AGRICULTURAL STUDY:

MULILO NEWCASTLE WIND POWER (PTY) LTD (NORTH WEF) KZN PROVINCE.

CES Environmental and Social advisory Services
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Port Elizabeth, 6001, Eastern Cape Province

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Index

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SUMMARY AND CONCLUSIONS

The project proposes the development of two 140 MW Wind Energy Facilities (WEF) at Newcastle that will be implemented in two phases, each with 20 to 35 turbines. The WEFs will connect to the existing Eskom Incandu Substation, near Newcastle, via an approximately 20-25 km long 132 kV OHL.

The site of the WEF is used for livestock production. There is no cropping land.

Donga erosion occurs in places due to overstocking and cultivation, especially in the ravines. The mudstone in the southern portion of the WEF site is particularly prone to erosion.

Conclusions WEF (Generation infrastructure and roads)

- There is no arable or cultivated land on the properties used for the WEF.
- The loss of income from livestock is estimated at R75 804 during construction and R66 916 per year during operation.

SUMMARY OF IMPACTS

The direct impact of creating the WEF is low on agriculture, there will be no loss of high potential land, the loss of grazing land and income from this source is low.

The impact of the development on agriculture is low and mostly during the construction phase. It is, therefore, recommended that the project be approved for implementation.

CONTENTS

1 BACKGROUND

The Client is proposing the development of two 140 MW Wind Energy Facilities (WEF) at Newcastle, implemented in two phases, each with between 20 – 35 turbines. In addition, the proposed development will include a collector substation (±1 ha), operations and maintenance buildings, construction yards laydown areas, concrete batching plant, road upgrades and new roads, a combination of 33kV overhead Lines (OHLs) and 33 kV underground cables, a Met Mast, and an optional Battery Energy Storage System (BESS). The proposed WEFs will connect to existing Eskom Substations, near Newcastle, via a 132 kV OHL.

CES will undertake the Environmental Authorisation.

This report deals specifically with the northern WEF. The applicant is Mulilo Newcastle Wind Power (PTY) Ltd (north WAF).

LOCALITY

The WEF north is located about 17 kilometres directly west of New Castle.

Newcastle WEF is proposing the development of a WEF and the associated grid infrastructure, as described in the sections below and indicated in Figure 1.

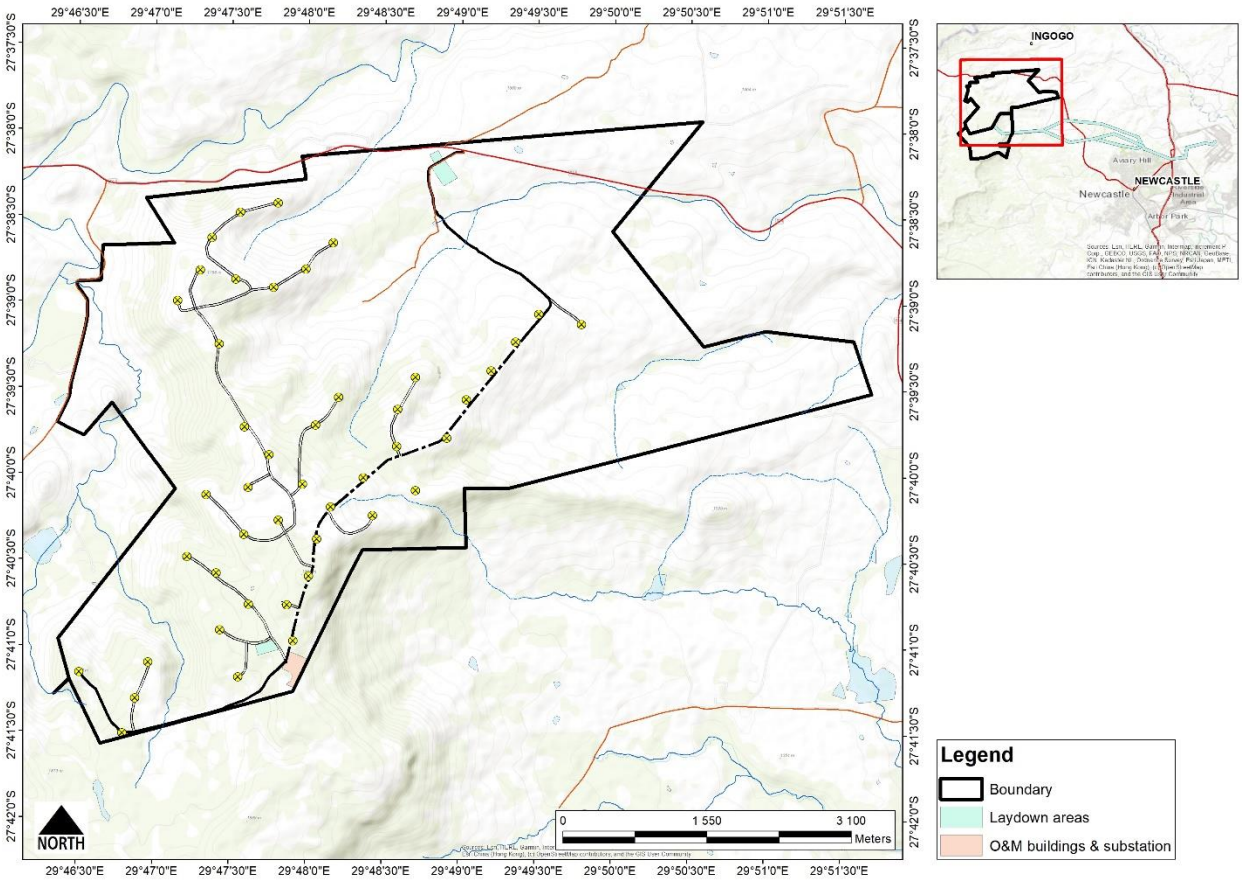

Figure 1. Locality of the proposed Newcastle WEF

SCOPE OF WORK

This report is a detailed assessment and includes the following:

- An Agricultural Impact Assessment Report which covers This report deals specifically with the northern WEF.
- An agricultural agro-ecosystem assessment, including an assessment of soil characteristics, vegetation composition, water availability, agro-climatic information, land productivity and existing impacts;
- The present land uses, land capability/potential and any agricultural/agro-ecosystem sensitivities;
- An assessment of the potential impacts of the WEFs on agriculture and/or agro-ecosystems; and
- Recommendations to mitigate these potential impacts.

1.1 METHODOLOGY

- Land uses

Existing land uses were mapped based on satellite images dated 2019 and from observations during a site visit.

- Soils

Soil patterns were identified from satellite images, from surface hydrology generated from Digital Terrain Modelling (DTM) and soil patterns described in AGIS and ENPAT. Soil types were described by using the Taxonomic system for RSA (*Soil Working Group, 1991*)

- Water

River locations were taken from GIS Layers provided by the Department of Land Affairs (Surveyor General).

- Vegetation

The vegetation condition was taken from AGIS in 2016.

1.2 PROJECT DESCRIPTION

The preliminary project description for the WEFs are as follows:

- Crane platform and hardstand laydown area: Approximately 150 m x 50 m (0,8 ha) for each turbine.
- On site Substation: 33 kV to 132 kV collector substation of approximately one hectare to receive, convert and step-up electricity from the WEF to the 132 kV grid suitable supply. The substations maximum height will be a lightning mast 21m high. The facility will house control rooms and grid control yards for both Eskom and the IPP
- Laydown areas/construction yards: Construction yards and laydown areas (used during construction and rehabilitated thereafter): It is proposed that one construction/office yard be established with an area of 2 ha (this include bunded

fuel areas, oil storage areas, general stores (containers) and skips) and one tower component laydown area with an area of 4 ha. There will also be a separate on-site concrete batching plant with an approximate area of 100 m x 100 m (1,0 ha).

- Internal Access Roads Site: Access will where possible make use existing farm roads that get upgraded and maintained for the life of the plant). New roads will be constructed (where there no existing roads) with a width of approximately 8 m (12 m servitude) and will connect all turbines. The existing roads to be used will be extended to a width of 8 m. The total length of the internal access roads is ±25 km
- Other Infrastructure
  - Operations and Maintenance (O&M) Buildings of approximately 0.5 ha.
  - Fencing of 2 m high around the O&M building and the on-site substation.
  - Reticulation (a combination of 33 kV overhead lines and 33 kV underground cable will be used)
  - Storm-water channels and culverts.
  - Two 140 m Meter Met Masts will be installed
- A Battery Energy Storage System (BESS) alongside the on-site substation, with an area of 400 m x 400 m.

2 PRESENT LAND USES

2.1 REGIONAL

The region sees mixed farming with all of the land used as grazing. The WEF site is underlain by dolerite and is mountainous with few portions that are arable.

2.2 LAND USE IN THE PROJECT AREA

The properties are used for livestock production. There is no cropping land.

Photo 1. Grazing land

Photo 2. Animals gazing

3 NATURAL RESOURCES

3.1 GEOLOGY

The WEF site is underlain by dolerite. Dolerite usually weathers into deep reddish structured soil with frequent rock and boulders.

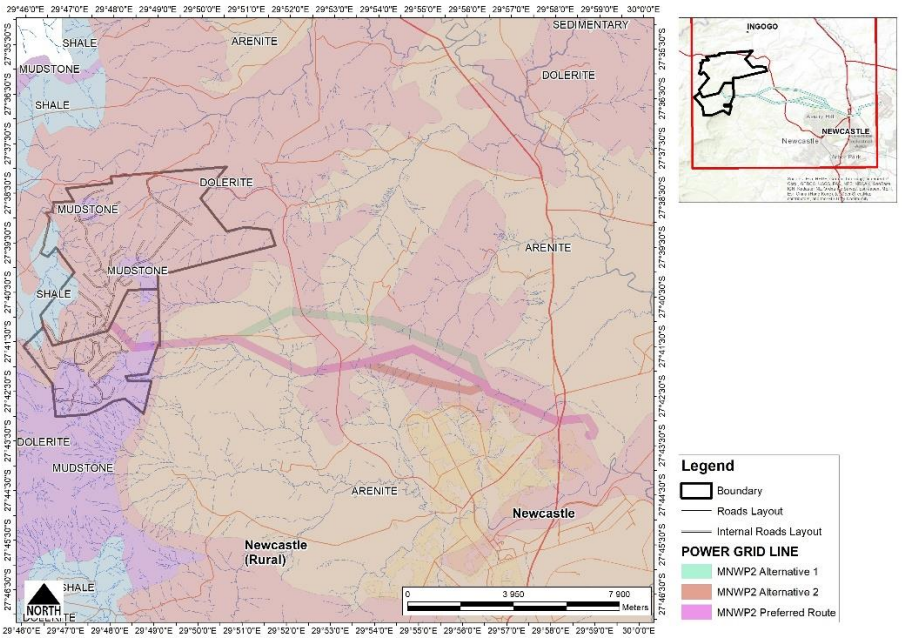

Figure 2. Generalised geology

3.2 TOPOGRAPHY

A slope analysis was done from a Digital Elevation Model (DEM) available from the Surveyor General.

Land proposed for the WEF generally has slopes of more than 12%. It is not arable.

Donga erosion occurs in places due to overstocking, especially in the ravines. The mudstone is particularly prone to erosion and normally yields shallow soils.

The soil map provided in Section 3.4 indicates that the terrestrial or uplands soils where the construction will take place, has Mispah and Glenrosa as dominant soils types.

Photo 3. Donga erosion on mudstone

3.3 CLIMATE

The warm season lasts for four months, from November 6 to March 7, with an average daily high temperature above 25°C. The hottest month of the year in Newcastle is January, with an average high of 27°C and low of 15°C.

The cool season lasts for two months, from June 1 to July 31, with an average daily high temperature below 20°C. The coldest month of the year in Newcastle is July, with an average low of 3°C and high of 19°C

Newcastle experiences extreme seasonal variation in monthly rainfall with an average of between 650 mm at Newcastle, increasing to 750 mm in a westerly direction.

The rainy period of the year lasts for 9,2 months, from August 2 to May 8, with a sliding 31-day rainfall of at least 13 mm. The month with the most rain in Newcastle is December, with an average rainfall of 109 mm. The rainless period of the year lasts for 2,8 months, from May 8 to August 2. The month with the least rain in Newcastle is June, with an average rainfall of 6 mm.

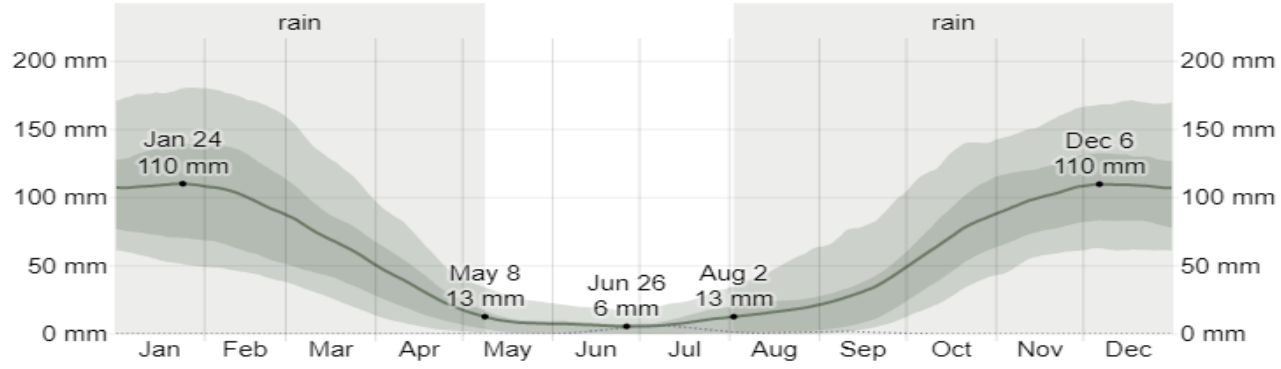

Figure 3. Monthly rainfall at Newcastle

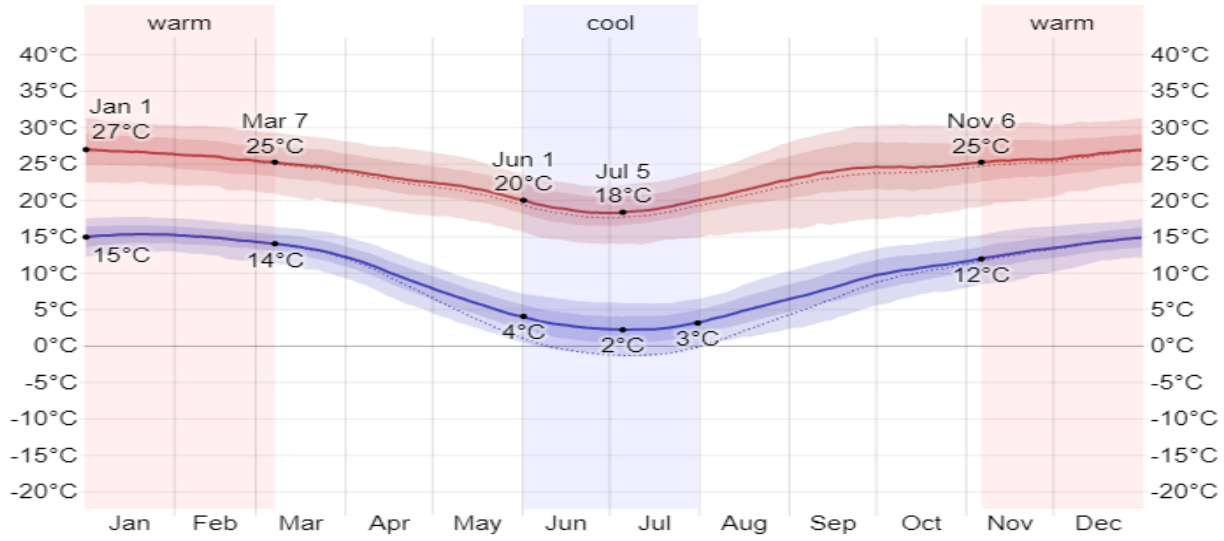

Figure 4. Average monthly temperature at Newcastle

3.4 SOIL

Soil associations and datasets from AGIS and from general soil patterns contained in ENPAT were interpreted and coupled with the topography and the consultant's knowledge of the region, to indicate general soil types for the sites.

Two soil groups were identified (Refer to Figure 5 and Table 1).

Table 1. Types, potential and land use capability of soils on the property

Soil	Description	Potential	Depth (mm)
Gs/Ms	Shallow reddish brown sandy loam topsoil that overlies partially weathered mud- and sandstone. Rock outcrops are common. The soil is generally not arable. Dominant soils are Glenrosa, Mispah, Oakleaf and rock outcrops.	Low	300 - 400
Sd/Ar	Dark red and black soils that derived from the weathering of dolerite. It consists of clay loam soil with medium to low arable potential. Dominant soils are Shortlands, Bonheim, Arcadia and Mayo.	Medium/ Low	300 - 450

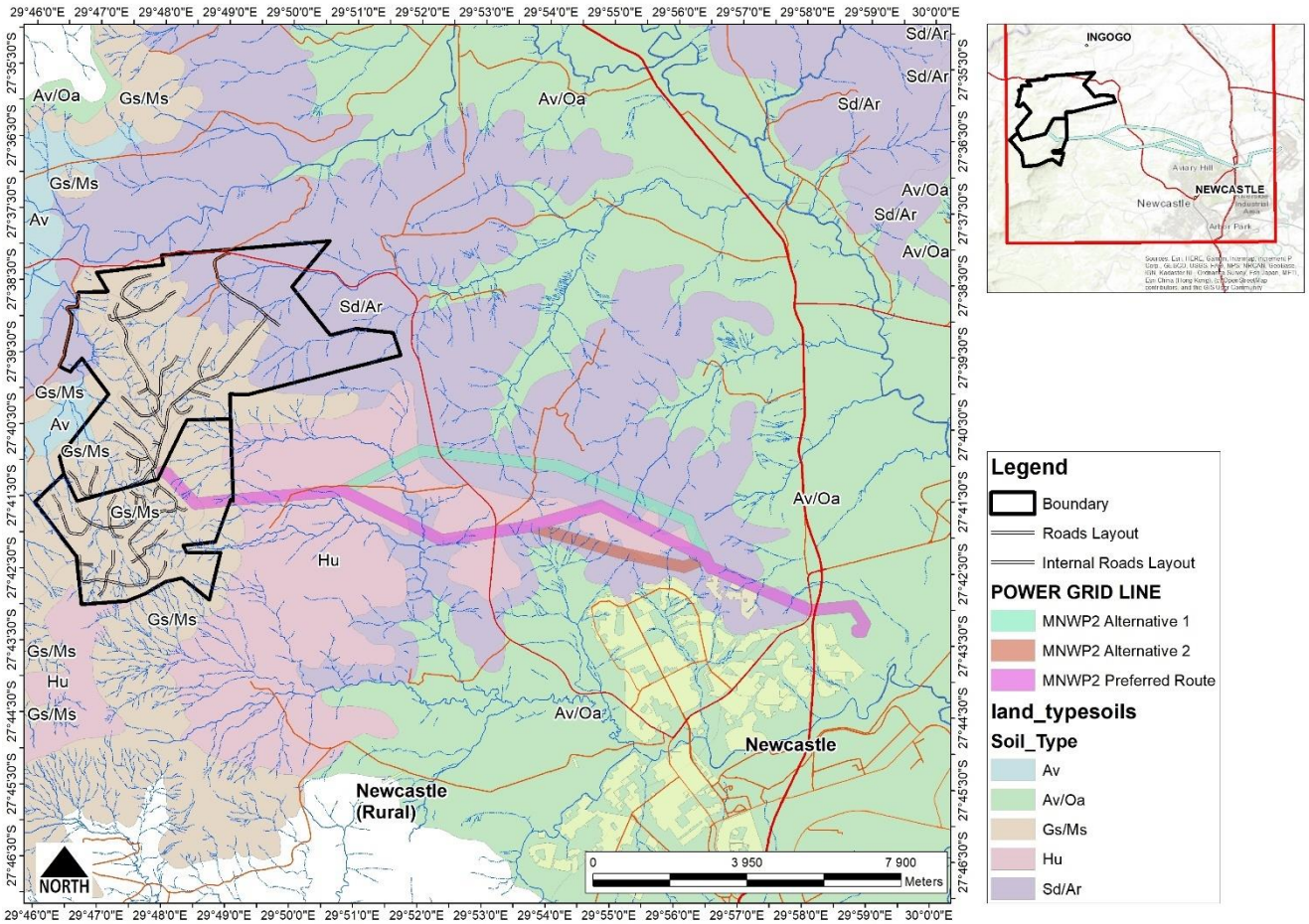

Figure 5. Soil map of the total development area

3.5 WATER

GROUNDWATER

The dolerite and sandstone are not high yielding aquifers. Borehole yields are normally adequate for household use or for animal watering but not for irrigation. The water quality, according to the DWS database, is expected to be good.

SURFACE WATER

The Buffels River and tributaries drains the area. There is no irrigation, hence the rivers have no significance in the agricultural potential of the site.

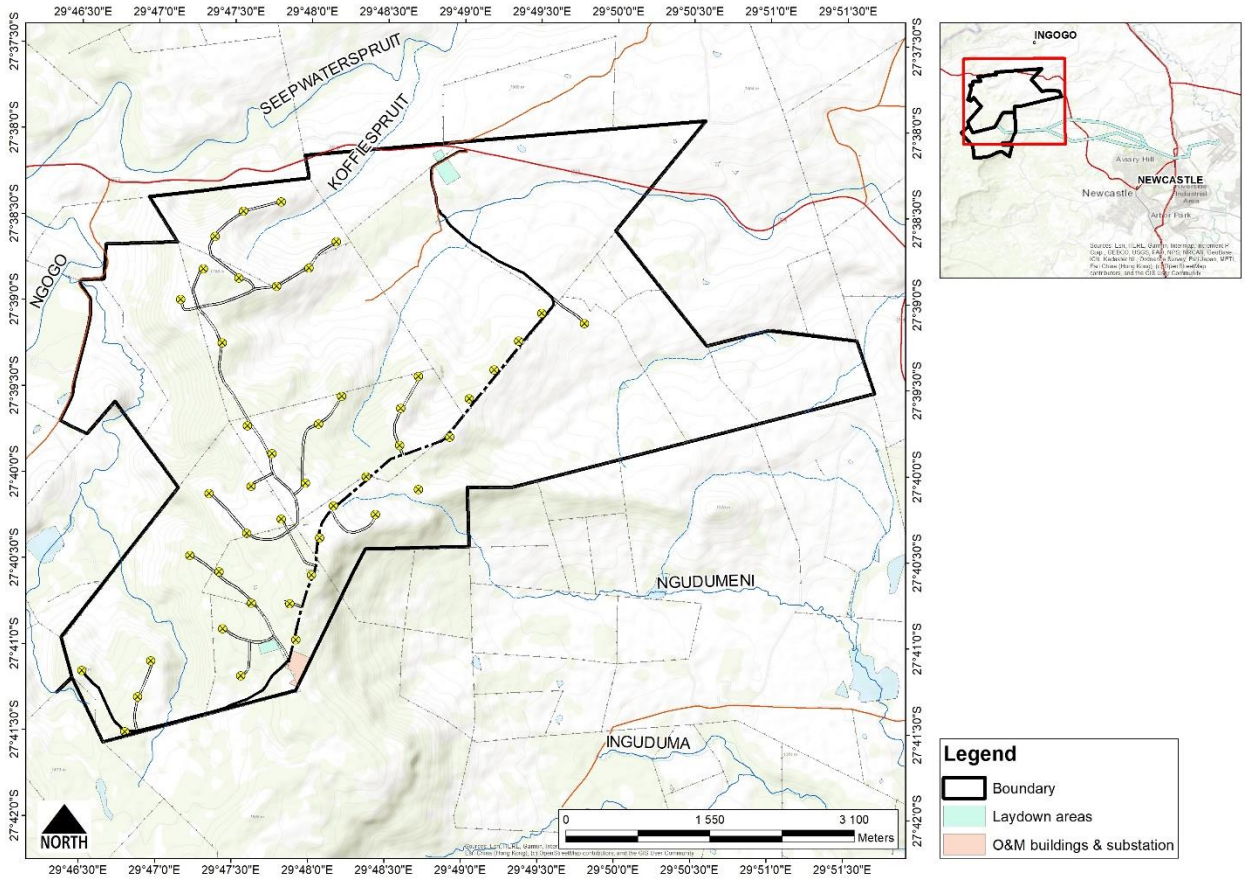

Figure 6. Rivers in the study area

3.6 VEGETATION

The vegetation is KwaZulu – Natal Highland Thornveld or North-eastern Mountain Grassland and consists of tall grassland usually dominated by *Hyparrhenia hirta*, with occasional Savannoid woodlands, scattered *Vachellia sieberiana* var. *woodi* and small pockets of V. *karroo* and V. *nilotica*.

The grazing capacity of the site is 3ha/LSU.

4 LAND USE CAPABILITY

The soil on the WEF construction sites is not arable and no water is available for irrigation.

There is some cultivated land along the OHL that is high/medium potential land. According to the agricultural potential map of NDA, the land is arable (*Department of Agriculture, 2019*).

Capability provides a general guideline for which the land is suitable. Soil properties, watercourses and land with infrastructure decide the land use capability of the site.

Following the same guidelines, the uplands soils of the WEFs are shallow and rocky, and not arable. The deeper sandy loam soils in the ravines are arable with a high potential for cropping. The latter, however, does not occur on the footprints of the infrastructure.

Photo 4. Soil on steep slopes that has a low agricultural capability

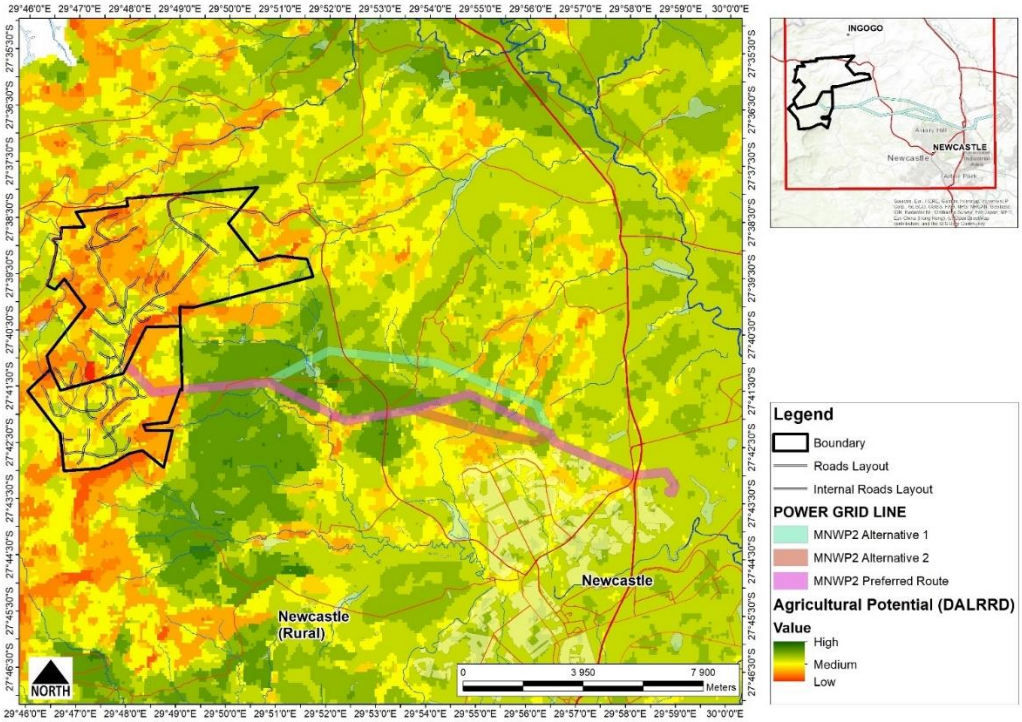

Figure 7. Soil potential – ENPAT, AGIS

5 ENVIRONMENTAL SENSITIVITY

The Department of Environmental Affairs published Notice 320 of the National Environmental Management Act in March 2020 that describes the minimum criteria when applying for environmental authorisation.

This protocol provides the criteria for the assessment and reporting of impacts on agricultural resources for activities requiring environmental authorisation. The assessments requirements of this protocol are associated with a level of environmental sensitivity determined by the national web-based environmental screening tool which for agricultural resources. It is based on the most recent land capability evaluation as provided by the DALRRD.

The sensitivity analyses, although not perfect in terms of describing the impact because it is based on very broad information. Figure 8**Error! Reference source not found.** indicates the result of the screening tool.

According to the screening tool, the site has medium to low sensitivity. The result of the Screening Tool is provided in the addenda.

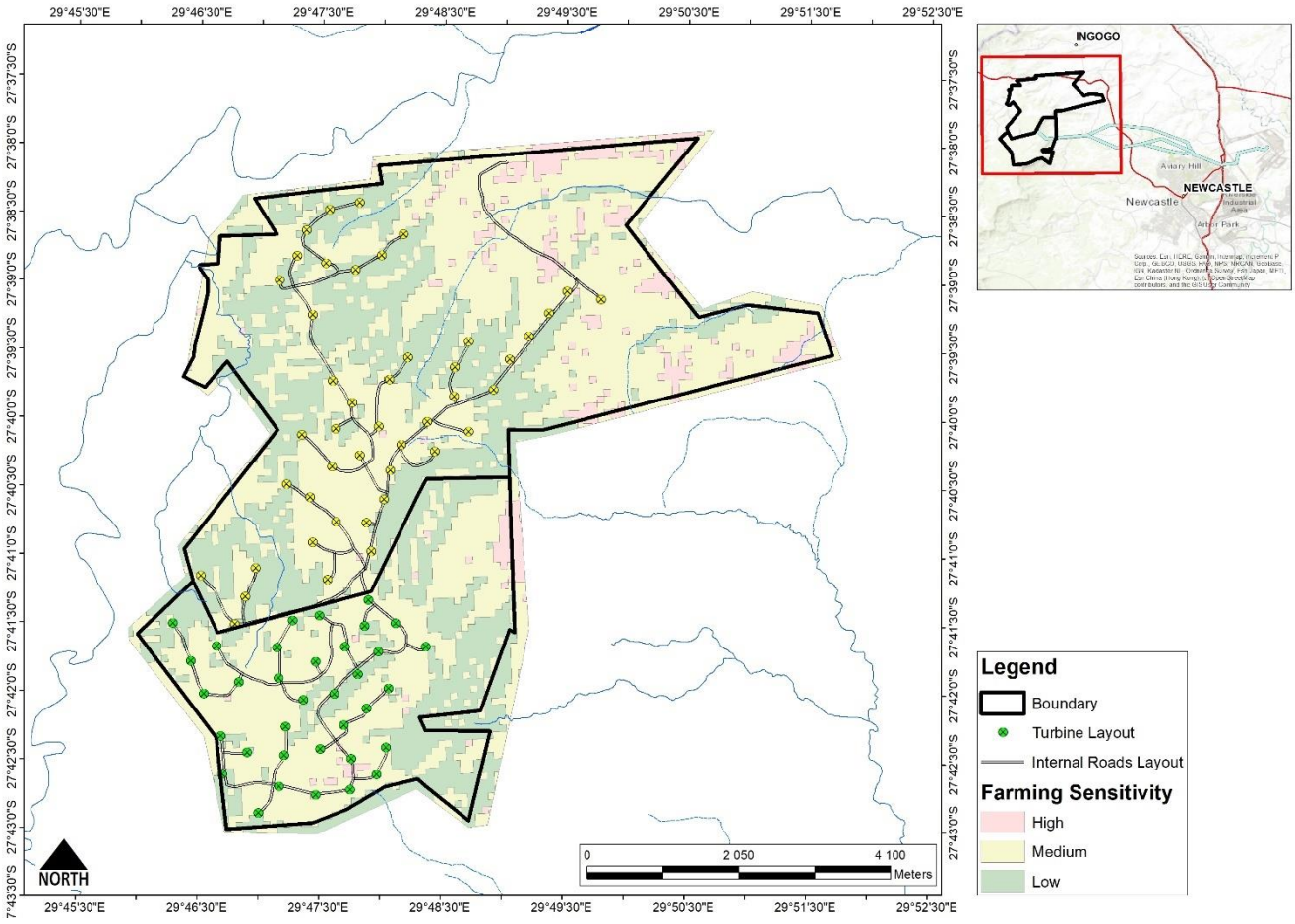

Figure 8. Results of the screening tool (north and southern sections)

6 LAND USE ASSUMPTIONS

The following assumptions are made in order to determine the impact of the activities on agriculture. Areas were either provided in the terms of reference or digitised and then calculated by GIS software.

Table 2. Activity description

Item	Description	Area (ha)
GENERATION SECTION		
Crane platform and hardstand laydown area	Approximately 150 m x 50 m (0,8 ha) for each turbine (17 selected form 54 positions).	13,6
On site Substation	Collector substation of approximately 1 ha. The facility will house control rooms and grid control	1,0
Laydown areas/construction yards	Construction yards and laydown areas (used during construction and rehabilitated thereafter): 1) One construction/office yard will be established with an area of 2 ha. 2) One tower component laydown area with an area of 4 ha. 3) There will also be a separate on-site concrete batching plant with an approximate area of 100 m x 100 m.	7
Roads	Site Access will use existing farm roads that get upgraded and maintained. New roads will be constructed where there no existing roads. Width of road is 8 m within a 12 m servitude. The total length of the internal access roads is ±27 km	21,6
Other Infrastructure	1) Operations and Maintenance (O&M) Buildings. 2) Fencing of 2 m high around the O&M building and the on-site substation. 3) Storm-water channels and culverts. 4) Two 140 m Meter Met Masts will be installed.	0,5
BESS	A Battery Energy Storage System (BESS) alongside the on-site substation, ± 400m x 400m.	16

There are 17 turbines that will be installed on the northern section. About 13,6ha will be cleared of vegetation during the construction phase and then be vegetated afterwards.

Table 3. Land lost due to the project

Component	Land uses	Hectare lost		LSU lost	
		Temp	Permanent	Temp	Permanent
WEF					
1) Towers	Grazing	13.60	13.60	3.4	3.4
3) Collect substation	Grazing	1.00	1.00	0.25	0.25
4) Construction yard	Grazing	7.00	0.00	1.75	0
5) O & M buildings	Grazing	0.50	0.50	0.125	0.125
6) BESS system	Grazing	16.00	16.00	4	4
ROADS					
1) New / upgraded	Grazing	21.60	21.70	5.40	5.43
TOTAL					

7 FINANCIAL ANALYSIS

7.1 GROSS MARGINS

LIVESTOCK

The gross margin was calculated from the information provided by *Computus, 2021*.

Table 4. Gross margin of weaner production

Item	Values (Rand/LSU)
SALES (250 kg @R32/kg, 90% calving)	**7 875,00**
DIRECT EXPENSES	**2 796,10**
Summer lick	305,50
Winter lick	912,60
Veterinary	150,00
Bull cost	150,00
Marketing	58,00
Transport, repairs and maintenance	220,00
Labour	650,00
Farm Fodder	350
Margin	**5 078,90**

The following assumptions are made:

- Provided that the land is optimally stocked and portions will be lost, then it will directly lead to a reduction in carrying capacity of the property (this is rarely the case – usually farms can absorb small areas of land that is lost to other activities);
- The analysis uses general norms; it is mainly done at a level to indicate financial impact (or lack thereof) of the farm as a farming unit.

7.2 FINANCIAL IMPACT

The following indicates the net income loss for the farmer:

Table 5. Total farm income

Component	Land uses	Income lost	
		Temporary	Permanent
WEF		**66 662**	**57 774**
1) Towers (17)	Grazing	17 269	17 269
3) Collect substation	Grazing	1 270	1 270
4) Construction yard	Grazing	8 888	0
5) O & M buildings	Grazing	635	635
6) BESS system	Grazing	20 316	20 316
ROADS		**27 427**	**27 427**
TOTAL		**75 804**	**66 916**

CONCLUSIONS WEF (GENERATION INFRASTRUCTURE)

- There is no arable or cultivated land on the properties used for the WEF.
- The loss of income from livestock is estimated at R75 804 during construction and R66 916 per year during operation. The construction period is assumed to be less than one year, which can then be until the veld grazing has recovered from being disturbed.

8 IMPACT ASSESSMENT

8.1 ASSUMPTIONS

8.1.1 GENERAL

The project entails construction of up to 45 wind turbines and associated infrastructure. The proposal deals with 17 turbines.

Some of the impacts will be of a temporary nature and will last for the duration of construction or the time the land takes to recover to its natural state. Depending on the rainfall, the period for the land to recover is expected to be less than two years.

No published evidence could be found that the presence of wind turbines influences the productivity of livestock.

8.1.2 IMPACT COMPONENTS

Sustainable land use and protection of agricultural resources are core functions of the Department of Agriculture. This has led to promulgation of various pieces of legislation to guide agricultural development. The more important are the following:

- Conservation of Agricultural Resources Act No 43 of 1983;

- Preservation and Development of Agricultural Land Framework Bill, 2014;
- National Policy on the Preservation of High Potential and Unique Agricultural Land;
- Land use Management Bill, 2008.

The components of development identified from this legislation that impacts on agriculture, and which will be assessed in this report are the following:

- Loss of high and medium potential land – including irrigated land;
- Loss of cultivated land;
- Loss of grazing land;
- Loss of agricultural production (yield and income); and,
- Loss of agricultural resources – soil loss due to erosion.
- Loss of farming infrastructure

8.2 RATING CRITERIA

The following rating criteria were used to indicate impacts:

EXTENT

- Local - extend to the site and its immediate surroundings.
- Regional - impact on the region but within the province.
- National - impact on an interprovincial scale.
- International - impact outside of South Africa.

MAGNITUDE

Degree to which impact may cause irreplaceable loss of resources.

- Low - natural and social functions and processes are not affected or minimally affected.
- Medium - affected environment is notably altered; natural and social functions and processes continue albeit in a modified way.
- High - natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.

DURATION

- Short term - 0-5 years.
- Medium term - 5-11 years.
- Long term - impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention.

- Permanent - mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

PROBABILITY

- Almost certain - the event is expected to occur in most circumstances.
- Likely - the event will probably occur in most circumstances.
- Moderate - the event should occur at some time.
- Unlikely - the event could occur at some time.
- Rare/Remote - the event may occur only in exceptional circumstances.

SIGNIFICANCE

Provides an overall impression of an impact's importance, and the degree to which it can be mitigated. The range for significance ratings is as follows-

- 0 – Impact will not affect the environment. No mitigation necessary.
- 1 – No impact after mitigation.
- 2 – Residual impact after mitigation.
- 3 – Impact cannot be mitigated.

8.3 IMPACT DESCRIPTION

Impacts of the WEF towers and access roads are as follows:

LOSS OF CULTIVATED OR HIGH POTENTIAL AGRICULTURAL LAND

- Extent
  - There is no high potential or unique land or land that is irrigated on or in proximity of available surface water.
- Magnitude
  - No high potential or unique land will be lost.
- Duration
  - No high potential or unique land will be lost.
- Probability
  - No high potential or unique land will be lost.
- Significance on local level:
  - No high potential or unique land will be lost.

<u>Mitigation</u>

1) No high potential land will be lost – no mitigation necessary

LOSS OF GRAZING LAND

The land on the construction site will remain as grazing after construction. The construction footprint is the only area is permanently lost.

- Extent
  - Temporary lost area: Local impact. Approximately 59,7ha will be lost for about a year. No residual or cumulative impact is expected afterwards.
  - Construction Footprint will be lost permanently: Local impact. The construction yard of 7ha will be rehabilitates. 52,8ha will be permanently lost as grazing
- Magnitude: Low
  - Temporary lost area: No residual impact after mitigation.
  - Construction Footprint: Low – only 52,8ha will be affected.
- Duration
  - Temporary lost area: No residual impact after mitigation - the duration is for one rainy season.
  - Construction Footprint: Permanent.
- Probability: Certain
  - The activity is certain to occur.
- Significance rating on local community:
  - Temporary lost area: No residual impact after mitigation.
  - Construction Footprint: Low although the impact is permanent. The loss of income from grazing is small.

<u>Mitigation</u>

1) Compensate farmers for what is lost.
2) Keep the construction period as short as possible.
3) Employ dust-supressing practices to protect adjoining grazing land.
4) Protect the land against soil erosion by following guidelines of the stormwater management plan.

LOSS OF AGRICULTURAL PRODUCTION (YIELD AND INCOME)

The loss of grazing is the only impact that translates to income loss.

- Extent
  - Temporary lost: Local impact - only 59,7ha will be lost during construction, which could contribute R75 804 towards farming income.
  - Construction Footprint: Local impact – 52,5ha is permanently lost and can contribute R108 564 towards the annual farming income.
- Magnitude
  - Temporary lost: Low – 59,7ha will be lost during construction

- Construction Footprint: Low – only 52,8ha will be affected.

- Duration
  - Temporary lost: The duration of the impact is for one rainy season.
  - Construction Footprint: Permanently lost.
- Probability
  - The activity is certain to occur.
- Significance rating on local community:
  - Temporary lost: No residual impact after mitigation.
  - Construction Footprint: Low although the impact is permanent. The loss of income is relatively small if viewed in the regional context.

Mitigation

1) Compensate farmers for what is lost.
2) Keep the construction period as short as possible.

LOSS OF AGRICULTURAL RESOURCES

The loss of resources relates to soil due to erosion and water that can be used for farming purposes.

- Extent
  - Temporary lost: Local impact. Only 59,7 will be cleared of vegetation. Erosion usually occurs only on bare soils. Potential loss to erosion, therefore, is minimal.
  - Construction Footprint: Local impact: 52,8ha is under construction and will not lead to any soil loss or water runoff provided that the stormwater management plan guidelines are followed.
- Magnitude
  - Temporary lost: Low magnitude. No residual impact after mitigation.
  - Construction Footprint: Low – erosion is not expected once stormwater is mediated.
- Duration
  - Temporary lost: The duration of the impact is until seed has germinated and ground cover is sufficient to counter the erosive power of rain.
  - Construction Footprint: No impact.
- Probability
  - The activity is unlikely if mitigation measures are in place.
- Significance rating on local community:
  - Temporary lost: No residual impact after mitigation.
  - Construction Footprint: Low.

Mitigation

1) Replace topsoil during rehabilitation and ensure that the soil is well fertilised and rolled.
2) Protect the land against soil erosion by following guidelines of the stormwater management plan.
3) Sow seed of local plants that is adapted to the climate.
4) Irrigate the soil to ensure germination and establishment of the seed occurs.
5) Remove all alien plants and weeds until the natural plants are well established.

8.3.1 INDIRECT IMPACTS OF DEVELOPMENT

Possible indirect impacts are the following:

- Increase in stock theft & poaching

  The increase in individuals accessing the affected properties for the WEF development during the operational phase could lead to the increase in stock theft and poaching. Stock theft and wildlife poaching are ongoing issues throughout the country. The risk/likelihood of stock theft and poaching could likely increase during construction due to the increase in activity.

- Access to farms and farming infrastructure

  Access by farmers to their own farms during the period of construction may be hampered. The effect is inconvenience rather than actual.

- Blasting and noise during construction

  Blasting with explosives can endanger animals and endanger construction workers.

MITIGATION FOR INDIRECT IMPACTS

1. No unauthorised individuals should be allowed to access the site without permission from the landowners and/or the developers. Theft and vandalism can be reduced by providing additional security to farmers where necessary.
2. The construction period is for a short period. Discuss the possible restriction of access to farm housing or farming infrastructure like watering facilities, boreholes, etc. with the farmers and come up with solutions.
3. Maintenance workers must not handle or remove any livestock or wildlife from the site or the surrounding properties.
4. Police should be notified if any illegal actions take place.

8.3.2 BIOLOGICAL IMPACTS

A possible environmental impact of the development is the creation of dust along the main roads by large trucks and construction vehicles. Dust could have an impact on the livestock carrying capacity of adjoining properties. The potential impact, however, is low.

Mitigation

1) Keep the construction period as short as possible
2) Employ dust reduction practices.

POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT	Before mitigation								After mitigation								MITIGATION
	Extent	Probability	Reversibility	Irreplaceable	Duration	Magnitude	**TOTAL (SP)**	**Significance**	Extent	Probability	Reversibility	Irreplaceable	Duration	Magnitude	**TOTAL (SP)**	**Significance**	
LOSS OF HIGH POTENTIAL LAND																	
Direct occupation /loss of land	1	1	1	1	1	0	**0**	**L**	1	1	1	1	1	0	**0**	**L**	The land has never been cultivated.
LOSS OF GRAZING LAND																	
Direct occupation /loss of land	1	4	2	1	3	1	**11**	**L**	1	4	2	1	3	1	**11**	**L**	Alternative grazing land can be found in the region.
LOSS OF AGRICULTURAL RESOURCES																	
Soil erosion, water quality and availability	1	3	1	1	2	2	16	L	1	1	1	1	1	0	0	L	Develop and implement a storm water management plan. Plant and maintain grass on disturbed areas. Remove alien vegetation.
LOSS OF AGRICULTURAL PRODUCTION																	
Loss of crop production	1	1	1	1	1	0	**0**	**L**	1	1	1	1	1	0	**0**	**L**	The land has never been cultivated.
Loss of animal production	1	4	1	1	3	1	**10**	**L**	1	4	1	1	3	1	**10**	**L**	It is not used as grazing, there will be no loss of income from livestock production.
LOSS OF AGRICULTURAL INFRASTRUCTURE																	
Direct loss	1	1	1	1	1	0	**0**	**L**	1	1	1	1	1	0	**0**	**L**	There is no agricultural infrastructure.
LOSS OF JOBS																	
Direct loss	1	1	1	1	1	1	**5**	**L**	1	1	1	1	1	0	**0**	**L**	Staff will be required to maintain WEF infrastructure. The proposed land use will, therefore, have a positive socio-economic impact

8.4 SUMMARY OF IMPACTS

The direct impact of creating the WEF is low on agriculture, there will be no loss of high potential land, the loss of grazing land and income from this source is low for the individual farms and can be mitigated through negotiated compensation.

Security and stock theft has potentially a moderate negative impact. It may increase due to access that is created by the newly constructed roads. The increase in stock theft and poaching is an existing regional problem. It is possible that the proposed mitigation measures can reduce the significance of this impact.

9 RECOMMENDATIONS

The proposed mitigation measures are likely to reduce the significance of negative impacts on agricultural. The impact of both the WEF and Grid infrastructure is likely to pose a low or moderately negative impact.

However, if the mitigation measures listed below are successfully implemented, then the overall significance can be reduced to low.

It is recommended that the following mitigation measures be included in the EMPr and that they are implemented during the various phases of development.

CONSTRUCTION PHASE

- A suitably qualified ECO must be appointed prior to the commencement of the construction phase to deal with agriculture and other environmental issues.
- Cement/concrete must only be mixed in the approved demarcated area.
- Drip trays or other impermeable material, such as plastic sheeting, must be placed under construction machinery to avoid soil contamination.
- Burning, burying or dumping of any waste materials must not occur on the site.
- Refuelling should only take place in demarcated areas.
- The appointed ECO should monitor the sanitation of the work sites and that of the Contractor's campsite.
- All solid waste must be disposed of offsite at an approved registered landfill site.
- Vegetation clearance should be restricted to the demarcated development footprints.
- Soil erosion near the demarcated development footprints must be monitored and managed during construction to prevent the loss of additional grazing land due to degradation.
- Disturbance of soils and clearing of vegetation should be kept to a minimum.
- Where possible, construction vehicles should only make use of the designated access routes and construction activities must be limited to the development footprint to avoid loss of grazing land and the generation of dust.
- All temporary construction footprints must be rehabilitated and re-vegetated, as soon as they are no longer required.

- The appointed ECO must monitor erosion during the construction phase. Remedial action must be taken at the first signs of soil erosion during the construction phase.
- Compacted areas should be ripped to loosen the soil structure.
- Topsoil stockpiles must not be compacted.
- The stripping of topsoil should be undertaken in such a manner as to minimise erosion by wind or runoff.
- All foreign materials, which could reduce the quality of the topsoil, such as construction rubble, litter and alien vegetation, must be stored separately.
- Topsoil and subsoil must be separated and replaced in the same sequence during rehabilitation.
- The ECO must approve the stockpiling location prior to the stockpiling of any topsoil.
- Any excess topsoil, which is not used for rehabilitation, must be removed from the site or spread on vulnerable areas.
- Access to the site must be controlled and monitored during construction.
- No unauthorised individuals should be allowed to access the site without permission from the landowners and/or the developers.
- Construction workers must not handle or remove any livestock or wildlife from the site or the surrounding properties.
- Where reasonable and feasible, proposed developments should be placed on land with low agricultural potential.

OPERATIONAL PHASE

- All maintenance equipment and vehicles should only make use of the designated access routes and internal roads.
- Soil erosion should be monitored during the operational phase and remedial action must be taken at the first signs of increased soil erosion.
- No unauthorised individuals should be allowed to access the site without permission from the landowners and/or the developers.
- Maintenance workers must not handle or remove any livestock or wildlife from the site or surrounding properties.

10 CONCLUSIONS

TURBINE TOWERS AND CONNECTION ROADS

The direct impact of creating the WEF is low on agriculture, there will be no loss of high potential land, the loss of grazing land and income from this source is low.

Security and stock theft has potentially a moderately high negative impact but may increase due to access that is created by the newly constructed roads. The increase in stock theft and poaching is an existing regional problem. It is possible that the proposed mitigation measures can reduce the significance of this impact to the status quo, which is of moderately negative significance.

RECOMMENDATION

The impact of the development on agriculture is low and mostly during the construction phase. It is, therefore, recommended that the project be approved for implementation.

11 ADDENDA

11.1 SOURCES OF INFORMATION

1. Draft Agriculture & Soils Assessment Report for Proposed Albany Wind Energy Facility & Grid Infrastructure Near Makhanda, Eastern Cape Province. CES, Port Elizabeth
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3. WRC, 2003 South African Atlas of Agro-hydrology and Climatology, Water Research Commission
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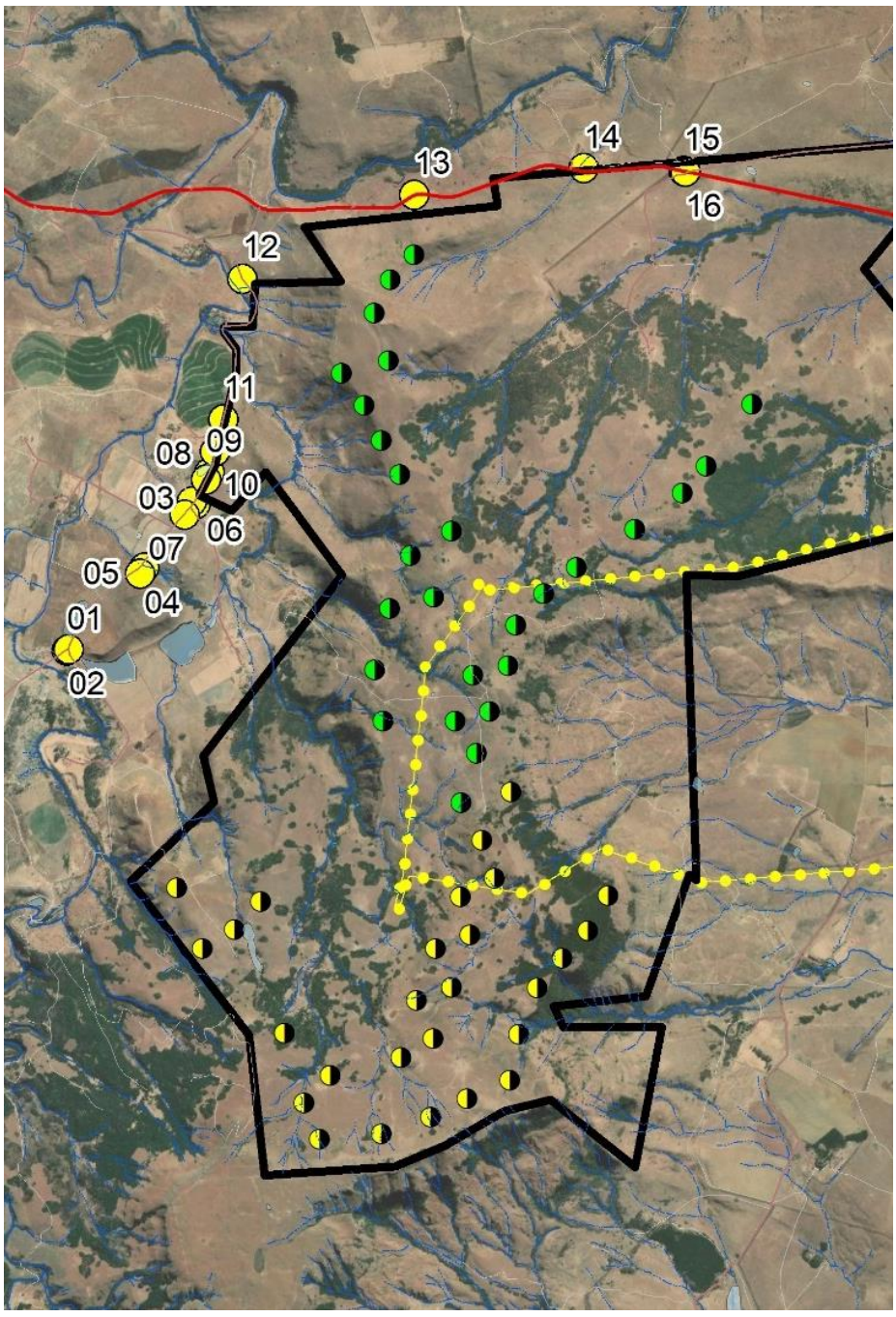
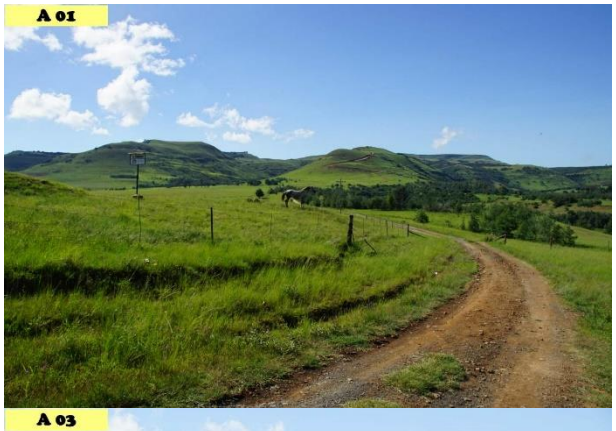
7. Grieser, J., 2006. Local Climate Estimator. Agromeeoolgy Group, FAO. Rome
8. Department of Agriculture, 2019. http://daffarcgis.nda.agric.za/Comp_Atlas_v2/
9. COMPUTUS, 2019. Bestuursburo, Posbus 1615. Bethlehem 9700, computus@computus.co.za.

Other information

1. Criteria for high potential agricultural land in South Africa, Department of Agriculture, Directorate Land Use and Soil Management, 2002.
2. Department of Agriculture. Grazing capacity. Development of Agricultural Land Framework Bill , 2016
3. CROPWAT 8.0 has been developed by Joss Swennenhuis for the Water Resources Development and Management Service of FAO.
4. Anneliza Collett, 2008. The determination, protection and management of high potential agricultural land in South Africa with special reference to Gauteng. Submitted in partial fulfilment of the requirements for the degree M.Sc (Plant Science) in the Faculty of Natural & Agricultural Science University of Pretoria.

11.2 PHOTOS

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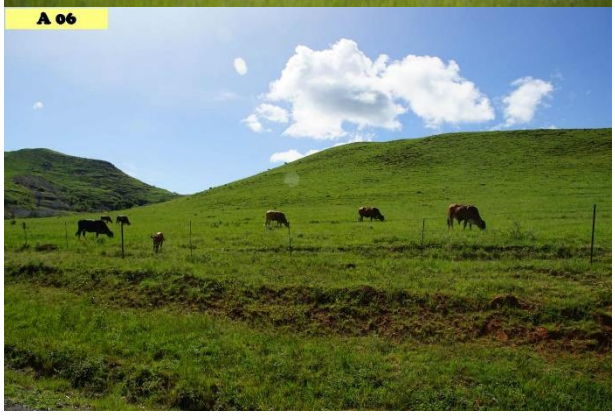
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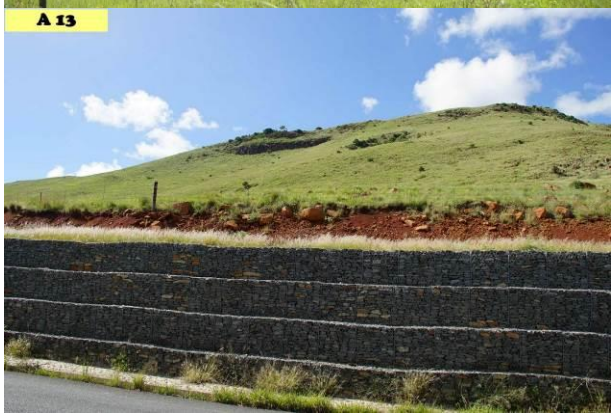
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