the consideration of all the desktop and gathered baseline data above, the project site can be classified as having areas with Low, Medium and High Sensitivity to the proposed development (refer to Figure 14). The sensitivity rating considers the land capability and agricultural potential as well as the soil erodibility.

Most of the infrastructure components are located well within areas with Low Sensitivity (refer to Figure 14) with only the eastern part having a small area which falls in a Medium sensitive area. High sensitive areas are found at the far southeastern boundary of the development area. Pivots are present in this area but does not fall within the study area.

The Low Sensitivity areas have shallow effective soil depth and the arid climate reduces the land capability of the area significantly. The area is mainly used for livestock grazing, with only a small area being cultivated. Soil conservation and mitigation measures must be implemented to avoid soil particle loss through erosion as the soil regeneration potential of the area is very low and any soil losses will unlikely be replaced by young soil from soil formation processes. The anticipated impacts of the proposed project on the soil properties and land productivity are discussed in Section 10 below.

Following the sensitivity delineation of the development area, the allowable development limit for the development footprint of 62ha, was calculated. The allowable development limit for areas outside crop field boundaries were used. The results of the calculations are provided in Table 1 below.

Table 1 Calculated allowable development limits of the development footprint

| **Sensitivity class** | **Area that will be affected by development footprint (ha)** | **Allowable limit (ha/MW)** | **Area allowed for a 240MW development (ha)** | **Area that exceeds allowable limit (ha)** |
|---|---|---|---|---|
| High | 2 | 0.20 | 48 | 0 |
| Medium | 6 | 0.35 | 84 | 0 |
| Low | 54 | 2.50 | 600 | 0 |

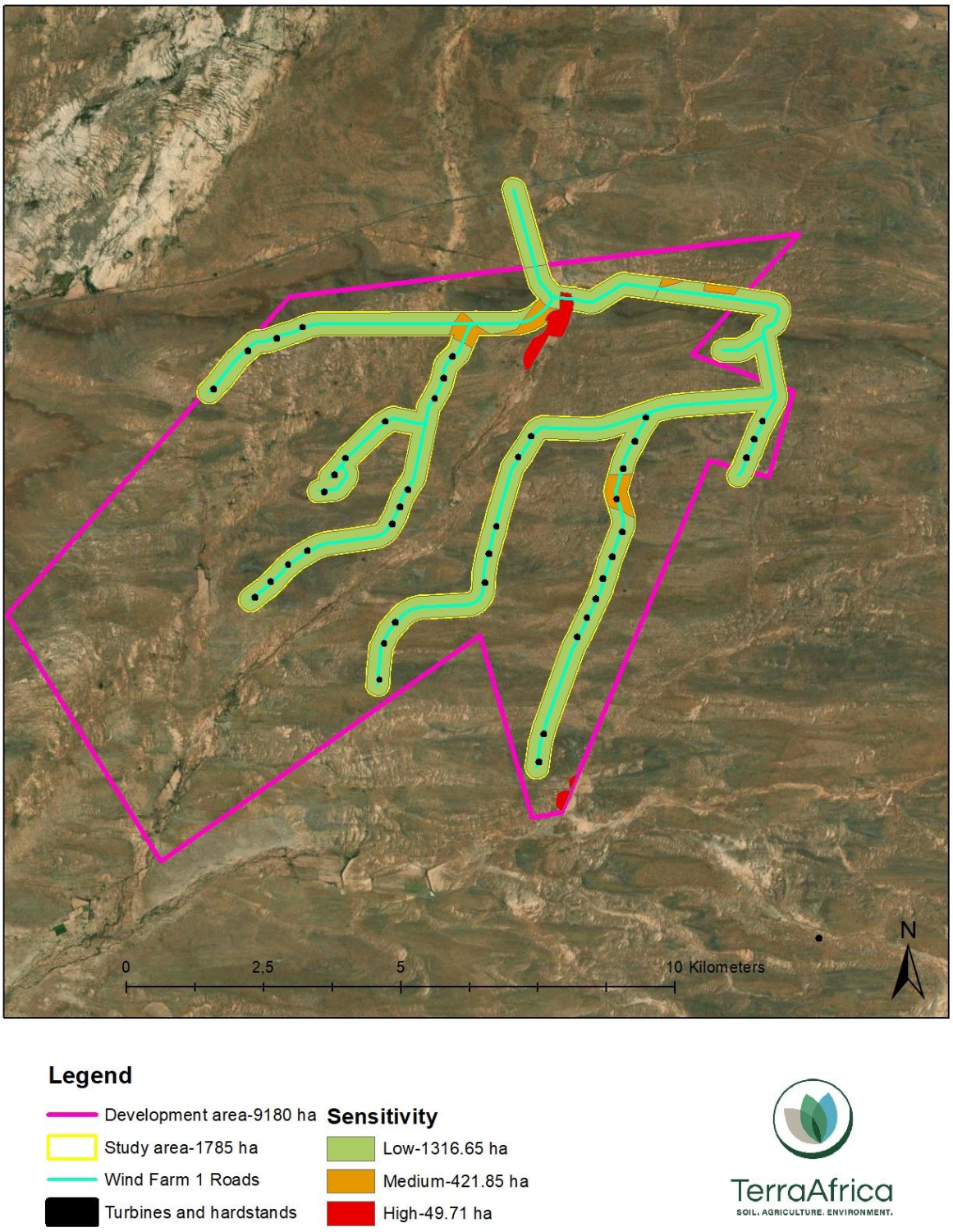


Figure 14: Original infrastructure layout superimposed on the combined agricultural and soil sensitivity of the proposed Aberdeen Wind Energy Facility 1.

# 10. Impact assessment

## 10.1 Project description

The Aberdeen Wind Facility 1 will have a contracted capacity of up to 240MW and comprise up to 41 wind turbines with a capacity of up to 8MW each. The project will have a preferred project site of approximately 9180 ha, and an estimated disturbance area of up to 62 ha. The Aberdeen Wind Facility 1 project site is proposed to accommodate the following infrastructure:

- Up to 41 wind turbines with a maximum hub height of up to 200m, rotor diameter of up to 200m, blade length of up to 100m and have a rotor tip height of up to 300m. The turbine foundations will have a combined permanent footprint of 6ha and 13ha for all turbine crane hardstands is required.
- Medium-voltage (MV) power lines internal to the wind farm will be trenched and located adjacent to internal access roads, where feasible.
- Up to 132kV on-site facility substation up to 2ha in extent.
- Battery Energy Storage System (BESS) with a footprint of up to 5ha.
- A main access road of approximately 2.5km in length and up to 10m in width[2].
- An internal road network between project components inclusive of stormwater infrastructure. A 12 m wide road corridor may be temporarily impacted during construction and rehabilitated to 6 m wide after construction
- Gate house and security: up to 0.5 ha
- Operation and Maintenance buildings (includes control centre, offices, warehouses, workshop, canteen, visitors centre, staff lockers, etc.): Up to 2 ha
- Site camp up to 1 ha
- Construction laydown areas up to 9ha

The power generated from the project will be sold to Eskom and will feed into the national electricity grid. Ultimately, the project is intended to be a part of the renewable energy projects portfolio for South Africa, as contemplated in the Integrated Resource Plan.

## 10.2 Description of project activities

The proposed project site currently has limited access roads. It is anticipated that the most significant change to the soil profiles will occur during the construction phase when the main and internal access roads as well as the areas where infrastructure will be erected, will be cleared of vegetation. During the construction phase, vehicles will traverse in and out of the construction camps and fuel, oils and greases that will be used by construction equipment and vehicles, may be stored on site. Construction materials will be transported and stored on site in the temporary laydown areas. The cabling between the wind turbines will also be laid underground.

[2] Access to the facility will be via an existing gravel road off the R61. The gravel road is well established (~10m wide excluding road reserve), however it's likely upgrades will be required at the access point off the R61 and potentially at water crossings.

During the operation phase, the footprint of the project will remain the same as that developed during the construction phase. Maintenance vehicles and equipment will travel on the main and internal access roads between the turbines and the offices and workshop. It is foreseen that these soil surfaces will remain bare and will be exposed to soil erosion by wind and water movement.

The decommissioning phase will have similar impacts to that of the construction phase as special cranes and other equipment will be used to remove the wind turbine materials. Soil in the areas where the turbine structures are removed will be exposed to soil erosion and soil pollution with materials as well fuel and lubricants from the construction vehicles, are impacts associated with this phase.

## 10.3 Rating of impact significance

### 10.3.1 Construction phase

Impact: Reduction of land with natural vegetation for livestock grazing

Earth-moving equipment will be used to clear the vegetation from the access road areas as well as all the areas where structures will be erected. In areas where obstacles such as rock outcrops are present, earth-moving equipment will be used to remove these rocks and lithic material and level the surface.

| ***Nature:*** The availability of grazing land that can be used for small stock farming will be reduced during the construction phase. It is anticipated that the impact will remain as long the infrastructure is present and the impact will only cease once all surface infrastructure has been decommissioned and vegetation has re-established in these areas. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Local (1) | Local (1) |
| ***Duration*** | Short duration - 2-5 years (2) | Very short duration - 0-1 years (1) |
| ***Magnitude*** | Low (4) | Minor (2) |
| ***Probability*** | Definite (4) | Probable (3) |
| ***Significance*** | **Low (28)** | **Low (12)** |
| ***Status (positive or negative)*** | Negative | Positive |
| ***Reversibility*** | High | High |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | N/A |
| ***Mitigation:***<br>• Vegetation clearance must be restricted to infrastructure and access road areas.<br>• Materials and equipment must only be stored in the pre-determined laydown areas.<br>• Removal of obstacles to allow for access of construction vehicles must be kept to only were essential.<br>• Prior arrangements must be made with the landowner and neighbouring landowners to ensure that farm and game animals are moved to areas where they cannot be injured by vehicles traversing the area.<br>• No boundary fence must be opened without the landowner or neighbouring landowners' permission.<br>• No open fires made by the construction teams are allowable during the construction phase.<br>• The supporting infrastructure must be constructed as closely as possible together to avoid fragmentation of the entire project site.<br>• Aberdeen Wind Energy Facility 1 (Pty) Ltd must communicate with the landowner on access restriction around the infrastructure to ensure the landowner is not expecting to return sheep farming to areas of the farm where it will no longer be possible. | | |
| ***Residual Impacts:*** | | |

| |
|---|
| The residual impact from the construction of the project is considered low. |
| ***Cumulative Impacts:*** Any additional wind energy facilities or other renewable projects to be developed in the area, will result in additional areas where grazing veld will be unavailable for small stock farming. |

Impact: Soil erosion

All areas where vegetation is removed from the soil surface will result in exposed soil surfaces that will be prone to erosion. Both wind and water erosion are a risk and even though the project area is in an arid climate, the intensity of a single rainstorm may result in soil particles being transported away. Once the soil particles are removed, vegetation will have difficulty establishing itself on the rock, lithic and hard carbonate material in the area.

***Nature:*** The clearing and levelling of a limited area of land within the proposed project site will increase the risk of soil erosion in the area. It is anticipated that the risk will naturally reduce as grass and lower shrubs re-establishes in the area once the construction has been completed and the operation phase commences.

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| ***Extent*** | Local (1) | Local (1) |
| ***Duration*** | Medium-term (3) | Medium-term (3) |
| ***Magnitude*** | Moderate (6) | Low (4) |
| ***Probability*** | Probable (3) | Improbable (2) |
| ***Significance*** | **Medium (30)** | **Low (16)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | N/A |

***Mitigation:***

- Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint/servitude;
- Unnecessary land clearance must be avoided;
- Level any remaining soil removed from excavation pits that remained on the surface instead of allowing small stockpiles of soil to remain on the surface.
- Regularly monitor the site to check for areas where signs of soil erosion may start to appear.
- Should any soil erosion be detected, it must be addressed immediately through rehabilitation and surface stabilisation techniques.

***Residual Impacts:***

The residual impact from the construction of the Aberdeen Wind Energy Facility 1 project on the susceptibility to erosion is considered low.

***Cumulative Impacts:***

Any additional wind energy facilities or other renewable projects to be developed in the area, will result in additional areas being exposed to soil erosion through wind and water movement.

Impact: Soil pollution

During the construction phase, construction workers will traverse through the area with vehicles and construction equipment. Both potential spills and leaks from construction vehicles and equipment as well as waste generation on site, can result in soil pollution.

***Nature:*** The following construction activities can result in the chemical pollution of the soil:

1. Petroleum hydrocarbon (present in oil and diesel) spills by machinery and vehicles during earthworks and the removal of vegetation as part of site preparation.
2. Spills from vehicles transporting workers, equipment, and construction material to and from the construction site.

3. The accidental spills from temporary chemical toilets used by construction workers.
4. The generation of domestic waste by construction workers.
5. Spills from fuel storage tanks during construction.
6. Pollution from concrete mixing.
7. Any construction material remaining within the construction area once construction is completed.

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| ***Extent*** | Local (1) | Local (1) |
| ***Duration*** | Short-term (2) | Short-term (2) |
| ***Magnitude*** | Moderate (6) | Low (4) |
| ***Probability*** | Low (4) | Improbable (2) |
| ***Significance*** | **Medium (36)** | **Low (14)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | N/A |

***Mitigation:***

- Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills;
- Any waste generated during construction, must be stored in designated containers and removed from the site by the construction teams; and
- Any left-over construction materials must be removed from site.

***Residual Impacts:***

The residual impact from the construction of the proposed project will be low to negligible.

***Cumulative Impacts:***

Any additional wind energy facilities or other renewable projects to be developed in the area where waste is not removed to designated waste sites, will increase the cumulative impacts associated with soil pollution in the area.

Impact: Soil compaction

The weight of vehicles and equipment traversing in the construction areas as well as deliberate compaction in areas where buildings will be constructed, will reduce the pore space between soil particles and reduce the water infiltration rate of soil. The reduced water infiltration will increase the risk of soil erosion during rainfall events.

***Nature:*** The clearing and levelling of land for the wind turbines and supporting infrastructure as well as the access roads, will result in soil compaction. In the area where the access road will be constructed, topsoil will be removed and the remaining soil material will be deliberately compacted to ensure a stable road surface.

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| ***Extent*** | Local (1) | Local (1) |
| ***Duration*** | Medium-term (3) | Medium-term (3) |
| ***Magnitude*** | Moderate (6) | Low (4) |
| ***Probability*** | Probable (3) | Improbable (2) |
| ***Significance*** | **Medium (30)** | **Low (16)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | N/A |

***Mitigation:***

- Vehicles and equipment must travel within demarcated areas and not outside of the construction footprint;
- Unnecessary land clearance must be avoided;
- Where possible, conduct the construction activities outside of the rainy season; and
- Vehicles and equipment must park in designated parking areas.

| |
|---|
| ***Residual Impacts:*** |
| The residual impact from the construction of the proposed project on soil compaction is considered low. |
| ***Cumulative Impacts:*** |
| Any additional wind energy facilities or other renewable projects to be developed in the area, will result in additional areas being exposed to soil compaction. |

### 10.3.2 Operation phase

During the operation phase, maintenance personnel will traverse between the wind turbines and the offices and workshop to ensure that the infrastructure functions optimally and to do repairs where necessary. This phase will have no additional impact on the livestock farming potential of the area. The following impact on soil is expected for this phase:

Impact: Soil erosion

| ***Nature:*** The areas where vegetation was cleared, will remain at risk of soil erosion, especially during a rainfall event when runoff from the cleared surfaces will increase the risk of soil erosion in the areas directly surrounding the wind turbines and buildings. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Local (1) | Local (1) |
| ***Duration*** | Medium-term (3) | Medium-term (3) |
| ***Magnitude*** | Moderate (6) | Low (4) |
| ***Probability*** | Probable (3) | Improbable (2) |
| ***Significance*** | **Medium (30)** | **Low (16)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | N/A |
| ***Mitigation:***<br>• The project site must regularly be monitored to detect early signs of soil erosion on-set.<br>• If soil erosion is detected, the area must be stabilised by the use of geo-textiles and facilitated re-vegetation. | | |
| ***Residual Impacts:***<br>The residual impact from the operation of the proposed Aberdeen Wind Energy Facility 1 on the susceptibility to erosion is considered low. | | |
| ***Cumulative Impacts:***<br>Any additional wind energy facilities or other renewable projects to be developed in the area, will result in additional areas being exposed to soil erosion through wind and water movement. | | |

Impact: Soil pollution

During the operation phase, engineers and maintenance workers will travel between the wind turbines, substations, offices and workshop to ensure that the project is maintained, and repairs are done. During the operation phase, potential spills and leaks from maintenance vehicles and equipment as well as waste generation on site, can result in soil pollution.

| ***Nature:*** During the operation phase of the project, the following activities can result in the chemical pollution of the soil:<br>1. Petroleum hydrocarbon (present in oil and diesel) spills by maintenance machinery and vehicles.<br>2. The generation of domestic waste by maintenance staff. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Local (1) | Local (1) |

| | | |
|---|---|---|
| ***Duration*** | Short-term (2) | Short-term (2) |
| ***Magnitude*** | Moderate (6) | Low (4) |
| ***Probability*** | Low (4) | Improbable (2) |
| ***Significance*** | **Medium (36)** | **Low (14)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | N/A |
| ***Mitigation:***<br>• Maintenance must be undertaken regularly on all vehicles and maintenance machinery to prevent hydrocarbon spills.<br>• No domestic and other waste must be left at the site and must be transported with the maintenance vehicles to an authorised waste dumping area. | | |
| ***Residual Impacts:***<br>The residual impact from the operation of the proposed project will be low to negligible. | | |
| ***Cumulative Impacts:***<br>Any additional wind energy facilities or other renewable projects to be developed in the area and where waste is not removed to designated waste sites, will increase the cumulative impacts associated with soil pollution in the area. | | |

### 10.3.3 Decommissioning phase

The decommissioning phase will have the same impacts as the construction phase i.e. soil erosion and soil pollution. It is anticipated that especially the risk of soil erosion will remain until the vegetation growth has re-established in the area where the infrastructure of the Aberdeen Wind Energy Facility 1 was decommissioned.

# 11. Cumulative impacts

"Cumulative Impact", in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities[3].

The role of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e. whether the addition of the proposed project in the area will increase the impact).

Within 30km of the project site, one other onshore wind project have already been authorised. The Eskom Aberdeen Wind Farm is located north of the current development area (refer to Figure 15).

The cumulative impacts of the proposed project have been discussed in Section 10 above. Below follows the rating of each of the cumulative impacts.

[3] Unless otherwise stated, all definitions are from the EIA Regulations 2014 (GNR 326).

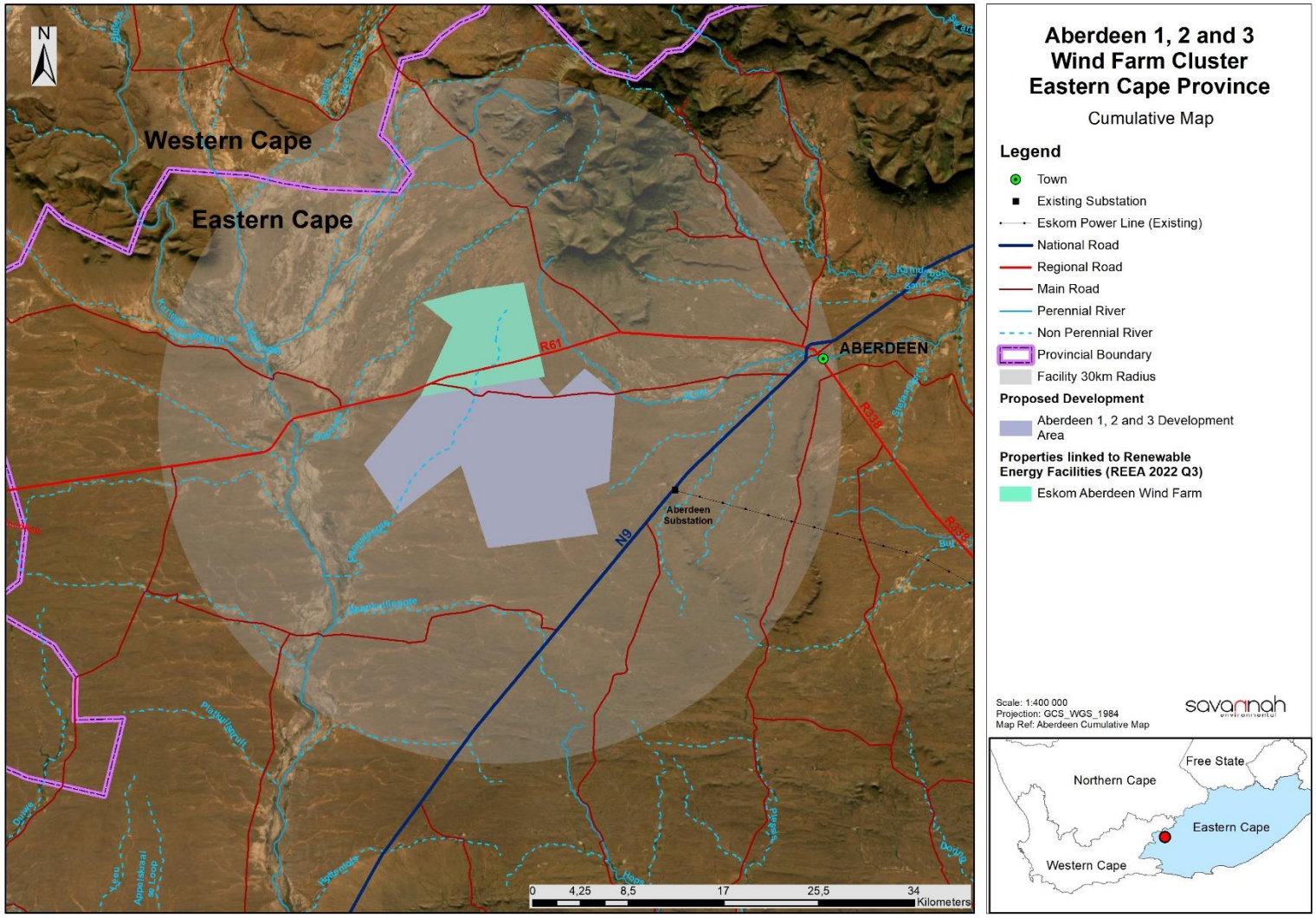


Figure 15: Locality of other renewable energy projects in the area that may result in cumulative impacts.

Cumulative impact of areas susceptible to soil erosion

| **Nature:** Increase in areas susceptible to soil erosion | | |
|---|---|---|
| | Local (1) | **Cumulative impact of the project and other projects in the area** |
| **Extent** | Medium-term (3) | Regional (2) |
| **Duration** | Low (4) | Medium-term (3) |
| **Magnitude** | Improbable (2) | Moderate (6) |
| **Probability** | **Low (16)** | Probable (3) |
| **Significance** | Negative | **Medium (33)** |
| **Status (positive/negative)** | Low | Negative |
| **Reversibility** | No | Low |
| **Loss of resources?** | Yes | Yes |
| **Can impacts be mitigated?** | Yes | No |
| **Confidence in findings:** High. | | |
| **Mitigation:** Each of the projects should adhere to the highest standards for soil erosion prevention and management as defined in Section 10.2.2 above. | | |

Cumulative impact of areas with compacted soils

| **Nature:** Increase in areas with compacted soils | | |
|---|---|---|
| | **Overall impact of the proposed project considered in isolation** | **Cumulative impact of the project and other projects in the area** |
| **Extent** | Local (1) | Regional (2) |
| **Duration** | Medium-term (3) | Medium-term (3) |
| **Magnitude** | Low (4) | Moderate (6) |
| **Probability** | Improbable (2) | Probable (3) |
| **Significance** | **Low (16)** | **Medium (33)** |
| **Status (positive/negative)** | Negative | Negative |
| **Reversibility** | Low | Low |
| **Loss of resources?** | Yes | Yes |
| **Can impacts be mitigated?** | Yes | No |
| **Confidence in findings:** High. | | |
| **Mitigation:** Each of the projects should adhere to the highest standards for soil erosion prevention and management as defined in Section 10.2.2 above. | | |

Cumulative impact of increased risk of soil pollution

| **Nature:** Increase in areas susceptible to soil pollution | | |
|---|---|---|
| | **Overall impact of the proposed project considered in isolation** | **Cumulative impact of the project and other projects in the area** |
| **Extent** | Local (1) | Regional (2) |
| **Duration** | Short-term (2) | Short-term (2) |
| **Magnitude** | Moderate (6) | Moderate (6) |
| **Probability** | Probable (3) | Probable (3) |
| **Significance** | **Low (27)** | **Medium (30)** |
| **Status (positive/negative)** | Negative | Negative |

| | | |
|---|---|---|
| **Reversibility** | Low | Low |
| **Loss of resources?** | Yes | Yes |
| **Can impacts be mitigated?** | Yes | No |
| **Confidence in findings:**<br>High. | | |
| **Mitigation:**<br>Each of the projects should adhere to the highest standards for soil pollution prevention and management as defined in Section 10.2.3 above. | | |

# 12. Acceptability statement

Following the data analysis and impact assessment above, the proposed Aberdeen Wind Energy Facility 1 is considered an acceptable development within the project site that was assessed.

The project site consists mainly of shallow soil profiles underlain by saprolithic material. In these areas, crop production is not viable due to the physical limitations of the soil. A small area of cultivated land was found during the site visit. This cultivated land covers only a small area of the study area and development area, it does not fall within the area where infrastructure (wind turbines) occurs.

Prior to the drought of the past six years, landowners have farmed with sheep. However, the prolonged drought and the lack of high-yielding sources of groundwater, have resulted in the abandonment and/or reduction of livestock farming on the land parcels of the project site. While vegetation has started to recover after the rain of the past season, it is still sparse and the grazing capacity low (24 ha/LSU or 6 ha/SSU) compared to the rest of South Africa.

While the development of a wind energy facility may be a more sustainable land use than agriculture, the project will have negative impacts on the soil quality of the areas to be affected by the infrastructure. These impacts include the risks of soil erosion, soil compaction and soil contamination. It is anticipated that the construction phase will have impacts that range from medium to low and that through the consistent implementation of the recommendation mitigation measures, these impacts can all be reduced to low and acceptable levels. Impacts during the operation phase are associated with possible repairs that may be required to maintain the power line.

It is my professional opinion that this application be considered favourably, permitting that the mitigation measures are followed to prevent soil erosion and soil pollution and to minimise impacts on the veld quality of the farm portion that will be affected. The project infrastructure should also remain within the project site boundaries and in the positions indicated in the layout map.

# 13. Reference list

Department of Agriculture, Forestry and Fisheries, 2016. National land capability evaluation raster data: Land capability data layer, 2016. Pretoria.

Land Type Survey Staff (1972 – 2006). *Land Types of South Africa data set*. ARC – Institute for Soil, Climate and Water. Pretoria.

South Africa (Republic) 2018. *Long-term grazing capacity for South Africa*: Data layer. Government Gazette Vol. 638, No. 41870. 31 August 2018. Regulation 10 of the Conservation of Agricultural Resources Act (CARA): Act 43 of 1983. Pretoria. Government Printing Works.

The Soil Classification Working Group (2018). *Soil Classification – Taxonomic System for South Africa.* Dept. of Agric., Pretoria.

# APPENDIX 1 – SPECIALIST DECLARATION OF INDEPENDENCE

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

| | (For official use only) |
|---|---|
| File Reference Number: | |
| NEAS Reference Number: | DEA/EIA/ |
| Date Received: | |

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**

ABERDEEN WIND FACILITY 1, EASTERN CAPE PROVINCE

**Kindly note the following:**

1. 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.
2. 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.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. 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.
5. 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

Details of Specialist, Declaration and Undertaking Under Oath

Page 1 of 3

## 1. SPECIALIST INFORMATION

| | | | | |
|---|---|---|---|---|
| Specialist Company Name: | TerraAfrica Consult CC | | | |
| B-BBEE | Contribution level (indicate 1 to 8 or non-compliant) | 4 | Percentage Procurement recognition | 100% |
| Specialist name: | Mariné Pienaar | | | |
| Specialist Qualifications: | MSc. Environmental Science (Wits) ; BSc. (Agric) Plant Production (UP) | | | |
| Professional affiliation/registration: | SACNASP Registration No:400274/10<br>Soil Science Society of South Africa ; IAIAsa | | | |
| Physical address: | Farm Strydpoort 403, Ottosdal, 2610 | | | |
| Postal address: | P.O. Box 433, Ottosdal | | | |
| Postal code: | 2610 | Cell: | 082 828 3587 | |
| Telephone: | 082 828 3587 | Fax: | N/A | |
| E-mail: | mpienaar@terraafrica.co.za | | | |

## 2. DECLARATION BY THE SPECIALIST

I, Mariné Pienaar, 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

TerraAfrica Consult

Name of Company:

2023-01-10

Date

Details of Specialist, Declaration and Undertaking Under Oath

**3. UNDERTAKING UNDER OATH/ AFFIRMATION**

I, MARINÉ PIENAAR, 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

TERRAAFRICA CONSULT CC

Name of Company

2023-01-10

Date

Signature of the Commissioner of Oaths

2023-01-10

Date

2023-01-10

Commissioner of Oaths (RSA)
Stephanus Francois Kasselman
59 Kruger street Wolmaransstad 2630
T: 018 596 1320 F: 018 596 1395

## APPENDIX 2 – CURRICULUM VITAE OF SPECIALIST

# MARINÉ PIENAAR

## Specialist Scientist

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linkedin.com/in/marinepienaar

Wolmaransstad,
South Africa

## EXPERTISE

Soil Quality Assessment

Soil Policy and Guidelines

Agricultural Agro-Ecosystem Assessment

Sustainable Agriculture

Data Consolidation

Land Use Planning

Soil Pollution

Hydropedology

## EDUCATION

MASTER'S DEGREE
**Environmental Science**
University of Witwatersrand
2010 – 2018

BACHELOR'S DEGREE
**Agricultural Science**
University of Pretoria
2001 – 2004

## PROFESSIONAL PROFILE

I contribute specialist knowledge on agriculture and soil management to ensure long-term sustainability of projects in Africa. For the past thirteen years, it has been my calling and I have consulted on more than 200 projects. My clients include environmental and engineering companies, mining houses, and project developers. I enjoy the multi-disciplinary nature of the projects that I work on and I am fascinated by the evolving nature of my field of practice. The next section provide examples of the range of projects completed. A comprehensive project list is available on request.

## PROJECT EXPERIENCE

### Global Assessment on Soil Pollution

*Food and Agricultural Organisation (FAO) of the United Nations (UN)*

Author of the regional assessment of Soil in Sub-Saharan Africa. The report is due for release in February 2021. The different sections included:

- Analysis of soil and soil-related policies and guidelines for each of the 48 regional countries
- Description of the major sources of soil pollution in the region
- The extent of soil pollution in the region and as well as the nature and extent of soil monitoring
- Case study discussions of the impacts of soil pollution on human and environmental health in the region
- Recommendations and guidelines for policy development and capacitation to address soil pollution in Sub-Saharan Africa

### Data Consolidation and Amendment

*Range of projects: Mining Projects, Renewal Energy*

These projects included developments where previous agricultural and soil studies are available that are not aligned with the current legal and international best practice requirements such as the IFC Principles. Other projects are expansion projects or changes in the project infrastructure layout. Tasks on such projects include the incorporation of all relevant data, site verification, updated baseline reporting and alignment of management and monitoring measures.

Project examples:

- Northam Platinum's Booysendal Mine, South Africa
- Musonoi Mine, Kolwezi District, Democratic Republic of Congo
- Polihali Reservoir and Associated Infrastructure, Lesotho
- Kaiha 2 Hydropower Project, Liberia
- Aquarius Platinum's Kroondal and Marikana Mines

# MARINÉ PIENAAR

## Specialist Scientist

## PROFESSIONAL MEMBERSHIP

South African Council for Natural Scientific Professions (SACNASP)

Soil Science Society of South Africa (SSSSA)

Soil Science Society of America (SSSA)

Network for Industrially Contaminated Land in Africa (NICOLA)

## LANGUAGES

English (Fluent)

Afrikaans (Native)

French (Basic)

## PRESENTATIONS

*There is spinach in my fish pond*
**TEDx Talk**
Available on YouTube

♦

*Soil and the Extractive Industries*
**Session organiser and presenter**
Global Soil Week, Berlin (2015)

♦

*How to dismantle an atomic bomb*
**Conference presentation (2014)**
Environmental Law Association (SA)

## PROJECT EXPERIENCE (Continued)

### Agricultural Agro-Ecosystem Assessments

*Range of projects: Renewable Energy, Industrial and Residential Developments, Mining, Linear Developments (railways and power lines)*

The assessments were conducted as part of the Environmental and Social Impact Assessment processes. The assessment process includes the assessment of soil physical and chemical properties as well as other natural resources that contributes to the land capability of the area.

Project examples:

- Mocuba Solar PV Development, Mozambique
- Italthai Railway between Tete and Quelimane, Mozambique
- Lichtenburg PV Solar Developments, South Africa
- Manica Gold Mine Project, Mozambique
- Khunab Solar PV Developments near Upington, South Africa
- Bomi Hills and Mano River Mines, Liberia
- King City near Sekondi-Takoradi and Appolonia City near Accra, Ghana
- Limpopo-Lipadi Game Reserve, Botswana
- Namoya Gold Mine, Democratic Republic of Congo

### Sustainable Agriculture

*Range of projects: Policy Development for Financial Institutions, Mine Closure Planning, Agricultural Project and Business Development Planning*

Each of the projects completed had a unique scope of works and the methodology was designed to answer the questions. While global indicators of sustainable agriculture are considered, the unique challenges to viable food production in Africa, especially climate change and a lack of infrastructure, in these analyses.

Project examples:

- Measurement of sustainability of agricultural practices of South African farmers – survey design and pilot testing for the LandBank of South Africa
- Analysis of the viability of avocado and mango large-scale farming developments in Angola for McKinsey & Company
- Closure options analysis for the Tshipi Borwa Mine to increase agricultural productivity in the area, consultation to SLR Consulting
- Analysis of risks and opportunities for farm feeds and supplement suppliers of the Southern African livestock and dairy farming industries
- Sustainable agricultural options development for mine closure planning of the Camutue Diamond Mine, Angola

# MARINÉ PIENAAR

## Specialist Scientist

## PROFESSIONAL DEVELOPMENT

Contaminated Land Management 101 Training
**Network for Industrially Contaminated Land in Africa**
2020

Intensive Agriculture in Arid & Semi-Arid Environments
**CINADCO/MASHAV R&D Course, Israel**
2015

World Soils and their Assessment Course
**ISRIC – World Soil Information Centre, Netherlands**
2015

Wetland Rehabilitation Course
**University of Pretoria**
2010

Course in Advanced Modelling of Water Flow and Solute Transport in the Vadose Zone with Hydrus
**University of Kwazulu-Natal**
2010

Environmental Law for Environmental Managers
**North-West University Centre for Environmental Management**
2009

## PROJECT EXPERIENCE (Continued)

### Soil Quality Assessments

*Range of projects: Rehabilitated Land Audits, Mine Closure Applications, Mineral and Ore Processing Facilities, Human Resettlement Plans*

The soil quality assessments included physical and chemical analysis of soil quality parameters to determine the success of land rehabilitation towards productive landscapes. The assessments are also used to understand the suitability for areas for Human Resettlement Plans

Project examples:

- Closure Planning for Yoctolux Colliery
- Soil and vegetation monitoring at Kingston Vale Waste Facility
- Exxaro Belfast Resettlement Action Plan Soil Assessment
- Soil Quality Monitoring of Wastewater Irrigated Areas around Matimba Power Station
- Keaton Vanggatfontein Colliery Bi-Annual Soil Quality Monitoring

## REFERENCES

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