ABERDEEN WIND FACILITY 2, EASTERN CAPE PROVINCE

Basic Assessment Report

MARCH 2023

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PROJECT DETAILS

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Applicant	:	Aberdeen Wind Facility 2 (Pty) Ltd
Report Status	:	Draft for Public Review
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PURPOSE OF THE EIA REPORT AND INVITATION TO COMMENT

Aberdeen Wind Facility 2 (Pty) Ltd has appointed Savannah Environmental as the independent environmental consultant to undertake the Basic Assessment (BA) for the Aberdeen Wind Facility 2, Eastern Cape. The BA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998). The entire extent of the site falls within the Beaufort West (REDZ) and therefore the undertaking of a Basic Assessment (BA) process is applicable as per GNR114 of February 2018. This BA Report describes and assesses this proposed project and consists of the following chapters:

» **Chapter 1** provides background to the proposed Aberdeen Wind Facility 2 and the basic assessment process
» **Chapter 2** provides a description of the wind energy facility and the infrastructure associated with the facility.
» **Chapter 3** provides the site selection information and identified project alternatives.
» **Chapter 4** describes wind energy as a power generation option and provides insight to technologies for wind energy.
» **Chapter 5** outlines the strategic regulatory and legal context for energy planning in South Africa and specifically for the proposed facility.
» **Chapter 6** describes the need and desirability of the Aberdeen Wind Facility 2 within the project site.
» **Chapter 7** outlines the approach to undertaking the basic assessment process.
» **Chapter 8** describes the existing biophysical and socio-economic environment within and surrounding the project site.
» **Chapter 9** provides a sensitivity analysis of the project site and development footprint.
» **Chapter 10** provides an assessment of the potential issues and impacts associated with the wind energy facility and associated infrastructure and presents recommendations for the mitigation of significant impacts.
» **Chapter 11** provides an assessment of the potential for cumulative impacts.
» **Chapter 12** presents the conclusions and recommendations based on the findings of the BA Report.
» **Chapter 13** provides references used in the compilation of the BA Report.

The development (i.e. construction and operation) of Aberdeen Wind Facility 2 is subject to the requirements of the EIA Regulations of 2014 (as amended), published in terms of Section 24(5) of NEMA. Therefore, in terms of the EIA Regulations of 2014, promulgated under Section 24 and 24D of NEMA, various aspects of the project are listed as activities that may have a detrimental impact on the environment. The primary listed activity triggered is Activity 1 of Listing Notice 2 (GN R325) which relates to the development of facilities or infrastructure for the generation of electricity from a renewable resource where the generating capacity is 20MW or more.

EXECUTIVE SUMMARY

Aberdeen Wind Facility 2 (Pty) Ltd, a Special Purpose Vehicle (SPV), proposes 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 greater Sarah Baartman District Municipality. The entire extent of the site falls within the Beaufort West Renewable Energy Development Zone (REDZ) . The facility is known as Aberdeen Wind Facility 2. The project site consists of four (4) affected properties:

» Remainder of the Farm Doorn Poort 93
» Portion 1 of Farm Doorn Poort 93
» Farm Kraanvogel Kuil 155
» Portion 4 of Farm Sambokdoorns 92.

These properties form a project site has been identified as the preferred area for the development of the facility by Aberdeen Wind Facility 2 (Pty) Ltd. The project site has an extent of ~15 800ha which is considered sufficient in extent (allowing sufficient space to avoid any major environmental sensitivities) and suitable for the development of up to 41 wind turbines from a technical perspective.

The wind farm and associated infrastructure is to be constructed within a 6 475ha development area located within the project site and will have a development footprint of up to 120ha. The development area proposed by Aberdeen Wind Facility 2 (Pty) Ltd is assessed as part of this BA process. The Aberdeen Wind Facility 2 will consist of the following components:

» Up to 41 wind turbines with a maximum hub height of up to 200m. The tip height of the turbines will be up to 300m.
» Concrete turbine foundations and turbine hardstands.
» An internal road network between project components inclusive of stormwater infrastructure.
» Medium-voltage (MV) power lines internal to the wind farm trenched and located adjacent to internal access roads, where feasible.
» Substation, Battery Energy Storage System (BESS) and O&M buildings hub, including:
  - On-site facility substation (132kV).
  - Battery Energy Storage System (BESS).
  - Operation and Maintenance buildings, including control centre
» Warehouse, laydown area and site camp hub, including:
  - Construction laydown areas
  - Site camp
  - Warehousing and buildings
» Upgrade to a main access road of approximately 5.7km in length and up to 10m in width.

A technically viable development footprint was proposed by the developer and assessed as part of the BA process. The assessment of the development footprint within the project site was undertaken by independent specialists and their findings have informed the results of this BA report.

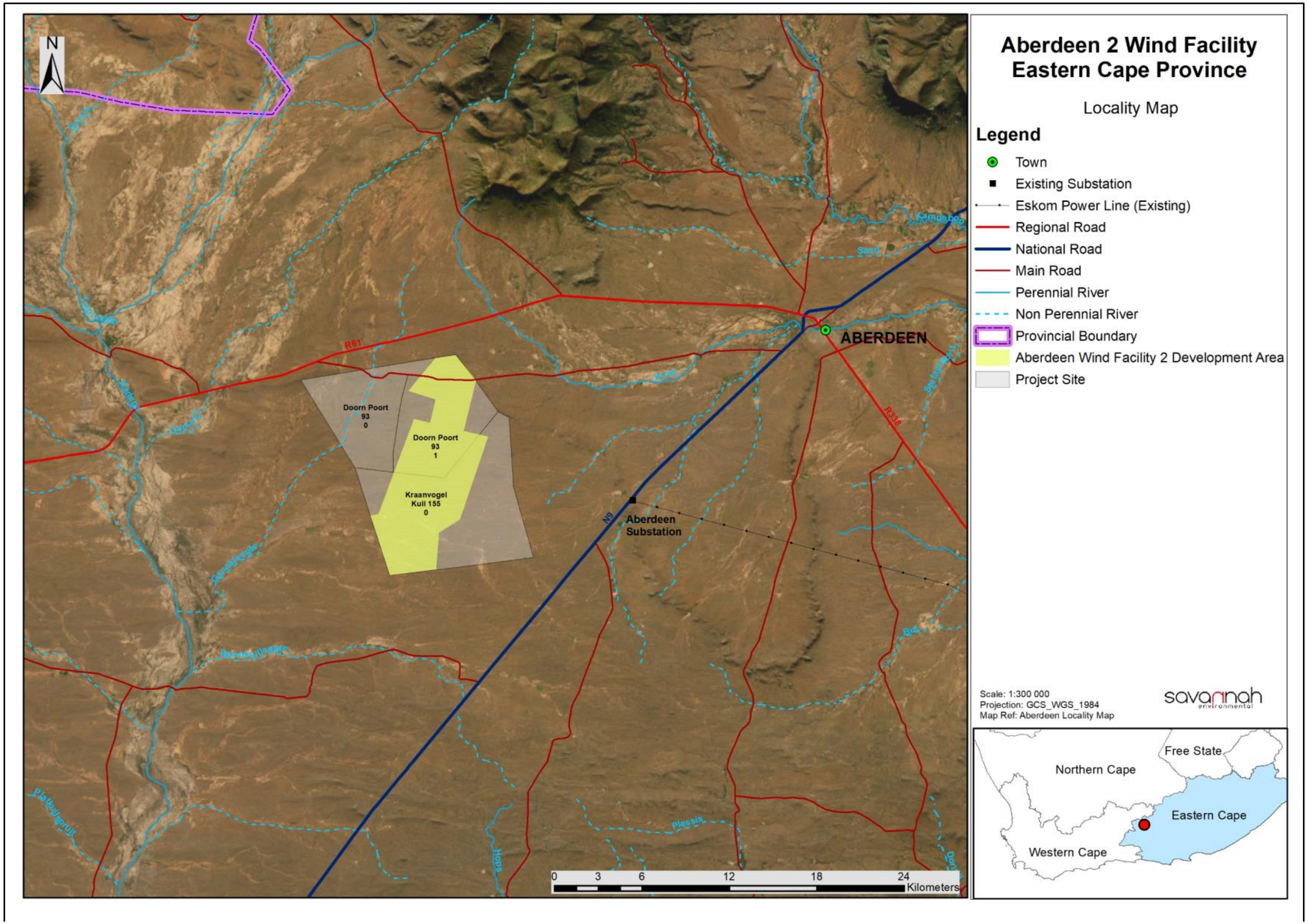

Figure 1: Locality map showing the location of the project site proposed for the development of the Aberdeen Wind Facility 2

The specialist findings have indicated that there are no identified fatal flaws associated with the implementation of the development footprint within the project site. The potential environmental impacts associated with the Aberdeen Wind Facility 2 identified and assessed through the BA process include:

Impacts on Terrestrial Ecology

The Ecological Impact Assessment has identified impacts of medium significance to be associated with the development of Aberdeen Wind Facility 2. No impacts of high significance were identified, and no fatal flaws are associated with the Aberdeen Wind Facility 2 from a terrestrial ecology perspective. There are no impacts associated with the Aberdeen Wind Facility 2 that cannot be mitigated to a low and acceptable level. With the application of relatively simple mitigation and avoidance measures, the impact of the Aberdeen Wind Facility 2 on the local environment can be reduced to a low and acceptable magnitude.

Impacts on Aquatic Resources

Impacts of a medium to high significance on aquatic resources have been identified to be associated with the development of the Aberdeen Wind Facility 2 prior to the implementation of appropriate mitigation measures. With the implementation of the mitigation measures all impacts would be reduced to a low significance which is considered to be acceptable.

No impacts of a high significance or fatal flaws are expected to occur after implementation of the recommended mitigation measures. The specialist indicates that with the implementation of the recommended mitigation measures, impacts on these aquatic features can be effectively minimised without negatively affecting/changing the rivers current conditions, and that the development can be authorised.

Impacts on Avifauna

The Avifauna Impact Assessment identified that all impacts associated with the development of the Aberdeen Wind Facility 2 development footprint will be of a medium to high significance. This can be mitigated to an acceptable medium to low level of impact.

No impacts of a high significance or fatal flaws are expected to occur with the implementation of the recommended mitigation measures.

Impacts on Bats

The significance ratings for the majority of the impacts to bats posed by the development are predicted to be medium or high depending on the impact being considered. After mitigation, bat impacts are predicted to be of a low to medium significance.

The specialist indicates that provided the mitigation measures are implemented, the development of the Aberdeen Wind Facility 2 will not result in unacceptable impacts to bats and can be authorised.

Impacts on Agriculture

Majority of the impacts of the Aberdeen Wind Energy Facility 1 from an agricultural perspective will be of medium to low sensitivity. With the implementation of the recommended mitigation measures, all impacts can be reduced to a low acceptable level.

No impacts of a high significance are expected to occur, and no fatal flaws are associated with the development from an agricultural perspective. The specialist indicates that the project will be acceptable, subject to the implementation of the recommended mitigation measures.

Impacts on Heritage Resources (archaeology, palaeontology and cultural landscape)

All impacts identified on the heritage resources (including archaeology, palaeontology and cultural landscape) are of a medium to high significance prior to the implementation of mitigation measures. With the implementation of the mitigation measures the impact significance will be reduced to impacts of a medium to low significance.

With the opportunities presented for the reduction of impact through the implementation of the recommended mitigation measures, no unacceptable impacts of a high significance are expected to occur. No fatal flaws are therefore associated with the Aberdeen Wind Facility 2 from a heritage perspective.

The specialist indicates that the Aberdeen Wind Facility 2 can proceed, subject to the implementation of the recommended mitigation measures.

Noise Impacts

From the noise impacts assessed there will be a low significance for daytime construction activities, a low significance for night-time construction activities and a low significance for night-time facility operation activities and an impact to ambient sound levels at noise-sensitive receptors due to air-borne noise from the wind turbines. No impacts of a high significance or fatal flaws were identified.

The specialist indicates that subject to the condition that the applicant will select appropriate measures to ensure that the potential medium significance noise impact is eliminated, it is recommended that the proposed Aberdeen Wind Facility 2 (and associated infrastructure) be authorized.

Visual Impacts

A visibility analysis was undertaken for the project. The result of the viewshed analysis displays the potential areas of visual exposure, as well as the potential frequency of exposure, and potential visual sensitive receptors. Negative impacts on visual receptors will occur during the undertaking of construction activities and the operation of the Aberdeen Wind Facility 2.

During the construction phase of the Aberdeen Wind Facility 2 a noticeable increase in heavy vehicles utilising the roads to the project site may occur. This will result in a visual nuisance to other road users and landowners within the surrounding area. Construction activities may potentially result in a high temporary visual impact, that may be mitigated to moderate.

Construction activities may potentially result in a high temporary visual impact, that may be mitigated to moderate. The operation of the Aberdeen Wind Facility 2 will have a high to very high visual impact on observers/visitors residing at homesteads and travelling along the roads within a 5km radius of the proposed wind turbine structures.

The operation of the Aberdeen Wind Facility 2 will have a very high visual impact (which can be mitigated to high) on observers/visitors residing at homesteads within a 5km radius of the proposed wind turbine structures, a high impact on observers travelling along the roads within a 5km radius of the wind turbines and on residents of (or visitors to) homesteads within a 5 - 10km radius of the wind turbine structures. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

The Aberdeen Wind Facility 2 could have a moderate visual impact on residents of (or visitors to) homesteads within a 10-20km radius of the wind turbine structures.

Shadow flicker is an impact relevant to the operation of the turbines. Shadow flicker only occurs when the sky is clear, and when the turbine rotor blades are between the sun and the receptor (i.e. when the sun is low). Most shadow impact is associated with 3-4 times the height of the object. Based on this, a 1.2km buffer along the edge of the outer most turbines were identified as the zone within which there is a risk of shadow flicker occurring. The potential for shadow flicker is anticipated to be of medium significance.

In terms of lighting impacts, the area immediately surrounding the proposed facility has a relatively low incidence of receptors and light sources. The anticipated lighting impact during operation is likely to be of high significance, and may be mitigated to moderate, especially within a 5km to 10km radius of the wind turbine structures.

In terms of ancillary infrastructure, the range of visual exposure will fall within that of the turbines. The anticipated visual impact resulting from this infrastructure is likely to be of low significance both before and after mitigation.

The significance of the visual impacts on the sense of place within the region (i.e. beyond a 20km radius of the development and within the greater region) is expected to be of low significance. Structures will be visible regardless of mitigation but general mitigation and management measures are recommended as best practice.

The visual impact is expected to be of high significance. However, this is not considered to be a fatal flaw

Social Impacts

The positive effects and impacts of Aberdeen Wind Facility 2 would outweigh the negative effects. This is largely due to the fact that the project is expected to have a positive net impact on economic development, employment, household earnings, skills development and most importantly in the local community that experiences a high unemployment rate as well as a small economic base. Negative impacts are expected to be of a medium significance with the implementation of mitigations measures reducing this to a low impact. Positive impacts are expected to be of a medium significance with the implementation of enhancements.

Considering the above, the development of the Aberdeen Wind Facility 2 is acceptable from a social perspective.

Impacts on Traffic

No impacts of high significance were identified, and no fatal flaws are associated with the Aberdeen Wind Facility 2 from a traffic perspective.

Cumulative Impacts

Based on the specialist cumulative assessment and findings, the development of the Aberdeen Wind Facility 2 and its contribution to the overall impact of all wind energy facilities to be developed within a 30km radius, it can be concluded that the Aberdeen Wind Facility 2 cumulative impacts will be of a medium to low significance, with impacts of a high significance mainly relating to socio-economic impacts, Bats, Heritage and visual impacts on the landscape. Therefore, the development of the Aberdeen Wind Facility 2 will not result in unacceptable, high cumulative impacts and will not result in a whole-scale change of the environment.

Figure 2 provides an environmental sensitivity map of the development footprint assessed as part of the BA process, as well as the environmental sensitivities identified.

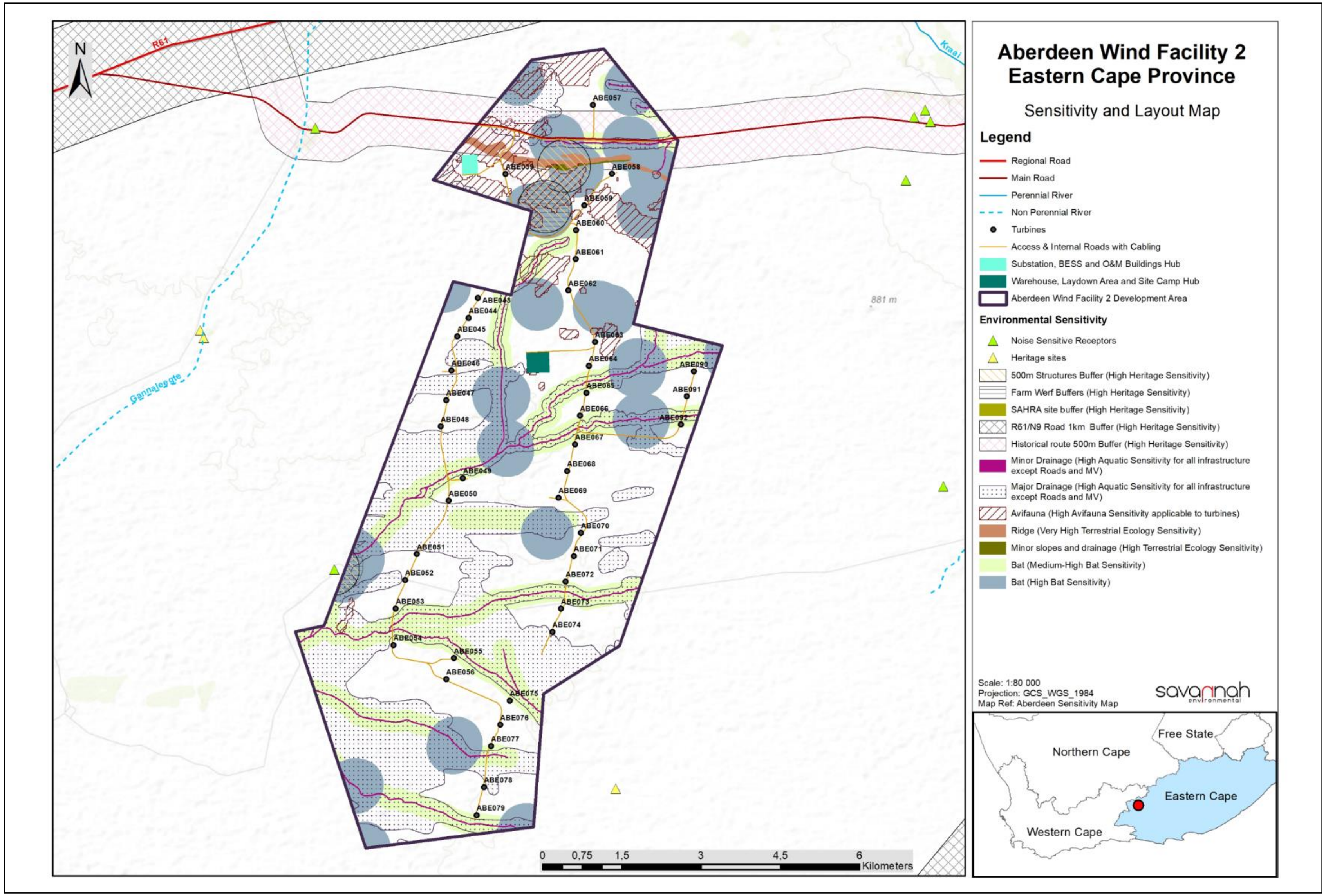

Figure 2: The development footprint (~120 ha) of the Aberdeen Wind Facility 2 overlain on the identified environmental sensitive features (refer to **Appendix O** for A3 map)

Overall Conclusion (Impact Statement)

A technically viable development footprint was proposed by the developer and assessed as part of the BA process. The assessment of the development footprint within the project site was undertaken by independent specialists and their findings have informed the results of this BA report.

Based on the specialist investigations of the larger area, a technically viable development footprint was proposed by the developer and assessed as part of the BA process. The findings of the assessment of the development footprint undertaken by independent specialists have informed the results of this BA report. The specialist findings have indicated that there are no identified fatal flaws associated with the implementation of the project within the project site.

Based on the conclusions of the specialist studies and the facility layout which prioritised the avoidance of environmental sensitivities, it can be concluded that the development of the Aberdeen Wind Facility 2 will not result in unacceptable environmental impacts (subject to the implementation of the recommended mitigation measures). Impacts can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures. This is however not relevant for the visual impact of the wind farm as the turbines will be visible regardless of the mitigation applied. This high significance rating is, however, not considered as a fatal flaw by the specialist. The facility layout and EMPr presented within this BAR should therefore be approved for implementation.

A validity period of 15 years of the Environmental Authorisation is requested, should the project obtain approval from DFFE.

DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Archaeological material: Remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Emergency: An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:
i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment, as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place because of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Method statement: A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

Mitigation hierarchy: The mitigation hierarchy is a framework for managing risks and potential impacts related to biodiversity and ecosystem services. The mitigation hierarchy is used when planning and implementing development projects, to provide a logical and effective approach to protecting and conserving biodiversity and maintaining important ecosystem services. It is a tool to aid in the sustainable management of living, natural resources, which provides a mechanism for making explicit decisions that balance conservation needs with development priorities.

No-go areas: Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

Perennial and non-perennial: Perennial systems contain flow or standing water for all or a large proportion of any given year, while non-perennial systems are episodic or ephemeral and thus contains flows for short periods, such as a few hours or days in the case of drainage lines.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

Pre-construction: The period prior to the commencement of construction, this may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Riparian: the area of land adjacent to a stream or river that is influenced by stream-induced or related processes. Riparian areas which are saturated or flooded for prolonged periods would be considered wetlands and could be described as riparian wetlands. However, some riparian areas are not wetlands (e.g. an area where alluvium is periodically deposited by a stream during floods but which is well drained).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Waste: means—

a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or
b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister

Watercourse: as per the National Water Act means -

(a) a river or spring;
(b) a natural channel in which water flows regularly or intermittently;

(c) a wetland, lake or dam into which, or from which, water flows; and
(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks

Wetlands: land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil (Water Act 36 of 1998); land where an excess of water is the dominant factor determining the nature of the soil development and the types of plants and animals living at the soil surface (Cowardin et al., 1979).

ACRONYMS

BA	Basic Assessment
BGIS	Biodiversity Geographic Information System
CBA	Critical Biodiversity Area
DFFE	Department of Forestry, Fisheries, and the Environment (National)
DWS	Department of Water and Sanitation
CBA	Critical Biodiversity Area
CR	Critically Endangered
CSIR	Council for Scientific and Industrial Research
DM	District Municipality
DMRE	Department of Mineral Resources Energy
EAP	Environmental Assessment Practitioner
EGIS	Environmental Geographic Information System
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EN	Endangered
EP	Equator Principles
ESA	Ecological Support Area
GA	General Authorisation
GHG	Greenhouse Gas
IBA	Important Bird Area
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IEP	Integrated Energy Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
I&AP	Interested and Affected Party
km	Kilometre
kWh	Kilowatt hour
LC	Least Concern
LM	Local Municipality
LNG	Liquid Natural Gas
m	Metre
m^2	Square meters
m^3	Cubic meters
m amsl	Metres Above Mean Sea Level
MW	Megawatts
NDP	National Development Plan
NEMA	National Environmental Management Act (No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act (No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act (No. 10 of 2004)

NEM:WA	National Environmental Management: Waste Act (No. 59 of 2008)
NFA	National Forests Act (No. 84 of 1998)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act (No. 25 of 1999)
NT	Near Threatened
NWA	National Water Act (No. 36 of 1998)
ONA	Other Natural Area
PA	Protected Area
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAIAB	South African Institute for Aquatic Biodiversity
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
TOPS	Threatened or Protected Species
VU	Vulnerable

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CHAPTER 1 INTRODUCTION

Aberdeen Wind Facility 2 (Pty) Ltd, a Special Purpose Vehicle (SPV), proposes 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 greater Sarah Baartman District Municipality. The entire extent of the site falls within the Beaufort West Renewable Energy Development Zone (REDZ)[1]. The facility is known as Aberdeen Wind Facility 2.

The project is planned as part of a larger cluster of renewable energy projects, which includes two adjacent wind energy facilities with a capacity up to 240MW each (Aberdeen Wind Facility 1 and Aberdeen Wind Facility 3). The proposed wind energy facility is set to inject up to 240MW into the national grid. The wind energy facility will connect to the national grid via a grid connection solution, which will be subject to a separate application of Environmental Authorisation.

The facility is proposed in response to identified objectives of the national and provincial government, and local and district municipalities to develop renewable energy facilities for power generation purposes. It is the Developer's intention to bid the wind energy facility under the Department of Mineral Resource and Energy's (DMRE) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or other public or private off-taker programmes. The power generated is intended to be sold either to Eskom to be fed into the national electricity grid, or as required by the off-taker programme. The development of the wind energy facilities will assist in achieving the energy mix (through a process of diversification) as set out in the Integrated Resources Plan (IRP), as well as aiding in the stabilisation of the country's electricity supply.

As the project has the potential to impact on the environment, an Environmental Impact Assessment process is required to be completed in support of an application for Environmental Authorisation prior to the commencement of construction of the project. The entire extent of the site falls within the Beaufort West (REDZ) and therefore the undertaking of a Basic Assessment (BA) process is applicable as per GNR114 of February 2018. This BA Report describes and assesses this proposed project and consists of the following chapters:

- **Chapter 1** provides background to the proposed Aberdeen Wind Facility 2 and the basic assessment process
- **Chapter 2** provides a description of the wind energy facility and the infrastructure associated with the facility.
- **Chapter 3** provides the site selection information and identified project alternatives.

[1] The REDZ are zones identified by the Department of Environment, Forestry and Fisheries (DEFF) as geographical areas of strategic importance for the development of large-scale solar PV and wind energy development activities and which have been earmarked for the development of renewable energy facilities within South Africa as per GNR114 of February 2018.

» **Chapter 4** describes wind energy as a power generation option and provides insight to technologies for wind energy.
» **Chapter 5** outlines the strategic regulatory and legal context for energy planning in South Africa and specifically for the proposed facility.
» **Chapter 6** describes the need and desirability of the Aberdeen Wind Facility 2 within the project site.
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The Environmental Management Programme (EMPr) is included in **Appendix N**.

1.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

The National Environmental Management Act (NEMA, Act No. 107 of 1998) is the national legislation that provides for the authorisation of certain controlled activities known as 'listed activities.' In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the Competent Authority (the decision-maker) charged by the NEMA with the granting of the relevant environmental authorisation being applied for through this BA process.

The development (i.e. construction and operation) of Aberdeen Wind Facility 2 is subject to the requirements of the EIA Regulations of 2014 (as amended), published in terms of Section 24(5) of NEMA. Therefore, in terms of the EIA Regulations of 2014, promulgated under Section 24 and 24D of NEMA, various aspects of the project are listed as activities that may have a detrimental impact on the environment. The primary listed activity triggered is Activity 1 of Listing Notice 2 (GN R325) which relates to the development of facilities or infrastructure for the generation of electricity from a renewable resource where the generating capacity is 20MW or more. Aberdeen Wind Facility 2 will have a contracted capacity of up to 240MWAC.

This BA report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (as amended in April 2017) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This chapter of the BA report includes the following information required in terms of Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(a) the details of the (i) EAP who prepared the report and (ii) the expertise of the EAP, including a curriculum vitae.	The details of the EAP who prepared the report and the expertise of the EAP is included in section 1.3. The curriculum vitae of the EAP, project team and independent specialists are included in **Appendix A**.

3(b) the location of the activity including (i) the 21 digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties.	The location of the Aberdeen Wind Facility 2 is included in section 1.2, **Table 1.1** and **Figure 1.1**. The information provided includes the 21-digit Surveyor General code of the affected properties and the farm names. Additional information is also provided regarding the location of the development which includes the relevant province, local and district municipalities, ward and current land zoning.

1.2 Project Overview

A project site[2] consisting of four affected properties (**Figure 1.1** and **Table 1.1**), has been identified as the preferred area for the development of the turbines and the associated infrastructure of the Aberdeen Wind Facility 2. The project site consists of four (4) affected properties:

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

A main access road up to 5.7km in length and up to 10m in width will provide access to the facility, and ultimately to all three planned wind farm sites (that is, a shared access route). The access to the facility/ies will be via an existing (unnamed) gravel road off the R61 between Beaufort West and Aberdeen. The gravel road is well established (~10m wide excluding road reserve), however it's likely portions of this road will require upgrading to accommodate the movement of heavy vehicles. This road traverses Portion 4 of Farm Sambokdoorns 92.

The identification of the project site was undertaken through a site selection process which included a regional screening process, as well a specific specialist input, to inform and confirm the suitability of the project site for the development of a wind energy facility and provide an upfront understanding of the potential social and environmental challenges which may be present within the project site and surrounding areas.

The project site has an extent of ~15 800ha, which is considered sufficient in extent (allowing sufficient space to avoid any major environmental sensitivities) and suitable from a technical perspective for the development of up to 41 wind turbines with a contracted capacity of up to 240MW. A development area[3] of approximately 6 475ha has been identified within the project site and assessed as part of the BA process.

[2] The project site is that identified area within which the development area and development footprint are located. It is the broader geographic area assessed as part of the BA process, within which indirect and direct effects of the project may occur. The project site is ~15 800ha in extent. The project site is the entire extent of all properties for the wind farm, namely the Remainder of the Farm Doorn Poort 93, Portion 1 of Farm Doorn Poort 93, Portion 4 of Farm Sambokdoorns 92, and Farm Kraanvogel Kuil 155

[3] The development area is that identified area where the 240MW wind farm is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints. The development area is ~6475ha in extent.

The much smaller development footprint[4] will be sited within the development area, with an estimated disturbance area of up to 120ha of the development area. The infrastructure associated with the 240MW Aberdeen Wind Facility will include:

» Up to 41 wind turbines with a maximum hub height of up to 200m. The tip height of the turbines will be up to 300m.
» Concrete turbine foundations and turbine hardstands.
» An internal road network between project components inclusive of stormwater infrastructure.
» Medium-voltage (MV) power lines internal to the wind farm trenched and located adjacent to internal access roads, where feasible.
» Substation, Battery Energy Storage System (BESS) and O&M buildings hub, including:
  - On-site facility substation (132kV).
  - Battery Energy Storage System (BESS).
  - Operation and Maintenance buildings, including control centre
» Warehouse, laydown area and site camp hub, including:
  - Construction laydown areas
  - Site camp
  - Warehousing and buildings
» Upgrade to a main access road of approximately 5.7km in length and up to 10m in width.

The key infrastructure components proposed as part of the projects are described in greater detail in Chapter 2 of this BA Report. Details of the Aberdeen Wind Facility 2 and associated infrastructure to be developed is included in **Table 1.1**. **Figure 1.1** provides a locality map of the Aberdeen Wind Facility 2.

Table 1.1: A detailed description of the Aberdeen Wind Facility 2 and associated infrastructure.

Province	Eastern Cape
District Municipality	Sarah Baartman District Municipality
Local Municipality	Dr Beyers Naude Local Municipality
Ward number(s)	Ward 1
Nearest town(s)	Aberdeen (20km west of the Aberdeen Wind Facility 2)
Affected Properties: Farm name(s), number(s) and portion numbers	Wind Farm: » Remainder of the Farm Doorn Poort 93 » Portion 1 of Farm Doorn Poort 93 » Farm Kraanvogel Kuil 155 Access Road » Portion 4 of Farm Sambokdoorns 92
SG 21 Digit Code (s)	» C00100000000009300000 - Remainder of the Farm Doorn Poort 93 » C00100000000009300001 - Portion 1 of Farm Doorn Poort 93 » C00100000000015500000 - Farm Kraanvogel Kuil 155

[4] The development footprint is the defined area (located within the development area) where the wind farm and other associated infrastructure for the facility is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

	» C00100000000009200004 - Portion 4 of Farm Sambokdoorns 92
Current zoning and land use	Zoning: Agricultural Land Use: Farming
Site central coordinates	23°46'54.40"E, 32°33'27.54"S
Start point of the access road to be upgraded	23°43’35.13”E, 32°29’24.36”S

Aberdeen Wind Facility 2 (Pty) Ltd has confirmed that the project site is particularly suitable for wind energy development from a technical perspective due to the strength of the prevailing wind resources, access to the electricity grid, compatibility with the current land use and land availability (refer to Chapter 2 for further details). The developer has been measuring the wind resource at the project site since 2021 and has determined that the wind resource is viable for the development of a wind energy facility. Depending on the final turbine selection, the estimated total contracted capacity for the wind farm is up to 240MW.

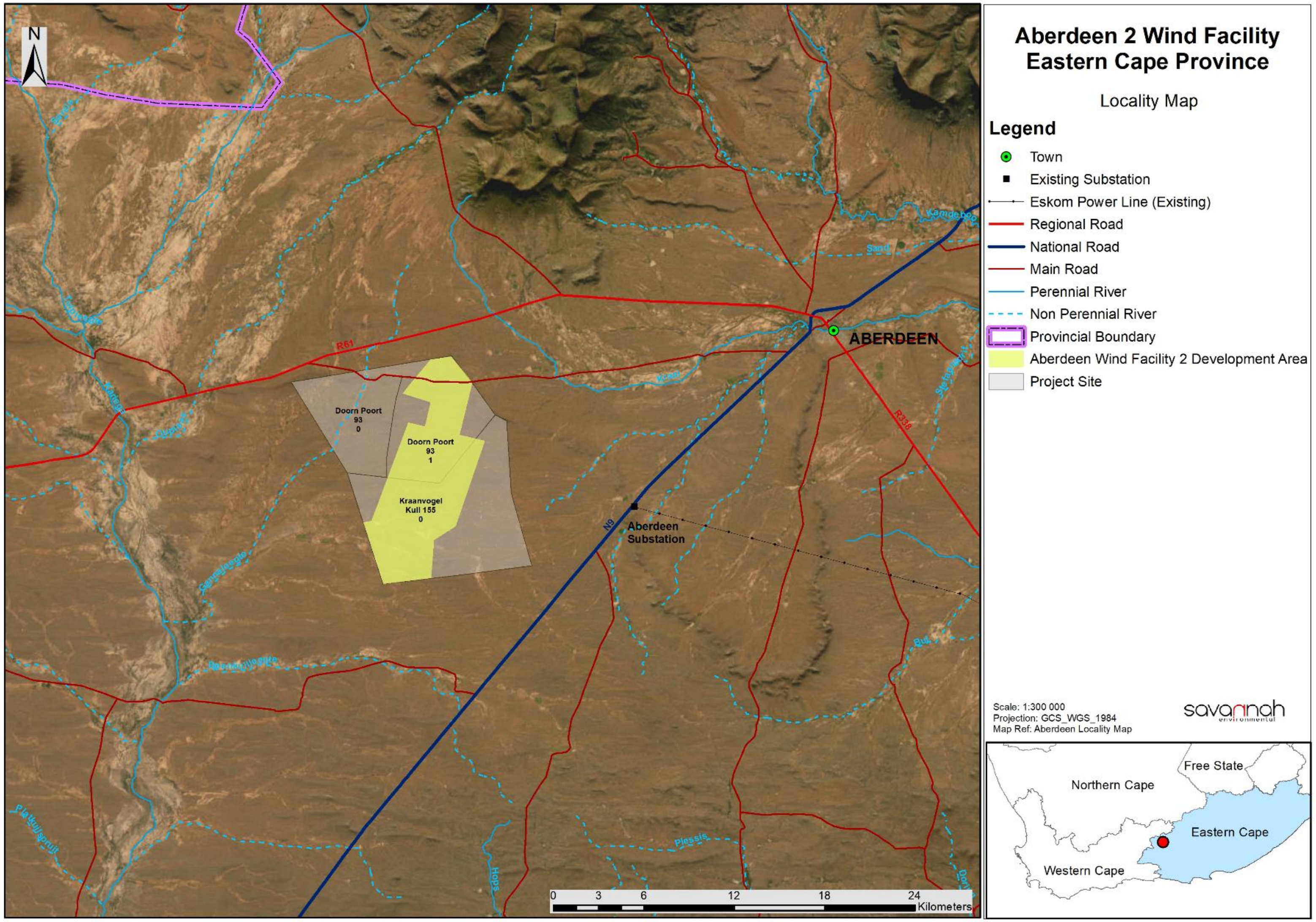

Figure 1.1: A locality map illustrating the development area under investigation for the establishment of the Aberdeen Wind Facility 2 and associated infrastructure.

1.3 Details of the Environmental Assessment Practitioner and Expertise to conduct the BA process

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), Aberdeen Wind Facility 2 (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd as the independent Environmental Assessment consultant to undertake the Basic Assessment and prepare the BA Report for the proposed Aberdeen Wind Facility 2. Neither Savannah Environmental nor any of its specialists are subsidiaries of, or are affiliated to Aberdeen Wind Facility 2 (Pty) Ltd. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consulting company providing a holistic environmental management service, including environmental assessment and planning to ensure compliance and evaluate the risk of development, and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team have considerable experience in basic assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects throughout South Africa, including those associated with electricity generation.

» ***Karen Jodas,*** holds a Master of Science Degree and is registered as a Professional Natural Scientist (400106/99) with the South African Council for Natural Scientific Professions (SACNASP) , and is registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA (2022/5499). She has gained extensive knowledge and experience on potential environmental impacts associated with electricity generation and transmission projects through her involvement in related EIA processes over the past 25 years. She has successfully managed and undertaken EIA processes for infrastructure development projects throughout South Africa.
» **Nkhensani Masondo**, the senior EAP on this project, is registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA (2020/1385) and holds a BSocSci in Environmental Analysis and Management and is currently completing her MSc in Environmental Management. She has six (6) years of working experience in the environmental field and has gained extensive experience in conducting Environmental Impact Assessments, Stakeholder Engagements, Environmental Auditing and Environmental Management Plans Programmes for a wide range of projects.
» **Nicolene Venter**, the public participation consultant for the project. She is a Board Member of IAPSA (International Association for Public Participation South Africa). She holds a Higher Secretarial Diploma and has over 21 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.
» **Matthew Ellero**, the author of this Basic Assessment Report, holds a MSc in Environmental Science and 1 years of experience in the environmental management field. His key focus is on undertaking basic assessments, environmental permitting and authorisations, water use licensing, and environmental management programmes.

In order to adequately identify and assess potential environmental impacts associated with the proposed Aberdeen Wind Facility 2, the following specialist consultants have provided input into this BA Report:

Company	Specialist Area and Expertise	Specialist Name
3Foxes Biodiversity Solutions	Terrestrial Ecology	Simon Todd
Brian Colloty Consulting	Aquatic and freshwater resources	Brian Colloty
Birds and Bats Unlimited	Avifauna	Rob Simmons
Inkululeko Wildlife Services	Bats	Caroline Lotter
JG Afrika	Traffic	Adrian Johnson
Enviro Acoustic Research	Noise	Morné de Jager
LOGIS	Visual	Lourens du Plessis
CTS Heritage	Heritage (including cultural landscape, archaeology and palaeontology)	Jenna Lavin
Tony Barbour	Social	Tony Barbour
Terra Africa	Soils and Agricultural potential	Mariné Pienaar

Appendix A includes the curricula vitae for the environmental assessment practitioners from Savannah Environmental as well as the specialist consultant.

CHAPTER 2 PROJECT DESCRIPTION

This chapter provides an overview of the Aberdeen Wind Facility 2 and details the project scope, which includes the planning/design, construction, operation and decommissioning activities required for the development.

2.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the Basic Assessment report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of Basic Assessment reports:

Requirement	Relevant Section
3(b) the location of the activity including (i) the 21-digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	The location of the proposed project is detailed in Chapter 1, **Table 1.1**, as well as **section 2.2.1** below.
3(c)(i)(ii) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or on land where the property has not been defined, the coordinates within which the activity is to be undertaken	A layout map illustrating the development footprint of the Aberdeen Wind Facility 2, including associated infrastructure (excluding the grid connection infrastructure) is included as **Figure 2.2**. This development footprint has been assessed within this Basic Assessment Report and the independent specialist studies.
3(d)(ii) a description of the scope of the proposed activity, including a description of the activities to be undertaken including associated structures and infrastructure	A description of the activities to be undertaken with the development of project is included in **Table 2.1** and **Table 2.2**.

2.2 Nature and extent of Aberdeen Wind Facility 2

The Aberdeen Wind Facility 2 and associated infrastructure will add capacity to the national electricity grid, which will comprising up to 41 wind turbines with a contracted capacity of up to 240MW. The optimum turbine for use at the site is yet to be determined, and it is considered that each turbine could have a generating capacity of up to 8MW[5], with a hub height of up to 200m and a tip height of up to 300m. The final turbine capacity and model will be dependent on what is deemed suitable for the site in relation to, among other things, further studies of the wind regime, terrain, and outcome of the final engineering, procurement and construction (EPC) tendering process.

[5] The capacity of the individual turbines is a predicted maximum capacity per turbine. The turbine capacity will be subject to the turbine technology at the time of the project commencement. The developer has however indicated that the turbine capacity will not result in an exceedance of the total contracted capacity of the facility of 240MW.

2.2.1. *Project Site, Development Area and Development Footprint*

A project site[6] consisting of four affected properties (**Figure 1.1** and **Table 1.1**), has been identified as the preferred area for the development of the turbines and the associated infrastructure of the Aberdeen Wind Facility 2. The project site consists of four (4) affected properties:

» Remainder of the Farm Doorn Poort 93
» Portion 1 of Farm Doorn Poort 93
» Farm Kraanvogel Kuil 155
» Portion 4 of Farm Sambokdoorns 92.

The project site has an extent of ~15 800ha, which is considered sufficient in extent (allowing sufficient space to avoid any major environmental sensitivities) and suitable from a technical perspective for the development of up to 41 wind turbines with a contracted capacity of up to 240MW.

A main access road up to 5.7km in length and up to 10m in width will provide access to the facility, and ultimately to all three planned wind farm sites (that is, a shared access route). The access to the facility/ies will be via an existing (unnamed) gravel road off the R61 between Beaufort West and Aberdeen. The gravel road is well established (~10m wide excluding road reserve), however it's likely portions of this road will require upgrading to accommodate the movement of heavy vehicles. This road traverses Portion 4 of Farm Sambokdoorns 92.

The identification of the project site was undertaken through a site selection process which included a regional screening process, as well a specific specialist input, to inform and confirm the suitability of the project site for the development of a wind energy facility and provide an upfront understanding of the potential social and environmental challenges which may be present within the project site and surrounding areas.

The project site is located approximately 20km west of the town of Aberdeen in the Eastern Cape Province, within the Dr Beyers Naude Local Municipality and the greater Sarah Baartman District Municipality. The entire extent of the site falls within the Beaufort West Renewable Energy Development Zones (i.e. REDZ Focus Area 11) as well as the Eastern Corridor of the Strategic Transmission Corridor. A development area[7] of approximately 6 475ha has been identified within the project site and assessed as part of the Basic Assessment process. Within this development area a development footprint, or area to be transformed is estimated to be up to 120ha of the development.

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[6] The project site is that identified area within which the development area and development footprint are located. It is the broader geographic area assessed as part of the BA process, within which indirect and direct effects of the project may occur. The project site is ~15 800ha in extent. The project site is the entire extent of all properties for the wind farm, namely the Remainder of the Farm Doorn Poort 93, Portion 1 of Farm Doorn Poort 93, Portion 4 of Farm Sambokdoorns 92 and Farm Kraanvogel Kuil 155.

[7] The development area is that identified area where the 240MW wind farm is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints. The development area is ~6475ha in extent.

Access to the project site is ample with the presence of existing roads, including national, regional and main roads. 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.

2.2.2. Components of the Aberdeen Wind Facility 2

The project site is proposed to accommodate both the wind turbines as well as the associated infrastructure which is required for such a facility. The infrastructure associated with the 240MW Aberdeen Wind Facility 2, and will include:

» Up to 41 wind turbines with a maximum hub height of up to 200m. The tip height of the turbines will be up to 300m.
» Concrete turbine foundations and turbine hardstands. The turbine foundations will have a combined permanent footprint of 6ha and 13ha for all turbine crane hardstands is required.
» 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.
» Upgrade to a main access road of approximately 5.7km in length and up to 10m in width.
» Medium-voltage (MV) power lines internal to the wind farm trenched and located adjacent to internal access roads, where feasible.
» Substation, BESS and O&M buildings hub, including:
  - On-site facility substation (132kV) up to 2ha in extent.
  - Battery Energy Storage System (BESS) with a footprint of up to 5ha.
  - Operation and Maintenance buildings, including control centre of up to 2ha.
» Warehouse, laydown area and site camp hub, including:
  - Construction laydown areas up to 9ha
  - Site camp up to 1 ha in extent
  - Warehousing and buildings (including offices, gatehouse, warehouses, workshop, canteen, visitors centre, staff lockers, etc.): up to 1 ha in extent.

Access to the site is planned via access roads (to be upgraded) connecting the Aberdeen Wind Facility 2 to the R61 road. Some portions of these access roads fall outside of the facility development area. Two other projects forming part of the Aberdeen Wind Facility Cluster, Aberdeen Wind Facility 1 and Aberdeen Wind Facility 3, will also require access to the R61 following the same main access road. Separate access road connection infrastructure solutions are being undertaken in separate Basic Assessment processes to allow for the connection of the adjacent Aberdeen Wind Facility clusters to the R61 road. As a result, three separate access road connection solutions are required (one for each project), as each one enables the connection of an authorised wind farm to the R61 and allows access to the site.

A summary of the details and dimensions of the planned infrastructure associated with the project is provided in **Table 2.1.** The confirmed details and dimensions of the facility development footprint have been assessed as part of the independent specialist studies. **Figure 2.1** illustrates the proposed development footprint (i.e. area proposed to be transformed) within the development area of the Aberdeen Wind Facility 2, as assessed in this Basic Assessment report.

Table 2.2 provides the details regarding the requirements and the activities to be undertaken during the project development phases, and **Table 2.3** provides photographs of the construction phase of a wind farm similar in nature to the Aberdeen Wind Facility 2.

Table 2.1: Summary of the details and dimensions of the planned infrastructure associated with the Aberdeen Wind Facility 2 and associated infrastructure.

Infrastructure	**Footprint and dimensions**
Development footprint (area transformed by permanent infrastructure)	Up to 120ha (including all associated infrastructure but excluding the grid connection infrastructure) will consist of permanent infrastructure. During the construction phase up to 120ha will be disturbed/transformed, however a large portion of the development area will be rehabilitated which will result in a permanent development footprint of ~58,5ha.
Number of turbines	Maximum of 41 turbines
Turbine hub height	Up to 200m
Turbine tip height	Up to 300m
Contracted capacity of the facility	Up to 240MW
Tower type	Steel towers, and/or concrete towers, and/or towers of a hybrid nature, comprising concrete towers with top steel sections.
Area occupied by the on-site facility substation, BESS and O&M Building hub	14ha - the on-site facility substation, BESS and O&M buildings will be placed within an area/hub within the development footprint.
Capacity of on-site facility substation	132kV
Underground cabling	Underground cabling, with a capacity of 33kV, will be installed to connect the turbines to the on-site facility substation.
Battery Energy Storage System (BESS)	» The BESS proposes to use use solid state battery technology (e.g. Lithium-ion technology) as a preferred technology. » The BESS will be housed in containers approximately 17 m long, 3.5 m wide, and 4 m high covering a total approximate footprint of up to 5ha within the assessed substation, BESS and O&M Building hub area.
Operation and maintenance buildings	To be included within in the area and extent proposed for the on-site facility / collector substation (ie within the assessed substations, BESS and O&M buildings hub area).
Area occupied by laydown , warehouse and site camp areas	16 ha - the laydown, warehouse and site camp areas will be placed within an area/hub within the development footprint. • A temporary construction laydown area will be required for the project will be of up to 9ha in extent (total extent of ha across the site). • A temporary warehouse of ± 100 m x 100 m (1 ha). • A temporary site camp establishment and concrete batching plants of ± 100 m x 100 m (1 ha).

Access and internal roads	Existing roads on the affected properties will be used where feasible and practical. The width of the internal access roads between the project components will be approximately 6m but a 12m wide road corridor may be temporarily impacted during construction
Access and internal roads – Main road	The width of the main access roads to the site will be up to 5.7km in length and up to 10m in width. upgrades will be required at the access point off the R61 and potentially at water crossings.
Turbine hardstand	For each turbine the following will be relevant: ~70m x 45m per turbine crane pad; ~up to 6000m^2 for the crane boom assembly and storage area per turbine.
Turbine foundation	~32m x 45m with a depth to be determined (depending on soil type) per turbine
Temporary infrastructure total area	Temporary infrastructure (including crane hardstanding areas, laydown and compound areas and a concrete batching plant) will be required during the construction phase. All temporary infrastructure will be rehabilitated following the completion of the construction phase, where it is not required for the operation phase. The total area for temporary infrastructure is half of the development area.
Grid line connection to Eskom grid	The grid line connection required to connect the facility to the national grid will primarily be located outside of the project site and will be assessed as part of a separate Basic Assessment process.

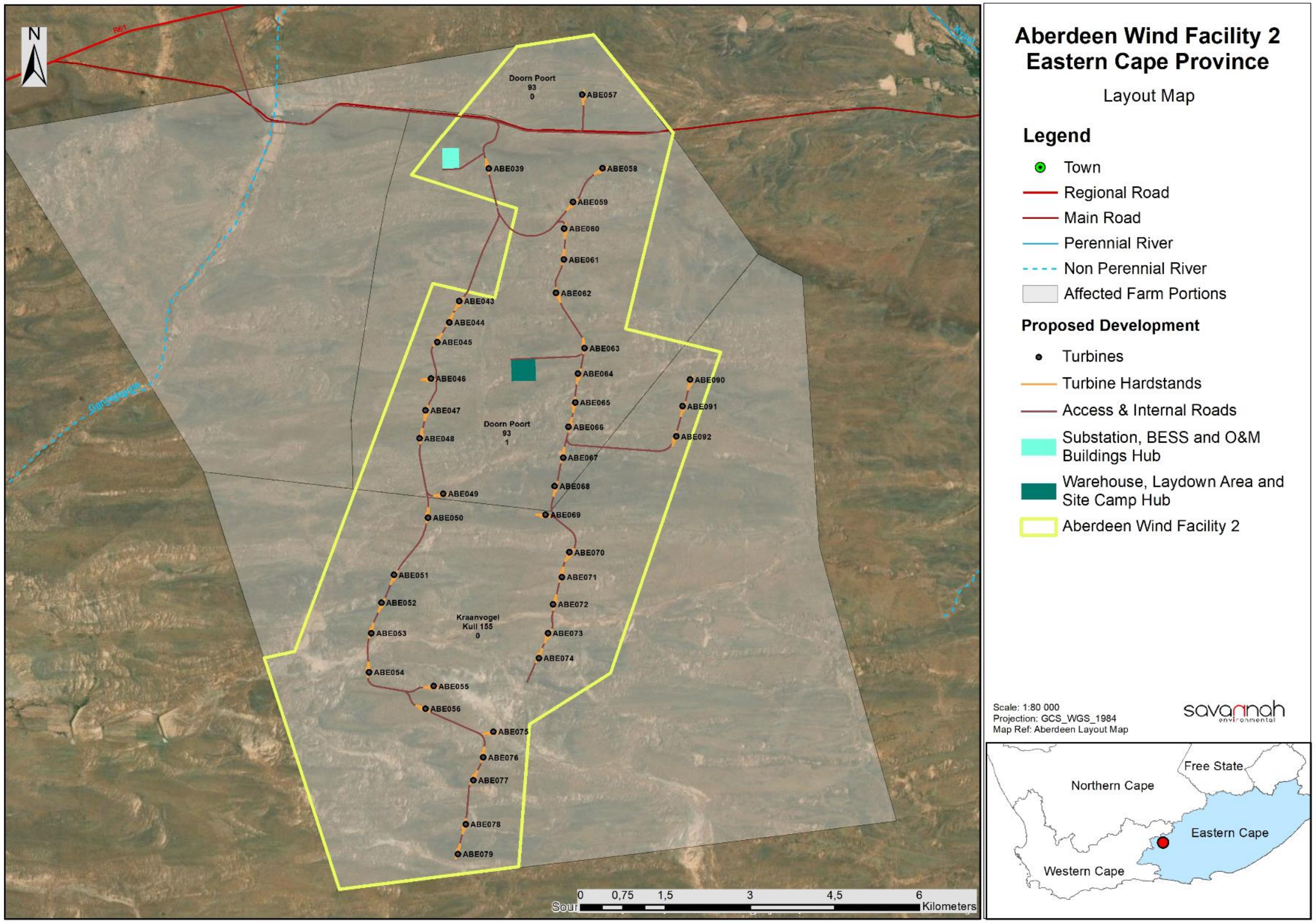

Figure 2.1: Illustration of the planned facility infrastructure assessed for the Aberdeen Wind Facility 2 site - which consists of 41 wind turbine positions and crane hardstands, a BESS, on-site substation, O&M Building hub, a warehouse, laydown area, site camp hub, and access roads.

2.2.4 Project Development Phases associated with the Aberdeen Wind Facility 2

Table 2.2: Details of the project development phases (i.e. construction, operation and decommissioning)

Construction Phase	
Requirements	» Project requires Environmental Authorisation from DFFE a generation license issued by NERSA (if required), and a secured Power Purchase Agreement. » Duration dependent on the number of turbines; expected to be up to 30 months for the Aberdeen Wind Facility 2. » Create direct construction employment opportunities. Up to 400 jobs created and maintained for approximately two years. The employment will include low skilled (55%), semi-skilled (30%) and skilled (15%) opportunities. » No on-site labour camps. Employees to be accommodated in the nearby towns such as Aberdeen and other suitable accommodation and will be transported to and from site by bus on a daily basis. » Overnight on-site worker presence would be limited to security staff. » Waste removal and sanitation will be undertaken by a sub-contractor or the municipality, where possible. Waste containers, including containers for hazardous waste, will be located at each crane pad, site camp and laydown (and compound) area when construction activities are active. » Electricity required for construction activities will be generated by a generator or will be sourced from available Eskom distribution networks in the area. » Water will be required for the construction phase and will largely be used for road construction, hardstand compaction, concrete batching, cleaning equipment after concrete pours and dust suppression on roads. Approximately 90,000m^3 in total will be required. Sources being considered for water supply include the Dr Beyers Naude Local Municipality, Supply from a Private Contractor which may include extraction from any bulk water supply lines nearby to the site. an existing borehole on site or a new borehole.
Activities to be undertaken	
Conduct surveys prior to construction	» Including, but not limited to: a geotechnical survey, site survey and confirmation of the turbine micro-siting footprint, survey of the onsite substation, BESS, O&M buildings hub, warehouse, laydown area and site camp hub, to determine and confirm the locations of all associated infrastructure.
Establishment of access roads to the site	» Access/haul roads and internal access roads within the site will be established at the commencement of construction. » Existing access roads will be utilised where possible to minimise impact and upgraded where required. » Main access roads to the site will have a width of up to 10m. » Access roads to be established between the turbines for construction and/or maintenance activities within the development footprint. » Internal service road alignment will temporarily impact a corridor of approximately 12 m wide during construction and rehabilitated to 6 m wide after construction.

Undertake site preparation	» Including the clearance of vegetation at the footprint of each turbine, establishment of the laydown and compound areas, the establishment of internal access roads and excavations for foundations. » Stripping of topsoil to be stockpiled, backfilled and/or removed from site. » To be undertaken in a systematic manner to reduce the risk of exposed ground being subjected to erosion. » Include search and rescue of floral species of concern (where required) and the identification and excavation of any sites of cultural/heritage value (where required).
Establishment of laydown and compound areas and batching plant on site	» A laydown and compound area for the storage of wind turbine components, including the cranes required for tower/turbine assembly and civil engineering construction equipment. » The laydown and compound area will also accommodate building materials and equipment associated with the construction of buildings. » A crane hardstand at each turbine position where the main lifting crane will be erected and/or disassembled. Each hardstand will include ~70m x 45m per turbine for the crane pad and ~ 80m x 45m for the blade laydown. » Infilling or depositing materials will be sourced from licensed operators/ borrow pits, as close as possible to the site. If a new borrow pit is required to be established, then it will comply with all statutory requirements. » A temporary concrete batching plant of 100m x 100m in extent to facilitate the concrete requirements for turbine foundations.
Construct foundation	» Concrete foundations of approximately 32m x 45m with a depth to be determined (depending on soil type), in extent to be constructed at each turbine location. » Excavations to be undertaken mechanically and filled with steel-reinforced concrete. » Concrete foundation will be constructed to support a mounting ring. » Depending on geological conditions, the use of alternative foundations may be considered (e.g. reinforced piles).
Transport of components and equipment to and within the site	» Turbine units to be transported includes the tower segments, hub, nacelle, and three rotor blades. » Components to be transported to the site in sections on flatbed trucks by the turbine supplier. Imported components to be transported from the Port of Ngqura in Coega, Port Elizabeth (preferred route) or the port of Saldanha , Western Cape. » Transportation will take place via appropriate National and Provincial roads, and the dedicated access/haul road to the site. » Components considered as abnormal loads in terms of Road Traffic Act (Act No 29 of 1989) due to dimensional limitations (abnormal length of the blades) and load limitations (i.e. the nacelle) will require a permit for the transportation of the abnormal loads on public roads. » Specialised construction and lifting equipment to be transported to site to erect the wind turbines. » Civil engineering construction equipment to be brought to the site for the civil works (e.g. excavators, trucks, graders, compaction equipment, cement trucks, site offices etc.). » Components for the establishment of the substation (including transformers) and associated infrastructure to be transported to site.
Construction of the turbine	» A lifting crane will be utilised to lift the tower sections, nacelle and rotor into place. » Approximately 1 week is required to erect a single turbine depending on climatic conditions. » Lifting cranes are required to move between the turbine sites.

Construction of the onsite substation, Battery Energy Storage System (BESS) and O&M Building	» Infrastructure, including the onsite facility substation, BESS and O&M Buildings hub will be constructed . » The infrastructure will be constructed adjacent one another.
Connection of wind turbines to the substation	» Each wind turbine is to be connected to the onsite facility substation via underground electrical cables. » Excavation of trenches are required for the installation of the cables. Trench depth will vary, but will be compliant with appropriate regulations depending on the specific application, design and loading requirements. » Underground cables are planned to follow the internal access roads, as far as possible.
Establishment of ancillary infrastructure	» A Control Centre, Offices, Warehouse, Workshop, Canteen, Visitors Centre, Staff Lockers, temporary storage areas and a construction laydown area will be required. » Establishment will require the clearing of vegetation, levelling and the excavation of foundations prior to construction.
Undertake site rehabilitation	» Commence with rehabilitation efforts once construction is completed in an area, and all construction equipment is removed. » On commissioning, access points to the site that will not be required for the operation phase will be closed and prepared for rehabilitation.
Operation Phase	
Requirements	» Duration will be 20-25 years » Requirements for security, monitoring and maintenance of the facility. » Employment opportunities relating mainly to operation activities and maintenance. Between 40-50 employment opportunities will be available and will include low skilled (50%), semi-skilled (40%) and skilled (10%) employment opportunities. » Current land-use activities, i.e. farming activities, being undertaken within the project site can continue during the operation of the wind energy facility.
Activities to be undertaken	
Operation and Maintenance	» Full time security, maintenance and control room staff. » All turbines will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities. » Wind turbines to be subject to periodic maintenance and inspection. » Disposal of waste products (e.g. Absorbents, filter materials (including oil filters), wiping cloths, protective clothing contaminated by maintenance chemicals, organic waste containing chemicals (e.g. nacelle cooling water), lead batteries, spent waxes and fats, synthetic machine and gear oil and mineral-based non-chlorinated hydraulic oils in accordance with relevant waste management legislation. » The construction period laydown area will be rehabilitated. The temporary hardstand area (boom erection, storage and assembly area) will also be rehabilitated. » Crane hardstands would be left for unplanned maintenance/ replacement of the blades or nacelle.

Decommissioning Phase	
Requirements	» Decommissioning of the Aberdeen Wind Facility 2 infrastructure at the end of its economic life. » Potential for repowering of the facility if the PPA can be renegotiated, and redesign possible and feasible, then the upgrade of the facility will be a consideration. » Expected lifespan of approximately 20 - 25 years (with maintenance) before decommissioning is required. » The decommissioning phase of the project is also expected to create skilled and unskilled employment opportunities. » Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	» Confirming the integrity of site access to accommodate the required equipment and lifting cranes. » Preparation of the site (e.g. laydown areas and construction platform). » Mobilisation of construction equipment.
Disassemble and remove turbines	» Large crane required for the disassembling of the turbine and tower sections. » Components to be reused, recycled, or disposed of in accordance with regulatory requirements. » All parts of the turbine would be considered reusable or recyclable » Concrete will be removed to a depth as defined by an agricultural specialist and the area rehabilitated. » Cables will be excavated and removed, as may be required. » The turbines may also be traded or sold as there is an active second hand market for wind turbines and/or it may be used as scrap metal.
Components to be disposed of or recycled.	» Foundation » Tower » Electrical facilities in tower base » Rotor » Generator » Machine house » Regarding the foundation body and sub-base of the tower, the concrete will undergo crushing and be used as combined base/wearing course » Reinforcing steel will go through cleansing and milling to re-melt the components

It is expected that the areas of the project site affected by the wind farm infrastructure (development footprint) will revert back to their original land-use (i.e. primarily grazing) once the Aberdeen Wind Facility 2 has reached the end of its economic life and all infrastructure has been decommissioned.




Table 2.3: Photographs of the construction phase of a wind farm similar to the Aberdeen Wind Facility 2.

CHAPTER 3: ALTERNATIVES

This chapter details the preferred site location, activity, layout and technology alternatives as well as the 'do nothing' option for the Aberdeen Wind Facility 2.

3.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(g) a motivation for the preferred site, activity and technology alternative	The identification and motivation for the preferred project site, the development footprint, the proposed activity and the proposed technology is included in sections 3.3.1, 3.3.2 and 3.3.3.
3(h)(i) details of the alternative considered	The details of all alternatives considered as part of the Aberdeen Wind Facility 2 is included in sections 3.3.1 – 3.3.6. A summary of the alternatives is also included in section 3.3.
3(h)(ix) the outcome of the site selection matrix	The site selection process followed by the developer in order to identify the preferred project site and development footprint is described in section 3.3.1.
3(h)(x) if no alternatives, including alternative locations for the activity were investigation, the motivation for not considering such	Where no alternatives have been considered, motivation has been included. This is included in section 3.3.

3.2 Alternatives Considered during the BA Process

In accordance with the requirements of Appendix 1 of the 2014 Environmental Impact Assessment (EIA) Regulations (GNR 326), reasonable and feasible alternatives including but not limited to site and technology alternatives, as well as the "do-nothing" alternative should be considered.

The DFFE Guideline for determining alternatives states that the key criteria for consideration when identifying alternatives are that they should be "practicable", "feasible", "relevant", "reasonable" and "viable". Essentially there are two types of alternatives:

» Incrementally different (modifications) alternatives to the project.
» Fundamentally (totally) different alternatives to the project.

In this instance, 'the project' refers to the Aberdeen Wind Facility 2, a wind energy facility with capacity of up to 240MW and associated infrastructure proposed to be developed by an Independent Power Producer (IPP). The project is intended to provide electricity to the national grid through the Department of Mineral Resource and Energy's (DMRE) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme or other public or private off-taker programmes.

3.2.1 *Consideration of Fundamentally Different Alternatives*

Fundamentally different alternatives are usually assessed at a strategic level and, as a result, project-specific environmental impact assessments (including Basic Assessment processes) are therefore limited in scope and ability to address fundamentally different alternatives. At a strategic level, electricity generating alternatives have been addressed as part of the DMRE's current Integrated Resource Plan for Electricity 2010 – 2030 (IRP)[1], and will continue to be addressed as part of future revisions (refer to Chapter 5 for more details). In this regard, the need for renewable energy power generation from wind energy facilities has been identified as part of the technology mix for power generation in the country for the next 20 years.

The fundamental energy generation alternatives were assessed and considered within the development of the IRP and the need for the development of renewable energy projects has been defined. Therefore, fundamentally different alternatives to the proposed project are not considered within this Basic Assessment process.

3.2.2 *Consideration of Incrementally Different Alternatives*

Incrementally different alternatives relate specifically to the project under investigation. "Alternatives", in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives for:

» The property on which, or location where the activity is proposed to be undertaken.
» The type of activity to be undertaken.
» The design or layout of the activity.
» The technology to be used in the activity.
» The operational aspects of the activity.

In addition, the option of not implementing the activity (i.e. the "do-nothing" alternative) must also be considered.

The sections below describe the incrementally different alternatives being considered as part of the Aberdeen Wind Facility 2. Where no alternative is being considered, a motivation has been provided as required by the EIA Regulations, 2014.

3.3 Project Alternatives under Consideration for the Aberdeen Wind Facility 2

Table 3.1 provides an overview of the alternatives being considered as part of the project.

[1] The Integrated Resource Plan (IRP) is legislated policy which regulates power generation planning.

Table 3.1: Summary of the alternatives considered as part of the Aberdeen Wind Facility 2 project.

Nature of Alternatives Considered	Description of the Alternative relating to the Aberdeen Wind Facility 2
Site-specific and Layout Alternatives	A preferred project site (affected property) has been identified for the development of the Aberdeen Wind Facility 2 due to site specific characteristics such as the wind resource, land availability, topographical considerations and environmental features. The project site is ~15 800ha in extent which is considered to be sufficient for the development of a wind farm with a contracted capacity of up to 240MW. The location of the project site within a REDZ (as determined by the Minister of Forestry, Fisheries and the Environment) has also been a significant determination for site site-specific identification. A single specific layout alternative has also been identified. This technically feasible layout was provided by the developer for assessment, which included the placement of the turbine positions. This layout has been assessed by the specialists and within the BA process. The process followed and steps taken in determining the facility boundary and layout is detailed in a Site Selection Report included as Appendix S.
Activity Alternatives	Only the development of a renewable energy facility is considered by Aberdeen Wind Facility 2. Due to the location of the project site and the suitability of the wind resource, only the development of a wind farm is considered feasible considering the natural resources available to the area and the current land-use activities undertaken within the project site (i.e. agriculture activities).
Technology Alternatives	An on-site wind measurement campaign and other technical characteristics that were assessed found the project site to be well suited to the establishment of a wind energy facility. The use of wind turbines for the generation of electricity is considered to be the most efficient technology for the project site for the generation of up to 240MW. It should be noted that various wind turbine options are being considered (these are not considered alternatives), as well as a range of alternative turbine technologies available for commercial-scale wind energy facilities, and that the technology is constantly evolving.
'Do-nothing' Alternative	This is the option to not construct the Aberdeen Wind Facility 2. No impacts (positive or negative) are expected to occur on the social and environmental sensitive features or aspects located within or within the surrounding areas of the project site. The opportunities associated with the development of the facility for the Aberdeen area and other surrounding towns will not be realised.

These alternatives are described in more detail in the sections which follow.

3.3.1 Site-specific and Layout Alternatives

The Aberdeen Wind Facility 2 project site is planned for the area east of Aberdeen. This area falls within the Beaufort West REDZ and the Eastern Corridor of the Strategic Transmission Corridors. This region was originally designated as a REDZ and Strategic Transmission Corridor by virtue of the favourable wind resource and existing and planned grid connection infrastructure. As a result, Aberdeen Wind Facility 2 (Pty) Ltd identified this area as a suitable area for the development of a commercial wind energy facility with the aim to supply the electricity generated to the national grid and/or private off-takers.

The project site identified as preferred for the development of the Aberdeen Wind Facility 2 was identified through a regional screening process which investigated prospective sites and properties in the Aberdeen area. The Investigation involved the consideration of specific characteristics within the Province and specifically within the areas near Aberdeen. The characteristics considered were identified by the developer as the main aspects that play a role in the opportunities and limitations for the development of a wind farm. The characteristics considered, and the results thereof, are discussed in the sections below. The developer considered that should these characteristics not be favourable for the development of a wind farm, then some limitations and challenges may be expected and potentially hinder such development.

» *Wind resource* – The developer firstly considered the available wind resource for the Eastern Cape and the Aberdeen area through the consideration of various datasets and variables. Following the consideration and the confirmation of the wind presence and wind speed on a desktop level (through the consideration of existing data), as well as meteorological information and geographical factors it was confirmed that the area, and in particular the Aberdeen Wind Facility 2 project site, is suitable for the development of a wind energy facility (refer to **Figure 3.1**). Following the desktop analysis, the developer installed four wind masts on the project site. The on-site measurements taken at the project site confirmed the wind resource and ultimately the suitability of the resource for the development of a wind energy facility.

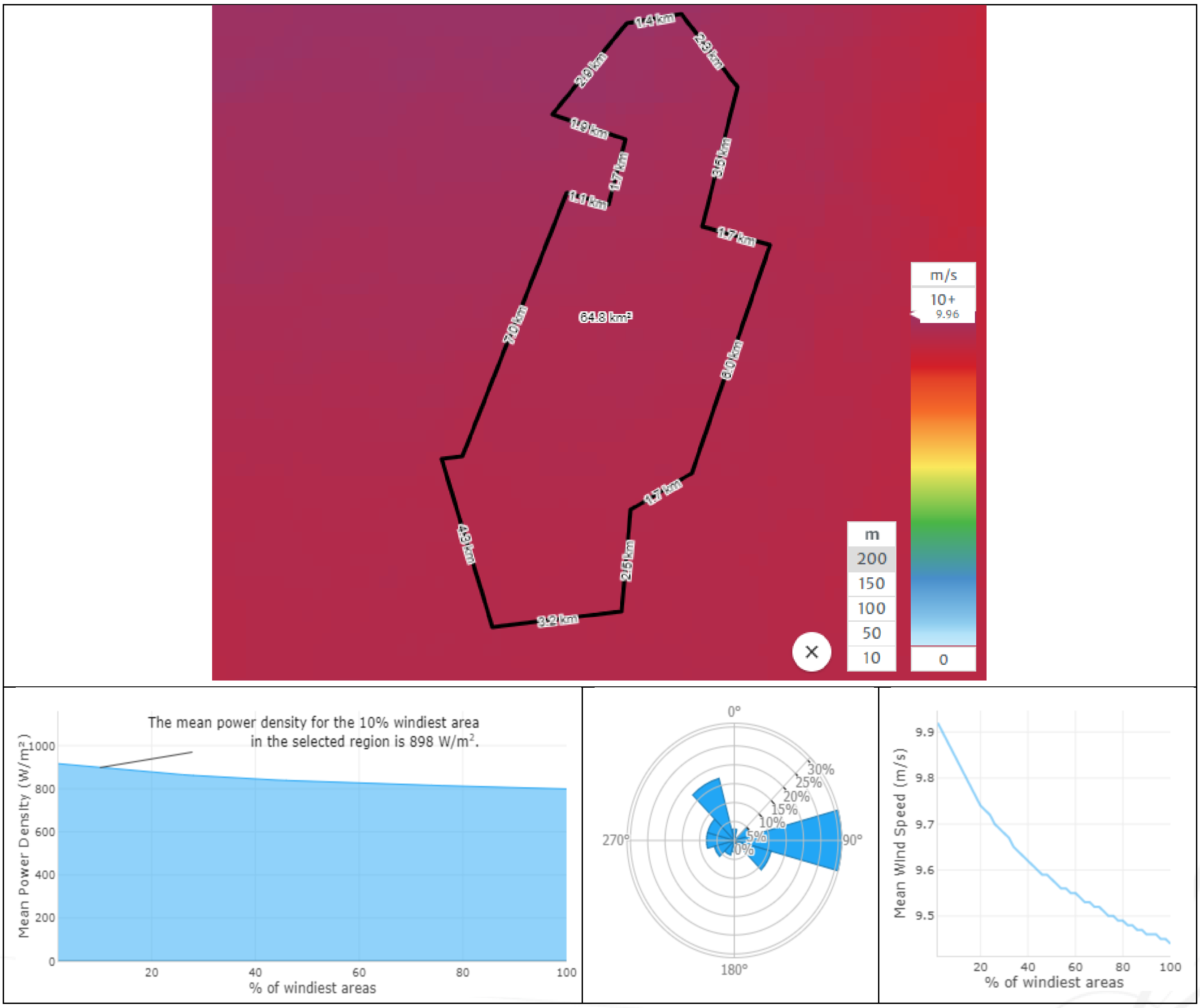

Figure 3.1: Average wind speed expected at the Aberdeen Wind Facility 2 (https://globalwindatlas.info/).

- *Land availability and rights* – In order to develop the Aberdeen Wind Facility 2 with a contracted capacity of up to 240MW sufficient land space is required. The project site was identified within the Eastern Cape Province and in the Aberdeen area following the confirmation of the wind resource. The properties included in the project site are privately-owned parcels of land available for development, which is confirmed through the consent provided by the landowner. The affected properties have an extent of ~15 800ha, which was considered by the developer as sufficient for the placement of a development footprint of up to 120ha. This was informed by the consideration of environmental constraints and sensitivities.

- *Access to the National Electricity Grid* – Following the confirmation of sufficient available land for the development of the wind energy facility, the developer considered the possible grid connection points in order to evacuate the generated electricity into the national grid. This was considered as a vital aspect by the developer for the project in order to reduce transmission costs and environmental and social impact as much as possible. The developer consulted with the Eskom network planners to understand the current capacity of the existing grid connection infrastructure and to identify feasible connection points for the wind farm. Pending confirmation from Eskom on the preffered grid connection, the grid solution will be assessed as part of a separate BA process and will cater for the connection of the Aberdeen cluster of wind energy facilities, which includes Aberdeen Wind Facility 2.

- *Geographical and topographical considerations, and existing infrastructure* – The greater area surrounding the project site has agricultural activities (mainly grazing) as the dominant land uses. The developer considered the potential opportunity for the Aberdeen Wind Facility 2 to bring some relief to the area and the affected landowner and surrounding communities in terms of socio-economic development, skills development and upliftment. The entire project site is also located within the Beaufort West REDZ and the development of the facility within the REDZ is considered to be a strategic placement as supporting transmission and distribution infrastructure (required for the development of renewable energy developments) is readily available in the surrounding area of the project site to enable renewable energy development and the evacuation of the generated power.

- The availability of existing infrastructure was also considered by the developer as this will enable the wind energy development to make use of infrastructure already available and reduce the disturbance associated with the construction of the associated infrastructure. The existing road network within the surrounding areas and within the project site makes access to the development footprint readily available. The developer also considered the fact that the project site has little infrastructure related to residential uses, which could be affected by the development of a wind energy facility.

- ***Transportation of Material and Components:*** As material and components would need to be transported to the site during the construction phase of the Aberdeen Wind Facility 2, accessibility was a key factor in determining the technical viability of the project, particularly taking transportation costs into consideration (direct and indirect) and the impact of this on project economics. The presence of national and regional roads available for use from the Port of Coega is considered beneficial as access to the site is available from the port for equipment transportation during the construction and operation of the wind energy facility.

- *Environmental Screening and consideration of sensitive environmental features* – Following the confirmation of the Aberdeen Wind Facility 2 preferred project site as being technically feasible for the development of a wind energy facility, the developer commenced with the environmental screening of the site, and assessed the main constraints and opportunities to determine whether or not there were any potential fatal flaws or significant no-go areas that might compromise or limit the development of the Aberdeen Wind Facility 2. The screening exercise took place prior to the commencement of the BA process and included specialist investigations of the project site. This included field investigations by the specialist team appointed to undertake the BA studies, as well as desk-top consideration of environmental constraints. The purpose of this phase of the process was to identify sensitive and no go areas, as well as determination of appropriate buffers to be considered within the development of the project layout. The sensitivity spatial data compiled by a specialist team for this larger site (which included ecology, birds and bats) was provided to the developer prior to the lodging of the application for environmental authorisation. This is a common approach in the development of renewable energy projects in order to inform the placement of infrastructure for further investigation in the BA process. Through the integration of the specialist sensitivity data (based on field-survey and pre-construction monitoring), the developer optimised the development footprint to consider/avoid areas and features of high environmental sensitivity through appropriate placement of infrastructure associated with the wind farm development. Where avoidance was not possible, the developer provided details of technical mitigation planned to reduce the significance of the potential environmental impacts associated with the project. This has resulted in the consideration of a development footprint as part of the BA process which is designed to be environmentally appropriate as far as possible. The process followed and steps taken in determining the facility boundary and layout is detailed in a Site Selection Report included as Appendix S.

Based on the above considerations, the project site was identified by the developer as being the most technically feasible and viable project site within the broader area for further investigation in support of an application for authorisation. No feasible alternative sites were identified for assessment as part of this BA process. The site selection and layout optimisation process applied by the developer (which includes the steps followed above) demonstrates due consideration of the suitability of the project site for the Aberdeen Wind Facility 2 in line with a typical mitigation hierarchy:

1. First Mitigation: avoidance of adverse impacts as far as possible by use of preventative measures (in this instance an environmental screening and integration process assisted in the avoidance of identified sensitive areas).
2. Second Mitigation: minimisation or reduction of adverse impacts to 'as low as practicable' through implementation of mitigation and management measures (in this instance the development of technical mitigation solutions as well as recommendations from the various environmental specialists).
3. Third Mitigation: remedy or compensation for adverse residual impacts, which are unavoidable and cannot be reduced further.

As part of the site selection process and environmental screening, as described above, the first tier of avoidance has already been applied prior to the BA process. A feasible layout (development footprint) has been identified for investigation. Therefore, as part of the BA process the development footprint has been fully assessed and the impact of the wind farm ground-truthed by independent specialists. The significance of the impacts associated with the proposed development footprint and the appropriateness of the layout has been assessed and is included in Chapter 9 and **Appendices D – M.**

Where any further conflicts in terms of the development footprint and environmental and social sensitivities or features occur, the mitigation strategy will be further implemented to refine the layout in order to meet the objectives of the mitigation hierarchy (i.e. avoid, minimise, mitigate). This refinement of the layout will lead to the optimisation of the development footprint resulting in the presentation of the most environmentally appropriate layout for the authorisation and development of the facility.

The sub-sections which follow provide the details of specific layout alternatives being considered for the development of Aberdeen Wind Facility 2.

3.3.2 *Activity Alternatives*

Aberdeen Wind Facility 2 (Pty) Ltd, the Applicant, is a renewable energy project company and as such will only consider renewable energy activities in accordance with the need for such development as set out in the IRP. Considering the available natural energy resources within the area and the current significant restrictions placed on other natural resources such as water, it is considered that wind energy is the preferred option for the development within the preferred project site. Based on the wind data collected from the four wind measurement met masts installed on the site, the site has shown good wind potential, making development of a wind energy facility on the proposed site technically and economically feasible. The site is also located within a REDZ, as identified by DFFE as an important node for wind and solar PV development. The project site is, therefore, considered best suited for the development of a wind energy facility. In addition, the site is located with the Eastern Corridor of the Strategic Transmission Corridor which are areas of strategic importance for the development grid connection infrastructure to connect the facility to the national grid.

No activity alternatives are considered further within this Basic Assessment as the activity (i.e. the development of a wind energy facility) is considered to be appropriate owing to due consideration of the following:

1. The suitability of the project site for the development of a wind energy facility;
2. The current land-use activities being undertaken within the project site which relate to grazing and the compatibility of this land use with the proposed facility; and
3. The size of the development footprint for the facility (i.e. ~120ha) and the minimal loss to livestock carrying capacity as a result of the development.

3.3.3 *Technology Alternatives*

As Aberdeen Wind Facility 2 (Pty) Ltd is an IPP, only renewable energy technologies are being considered for the generation of up to 240MW (contracted capacity) of electricity. Considering the local resources available (i.e. wind and solar irradiation) for such technologies, the footprint requirements for such developments, the topography of the project site and the current land use in the project site (i.e. agriculture), the project site is considered most suitable for the establishment of a wind energy facility. This has been confirmed through the onsite wind measurement campaign undertaken since 2021 and other technical characteristics available within the surrounding areas of the project site.

Once environmental constraining factors have been determined through the BA process, and more detailed site-specific wind data and turbine specifications are available from the wind monitoring on site, Aberdeen Wind Facility 2 (Pty) Ltd will be considering various wind turbine options. The preferred option will be informed by efficiency as well as environmental impact and constraints (such as noise associated with the turbine and sensitive biophysical features). The wind turbines being proposed for the project will be up to 8MW[2] in capacity. The turbines are proposed to have a hub height of up to 200m, with an overall tip height of up to 300m.

There is a limited range of alternative technologies (turbines) available for commercial-scale wind energy facilities. In addition, the technology is constantly evolving. **Table 3.2** summarises the types of variables associated with existing wind turbine technologies.

Table 3.2: Variables associated with existing wind turbine technologies.

Variables	Description
Type	The vertical axis wind turbine completely dominates the commercial scale wind turbine market.
Size	Typical land-based utility scale wind turbines are currently in the 600 kW to 8MW range internationally as well as locally.
Foundation	The foundation is usually poured reinforced concrete. Its size and shape is dictated by the size of the wind turbine and local geotechnical considerations. The foundation for the Aberdeen Wind Facility 2 will be ~45m x 32m in area with the combined permanent footprint for the turbine foundations to be approximately 6ha.
Tower	Towers are typically constructed from steel and/or concrete and can be hybrid using both materials. The towers used for the Aberdeen Wind Facility 2 will be up to 200m in height.
Rotor	3- Bladed rotor is standard.
Rotor speed control	Fixed or variable speed rotors.
Gears	Geared and gearless.
Generator	Standard high-speed generator (geared) or custom low-speed ring generator (gearless).
Other variables	Yaw gears, brakes, control systems, lubrication systems and all other turbine components are similar on modern wind turbines.

Aberdeen Wind Facility 2 (Pty) Ltd therefore confirms wind energy technology as the preferred technology alternative for the development of the Aberdeen Wind Facility 2. No further technology alternatives will be considered.

3.3.4 The 'do-nothing' Alternative

The 'do-nothing' alternative is the option of Aberdeen Wind Facility 2 (Pty) Ltd not constructing the Aberdeen Wind Facility 2 on the proposed site. This would result in no environment or social impacts (positive or negative) as a result of the development of a wind energy facility within the preferred project site. This alternative is assessed in detail within Chapter 9 of this BA Report.

[2] The capacity of the individual turbines is a predicted maximum capacity per turbine. The turbine capacity will be subject to the turbine technology at the time of the project commencement. The developer has however indicated that the turbine capacity will not result in an exceedance of the total contracted capacity of the facility of 240MW.

CHAPTER 4: WIND AS A POWER GENERATION TECHNOLOGY

Environmental pollution and the emission of CO_2 from the combustion of fossil fuels through the implementation of conventional power plants constitute a threat to the environment. The use of fossil fuels is reportedly responsible for ~70% of greenhouse gas emissions worldwide. The approach to addressing climate change needs to include a shift in the way that energy is generated and consumed. Worldwide, many solutions and approaches are being developed to reduce emissions. However, it is important to acknowledge that the most cost-effective solution in the short-term is not necessarily the least expensive long-term solution. This holds true not only for direct project costs, but also indirect project costs such as impacts on the environment. Renewable energy is considered a 'clean source of energy' with the potential to contribute greatly to a more ecologically, socially and economically sustainable future. The challenge, however, is to ensure that wind energy projects are able to meet all economic, social and environmental sustainability criteria through the appropriate placement of these facilities.

Compared with other renewable energy sources such as solar and bio-energy, wind energy generates a higher energy yield while affecting the smallest physical land space. Wind technologies convert the energy of moving air masses at the earth's surface to mechanical power that can be used directly for mechanical needs (e.g. milling or water pumping) or converted to electric power in a generator (i.e. a wind turbine). The use of wind for electricity generation is essentially a non-consumptive use of a natural resource, and produces an insignificant quantity of greenhouse gases in its life cycle. A wind energy facility also qualifies as a Clean Development Mechanism (CDM) project (i.e. a financial mechanism developed to encourage the development of low carbon generating technologies) as it meets all international requirements in this regard.

This chapter explores the use of wind energy as a means of power generation.

4.1. Wind Resource as a Power Generation Technology

Using the wind resource for energy generation has the attractive attribute in that the fuel is free. The economics of a wind energy project crucially depend on the wind resource at the project site. Detailed and reliable information about the speed, strength, direction, and frequency of the wind resource is vital when considering the installation of a wind energy facility, as the wind resource is a critical factor to the success of the installation.

» **Wind power** is the conversion of wind energy into a useful form, such as electricity, using wind turbines.
» **Wind speed** is the rate at which air flows past a point above the earth's surface. Average annual wind speed is a critical siting criterion, since this determines the cost of generating electricity. The doubling of the wind speed increases the wind power by a factor of 8, so even small changes in wind speed can produce large changes in the economic performance of a wind energy facility. Wind turbines can start generating electricity at wind speeds of between ~3 m/s to 4 m/s (this is also known as the cut-in wind speed), with average annual wind speeds greater than 6 m/s currently typically required for a wind energy facility to be economically viable. Wind speed can be highly variable and is also affected by a number of factors, including surface roughness of the terrain. The effect of height variation/relief in the terrain is seen as a speeding-up/slowing-down effect of the wind due to the topography of the

landscape. Elevation in the topography influences the flow of air, and results in turbulence within the air stream, which has to be considered in the placement of turbines.

» **Wind direction** at a site is important to understand as it influences the turbulence over the site, and therefore the potential energy output. However, wind turbines can extract energy from any wind direction as the nacelle automatically turns to face the blades into the predominant wind direction at any point in time.

A wind resource measurement campaign and analysis programme should be conducted for the site proposed for development, as only measured data will provide a robust prediction of the wind energy facility's expected energy production over its lifetime. This is being undertaken for the project site through the on-site monitoring of the wind resource via four wind measurement met masts installed on the larger project site.

The placement of the individual turbines within a wind energy facility should consider the following technical factors:

» Predominant wind direction, wind strength and frequency;
» Topographical features or relief affecting the flow of the wind (e.g. causing shading effects and turbulence of air flow); and
» Effects of adjacent turbines on wind flow and speed – specific spacing is required between turbines in order to reduce the effects of wake turbulence.

Wind turbines typically need to be spaced approximately 3 to 5 times the rotor diameter apart in order to minimise the induced wake effect that the turbines might have on each other (refer to **Figure 4.1**). Once a viable footprint for the establishment of the wind energy facility has been determined (through the consideration of both technical and environmental criteria) the spacing requirements will be considered through the process of micro-siting the turbines on the site.

4.1.1. How do wind turbines function and what are the associated infrastructure?

Wind turbines are mounted on a tower at height to capture the most energy. The kinetic energy of wind is used to turn a wind turbine to generate electricity. At an increased height above ground, they can take advantage of the faster and less turbulent wind. Turbines catch the wind's energy with their propeller-like blades. Generally, a wind turbine consists of three rotor blades and a nacelle mounted at the top of a tapered steel or concrete tower. The mechanical power generated by the rotation of the blades is transmitted to the generator within the nacelle.

Turbines are able to operate at varying speeds. The amount of energy a turbine can harness depends on both the wind velocity and the length of the rotor blades. It is anticipated that the turbines utilised for the Aberdeen Wind Facility 2 will have a hub height of up to 200m, and a tip height of up to 300m. The capacity of the wind energy facility will depend on the wind turbine selected by Aberdeen Wind Facility 2 (Pty) Ltd (turbine capacity and model that will be deemed most suitable for the site). A maximum of 41 turbines are proposed for the project site.

Other infrastructure associated with the facility includes internal access roads, an onsite facility substation, a warehouse, BESS, and operation and maintenance buildings. The construction phase of the wind energy facility is dependent on the number of turbines erected and is estimated at a maximum of approximately

24-30 months (including all infrastructure). The lifespan of the facility (i.e. operation phase) is approximated at 20 to 25 years.

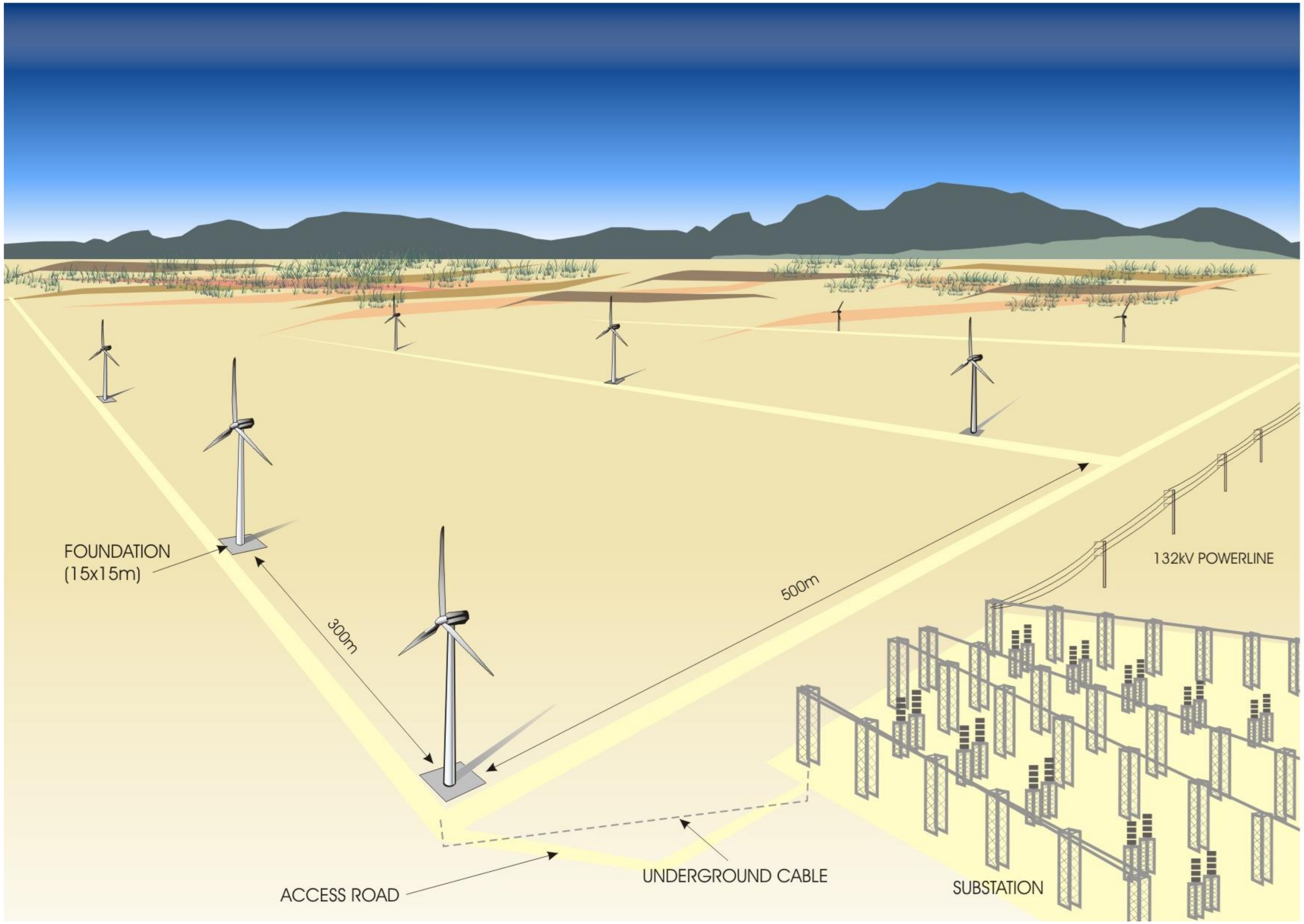

Figure 4.1: Artist's impression of a portion of a typical wind energy facility, illustrating the various components and associated infrastructure. Note that distances and measurements shown are indicative and for illustrative purposes only.

4.1.2. Main Components of a Wind Turbine

The turbine consists of the following major components (as shown in **Figure 4.2**):
» The foundation unit
» The tower
» The rotor
» The nacelle

<u>The foundation</u>
The foundation is used to secure each wind turbine to the ground. These structures are commonly made of reinforced concrete and are designed to withstand the vertical loads (weight) and lateral loads (wind). The foundation footprint for the turbines proposed for the Aberdeen Wind Facility 2 project are 45m x 32m in extent.

<u>The tower</u>
The tower is a hollow structure (steel, or concrete, or a combination of the two materials, known as hybrid) allowing access to the nacelle (up to 200m in height). The height of the tower is a key factor in determining the amount of electricity a turbine can generate as the wind speed varies with height. Towers are typically delivered to site in sections and then erected and joined together on site. Towers can be made of steel or reinforced post-stressed concrete, or a combination of the two materials.

The tower on which a wind turbine is mounted is not just a support structure. It also raises the wind turbine so that its blades safely clear the ground and so it can reach the stronger winds at higher elevations. The tower must be strong enough to support the wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

Figure 4.2: Example of a tower on which the blade is being mounted

The Rotor

The portion of the wind turbine that collects energy from the wind is called the rotor. The rotor comprises of three rotor blades. The rotor blades use the latest advances in aeronautical engineering materials science to maximise efficiency. The greater the number of turns of the rotor, the more electricity is produced. The rotor converts the energy in the wind into rotational energy to turn the generator. The rotor has three blades that rotate at about 15 to 28 revolutions per minute (rpm). The speed of rotation of the blades is controlled by turning the blades to face into the wind ('yaw control') and changing the angle of the blades ('pitch control') to make the most use of the available wind.

The rotor blades function in a similar way to the wing of an aircraft, utilising the principles of lift. When air flows past the blade, a wind speed and pressure differential is created between the upper and lower blade surfaces. The pressure at the lower surface is greater and therefore acts to "lift" the blade. When blades are attached to a central axis, like a wind turbine rotor, the lift is translated into rotational motion. Lift-powered wind turbines are well suited for electricity generation.

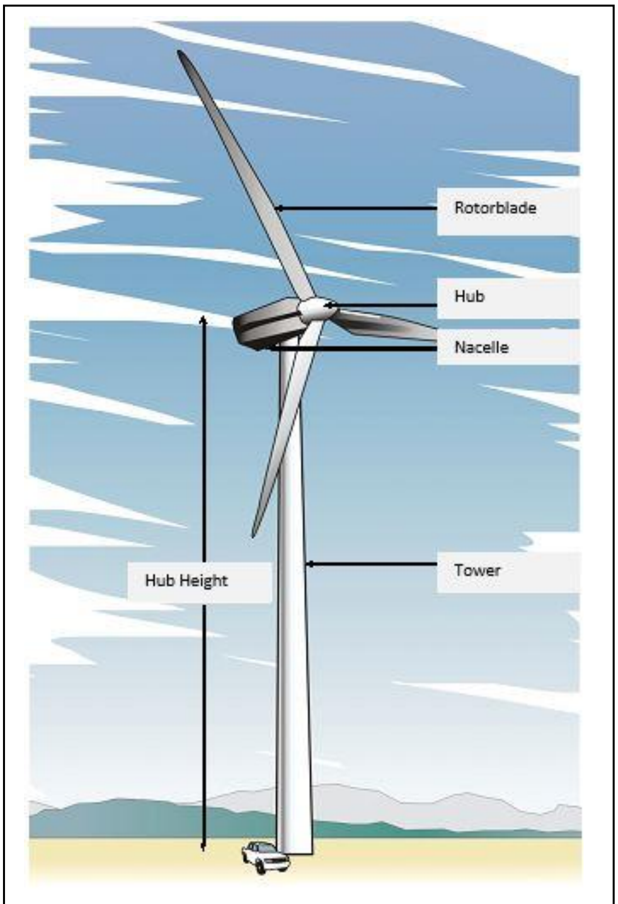

Figure 4.3: Illustration of the main components of a wind turbine

The nacelle

The nacelle at the top of the tower accommodates the gears, the generator, anemometer for monitoring the wind speed and direction, cooling and electronic control devices, and yaw mechanism. Geared nacelles generally have a longer form/ structure than gearless turbines.

The generator is what converts the turning motion of a wind turbine's blades into electricity. Inside this component, coils of wire are rotated in a magnetic field to produce electricity. The generator's rating, or size, is partly dependent on the length of the wind turbine's blades because more energy is captured by longer blades.

4.1.3. Operating Characteristics of a Wind Turbine

A turbine is designed to operate continuously, unattended and with low maintenance for more than 20 years or >120 000 hours of operation. Once operating, a wind energy facility can be monitored and controlled remotely, with a mobile team for maintenance, when required.

At very high wind speeds, typically over 25 m/s, the wind turbine will cease power generation and shut down. The wind speed at which shut down occurs is called the cut-out speed. Having a cut-out speed is a safety feature which protects the wind turbine from damage. Normal wind turbine operation usually resumes when the wind drops back to a safe level.

It is the flow of air over the blades and through the rotor area that makes a wind turbine function. The wind turbine extracts energy by slowing the wind down. The theoretical maximum amount of energy in the wind that can be collected by a wind turbine's rotor is approximately 59%. This value is known as the Betz Limit. Therefore, if a blade were 100% efficient then it would extract 59% of the energy, as this is the maximum (due to Betz law). In practice, the typical collection efficiency of a rotor is 35% to 45%. A complete wind energy system incurs losses through friction and modern systems end up converting between 20-25% of the energy in the air into electricity (which equates to 34% to 42% of the maximum (due to Betz Law)).

However, because the energy in the air is free, describing how efficiently the energy is converted is only useful for system improvement and monitoring purposes. A more useful measurement is the Capacity Factor, which is also represented as a percentage. The Capacity Factor percentage is calculated from the actual MWh output of electricity from the entire wind energy facility over 1 year divided by the nameplate maximum theoretical output for the same period. It therefore also takes wind resource, wind variability and system availability (downtime, maintenance and breakdowns) into account. Aberdeen Wind Facility 2 (Pty) Ltd has initial Net P50 predictions for Capacity Factors between 35% and 40%. This is turbine specific and subject to change, which compares favourably with other best resource sites in South Africa. This figure will be predicted more accurately when more on-site wind data has been recorded and the most suitable turbine has been chosen.

Wind turbines can be used as stand-alone applications, or they can be connected to a utility power grid. For utility-scale sources of wind energy, a large number of wind turbines are usually erected close together (suitably spaced so as to minimise wake losses and wake induced turbulence) and then connected to an on-site substation where all power is transformed to the correct voltage and then exported via a grid connection to the utility power grid. This is termed a wind energy facility.

4.2. Battery Energy Storage System (BESS) as an Energy Storage Technology

The need for a Battery Energy Storage System (BESS) stems from the fact that electricity is only produced by the Wind Energy Facility while the wind is blowing. Therefore, the storage of electricity and supply thereof during peak-demand will mean that the facility is more efficient, reliable and electricity supply more constant.

The BESS will:

» Store and integrate a greater amount of renewable energy from the Wind Energy Facilities into the electricity grid;
» This will assist with the objective to generate electricity by means of renewable energy to feed into the National Grid which will be procured under either the Renewable Energy Independent Power Producer Procurement Program (REIPPPP), other government run procurement programmes or for sale to private entities if required.
» Proposed footprint of battery storage area: Up to ~5 ha
» Proposed preferred technology to be used: Solid state battery technology (e.g. Lithium Ion)
» Battery types to be considered: Solid State Batteries as the preferred (Lithium Ion)

4.2.1 Battery Energy Storge System (BESS) technology

The general purpose and utilisation of a BESS is to save and store excess electrical output as it is generated, allowing for a timed release when the capacity is required. BESS systems therefore provide flexibility in the efficient operation of the electric grid through decoupling of the energy supply and demand. **Figures 4.4, 4.5, 4.6** and **4.7** below illustrate a typical utility scale BESS system (a Lithium-Ion BESS) as applied in the context of a renewable energy facility.

Figure 4.4: Li-Ion BESS implementation for a Renewable Energy facility (Source: Enel Green Power)

Figure 4.5: Li-Ion BESS containerised modules located within the BESS enclosure footprint (Source: Enel Green Power)

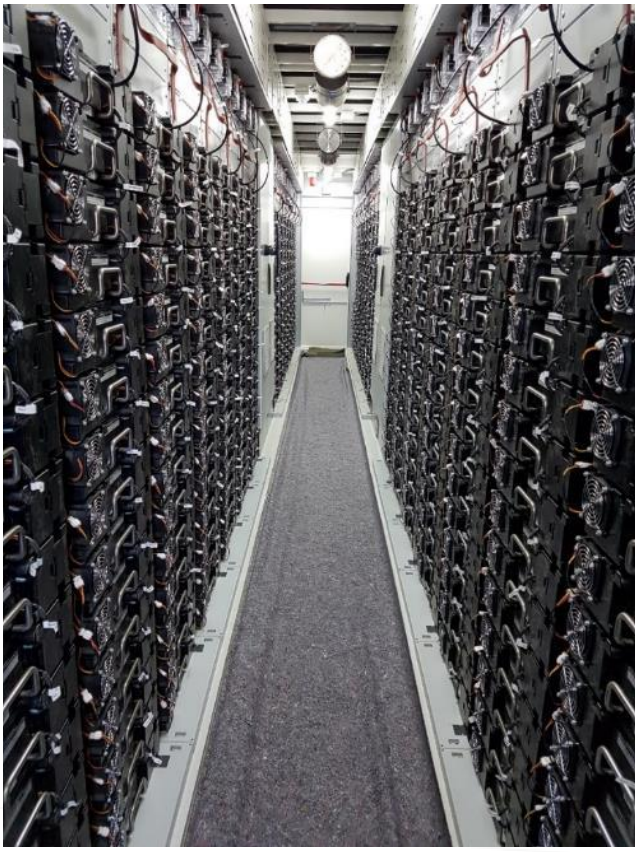

Figure 4.6: Li-Ion BESS internal design and implementation of a container used within a BESS. The image shows a series of sealed battery cell packs within a containerised module (Source: Enel Green Power)

Figure 4.7: Illustration of battery storage units installed by Tesla (Source: fastcompany.com)

As technological advances within battery energy storage systems (BESS) are frequent, two BESS technology alternatives are typically used:

- » Solid state battery electrolytes typically consist of Lead Acid (Pb), Nickel Cadium (NiCad), Lithium-Ion (Li-ion), Sodium Sulphur (NaS) or Sodium Nickle Chloride (Zebra) (NaNiCl) and use solid electrodes and electrolytes. As a result of the declining costs, Li-ion technology now accounts for more than 90% of battery storage additions globally (IRENA, 2019); and
- » Redox-flow technology (e.g. vanadium flow battery, or similar technology and chemistries). Flow batteries use solid electrodes and liquid electrolytes. The most used flow battery is the Vanadium Redox Flow Battery (VRFB), which is a type of rechargeable flow battery that employs vanadium ions in different oxidative states to store chemical potential energy.

Considering the nature of the project, only a solid-state technology type would be envisaged for implementation. The technology includes batteries housed within containers which are fully enclosed and self-contained. Therefore, the assessment proposes all solid-state technologies for authorisation to allow the proponent to determine the precise technology when the project is implemented, on the understanding that further investigation into the specific technologies available at the time of project implementation will allow for one of two to be selected and ultimately developed.

4.2.2 Compliance to local and international standards and Fire Prevention

The BESS will be compliant with all local laws and regulations and health and safety requirements governing battery facilities. Over and above that they will comply with international standards such as UN 38.3 (Transportation Testing for Lithium Batteries), UL 1642 (Standard for Safety – Lithium-ion Batteries) and IEC 62619 (Secondary cells and batteries containing alkaline or other non-acid electrolytes Safety requirements for secondary lithium cells and batteries, for use in industrial applications). Furthermore, the battery facility will also comply with standards such as UL 1973 (Batteries for Use in Stationary Applications) and IEC 62619-

2017 including thermal runaway non-propagation and safety zone region operation limits and a failure mode analysis. The design will be compliant with UL 9540 (Energy Storage Systems and Equipment): this standard defines the safety requirements for battery installation in industrial and grid connected applications.

The design of the BESS in compliance with all the local and international standards ensures that fire risk is minimal. Furthermore, each container has a built-in fire detection and suppression system. This system continually monitors the batteries and in an unlikely event of a fire it supresses the fire using inert gas. Each container is also spaced about 3m apart ensuring the chance of a fire spreading between containers (which are made of metal and therefore not easily flammable) is also minimal.

Figure 4.8 below provides a typical configuration of fire detection and suppression system.

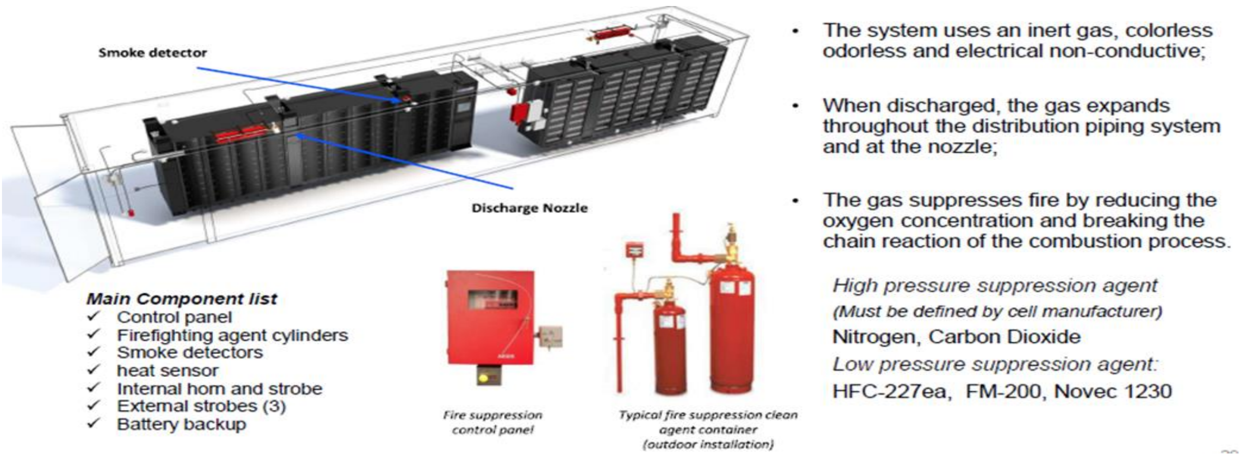

Figure 4.8: Typical configuration of fire detection and suppression system

CHAPTER 5: POLICY AND LEGISLATIVE CONTEXT

This Chapter provides an overview of the policy and legislative context within which the development of a wind energy facility such as the Aberdeen Wind Facility 2 and its associated infrastructure is proposed. It identifies environmental legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process which may be applicable to or have bearing on the proposed project. It also provides information which supports the need and justification for the project, as discussed in Chapter 6.

Further environmental legislation relevant to the project is described and considered in Chapter 7 of this Basic Assessment Report.

5.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
(e) a description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report. (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments.	A description of the policy and legislative context within which the Aberdeen Wind Facility 2 is proposed is included and considered within this chapter.

5.2 Strategic Electricity Planning in South Africa

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of basic assessment reports:

5.2 Strategic Electricity Planning in South Africa

The energy sector in South Africa has been, and continues to be, at the centre of the economic and social development. The industry directly affects the economy by using labour and capital to produce energy. As the country's economy continues to grow, the Department of Mineral Resources and Energy (DMRE) is mandated to ensure that energy resources are available, and that there is access to energy services in an affordable, reliable and sustainable manner, while minimising the associated adverse environmental impacts (Department of Energy, 2019).

The expansion of electricity generation capacity in South Africa is based on national policy and informed by on-going strategic planning undertaken by the DMRE. The hierarchy of policy and planning documentation that supports the development of renewable energy projects, such as wind energy facilities, is illustrated in **Figure 5.1**. These policies are discussed in more detail in the following sections, along with the provincial and local policies and plans that have relevance to the development of the Aberdeen Wind Facility 2.

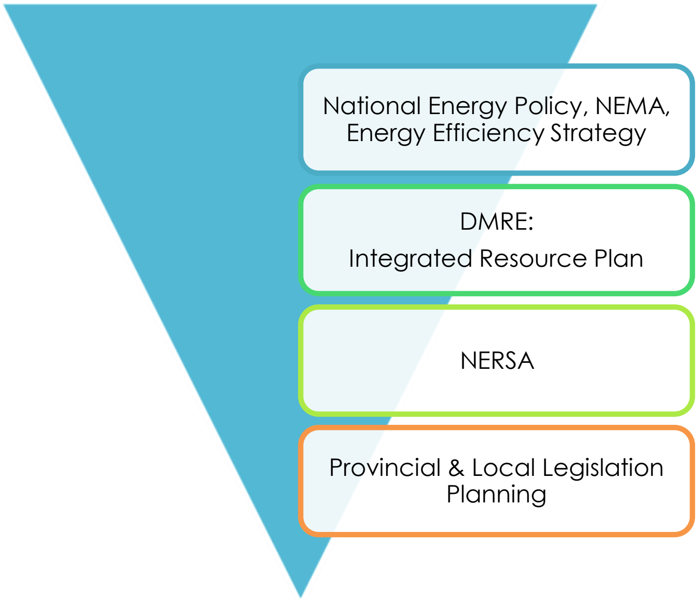

Figure 5.1: Hierarchy of electricity and planning documents

The South African energy industry is evolving rapidly, with regular changes to legislation and industry role-players. The regulatory hierarchy for an energy generation project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels. As wind energy developments are a multi-sectoral issue (encompassing economic, spatial, biophysical, and cultural dimensions) various statutory bodies are likely to be involved in the approval process of a wind energy project and the related statutory environmental assessment process.

At **National Level**, the main regulatory agencies are:

» **Department of Mineral Resources and Energy (DMRE):** This Department is responsible for policy relating to all energy forms and for compiling and approving the Integrated Resource Plan (IRP), and is also responsible for granting approvals for the use of land which is contrary to the objects of the Mineral and Petroleum Resource Development Act (No. 28 of 2002) (MPRDA) in terms of Section 53 of the MPRDA. Therefore, in terms of the Act, approval from the Minister is required to ensure that the proposed activities do not sterilise mineral resources that may occur within the broader study area.
» **National Energy Regulator of South Africa (NERSA):** NERSA is responsible for regulating all aspects of the electricity sector and will ultimately issue licenses for IPP projects to generate electricity.
» **Department of Forestry, Fisheries and the Environment (DFFE):** This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the 2014 EIA Regulations (GN R326) as amended. DFFE is the competent authority for this project (as per GNR 779 of 01 July 2016), and is charged with considering whether to grant an EA for the project under consideration. Furthermore, the Department is also responsible for issuing permits for the disturbance or destruction of protected tree

species listed under Section 15 (1) of the National Forest Act (No. 84 of 1998) (NFA). The Department is also responsible for permits for Threatened or Protected Species (TOPS) under the National Environmental Management: Biodiversity Act.

» **The South African Heritage Resources Agency (SAHRA):** SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
» **South African National Roads Agency Limited (SANRAL):** This Agency is responsible for the regulation and maintenance of all national road routes.
» **Department of Human Settlements, Water and Sanitation (DHSWS):** This Department is responsible for effective and efficient water resource management to ensure sustainable economic and social development. This Department is also responsible for evaluating applications and issuing licenses pertaining to water use (i.e. Water Use Licenses (WUL) and General Authorisation).
» **The Department of Agriculture, Land Reform and Rural Development (DALRRD):** This Department is the custodian of South Africa's agricultural resources and is responsible for the formulation and implementation of policies governing the agricultural sector and the initiation, facilitation, coordination and implementation of integrated rural development programmes.

At **Provincial Level**, the main regulatory agencies are:

» **Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT):** This Department is the commenting authority for the BA process for the project and is responsible for issuing of other biodiversity and conservation-related permits.
» **Eastern Cape Department of Transport:** This department is responsible for Provincial roads within the Eastern Cape, and for the granting of exemption permits for the conveyance of abnormal loads on public roads.
» **Eastern Cape Provincial Heritage Resources Authority (ECHRA)**: This Department identifies, conserves and manage heritage resources throughout the Eastern Cape Province.
» **Eastern Cape Department: Rural Development and Agrarian Reform:** This Department's involvement relates specifically to sustainable agricultural resource management and land care.

At the **Local Level,** the local and district municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Eastern Cape Province, both the local and district municipalities play a role. The affected local municipality is the **Dr Beyers Naude Local Municipality** which forms parts of the **Sarah Baartman District Municipality**. In terms of the Municipal Systems Act (No. 32 of 2000), it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control.

5.3 International Policy and Planning Context

A brief review of the most relevant international policies relevant to the establishment of Aberdeen Wind Facility 2 are provided below in **Table 5.1**. The facility is considered to be aligned with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 5.1: International policies relevant to the Aberdeen Wind Facility 2

Relevant policy	Relevance to the Aberdeen Wind Facility 2
United Nations Framework Convention on Climate	The Conference of the Parties (COP), established by Article 7 of the UNFCCC, is the supreme body and highest decision-making organ of the Convention. It reviews the

Relevant policy	Relevance to the Aberdeen Wind Facility 2
Change (UNFCCC) and Conference of the Party (COP)	implementation of the Convention and any related legal instruments and takes decisions to promote the effective implementation of the Convention. The Conference of the Parties (COP) 21 was held in Paris from 30 November to 12 December 2015. From this conference, an agreement to tackle global warming was reached between 195 countries. South Africa signed the Agreement in April 2016 and ratified the agreement on 01 November 2016. The Agreement was assented to by the National Council of Provinces on 27 October 2016, and the National Assembly on 1 November 2016. South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively. The policy provides support for the Aberdeen Wind Facility 2 which will contribute to managing climate change impacts, supporting the emergency response capacity, as well as assist in reducing GHG emissions in a sustainable manner.
The Equator Principles IV (October 2020)	The Equator Principles (EPs) IV constitute a financial industry benchmark used for determining, assessing, and managing a project's environmental and social risks. The EPs are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. In addition, these principles are used to ensure that projects financed by the Equator Principles Financial Institutions (EPFI) are developed in a manner that is socially responsible and reflects sound environmental management practices. The EPs are applicable to infrastructure projects (such as the proposed Project) and apply globally to all industry sectors. Such an assessment should propose measures to minimise, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of the Project. In terms of the EPs, South Africa is a non-designated country (as at 4 March 2020), and as such the assessment process for projects located in South Africa evaluates compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability, and Environmental Health and Safety (EHS) Guidelines. The Project is currently being assessed in accordance with the requirements of the 2014 EIA Regulations, as amended, published in terms of Section 24(5) of the National Environmental Management Act (No. 107 of 1998) (NEMA), which is South Africa's national legislation providing for the authorisation of certain controlled activities. Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed.
International Finance Corporation (IFC) Performance Standards and Environmental and Social Sustainability (January 2012)	The International Finance Corporation's (IFC) Performance Standards (PSs) on Environmental and Social Sustainability were developed by the IFC and were last updated on 1 January 2012. Performance Standard 1 requires that a process of environmental and social assessment be conducted, and an Environmental and Social Management System

Relevant policy	Relevance to the Aberdeen Wind Facility 2
	(ESMS) appropriate to the nature and scale of the project, and commensurate with the level of its environmental and social risks and impacts, be established and maintained. The above-mentioned standard is the overarching standard to which all the other standards relate. Performance Standards 2 through to 8 establish specific requirements to avoid, reduce, mitigate or compensate for impacts on people and the environment, and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, the standards 2 and 8 describe potential social and environmental impacts that require particular attention specifically within emerging markets. Where social or environmental impacts are anticipated, the developer is required to manage them through its ESMS consistent with Performance Standard 1. Given the nature of the Aberdeen Wind Facility 2, it is anticipated that Performance Standards 1, 2, 3, 4, 6, and 8 may be applicable to the project. • Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts • Performance Standard 2: Labour and Working Conditions • Performance Standard 3: Resource Efficiency and Pollution Prevention • Performance Standard 4: Community Health, Safety and Security • ~~Performance Standard 5: Land Acquisition and Involuntary Resettlement –~~ N/A • Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources • ~~Performance Standard 7: Indigenous Peoples –~~ N/A • Performance Standard 8: Cultural Heritage

5.4. National Policy and Planning Context

Further to the South African government's commitment in August 2011 to support the development of renewable energy capacity, the DMRE initiated the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) to procure renewable energy from the private sector in a series of rounds. According to the IPP Procurement Programme overview report (2021), as of March 2021, 6 422MW of renewable energy capacity from 112 independent power producers (IPPs) has been procured in seven bid rounds[1], with 5 078MW from 79 IPP projects operational and made available to the grid[2]. National policies have to be considered for the construction and operation of the Solar Energy Facility to ensure that the development is in line with the planning of the country.

1 Bid windows1, 2 ,3 ,3.5 ,4 and small BW1(1S2) and small BW2(2S2). 2 583 MW of renewable energy capacity was awarded to IPPs in the REIPPPP bid window 5 in October 2021. 860MW of renewable energy capacity (all solar PV) was awarded to IPPs in the REIPPPP bid window 6 in December 2022.

2 https://www.cliffedekkerhofmeyr.com/en/news/publications/2019/Corporate/energy-alert-22-october-The-Integrated-Resource-Plan-2019-A-promising-future-roadmap-for-generation-capacity-in-South-Africa.html

5.4.1 *Constitution of the Republic of South Africa, 1996*

Section 24 of the Constitution pertains specifically to the environment. It states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The Constitution outlines the need to promote social and economic development. Section 24 of the Constitution therefore requires that development be conducted in such a manner that it does not infringe on an individual's environmental rights, health, or well-being. This is especially significant for previously disadvantaged individuals who are most at risk to environmental impacts. The undertaking of an EIA process for the proposed project in terms of the requirements of the EIA Regulations, 2014 (as amended), aims to minimise any impacts on the natural and social environment.

5.4.2 *National Environmental Management Act (No. 107 of 1998) (NEMA)*

This piece of legislation is South Africa's key piece of environmental legislation and sets the framework for environmental management in South Africa. NEMA is founded on the principle that everyone has the right to an environment that is not harmful to their health or well-being as contained within the Bill of Rights.

The national environmental management principles state that the social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment. The Project is currently being assessed in accordance with the requirements of the 2014 EIA Regulations, as amended, published in terms of Section 24(5) of NEMA. Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed.

The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within NEMA.

5.4.3 *The National Energy Act (No. 34 of 2008)*

The purpose of the National Energy Act (No. 34 of 2008) is to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, while taking into account environmental management requirements and interactions amongst economic sectors, as well as matters relating to renewable energy. The National Energy Act also provides for energy planning, increased generation and consumption of renewable energies, contingency energy supply, holding of strategic energy feedstocks and carriers, adequate investment in, appropriate upkeep and access to energy infrastructure. The Act provides measures for the furnishing of certain data and information regarding energy demand, supply and generation, and for establishing an institution to be responsible for promotion of efficient generation and consumption of energy and energy research.

The Act provides the legal framework which supports the development of power generation facilities. The Act also provides for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated. The development of Aberdeen Wind Facility

2 will have to ensure compliance with this Act as a license for the generation of electricity from NERSA will be required.

5.4.4 White Paper on the Energy Policy of South Africa, 1998

The White Paper on Energy Policy places emphasis on the expansion of energy supply options to enhance South Africa's energy security. This can be achieved through increased use of renewable energy and encouraging new entries into the generation market.

The policy states that the advantages of renewable energy include, minimal environmental impacts during operation in comparison with traditional supply technologies, generally lower running costs, and high labour intensities. Disadvantages include higher capital costs in some cases, lower energy densities, and lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. Nonetheless, renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future.

5.4.5 White Paper on the Renewable Energy Policy, 2003

The White Paper on Renewable Energy Policy Supplements Government's predominant policy on energy as set out in the White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The policy recognises the potential of renewable energy and aims to create the necessary conditions for the development and commercial implementation of renewable energy technologies.

The White Paper on renewable energy sets out Government's vision, policy principles, strategic goals, and objectives for promoting and implementing renewable energy in South Africa. The country relies heavily on coal to meet its energy needs due to its abundant, and accessible and affordable coal resources. However, massive renewable energy resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped.

The development of additional renewable energy projects will promote the use of the abundant South African renewable energy resources and contribute to long-term energy security and diversification of the energy mix.

5.4.6 The Electricity Regulation Act (No. 04 of 2006) (ERA)

The Electricity Regulation Act of 2006, replaced the Electricity Act (No. 41 of 1987), as amended, except for Section 5B, which provides funds for the energy regulator for the purpose of regulating the electricity industry. The Act establishes a national regulatory framework for the electricity supply industry and introduces the National Energy Regulator (NERSA) as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licences and registration as the manner in which the generation, transmission, distribution, trading, and import and export of electricity are regulated.

5.4.7 The National Development Plan (NDP) 2030

The National Development Plan (NDP) 2030 is a plan prepared by the National Planning Commission in consultation with the South African public which is aimed at eliminating poverty and reducing inequality by 2030.

In terms of the Energy Sector's role in empowering South Africa, the NDP envisages that, by 2030, South Africa will have an energy sector that promotes:

» Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.
» Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.
» Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change.

In formulating its vision for the energy sector, the NDP took the IRP 2010 as its point of departure. Therefore, although electricity generation from coal is still seen as part of the energy mix within the NDP, the plan sets out steps that aim to ensure that, by 2030, South Africa's energy system will look very different to the current situation: coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources – especially wind, solar, and imported hydroelectricity – will play a much larger role.

The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The development of Aberdeen Wind Facility 2 supports the NDP through the development of energy-generating infrastructure which will not lead to the generation of GHGs and will result in economic development and growth of the area surrounding the development area.

5.4.8 Integrated Energy Plan (IEP), November 2016

The purpose and objectives of the Integrated Energy Plan (IEP) are derived from the National Energy Act (No. 34 of 2008). The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. It is a multi-faceted, long-term energy framework which has multiple aims, some of which include:

» To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector.
» To guide the selection of appropriate technologies to meet energy demand (i.e. the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels).
» To guide investment in and the development of energy infrastructure in South Africa.
» To propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors.

A draft version of the IEP was released for comment on 25 November 2016. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The development of the IEP is an ongoing continuous process. It is reviewed periodically to take into account changes in the macroeconomic environment, developments in new technologies and changes in national priorities and imperatives, amongst others.

The 8 key objectives of the integrated energy planning process are as follows:

- Objective 1: Ensure security of supply.
- Objective 2: Minimise the cost of energy.
- Objective 3: Promote the creation of jobs and localisation.
- Objective 4: Minimise negative environmental impacts from the energy sector.
- Objective 5: Promote the conservation of water.
- Objective 6: Diversify supply sources and primary sources of energy.
- Objective 7: Promote energy efficiency in the economy.
- Objective 8: Increase access to modern energy.

5.4.9 Integrated Resource Plan (IRP) for Electricity 2010 - 2030

The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 is a subset of the IEP and constitutes South Africa's National electricity plan. The primary objective of the IRP is to determine the long-term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing and cost. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation.

The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development.

Since the promulgated IRP 2010–2030, the following capacity developments have been procured:

- A total 6 422 MW under the Renewable Energy Independent Power Producers Programme (REIPPP) has been procured. As of 31 March 2021[3], 5 078MW from 79 IPP projects operational has been made available to the grid[4].
- 2 000MW of generating capacity (comprising various technologies) has been awarded to 8 Independent Power Producers under the RMIPPPP in March 2021.
- 2 583MW of electricity in bid window 5 of the REIPPPP, announced on 28 October 2021 (DMRE, 2021).
- 860MW of electricity in bid window 6 of the REIPPPP, with 315MW of electricity still eligable, announced on 8 December 2022.
- IPPs have commissioned 1 005 MW from two Open Cycle Gas Turbine (OCGT) peaking plants.
- Under the Eskom build programme, the following capacity has been commissioned:
    - 1 332 MW of Ingula pumped storage,
    - 1 588 MW of Medupi,
    - 800 MW of Kusile and
    - 100 MW of Sere Wind Farm.

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3 Bid windows1, 2 ,3, 3.5, 4 and small BW1(1S2) and small BW2(2S2). 2 583 MW of renewable energy capacity was awarded to IPPs in the REIPPPP bid window 5 in October 2021.

4 https://www.cliffedekkerhofmeyr.com/en/news/publications/2019/Corporate/energy-alert-22-october-The-Integrated-Resource-Plan-2019-A-promising-future-roadmap-for-generation-capacity-in-South-Africa.html

» 18 000MW of new generation capacity has been committed to.

Besides capacity additions, a number of assumptions have changed since the promulgation of IRP 2010–2030. Key assumptions that changed include the electricity demand projection, Eskom's existing plant performance, as well as new technology costs. In addition, environmental considerations such as South Africa's contribution to Greenhouse gases which contribute to climate change, local air quality and water availability have come to the fore.

These considerations necessitated the review and update of the IRP and ultimately the promulgation of a revised plan in October 2019. In terms of the IRP 2019, South Africa continues to pursue a diversified energy mix that reduces reliance on a single or a few primary energy sources. In the period prior to 2030, the system requirements are largely for incremental capacity addition (modular) and flexible technology, to complement the existing installed inflexible capacity. South Africa is a signatory to the Paris Agreement on Climate Change and has ratified the agreement. In line with INDCs (submitted to the UNFCCC in November 2016), South Africa's emissions are expected to peak, plateau and from year 2025 decline.

Following consideration of all these factors, the following provision has been made for the following new capacity by 2030:

» 1 500MW of coal;
» 2 500MW of hydro;
» 6 000MW of solar PV;
» 14 400MW of wind;
» 1 860MW of nuclear;
» 2 088MW of storage;
» 3 000MW of gas/diesel; and
» 4 000MW from other distributed generation, co-generation, biomass and landfill technologies.

Development of Aberdeen Wind Facility 2 would contribute towards the allocation for wind energy development.

5.4.10 New Growth Path (NGP) Framework, 2010

The purpose of the New Growth Path (NGP) Framework is to provide effective strategies towards accelerated job-creation through the development of an equitable economy and sustained growth. The target of the NGP is to create 5 million jobs by 2020. With economic growth and employment creation as the key indicators identified in the NGP. The framework seeks to identify key structural changes in the economy that can improve performance in term of labour absorption and the composition and rate of growth.

To achieve this, government will seek to, amongst other things, identify key areas for large-scale employment creation, as a result of changes in conditions in South Africa and globally, and to develop a policy package to facilitate employment creation in these areas.

5.4.11 National Climate Change Bill, 2018

On 08 June 2018, the Minister of Environmental Affairs published the National Climate Change Bill ("the Bill") for public comment. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans.

Aberdeen Wind Facility 2 is a renewable energy generation facility and would not result in the generation or release of emissions during its operation.

5.4.12 National Climate Change Response Policy, 2011

South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively.

As an integral part of the policy, a set of near-term priority flagship programmes will be implemented to address the challenges of climate change, one of which includes the Renewable Energy Flagship Programme. This flagship programme includes a scaled-up renewable energy programme, based on the current programme specified in the IRP 2010, and using the evolving South African Renewables Initiative led by the Department of Public Enterprise and Department of Trade and Industry (DTI), as a driver for the deployment of renewable energy technologies. The programme will be informed by enhanced domestic manufacturing potential and the implementation of energy efficiency and renewable energy plans by local government.

The policy provides support for Aberdeen Wind Facility 2 which will contribute to managing climate change impacts, supporting the emergency response capacity, as well as assist in reducing GHG emissions in a sustainable manner.

5.4.13 National Climate Change Response Strategy for South Africa, 2004

The need for a national climate change policy for South Africa was identified as an urgent requirement during the preparations for the ratification of the UNFCCC in 1997. A process to develop such a policy was thus instituted under the auspices of the National Committee for Climate Change (NCCC), a non-statutory stakeholder body set up in 1994 to advise the Minister on climate change issues and chaired by the then Department of Environmental Affairs and Tourism (DEAT). It was determined that a national climate change response strategy will promote integration between the programmes of the various government departments involved to maximise the benefits to the country as a whole, while minimising negative impacts. Further, as climate change response actions can potentially act as a significant factor in boosting sustainable economic and social development, a national strategy specifically designed to bring this about is clearly in the national interest, supporting the major objectives of the government including poverty alleviation and the creation of jobs.

A number of principles and factors guided the conception of the strategy and is required to be implemented. These are:

- Ensuring that the strategy is consistent with national priorities, including poverty alleviation, access to basic amenities including infrastructure development, job creation, rural development, foreign investment, human resource development and improved health, leading to sustainable economic growth;
- Ensuring alignment with the need to consistently use locally available resources;
- Ensuring compliance with international obligations;
- Recognizing that climate change is a cross cutting issue that demands integration across the work programmes of other departments and stakeholders, and across many sectors of industry, business and the community;
- Focussing on those areas that promote sustainable development;
- Promoting programmes that will build capacity, raise awareness and improve education in climate change issues;
- Encouraging programmes that will harness existing national technological competencies;
- Reviewing the strategy constantly in the light of national priorities and international trends;
- Recognizing that South Africa's emissions will continue to increase as development is realised.

The strategy was devised through an integrated approach and considers policies and programmes of other government departments and the fact that South Africa is a developing country. This will ensure that the principles of sustainable development are adequately served and do not conflict with existing development policies.

5.4.14 Just Transition Framework for South Africa (June 2022) - A Presidential Climate Commission Report

The Presidential Climate Commission (PCC) is a multi-stakeholder body established by the President of the Republic of South Africa to (1) advise on the country's climate change response and (2) support a just transition to a low-carbon climate-resilient economy and society. The PCC facilitates dialogue between social partners on these issues—defining the type of economy and society the country wants to achieve, and detailed pathways for how to get there.

One of the first tasks of the PCC was to design a just transition framework for South Africa. In December 2020, President Cyril Ramaphosa created the PCC to oversee and facilitate a just transition to a low-emissions and climate-resilient economy. The just transition framework is the first building block towards this objective, bringing coordination and coherence to just transition planning in the country. The just transition framework sets out a shared vision for the just transition, principles to guide the transition, and policies and governance arrangements to give effect to the transition.

The Just Transition Framework builds on research, policies, and consultations on the just transition in South Africa, as well as international best practice guidelines.

The Just Transition Framework sets out a shared vision for the just transition, principles to guide the transition, and policies and governance arrangements to give effect to the transition from an economy that is predominantly reliant on fossil-fuel based energy, towards a low-emissions and climate-resilient economy. The framework is a planning tool for achieving a just transition in South Africa, setting out the actions that the government and its social partners will take to achieve a just transition, and the outcomes to be realised in the short, medium, and long term.

5.4.15 Strategic Integrated Projects (SIPs)

The Presidential Infrastructure Coordinating Committee (PICC) was established to integrate and coordinate the long term infrastructure build programmes. Core functions include: to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support the integration of African economies. A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development and enabling regional integration.

Strategic Integrated Project's (SIP) have been developed and approved to support economic development and address service delivery in the poorest provinces. These projects are to be expedited in terms of Schedule 2 (Section 17(2)) of the Infrastructure Development Act (Act No. 23 of 2014).

SIP 8, 9 and 20 supports the development of the wind energy facility:

» SIP 8: Green energy in support of the South African economy: Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010 – 2030) and supports bio-fuel production facilities.
» SIP 9: Electricity generation to support socio-economic development: The proposed Aberdeen Wind Facility 2 is a potential SIP 9 Project as electricity will be generated and social and economic upliftment, development and growth will take place within the surrounding communities. It would become a SIP 9 project if selected as a Preferred Bidder project by the Department Mineral Resources and Energy. SIP 9 supports the acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances.
» SIP 20: Energy: Relating to energy generation and associated infrastructure.

The Embedded Generation National Programme (EGNP) forms part of the Energy Strategic Integrated Project No. 20c, which was gazetted in Government Gazette 43547 on 24 July 2020. These projects are classified as Strategic Integrated Projects are to be managed within the requirements as set out in the Infrastructure Development Act (Act No. 23 of 2014) and its amendments. The overall objective of the EGIP is to support the development and upscaling of solar photovoltaic and wind renewable energy embedded generation projects, developed by independent power producers operating in South Africa.

The outcome of the SIP process will be a letter which requests that the Project Sponsor is assisted with the necessary approvals, authorisations, licences, permissions and exemptions, as determined within the boundaries of the Infrastructure Development Act (Act No 23 of 2014).

The Aberdeen Wind Facility 2 could be registered as a SIP project once it is under development.

5.4.16 Renewable Energy Development Zones (REDZ) (GNR 114 of February 2018)

The Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa identified 8 (increased to 11 in 2021) Renewable Energy Development Zones (REDZs) that are of strategic importance for large-scale wind and solar photovoltaic energy development, including the roll-out of its supporting transmission and distribution infrastructure, in terms of Strategic Integrated Project (SIP) 8: Green Energy in support of the South African Economy. The Aberdeen Wind Facility 2 is located within the Beaufort West REDZ.

5.4.17 National Biodiversity Economy Strategy (NBES) (March 2016)

The biodiversity economy of South Africa encompasses the businesses and economic activities that either directly depend on biodiversity for their core business or that contribute to conservation of biodiversity through their activities. The commercial wildlife and the bioprospecting industries of South Africa provide cornerstones for the biodiversity economy and are the focus of this strategy.

Both the wildlife and bioprospecting sub-sectors of the biodiversity economy have already demonstrated the potential for significant future development and growth. In the study commissioned on the situational analysis of the biodiversity economy, the contribution of the biodiversity economy to the national economy can be measured in terms of Gross Domestic Product (GDP), with the wildlife and bioprospecting industries contributing approximately R3 billion to GDP in 2013. Growth in the wildlife and bioprospecting industries can make a significant impact on the national economy, while contributing to national imperatives such as job creation, rural development and conservation of our natural resources.

The Wildlife Industry value chain is centred on game and wildlife farming/ranching activities that relate to the stocking, trading, breeding, and hunting of game, and all the services and goods required to support this value chain. The key drivers of this value chain include domestic hunters, international hunters and a growing retail market demand for wildlife products such as game meat and taxidermy products. This sector is therefore characterised by an interesting combination of agriculture, eco-tourism and conservation characteristics.

Over the period 2008-2013, the total Wildlife Industry market grew by more than 14% per year. This growth comprised an average annual growth exceeding 6% in domestic hunting, a decrease in international hunting, and an exponential growth in live auction sales. It is considered likely that the consolidated Wildlife Industry has the potential to experience a weighted average annual growth rate of between 4 %-14 % per year up to 2030.

In order for the wildlife and bioprospecting sub-sectors of the biodiversity economy to achieve its full potential, a strategic partnership between the state, private sector and communities is required. To this end, a National Biodiversity Economy Strategy (NBES) is required to guide the sustainable growth of the wildlife and bioprospecting industries and to provide a basis for addressing constraints to growth, ensuring sustainability, identifying clear stakeholder's responsibilities and monitoring progress of the Enabling Actions.

The Vision of NBES is to optimise the total economic benefits of the wildlife and bioprospecting industries through its sustainable use, in line with the Vision of the Department of Environmental Affairs. The purpose of NBES is to provide a 14-year national coordination, leadership and guidance to the development and growth of the biodiversity economy.

NBES has set an industry growth goal stating that by 2030, the South African biodiversity economy will achieve an average annualised GDP growth rate of 10% per annum. This envisioned growth curve extends into the year 2030 and is aligned to the efforts of the country's National Development Plan, Vision 2030. The NBES seeks to contribute to the transformation of the biodiversity economy in South Africa through inclusive economic opportunities, reflected by a sector which is equitable - equitable access to resources, equitable and fair processes and procedures and equitable in distribution of resources (i.e. business, human, financial, indigenous species, land, water) in the market.

To address these transformation NBES imperatives, NBES has the principles of:

- » Conservation of biodiversity and ecological infrastructure
- » Sustainable use of indigenous resources
- » Fair and equitable beneficiation
- » Socio-economic sustainability
- » Incentive driven compliance to regulation
- » Ethical practices
- » Improving quality and standards of products.

The NBES provides the opportunity to redistribute South Africa's indigenous biological/ genetic resources in an equitable manner, across various income categories and settlement areas of the country. The NBES has prioritised nodes in the country for biodiversity economy transformation (BET), referred to as BET nodes. NBES prioritises 18 BET nodes, 13 rural and 5 urban districts across the nine provinces of the country, with communities having been prioritised for development of small and medium size enterprises and community-based initiatives which sustainably use of indigenous biological and/or genetic resources. The municipality within which the Project is proposed is not identified as a priority area.

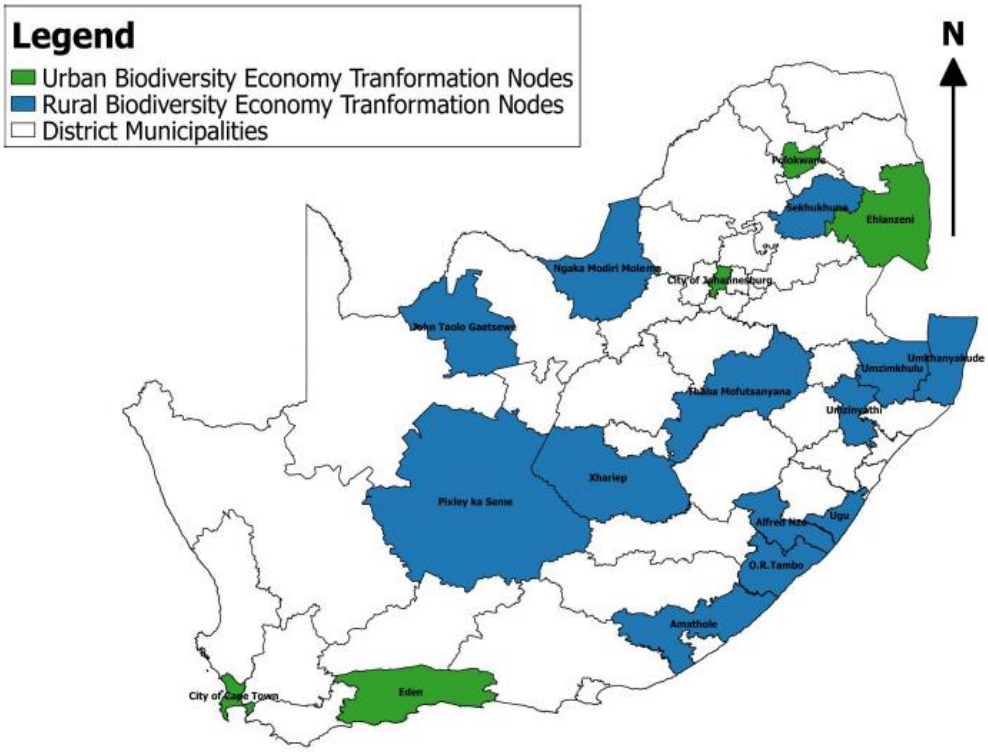

Figure 5.2: Urban and rural Biodiversity Economy Transformation Nodes

5.5 Provincial Planning and Context

5.5.1. Eastern Cape Provincial 2030 Draft Development Plan (PDP), 2014

The vision set out for 2030 is stated as a point along a journey towards ubuntu, where by 2030 the Eastern Cape will seek to achieve the commitment for the province where:

- There has been proliferation of innovation and industry, and citizens who can feed themselves.
- All children and youth manifesting our shared belief that they are the cornerstone of the future.
- Participatory local development action is driven by committed, capable citizens and conscientious institutional agents.

The 2030 vision notes that the sustainable future for the Eastern Cape rests on a people-centred development to achieve five related goals as agreed by all stakeholders involved in the process to develop this plan. The provincial development plan (PDP) identifies five goals, with the following relevant to the project

Goal 1: A growing, inclusive and equitable economy

The PDP promotes a growing, inclusive, and equitable economy. This includes a larger and more efficient provincial economy that optimally exploits the competitive advantages of the Eastern Cape, increased employment and reduced inequalities of income and wealth. The economic goal will be achieved through five strategic objectives, of which improved economic infrastructure that promotes new economic activity and development of high potential economic sectors are of relevance to the project.

In terms of improved economic infrastructure, the PDP notes that this includes positioning the Eastern Cape as a key investment hub in the energy sector and ensuring reliable energy supplies to high potential sectors. Strategic Action 1.1.6 notes that the province is positioning itself as an investment hub in the energy sector (wind farms, imported liquefied natural gas, shale-gas, and nuclear energy). This will provide opportunities to develop the capital goods sector and heavy industries.

The rapid development of high-potential economic sectors includes the energy sector with the aim of developing the province as an energy hub. Tourism is also identified as a key sector, including eco-tourism.

Goal 4: Vibrant and equitably enabled communities

Strategic objective 4.3 seeks to ensure universal access to adequate, reliable, and basic infrastructure for all by 2030.Linked to this Strategic Action, 4.3.2 outlines the requirements to ensure adequate energy infrastructure for household and public facility access and universal access to energy by 2030. The development of renewable energy hubs for remote rural areas are a potential solution, using solar, wind and biomass/biogas is identified as means to achieving this.

The PDP also identifies four catalytic flagships that are aimed at meeting the development goals and addressing the socio-economic challenges facing the province. The following are relevant to the project:

Infrastructure

The third catalytic flagship focuses on the provision and maintenance of infrastructure, including energy infrastructure. The initiative also aims to encourage private sector investment in infrastructure and develop appropriate technology. The REIPPP creates the opportunity for private sector investment in renewable energy infrastructure.

Ilima labantu

Ilima labantu is an agricultural development initiative that aims to revive the rural economy and encourage other areas of development in the province. The Eastern Cape is endowed with significant natural resources that can be used to help address its food security needs, expand its capacity to provide jobs, raise income levels and trigger development in allied industries and other sectors. The establishment of Community Trusts associated with the REIPPPP creates opportunities to support agricultural development in rural areas.

Ematholeni!

Ematholeni! (children first!). The focus is on creating and improving education opportunities and facilities in the Eastern Cape, starting with better-coordinated early childhood development (ECD). The establishment of Community Trusts associated with the REIPPPP creates opportunities to support education programmes in rural areas.

Considering the above, the Aberdeen Wind Facility 2 falls within the overall energy objective for the Province.

5.5.2. Eastern Cape Provincial Growth and Development Program

The Eastern Cape Provincial Growth and Development Programme (PGDP) (2004-2014) sets out the vision and plan for development for the Eastern Cape up until 2014. It highlights, in particular, strategies to fight poverty, promote economic and social development, and create jobs. In as far as could be established, no updated version of the Program is available.

The strategy document does not highlight any specific measures to promote the development of renewable energy sources. However, an analysis of energy sources within the province reveals that 23% of the population of the province still rely on paraffin for their energy needs while 25% rely on candles for lighting.

Section 5 of the PGDP (2004-2014) identifies six strategic objective areas or programs aimed at addressing the challenges facing the province. The PGDP indicates that the programmes have been selected for their potential in leveraging significant resources, creating a large multiplier effect, and providing a foundation for accelerated economic growth. Of specific relevance to the proposed development is the Strategic Infrastructure Programme. This programme indicates that enabling economic and logistics infrastructure – energy, roads, rail, ports, and air transport among others – is a necessary condition for economic growth and development. Specific reference is therefore made to energy infrastructure.

The report notes that development of infrastructure, especially in the former homelands, is a necessary condition to eradicate poverty through:

» The elimination of social backlogs in access roads, schools and clinics and water and sanitation.
» To leverage economic growth through access roads and improving the road, rail and air networks of the province.

Energy demands and electricity infrastructure rollout forms part of the Strategic Infrastructure Programme of the PGDP. The PGDP states that the, "…economic and logistics infrastructure – energy, roads, rail, ports, and air transport among others – is a necessary condition for economic growth and development."

The Strategic Infrastructure Programme also seeks to consolidate and build on this coastal advantage through the provision of world-class infrastructure and logistics capability at the Coega and East London IDZs and improving connectivity and linkages with major industrial centers such as Johannesburg.

The high-level objectives of the Strategic Infrastructure Programme include consolidating and building upon the strengths of the Province's globally-competitive industrial sector through the development of world-class infrastructure and logistics capability in the East London and Coega IDZs. A reliable energy supply will be critical to achieving these objectives. The proposed wind energy facility will assist to contribute to the future energy requirements of the Eastern Cape, and its proximity to the Coega IDZs will also benefit these key initiatives.

5.5.3. Eastern Cape Sustainable Energy Strategy 2012

The Eastern Cape Sustainable Energy Strategy developed in 2012 responds to a number of imperatives, including the need for improved provincial energy security and self-sufficiency, improved access to energy among the poorest in the province, and the need to stimulate a green and low-carbon economy underpinning decent and sustainable jobs.

The vision set out in 2012 was "The Eastern Cape provides the most enabling environment for sustainable energy investment and implementation in the country". The mission statement linked to the vision is "To encourage sustainable, affordable and environmentally friendly energy production and efficient use within the Eastern Cape Province by creating an enabling environment for energy production and sustainable technology, skills and industry development".

The strategy also identifies a set of goals to achieve the vision, namely:

- Goal 1: Job creation and skills development.
- Goal 2: Alleviate energy poverty.
- Goal 3: Reduce CO_2 emissions and environmental pollution.
- Goal 4: Improve industrial competitiveness.
- Goal 5: Promote renewable energy production in the Province.
- Goal 6: Promote the development of a renewable energy manufacturing industry and technology development.

Goal 3: Reduce CO_2 emissions and environmental pollution.
A key objective of Goal 3 is to reduce Greenhouse gas emissions and combat climate change.

Goal 4: Improve industrial competitiveness
Providing clean energy to manufacturers will assist them in improving the environmental performance, and therefore market competitiveness, of their products.

Goal 5: Promote renewable energy production in the Province
The production of renewable energy in the province will promote provincial energy security and self-sufficiency, improve local economies (particularly in rural areas), and assist with job creation both in urban and rural areas.

Goal 6: Promote the development of a renewable energy manufacturing industry and technology development
Meeting goal 6 will create jobs and develop skills and industrial expertise.

The strategy lists a number of recommendations, of which the following are relevant to the development.

Recommendation 1
The development of a sustainable energy sector should form an integral and important part of the Province's development initiatives such as the Provincial Growth and Development Plan and the Green Economy theme of the Provincial Industrial Development Strategy and Implementation Plan.

Recommendation 4
Develop an Eastern Cape Provincial locational perspective on renewable energy, this includes guidance on the appropriate location of renewable energy developments. This includes environmental sensitivity analysis using existing data from various environmental planning processes which indicate ecosystem sensitivities and general parameters that renewable energy developments should work within to avoid controversy and prevent environmental damage and unsustainable development patterns emerging.

5.5.4. Eastern Cape Climate Change Response Strategy (2011)

The Eastern Cape Climate Response Strategy (ECCCRS) was initiated by the Eastern Cape Provincial Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) in January 2010. The province recognised itself as a contributor of climate change whilst simultaneously being vulnerable to the effects of climate change. The key aspects of the Eastern Cape Climate Change Response Strategy (ECCCRS) Report were discussed in the MEC's (DEDEA: Department of Economic Development, Environmental Affairs) 2011 budget speech: "*The recent completion of the Eastern Cape Climate Change Response Strategy paves the way for the Province to explore alternative industrial models supporting a Green Economy and Decent Work. Avenues that hold potential include alternate building materials, reducing emissions, and the establishment of alternate energy generation. We concur with the Ministers of Economic Development and Environmental Affairs, who believe that the renewable energy industry could boost Government's plans to halve unemployment by 2014. Minister Patel estimates that up to 300 000 jobs can be created in the green economy over ten years. He projects that the benefits, which include health and pollution management, waste collection, disposal and storage activities, could generate between R22 billion and R36 billion within the environment sector*".

Key points from the ECCCRS in line with the MEC's address include the DEDEAT's commitment to develop and implement policy in accordance with the National Green Paper for the National Climate Change Response Strategy (2010), and an acknowledgement of the Eastern Cape Province's vulnerability to climate-change. The development and promotion of a provincial green economy, including green jobs, and environmental learnership is regarded as an important provincial intervention in addressing climate change. The renewable energy sector, including solar and wind energy (including also biofuels and energy from waste), is explicitly indicated as an important element of the Provincial Climate Change Response Strategy.

According to strategy, wind energy was the fastest growing energy technology sector, which accounted for more than 50% of worldwide clean energy investment, in 2009 as well as almost half of the installed clean energy capacity worldwide. The South African Wind Energy Association called for 25% of the overall electricity generation mix by 2025 to be derived from renewable energy, with 80% of this target potentially coming from wind power. The ECCCRS further indicated that by mid-2010 more than 30 separate wind farms ranging from 8MW to over 100MW had been planned for the Eastern Cape.

As part of the strategy, Greenhouse Gas (GHG) mitigation programmes have been developed and include the following:

- Mainstreaming GHG mitigation in provincial and local government and in industry
- Promotion of renewable energy in the Eastern Cape
- Mitigation and opportunities for rural livelihoods
- Mitigation in solid waste and wastewater treatment
- Greenhouse gas mitigation in transport

The development of the Aberdeen Wind Facility 2 contributes towards the strategy as it is in line with some of the mitigation measures that have been developed in an effort to reduce GHG emissions, albeit only to a limited extent.

5.5.5. Eastern Cape Sustainable Energy Strategy (2012)

The Eastern Cape Sustainable Energy Strategy identifies six (6) goals to assist in achieving the Province's vision of creating an enabling environment for sustainable energy investment and implementation, and these goals include:

- Job creation and skills development
- Alleviate energy poverty
- Alleviate CO2 emissions and environmental pollution
- Improve industrial competitiveness
- Promote renewable energy production in the Province
- Promote the development of a renewable energy manufacturing industry and technology development

Considering the goal to promote renewable energy production and the associated manufacturing industry in the Province, the development of the Wind Garden Wind Farm is considered to contribute to the goals.

5.5.6. Eastern Cape Environmental Management Bill (Department of Economic Development, Environmental Affairs and Tourism, 2019)

This Bill ensures that the government of the Province of the Eastern Cape shall manage the environment in such a way that the basic right of every citizen can be realised. The Bill seeks to ensure that an adverse impact on the environment is limited and that the rights of all that live in the province with regard to the environment are protected.

Applicable clauses within the bill in the context of this study include:

- Provides for the transfer of hunting and other rights of a holder of a certificate of adequate enclosure.
- Provides for the MEC's general powers in respect of wild animals.
- Details restricted activities involving provincially protected and endangered species.

» Stipulates obligations of holders of certificates of adequate enclosure.
» Details permit requirements of persons and businesses operating game parks etc.

5.5.7. Eastern Cape Biodiversity Conservation Plan (2019)

A Biodiversity Conservation Plan (BCP), also known as a Biodiversity Sector Plan, is a tool that guides and informs land use and resource-use planning and decision-making by a full range of sectors whose policies, programmes and decisions impact on biodiversity, in order to preserve long-term functioning and health of priority areas known as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). The purpose of the plan is to provide a map of these important biodiversity areas and develop associated land use management guidelines to inform:

1. Cross-sectoral spatial planning at all levels of government, relevant to sectors whose policies, actions and decisions impact on biodiversity;
2. Environmental assessment and authorisations; and
3. Natural resource management and protected area expansion programmes.

A complete revision of the first version of the Eastern Cape Biodiversity Conservation Plan (ECBCP2007) was undertaken. The Eastern Cape Biodiversity Conservation Plan (ECBCP2019) was developed in line with the principles and methods gazetted in the National Environmental Management: Biodiversity Act No 291 of 2009, "*Guideline regarding the determination of Bioregions and the Preparation of and publication of Bioregional Plans*".

The Eastern Cape Biodiversity Conservation Plan (ECBCP) is responsible for mapping areas that are priorities for conservation in the province, and defines Terrestrial and Aquatic CBAs. The Terrestrial CBA map and the Aquatic CBA maps developed in the current assessment replace, in their entirety, the ECBCP2007 maps and are presented in Part C of the ECBCP2019.

Land use guidelines have been developed to influence planning and development. These are detailed in Part D of the ECBCP2019 and summarised below.

Table 5.2: Terrestrial Critical Biodiversity Areas and Biodiversity Land Management Classes as described by the Eastern Cape Biodiversity Conservation Plan

CBA Map Category	Desired State	Land management objective
Protected Areas	Natural	Protected Areas are managed through Protected Area Management Plans and are therefore not managed through the ECBCP2019.
Critical Biodiversity Area 1	Natural	Maintain in a natural state (or near-natural state if this is the current condition of the site) that secures the retention of biodiversity pattern and ecological processes. For areas classified as CBA1, the following objectives must apply: » Ecosystem and species must remain intact and undisturbed; » Since these areas demonstrate high irreplaceability, if disturbed or lost, biodiversity targets will not be met; » Important: these biodiversity features are at, or beyond, their limits of acceptable change.

CBA Map Category	Desired State	Land management objective
		If land use activities are unavoidable in these areas, and depending on expert opinion of the condition of the site, a Biodiversity Offset must be designed and implemented
Critical Biodiversity Area 2	Natural	Maintain in natural (or near-natural state if this is the current condition of the site) that secures the retention of biodiversity pattern and ecological processes. For areas classified as CBA2, the following objectives must apply: » Ecosystem and species must remain intact and undisturbed; » There is some flexibility in the landscape to achieve biodiversity targets in these areas. It must be noted that the loss of a CBA2 area may elevate other CBA 2 areas to a CBA 1 category. » These biodiversity features are at risk of reaching their limits of acceptable change. If land use activities are unavoidable in these areas, and depending on the condition of the site, set-aside areas must be designed in the layout and implemented. If site specific data confirms that biodiversity is significant, unique and/or highly threatened or that a Critically Endangered or Endangered species is present, Biodiversity Offsets must be implemented.

Ecological Support Area 1	Functional	Maintain ecological function within the localised and broader landscape. A functional state in this context means that the area must be maintained in a semi-natural state such that ecological function and ecosystem services are maintained.
		
		For areas classified as ESA1, the following objectives apply:
		» These areas are not required to meet biodiversity targets, but they still perform essential roles in terms of connectivity, ecosystem service delivery and climate change resilience.
		» These systems may varying in condition and maintaining function is the main objective, therefore:
		    * Ecosystems still in natural, near natural state should be maintained.
		    * Ecosystems that are moderately disturbed/degraded should be restored

Ecological Support Area 2	Functional	Maintain current land use with no intensification For areas classified as ESA2, the following objectives apply:
		
		» These areas have already been subjected to severe and/or irreversible modification
		» These areas are not required to meet biodiversity targets, but they may still perform some function with respect tov connectivity, ecosystem service delivery and climate change resilience
		» Objective is to maintain remaining function, therefore:
		    * Areas should not undergo any further deterioration in ecological function.
		    * Opportunities to change land use practices to improve ecological function (i.e. cultivation agriculture to livestock grazing agriculture) are desirable in ESA2 areas.

CBA Map Category	Desired State	Land management objective
Other Natural Areas and No Natural Habitat Remaining	Production	No desired state or management objective is provided for ONA or NNR.

The ECBCP2019 states the following regarding the development of the development of wind energy facilities:

5.6 Local Policy and Planning Context

The local tiers of government within which the Aberdeen Wind Facility 2 is located is the Dr Beyers Naude Local Municipality which falls within the jurisdiction of the Sarah Baartman District Municipality. The development instruments or policies at both the district and local level contain objectives which are in line with the development of the Aberdeen Wind Facility 2. These include economic growth, job creation, community upliftment and poverty alleviation.

Table 5.2: Relevant district and local legislation and policies for the Aberdeen Wind Facility 2

Relevant policy	Relevance to the Aberdeen Wind Facility 2
Dr Beyers Naude Municipality Spatial Development Framework (SDF) Final Report (2021)	Dr Beyers Naudé Local Municipality (BNLM) is third largest Local Municipality in the country and covers an area of 28,653 km². The main settlements include Graaff-Reinet, Willowmore, Aberdeen, Jansenville, Steytlerville, Nieu-Bethesda, Klipplaat and Rietbron; plus a number of smaller settlements and surrounding farms. The town of Graaff-Reinet, 4th oldest in South Africa and referred to as the "Gem of the Karoo", is a hub of agri-tourism activity and the political and administrative seat of the Municipality. In terms of the settlements and their functions Aberdeen is identified as a sub-district centre. The Spatial Development Framework (SDF) notes that the town is located at the junction of the N9 and R61 national and regional distributors and serves an important agricultural service centre to the surrounding community who practice primary stock and game farming activities. Furthermore, the town is surrounded by primarily privately owned agricultural land units. The urban area comprises of Aberdeen Town, Lotusville and Thembalesizwe settlements. In terms of potential project linked socio-economic development opportunities, the SDF notes that adequate vacant and partly serviced land is available in Aberdeen for community facilities. This land can be rezoned for community needs and facilities. New spatial planning must provide for all land use and facilities identified by the municipality and residents of Aberdeen. The SDF indicates that the population of Aberdeen was 5 133, made up of 1 407 households. The vision of the BNLM SDF is "A resilient and prosperous community living in a pleasant, healthy environment with sustainable well-planned development and integrated settlements". The SDF notes that the spatial vision can be expanded into four primary spatial goals: » Spatial Goal 1: Integrated and Efficient Settlements. » Spatial Goal 2: Tourism and Agricultural Development. » Spatial Goal 3: Sustainable Resource Use. » Spatial Goal 4: Mainstream Spatial Planning. Spatial Goal 3 lists a number of objectives that are relevant to the proposed development. The following are of specific relevance.

Relevant policy	Relevance to the Aberdeen Wind Facility 2
	Alternative energy production Green energy production developments (Solar and wind) are supported in principle provided that any negative impacts on the tourism and agricultural economy are avoided. These developments, particularly wind energy production facilities, have a high visual impact on the surrounding area and should be located away from existing and future tourism focus area - Preferably outside of the 10km 'buffer' surrounding the World Heritage Site. The SDF makes specific reference to renewable energy and refers to projects located near Aberdeen. The SDF also refers to the potential impacts associated with the establishment of renewable energy projects, including potential damage to roads and other infrastructure and their strain on the region's scarce water resources, is a concern. Reference is also made to the traffic impacts associated with the transportation of wind turbine components. **Use of appropriate technology** Alternative and appropriate technologies are utilised to reduce the demand on non-renewable fuel energy and scarce resource. **Adopting the current protected area network** The protected area network together with the proposed ecological linkages is acknowledged in the spatial plan and the appropriate land use management guidelines implemented. The areas that have been identified for protected area expansion have been mapped and are subjected to similar land use management guidelines as for the protected area. In terms of economic activities tourism and ecotourism are the two key economic drivers in the DBNLM. The key tourist and eco-tourism assets include the Camdeboo National Park with the Valley of Desolation. The SDF highlights the risks posed by climate change
Sarah Baartman District Municipality Draft Integrated Development Plan for 2022/2027 (2021/2022)	The vision of the Sarah Baartman District Municipality (DM) is "An innovative and dynamic municipality striving to improve the quality of life for all communities in the District". The mission of the Sarah Baartman DM is to "Co-ordinate, support and provide sustainable services and promote socio-economic development". The following strategic and local economic development objectives have been identified for the Sarah Baartman DM: » Infrastructure development » Capacity building and support » Economic development » Community services provision » Institutional development The Sarah Baartman IDP identifies the green economy (including, but not limited to renewable energy and ecosystem services) as a focal point of economic development in the district, noting that such investments are likely to have significant economic spinoffs for local income streams. To achieve this, the IDP proposes investing in natural capital so as to create a new generation of green economy jobs rooted in renewable energy. The development of the Aberdeen Wind Facility 2 is in line with the objectives of the IDP and will contribute to the achieving of the objectives, albeit to a limited extent.

Relevant policy	Relevance to the Aberdeen Wind Facility 2
	The contribution of the tourism as a key private sector driven industry, is noted within the IDP, however concern is drawn to the fact visits from other regions in South Africa has decreased at an average annual rate of-5.21% whilst visits from tourists from other countries decreased at an average annual growth rate of 2.99% from 2009. . Due to the COVID Pandemic and the closing of national and provincial borders and limited travel permitted as well as the closure of most of the tourist and hospitality industry the situation for 2020-2021 is extremely bleak for Tourism in SBDM.
Dr Beyers Naude Municipality Integrated Development Plan 2020/ 2021	The vision of the BNLM is "A responsive, developmental and unifying Local Government providing quality services to its citizens in a safe, healthy and well managed environment, with equal opportunities for all." The IDP lists five Key Performance Areas (KPAs), namely: » KPA 1 Organizational Transformation & Institutional Development » KPA 2 Service Delivery & Infrastructure Planning » KPA 3 Local Economic Development » KPA 4 Financial Viability » KPA 5 Good Governance & Public Participation KPA 3, local economic development, is the most relevant KPA to the development. The IDP identifies a number of challenges facing economic development in the BNLM, including high levels of unemployment and poverty. The IDP also notes that a key constraint to economic growth in the BNLM is the shortage of water. The IDP lists a number of requirements that are required to supporting LED. The following are relevant to the proposed development. » Creation of an environment conducive to economic development through the provision of economic and other infrastructure and investment incentives. » Creation of employment opportunities and poverty eradication programmes that support and involve SMMEs. » Created opportunities for skills development and training (internships, learnerships, apprenticeships etc). » Support Basic Education & Training (ABET, skills development courses). » Provide community facilities (sports, recreation, and cultural facilities). The IDP also identifies climate change and the associated droughts as a key threat / risk to economic development. With reference to renewable energy the IDP notes that the Municipality supports renewable energy and green technology and is actively seeking ways and means to play a meaningful role in alleviating the country's energy crisis, by partnering with or supporting initiatives for alternative and renewable energy. However, the IDP also notes that the development of renewable energy projects should not impact on the natural environment and or the health and the livelihoods of its communities. Of specific reference the IDP does refer to the potential threats posed by proposed wind farms. The proposed development area is located in Ward 1. Key challenges facing Ward 1 include: » Unemployment and low skills levels. » Lack of sports and recreation facilities » Land for commercial and agricultural development.

5.7 Conclusion

From a review of the relevant policy and planning framework, it can be concluded that the project is well aligned with the policy framework, and a clear need for the project is seen from a policy perspective at a local, provincial, and National level.

CHAPTER 6: NEED AND DESIRABILITY

One of the objectives of the EIA process is to motivate for "*the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint*". The need and desirability of a development needs to consider whether it is the right time and right place for locating the type of land-use/activity being proposed. Need and desirability must consider the wise use of land, and should be able to answer the question of what the most practicable and/sustainable use of land is.

This chapter provides a description of the need and desirability of the Aberdeen Wind Facility 2 at the project site considered to be reasonable and feasible by the project Applicant.

6.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location.	The need and desirability of the Aberdeen Wind Facility 2 is included and discussed within this chapter. The need and desirability for the development of the Aberdeen Wind Facility 2 has been considered from an international, national, regional and site-specific perspective.

6.2 Need and Desirability from an Energy Perspective

Electricity is essential for most human activities and for South Africa's social and economic development. The development of large-scale electricity generation projects contributes towards security of supply and assists in minimising the costs of energy. In order for the benefits associated with electricity to be realised, it needs to be readily available, easily accessible, and affordable. It should also be generated in a sustainable manner, while minimising adverse social and environmental impacts. In addition to energy provision, large-scale electricity generation projects, such as wind energy facilities, have the ability to contribute positively to the creation of skilled, unskilled, and semi-skilled employment opportunities and mitigate climate change.

An increased supply of electricity within or to an area is also considered beneficial from a development perspective as the availability of electricity and other services can act as a pull factor attracting new development and industry.

6.3 Need and Desirability from an International Perspective

The need and desirability of the Aberdeen Wind Facility 2 from an international perspective, can be described through the project's alignment with internationally recognised and adopted agreements, protocols, and conventions. South Africa is signatory to a number of international treaties and initiatives, including the United Nation's Development Programme's (UNDP's) Sustainable Development Goals (SDGs).

The SDGs address social and economic development issues such as poverty, hunger, health, education, climate change, gender equality, water, sanitation, energy, urbanisation, environment and social justice. The SDGs comprise 17 global goals set by the United Nations. The 17 SDGs are characterised by 169 targets, and 304 indicators.

Goal 7 of the SGDs relates to "Affordable and Clean Energy", with the aim of the goal being to ensure access to affordable, reliable, sustainable and modern energy for all. The following targets and indicators have been set for Goal 7:

Targets		Indicators	
7.1	By 2030, ensure universal access to affordable, reliable and modern energy services.	7.1.1 7.1.2	Proportion of population with access to electricity. Proportion of population with primary reliance on clean fuels and technology.
7.2	By 2030, increase substantially the share of renewable energy in the global energy mix.	7.2.1	Renewable energy share in the total final energy consumption.
7.3	By 2030, double the global rate of improvement in energy efficiency.	7.3.1	Energy intensity measured in terms of primary energy and GDP.
7.A	By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.	7.A.1	Mobilised amount of United States dollars per year starting in 2020 accountable towards the $100 billion commitment.
7.B	By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support.	7.B.1	Investments in energy efficiency as a percentage of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services.

The development of the Aberdeen Wind Facility 2 would contribute positively towards achieving Goal 7 (and specifically 7.2.1) of the SGDs through the following means:

» By generating up to 240MW (contracted capacity) of affordable and clean energy.
  * A study published by the CSIR on 14 October 2016 ("Cost of new power generators in South Africa Comparative analysis based on recent Independent Power Producer (IPP) announcements", Dr Tobias Bischof-Niemz and Ruan Fourie) which took into consideration the results of the cost prices bid successfully under the Department of Mineral Resources and Energy's Renewable Energy (RE) IPP and Coal Baseload IPP Procurement Programmes, found that solar PV and wind were 40% cheaper than new baseload coal (i.e. R0.62/kWh for PV and wind vs R1.03/kWh for coal).
  * Wind power technology is one of the clean electricity generation technologies, as it is not a consumptive technology and does not result in the release of emissions during its operation.
» By contributing towards South Africa's total generation capacity, specifically through the utilisation of renewable energy resources.

The Kyoto Protocol (1997) is also relevant to the need of the development of the Aberdeen Wind Facility 2 from an international perspective. The protocol calls for the reduction of South Africa's greenhouse gas emissions through actively cutting down on using fossil fuels, or by utilising more renewable resources. The development of the Aberdeen Wind Facility 2 will add capacity to the renewable energy sector of the country and strengthen the commitment and action plan to achieve the requirements, as set out in the protocol, through the generation of energy without the emission of greenhouse gasses.

6.4 Need and Desirability from a National Perspective

South Africa has experienced 15 years of intermittent black-outs and in the recent months, the country has yet again faced a considerable shortage in the availability and stability of electricity supply. Following the energy crisis in 2008, the South African Government embarked on a process to introduce renewable energy on a large scale and further enhanced the promotion of energy efficiency in all sectors to meet the demand of energy, while reducing CO_2 emissions and creating jobs. As a consequence, significant investment in renewable energy projects and energy efficiency is required. Increasing the diversity of South Africa's electricity mix is important, not only for enhancing the crucially important security of supply of the country, but also to support job creation and mitigate climate change.

The National Development Plan (NDP) envisages that, by 2030, South Africa will have an energy sector that provides reliable and efficient energy service at competitive rates; that is socially equitable through expanded access to energy at affordable tariffs; and that is environmentally sustainable through reduced emissions and pollution. Historically, coal has provided the primary fuel resource for baseload electricity generation in South Africa. Consequently, Eskom, who is the main electricity generating company in the country, generates approximately 85% of the country's electricity from coal resources (Stats SA, 2016), resulting in a large carbon footprint. Taking into consideration the need to ensure adequate supply of electricity and meet international obligations in terms of addressing climate change, Government has identified the need to diversify the energy mix within the country.

South Africa needs to build about 40 000MW of new generation capacity to meet demand requirements. According to the NDP, 17800MW should be provided by renewable energy projects. To achieve this, the government plans to install a total of 8 400 MW of wind energy, 8 400MW of solar photovoltaic energy, and 1 000 MW of concentrated solar power by 2030.

The Aberdeen Wind Facility 2 is proposed in specific response to the identified energy mix of South Africa as per the requirements set out in the IRP with regards to renewable energy targets. As a result, the need and desirability of the project from a national perspective can largely be assimilated from the project's alignment with national government policies, plans, and programmes which have relevance to energy planning and production (as discussed in detail in Chapter 5). The following key policies have been developed by Government to take into account South Africa's current energy production and projected future demands, and provides the necessary framework within which energy generation projects can be developed:

» Integrated Energy Plan (IEP)
» Integrated Resource Plan (IRP)

The above-mentioned policies have been extensively researched and are updated on an on-going basis to take into consideration changing scenarios, new information, developments in new technologies, and to reflect updated demands and requirements for energy production within the South African context. These plans form the basis of South Africa's energy generation sector and dictate national priorities for energy production.

The IEP is intended to provide a roadmap of South Africa's future energy landscape which guides future energy infrastructure investments and policy development. South Africa has a good wind resource for the development and generation of wind energy.

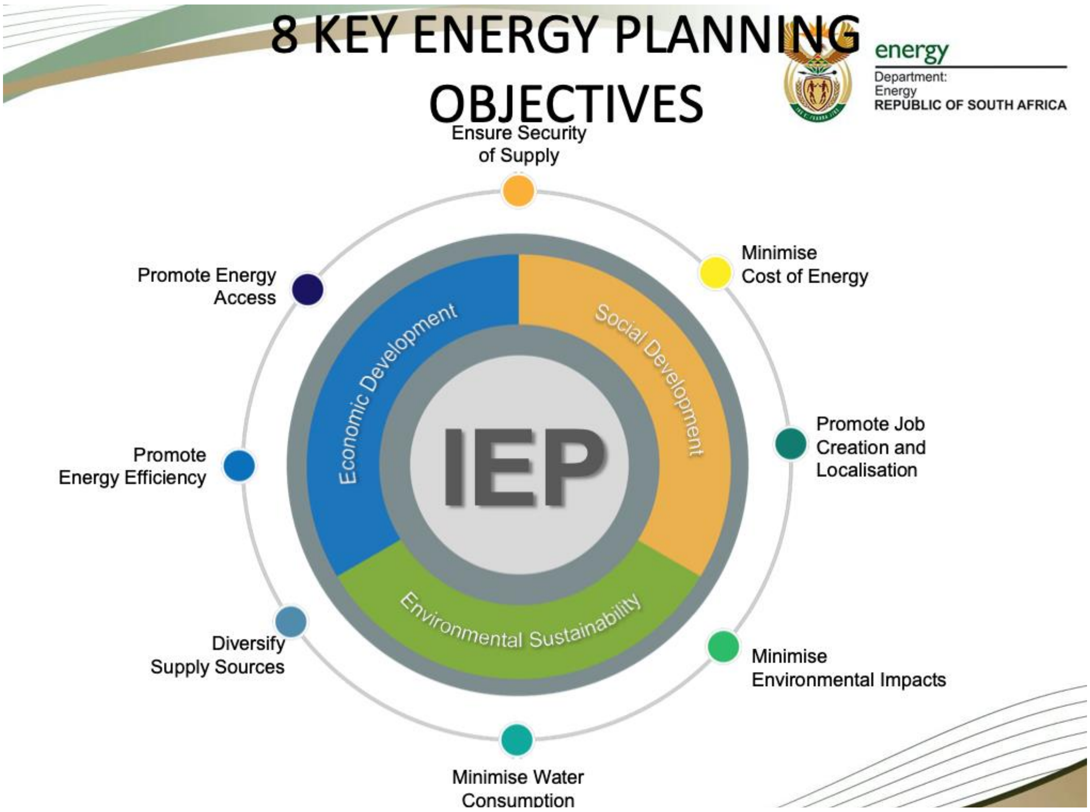

Figure 6.1: Eight key energy objectives as listed in the IEP, 2016 (extract from DOE presentation, December 2016)

In terms of electricity generation, the IEP states that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources, and includes the following statement regarding solar energy's contribution to the diversified energy mix:

» *Wind energy should continue to play a role in the generation of electricity. Allocations to ensure the development of wind energy projects aligned with the IRP should continue to be pursued.*

The IRP for Electricity 2010 – 2030 (gazetted in 2019) is a subset of the IEP and constitutes South Africa's current gazetted energy plan. The purpose of the plan is to ensure sustainable electricity development which takes into consideration technical, economic, and social constraints, and identifies investments in the electricity sector which are required to meet the country's forecasted electricity demands at minimum costs. This plan provides for the development of a total 17 742MW of capacity from wind energy facilities by 2030, with an annual contribution of 1600MW from 2022.

Provision has been made for new additional capacities in the IRP 2019 (refer to **Table 6.1**).

Table 6.1: Overview of the total installed capacity expected by 2030

IPP Procurement Programme	Technology	MW	Total
Renewables	Wind	17 742MW	31 320MW
	Solar CSP	6000MW	
	Solar Photovoltaic	8 288MW	
	Hydro	4 600MW	
Coal	Coal	33 364MW	33 364MW
Nuclear	Nuclear	1 860MW	1 860MW
Gas & Diesel	Gas & Diesel	3 000MW	3 000MW
Other (Distributed Generation, CoGen, Biomass, Landfill)	Other (Distributed Generation, CoGen, Biomass, Landfill)	4 000MW	4 000MW

Renewable resources are valuable in contributing towards electricity generation and diversifying South Africa's electricity mix, while contributing towards South Africa's response to Climate Change. A number of IPP Procurement Programmes have been initiated by government to secure electricity generated from a range of resources from the private sector (i.e., from Independent Power Producers, or IPPs). Between 2011 and 2022, the South African Government, through its IRP 2010 -2020, have successfully launched and completed six bidding windows under the REIPPP Programme. Approximately 4.51GW of projects are already in operation, with wind and solar PV projects compromising most of the projects awarded.

In addition to government procurement programmes, various private procurement initiatives have been undertaken by various industries that are electricity intensive which have identified a need to diversify their energy mix and to change their reliance on State-provided electricity. In 2021, the South African government acknowledged that aging state-owned electricity infrastructure and a demand far surpassing supply, is hampering the country and economy's growth. On 10 June 2021, President Ramaphosa announced the government's approval of an increase in the generation license exemption threshold for embedded generation facilities from 1MW to 100MW. This allows industry to not only generate electricity for self-consumption but allows them to develop facilities with a more realistic capacity response to their demand requirements without the need to obtain a Generation License from NERSA. This in turn aims to reduce generation demands on the national grid and to alleviate residential, commercial, and industrial electricity supply constraints.

In addition to the policy considerations detailed above, Government has prioritised post COVID-19 turnaround plans in terms of renewable energies within the Just Energy Transition (JET), coupled with key development objectives of the various spheres of government. These policies share the same ideals, such as:

» The utilisation, application and investment in renewable energy resources in South Africa is considered to be an essential means of reducing the carbon footprint of the country;
» Diversifying the national economy;
» Reducing poverty; and

» Providing critical additional energy to that provided by Eskom.

Government has compiled an Economic Reconstruction and Recovery Plan which was presented to Parliament in October 2020. According to this plan, the economic survey will rely on a massive investment in infrastructure, including energy, telecommunications, ports and rail. The core elements of the Economic Reconstruction and Recovery Plan are as follows:

1. Priority interventions for economic recovery: the plan sets out eight priority interventions that will ignite South Africa's recovery and reconstruction effort. These are the flagship initiatives that all of society will rally around to build a new economy (refer to **Figure 6.2**).
2. Enabling conditions for growth: these are growth-enhancing reforms and other preconditions for an inclusive, competitive and growing economy.
3. Macroeconomic framework: economic reconstruction and recovery requires careful mobilisation of resources to ensure fiscal sustainability.
4. Institutional arrangements: the plan focuses on execution, and is supported by enhanced institutional arrangements to ensure implementation and accountability.

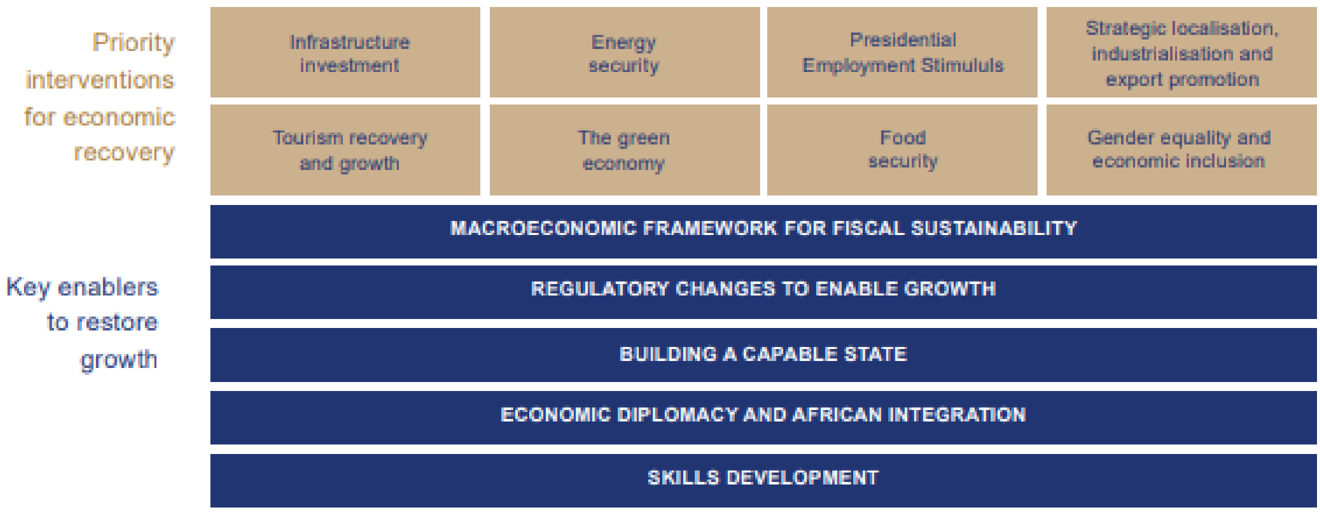

Figure 6.2: Core elements of the Economic Reconstruction and Recovery Plan (source: Building a new economy - Highlights of the Reconstruction and Recovery Plan, Presidency of the Republic of South Africa)

The plan recognises energy security as the most important prerequisite for the recovery agenda and states that renewed investment in a diversified energy mix can be achieved within a short time horizon, while alleviating a crippling energy crisis and facilitating a necessary transition to a less carbon-intensive economy. One of the key commitments of the plan is therefore to implement the IRP 2019 without delay to provide a substantial increase in the contribution of renewable energy sources by 2030, alongside other sources including battery storage, gas and clean coal. The transition to green energy is recognised as contributing towards the realisation of the low-carbon, climate-resilient and inclusive economy envisaged by the National Development Plan. The development of the Aberdeen Wind Facility 2 is identified as a mechanism for securing additional power generation capacity as part of the REIPPP programme or for private off-takers, reducing the reliance for electricity on Eskom.

The development of the Aberdeen Wind Facility 2 will ensure the optimisation of supply, as well as play a significant role in the Just Energy Transition by supplying low-cost energy to the national grid.

The South African government has identified the green economy as one of 12 job drivers that could help contribute to creating 5 million additional jobs by 2020. The New Growth Path, in which the sectoral jobs targets are disaggregated, envisages that as many as 300 000 new direct jobs could be created in the areas of natural resource management and renewable energy construction (Department of Energy, 2019). As the project forms part of the REIPPP programme, the Applicant will implement similar social and economic development strategies, including amongst others, job creation, local content, skills development, enterprise and supplier development, and socio-economic development. In addition to electricity generation and supply the project will therefore also contribute positively towards socio-economic development of a region, over and above job creation.

The need for new power generation from wind energy has, therefore, been identified and assessed by Government at a national scale considering the national energy requirements as well as international commitments to address climate change under the Paris Agreement, and provision has been made for the inclusion of new wind power generation capacity in South Africa's energy mix. The implementation of the Aberdeen Wind Facility 2, therefore, has the potential to contribute positively towards the identified national need, while simultaneously contributing to job creation and socio-economic development, which is identified as a need for the country within the National Development Plan. The wind farm will make use of renewable energy technology and would contribute positively towards reducing South Africa's GHG emissions and the Just Energy Transition of the country. In addition, by making use of wind power technology, the project would have reduced water requirements, when compared with other generation technologies such as coal and gas, in alignment with one of the vision 2030 themes of DWS's National Water Resource Strategy 2 (2013) (i.e. transitioning to a low carbon economy through stimulating renewable energy and retrofitting buildings).

6.5 Need and Desirability of the project from a Provincial Perspective

South Africa's electricity generation mix has historically been dominated by coal. This can be attributed to the fact that South Africa has abundant coal deposits, which are relatively shallow with thick seams, and are therefore easy and comparatively cost effective to mine. In 2016, South Africa had a total generation capacity of 237 006GWh; approximately 85.7% (equivalent to 203 054GWh) of this figure was generated by coal, and only 0.9% (equivalent to 2 151GWh) was generated by wind (refer to **Figure 6.3**).

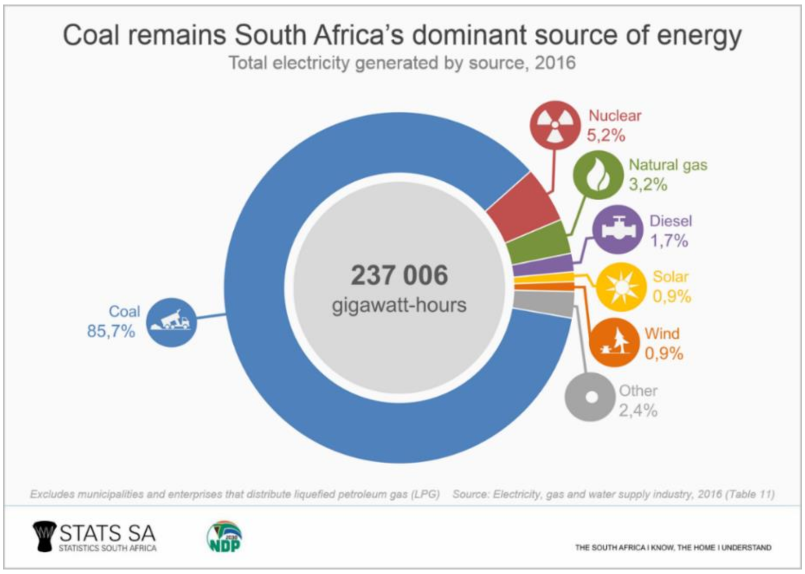

Figure 6.3: Overview of South Africa's electricity generation by source (source: StatsSA 2016 Electricity, gas and water supply industry)

Whereas the majority of South Africa's electricity generation infrastructure is currently located within Mpumalanga due to the location of coal resources within this province, the Eastern Cape Province has been identified as an area where the development of wind energy facilities is a feasible and suitable option for electricity generation.

The Eastern Cape Provincial 2030 Draft Development Plan indicates that sustainable development must be ensured in the Province and that people-centred development and economic development is imperative to address the most significant challenge facing the Eastern Cape, i.e. material poverty and deprivation. The Province also acknowledges climate and environmental challenges, the need to enhance environmental resilience and sustainability, the efficient use of scarce natural resources, the promotion of renewable sources of energy and new jobs and income for the poor in terms of a green agenda.

The overall energy objective for the Province also includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the economic opportunities for affected communities, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the Province through appropriate financial and fiscal instruments.

The Province has also been identified as a major source of electricity in South Africa, with the largest number of operational wind energy facilities currently located within the Province. The location of the Province is suited for wind generation based on the wind flows present along the coast and the strong and steady wind current between Aberdeen and the western border of Lesotho. The availability of existing grid infrastructure in the windy areas of the Province makes for ease of access to connect the projects to the national grid and evacuate the generated electricity[1].

The need for the project is therefore supported from a planning and policy level at a Provincial level.

6.6 Need and Desirability of the project from a District and Local Perspective

From a district level, the need for the development of the Aberdeen Wind Facility 2 is reflected within the Sarah Baartman District Municipality and Dr Beyers Naude Local Municipality. The following planning policies directly and indirectly make reference to the need for the development of renewable energy facilities within the municipal area, based on the contributions of such facilities to various aspects in the municipal area.

» The Sarah Baartman SDF further notes that the introduction of alternative energy generation infrastructure and the associated land use change will provide both economic opportunities but may also have a negative impact on the ecotourism of the district (in the form of potential changes to the visual and cultural landscapes).

» The Sarah Baartman District Municipality Final Reviewed Integrated Development Plan for 2017/2022 has determined that the creation of new generation green jobs and local income streams are rooted in renewable energy. The anticipated growth in the renewable energy sector provides major opportunities for growth in job creation in the province because of the potential of the area to host renewable energy generation infrastructure as well as the potential to be a major manufacturer of such infrastructure leveraging off the automotive sector.

» The Dr Beyers Naude Final Integrated Development Plan (2019-2020) indicates that the municipality is considering innovative energy sourcing methods. With reference to renewable energy the IDP notes that the Municipality supports renewable energy and green technology and is actively seeking ways and means to play a meaningful role in alleviating the country's energy crisis, by partnering with or supporting initiatives for alternative and renewable energy.

Considering the requirements and needs and desirability for the development of a wind energy facility within the municipal area, it is considered that there is a definite need for developments of such a nature considering the development plans of the relevant local and district municipalities and the reliance of the affected areas on such developments.

6.7 Receptiveness and Desirability of the project site to develop the Aberdeen Wind Facility 2

The overarching objective of the Aberdeen Wind Facility 2 is to maximise electricity production utilising the wind resource. The placement of a wind energy facility is strongly dependent on several factors, including climatic conditions (average wind speeds and duration), topography, the location of the site, and in particular the location in a node for renewable projects, availability of grid connection, the extent of the

[1] https://www.businessinsider.co.za/trending/eastern-cape-primed-to-become-wind-power-hub-of-sa-this-map-shows-why-2020-11

site and the need and desirability for the project as detailed in this Chapter. From a regional site selection perspective, the Eastern Cape region is considered to be favourable for the development of a wind energy facility due to its significant wind resource. From a local level perspective, the project site has specifically been identified by the proponent as being highly desirable for the development of a wind energy facility based on the characteristics detailed in Chapter 3. Section 3.3.1 provides a description of the site-specific considerations that contribute to the desirability of the project within the identified project site.

Aberdeen Wind Facility 2 is proposed to be constructed outside of the urban edge of the surrounding towns on privately-owned properties currently used mainly for agricultural practises. The affected farm portions have not been considered for an alternative land use such as urban development or mining, and therefore the proposed wind energy facility does not conflict with the current land use of the affected property. The project site falls within the Beaufort West REDZ, an area which has become a node for wind energy projects, as well as within the Central Corridor of the Strategic Transmission Corridors. The project site proposed for the development of Aberdeen Wind Facility 2 displays characteristics which contribute to the overall desirability. In particular, the Aberdeen area has been confirmed as an area with sufficient wind resources and wind speeds for a wind energy development (refer to **Figure 3.1** in Chapter 3). The wind resource for the area has also been confirmed through the wind data collection at the project site via four wind masts since 2021.

Considering the above, it can be confirmed that from a district and local perspective there is a need and desirability for the development of wind energy facilities within the regional area of the project site.

6.8 Need for and Benefits of Renewable Energy in the South African Environment

The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa. These benefits include:

Socio-economic upliftment of local communities: Aberdeen Wind Facility 2 has the potential to create much needed employment for unskilled locals during the construction phase. Training opportunities will also be afforded to qualified local people who can be upskilled to undertake certain roles during the construction and operation phases. In terms of the needs of the local community, the Local and District municipality IDPs identified the need to facilitate economic development by creating an environment that is conducive for business development, economic growth, sustainable employment opportunities and growth in personal income levels of communities; unlock opportunities to increase participation amongst all sectors of society in the mainstream economy to create decent job opportunities; promote Local Economic Development; and enhance rural development and agriculture.

Since inception of the REIPPP Programme in 2011 up to bid window 4, approximately 109 400 job years for South African citizens to date have been created[2]. Aberdeen Wind Facility 2 also has the potential to make

[2] University of Cape Town. The South African Renewable Energy IPP Procurement Programme: Review, Lessons Learned & Proposals to Reduce Transaction Costs.

a positive contribution towards the identified community needs. The potential for creation of employment and business opportunities, and the opportunity for skills development for local communities is significant. Secondary social benefits can be expected in terms of additional spend in nearby towns due to the increased demand for goods and services. These socio-economic benefits would include an increase in the standard of living for local residents within the area as well as overall financial and economic upliftment.

Increased energy security: Given that renewables can often be deployed in a short timeframe and in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality in the short-term, while reducing expensive distribution losses. According to CSIR's power sector statistics, South Africa experienced loadshedding for 1 900 hours in the first 3 quarters of 2022, making it the most intensive loadshedding year. More loadshedding was recorded in September 2022 than for the entirety of 2020. The contribution of renewable energy technologies (wind, solar PV and CSP) increased in 2022 to a total of 6.2 GW installed capacity and provided 6.5% of the total energy mix.

Resource saving: It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres per annum. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability. Renewable energy also translates into revenue savings, as fuel for renewable energy facilities is free, while compared to the continual purchase of fuel for conventional power stations.

According to the IPP Procurement Programme overview report dated 31 December 2021, water savings of 85.3 million kilolitres has been realised by the programme from inception to the date of this publication, of which 5.2 million kilolitres were from reporting quarter 3 of 2021.

Exploitation of our significant renewable energy resource: At present, valuable renewable resources including biomass by-products, solar radiation and wind power remain largely under-exploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio in South Africa.

According to the IPP Procurement Programme overview report, as of 31 December 2021, the REIPPPP had made the following significant impacts in terms of energy supply:

- 5 661 MW of electricity generation capacity from 85 IPP projects has been connected to the national grid.
- 71 073 GWh of energy has been generated by renewable energy sources procured under the REIPPPP since the first project became operational in November 2013. Renewable energy IPPs have proved to be very reliable. Of the 85 projects that have started operations, 77 projects have been operational for longer than a year. The electrical energy generated over the past 12-month period for the 77 projects is 14 117 GWh, which is 95% of their annual energy contribution projections of 14 924 GWh over a 12-month delivery period. Thirty one (31) of the 77 projects (40%) have individually exceeded their projections.

Economics: As a result of the excellent resource and competitive procurement processes, both wind power and solar PV power are now proven in South Africa as cheaper forms of energy generation than coal power. They offer excellent value for money to the economy and citizens of South Africa while benefitting society as a whole through the development of clean energy.

The following has been achieved by the IPP programme (December 2021) in terms of investment and economics:

» Investment (equity and debt) to the value of R209.7 billion of which R41.8 billion (20%) is foreign investment, was attracted.
» Socio-economic development contributions of R1.8 billion to date, of which R109.6 million was spent in this 2021 reporting quarter.
» Enterprise development contributions of R537.9 million to date, of which R27.2 million was spent in this 2021 reporting quarter.

Pollution reduction: The release of by-products through the burning of fossil fuels for electricity generation has a particularly hazardous impact on human health and contributes to ecosystem degradation. The use of solar irradiation or wind for power generation is a non-consumptive use of a natural resource which produces zero emissions during its operation.

The overview of the Independent Power Producers Procurement Report (December 2021) indicates that a carbon emission reduction of 72.1 Mton CO_2 has been realised by the IPP programme from inception to date, of which 4.4 Mton is in the 2021 reporting quarter 3.

Climate friendly development: The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of greenhouse gas (GHG) emissions. South Africa is estimated to be currently responsible for approximately 1% of global GHG emissions (and circa half of those for which Africa is responsible) and is currently ranked 9th worldwide in terms of per capita carbon dioxide emissions. The renewable energy sector saved South Africa 1.4 million tons of carbon emissions over the first 6 months of 2015[3], with savings that will keep increasing with the development and implementation of renewable energy.

Support for international agreements: The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol and the Paris Agreement, and for cementing its status as a leading player within the international community.

Employment creation: The development, procurement, installation, maintenance and management of renewable energy facilities have significant potential for job creation and skills development in South Africa. The construction phase will create temporary employment opportunities and the operation phase will create limited full-time employment opportunities.

The overview of the Independent Power Producers Procurement Report indicates that all IPP projects, as at 31 December 2021, have created 44 172 job years for South African citizens.

[3] http://www.iol.co.za/capetimes/renewable-energy-saving-sa-billions-csir-1.1903409#.VkNjdJq6FeU

Acceptability to society: Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health, the use of clean energy and climate friendly development.

Support to a new industry sector: The development of renewable energy offers the opportunity to establish a new industry within the South African economy, which will create jobs and skill local communities and result in community upliftment for the affected areas.

Protecting the natural foundations of life for future generations: Actions to reduce the disproportionate carbon footprint can play an important part in ensuring the human role in preventing dangerous anthropogenic climate change, thereby securing the natural foundations of life for generations to come; this is the basis of sustainable development.

6.9. Conclusion

The need and desirability for the project is supported from a planning and policy perspective on a national, provincial, district, and local level, as well as from a technical perspective when considering solar resource. It is however important to also consider the potential impacts and benefits that the proposed wind energy facility may have for the affected site and surrounding area from both a biodiversity sustainability perspective and a socio-economic perspective. Therefore, it is imperative for the assessment being undertaken for the project to consider this project not only from a policy (national, provincial, and local level) perspective, but also from a site-specific biodiversity and socio-economic perspective. The aim of the EIA process is to ensure a balance between these three spheres and to ensure that conclusions made regarding the project draw on both the positive and negative consequences of the proposed development, as well as the potential for impacts to be compounded through the development of the wind energy facility and its associated infrastructure in proximity to other similar developments (i.e. cumulative impact). The potential impacts associated with the project are identified and described within this Basic Assessment Report.

CHAPTER 7: APPROACH TO UNDERTAKING THE BASIC ASSESSMENT PROCESS

In terms of the EIA Regulations of December 2014 (as amended in April 2017) published in terms of the NEMA (Act No. 107 of 1998) as amended, the construction and operation of the Aberdeen Wind Facility 2 is a listed activity requiring environmental authorisation. In terms of GN R114 of February 2018, the application for environmental authorisation is required to be supported by a BA process based on the location of the project site within the Beaufort West REDZ.

The Basic Assessment process aims at identifying and describing potential environmental issues associated with the development of the proposed wind energy facility and the associated infrastructure. In order to ensure that a comprehensive assessment is provided to the competent authority and I&APs regarding the impacts of the facility, detailed independent specialist studies were undertaken as part of the Basic Assessment process.

7.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the Basic Assessment report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(d)(i) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for.	All listed activities triggered as a result of the development of the Aberdeen Wind Facility 2 have been included in section 7.2, **Table 7.1**. The specific project activity relating to the relevant triggered listed activity has also been included in **Table 7.1**.
3(h)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs.	A public participation plan was prepared and approved by the DFFE (**Appendix C1**). The details of the public participation process undertaken have been included and described in section 7.3.2.
3(h)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	All comments received from the commencement of the BA process has been included and responded to in the Comments and Responses (C&R) Report (**Appendix C9**). All comments raised during the 30-day review and comment period of the BA Report and through on-going consultation with I&APs will be included and responded to as part of a C&R report (**Appendix C9**) to be submitted as part of the Final Basic Assessment Report to DFFE for decision-making. A summary of this is included in Section 7.3.2 iv.

Requirement	Relevant Section
3(h)(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives.	The methodology used to assess the significance of the impacts of the Aberdeen Wind Facility 2 has been included in section 7.4.
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed.	The assumptions and limitations of the Basic Assessment process being undertaken for the Aberdeen Wind Facility 2 is included in section 7.6.

7.2 Relevant legislative permitting requirements

The legislative permitting requirements applicable to the Aberdeen Wind Facility 2, as identified at this stage in the process, are described in more detail under the respective sub-headings.

7.2.1 National Environmental Management Act (No. 107 of 1998) (NEMA)

NEMA is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(5) of NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed and reported on to the Competent Authority (the decision-maker) charged by NEMA with granting of the relevant EA. Due to the fact that the Aberdeen Wind Facility 2 is a power generation project and therefore relates to the IRP 2010 – 2030, the National Department of Forestry, Fisheries and the Environment (DFFE) has been determined as the Competent Authority (in terms of GN R779 of 01 July 2016. The Provincial Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) is the Commenting Authority on the project.

The need to comply with the requirements of the EIA Regulations published under the NEMA ensures that proponents are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project and Application for Environmental Authorisation.

The BA process conducted for the Aberdeen Wind Facility 2 is undertaken in accordance with Section 24(5) of the NEMA, which defines the procedure to be followed in applying for Environmental Authorisation, and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full Scoping and EIA).

As the proposed development is located within Zone 11 of the REDZ (also known as the Beaufort West REDZ), one of the eleven (11) designated REDZ areas, the Basic Assessment process to be followed for the wind energy facility will be as per GN R114, as formally gazetted on 16 February 2018. The Aberdeen Wind Facility

2 is now subject to a Basic Assessment process and not a full EIA process, as well as a shortened timeframe of 57 days for the processing of an application for environmental authorisation.

Table 7.1 details the listed activities in terms of the EIA Regulations, 2014 (as amended) that apply to the Aberdeen Wind Facility 2, and for which an application for Environmental Authorisation has been submitted to the DFFE. The table also includes a description of the specific project activities that relate to the applicable listed activities.

Table 7.1: Listed activities as per the EIA regulations that are triggered by the Aberdeen Wind Facility 2

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
GN R327, 08 December 2014 (as amended on 07 April 2017)	11(i)	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts. ***The wind farm will require the construction and operation of a 132kV facility substation to facilitate the connection to the national grid. The turbines will be connected to the substation via 33kV cabling/grid lines. The development footprint for the facility substation is located outside of an urban area.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	12(xii)(a)(c)	The development of – (xii) infrastructure or structures with a physical footprint of 100 square metres or more; Where such development occurs- (a) within a watercourse; or (c) within 32 metres of a watercourse. ***The wind farm will include the establishment of infrastructure (including internal access roads) with a physical footprint exceeding 100m² within or within 32m of drainage features, ephemeral washes or streams present within the project site. The development footprint of the wind energy facility will be up to 120ha in extent.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic meters or more but not exceeding 500 cubic meters. ***The development of the wind farm will include the construction and operation of facilities and infrastructure for the storage and handling of dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents associated with the facility, and facility substation) where such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters.***

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
GN R327, 08 December 2014 (as amended on 07 April 2017)	19(i)	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a (i)watercourse ***Drainage features, ephemeral washes or streams are present within the project site. During the construction phase, more than 10 cubic metres of rock will be removed from drainage features for the construction of the wind farm facility and associated infrastructure.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	24(ii)	The development of a road— (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; ***A 12m wide road corridor may be temporarily impacted during construction and rehabilitated to 6m wide after construction.*** ***The width of the internal access roads between the project components will be approximately 8m but may be up to 10m wide where required for the movement of the crane between turbine positions.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	28(ii)	Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. ***The total area to be developed for the wind energy facility (including the facility substation) is greater than 1ha and occurs outside an urban area and is currently used for agricultural purposes, mainly grazing. The development footprint considered for the establishment of the wind energy facility is up to 120ha in extent and is located outside an urban area.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	56(ii)	The widening of a road by more than 6 m, or lengthening of a road by more than 1 km – (ii) where no reserve exists, where the existing road is wider than 8 metres; ***Existing farm roads within the project site will be widened to up to 8m and/or lengthened by more than 1km to accommodate the movement of heavy vehicles and cable trenching activities.***
GN R325, 08 December 2014 (as amended on 07 April 2017)	1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more,

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
		Aberdeen Wind Facility 2 will make use of wind energy as a renewable energy resource. The project will have a contracted capacity of up to 240MW.
GN R325, 08 December 2014 (as amended on 07 April 2017)	15	The clearance of an area of 20 hectares or more of indigenous vegetation. ***Aberdeen Wind Facility 2 will require the clearance of an area of up to 113ha (the development footprint area) of vegetation. The project is proposed on a property where the predominant land use is grazing and comprises of indigenous vegetation. The project would therefore result in the clearance of an area of indigenous vegetation greater than 20ha in extent.***
GN R324, 08 December 2014 (as amended on 07 April 2017)	4(i)(ii)(aa)	The development of a road wider than 4 metres with a reserve less than 13,5 metres. a. Eastern Cape i. Outside urban areas (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; ***The width of the main access roads to the site will be up to 12m. The width of the internal access roads between the project components will be approximately 8m, but may be up to 10m wide where required for the movement of the crane between turbine positions. The project site is located outside of an urban area, and within areas containing indigenous vegetation and and within the critical biodiversity areas as identified in the Eastern Cape Biodiversity Conservation Plan (within Ecological Support Areas).***
GN R324, 08 December 2014 (as amended on 07 April 2017)	10(a)(i)(ee)(ii)	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres a. Eastern Cape i. Outside urban areas ((ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined; ***The development and operation of the wind farm and associated infrastructure will require facilities for 80 cubic metres of storage of dangerous goods, which will include flammable and combustible liquids such as oils, lubricants and solvents associated with the facility, on-site substation, and BESS hub. The project site is located outside of an urban area, within 100 metres from the edge of a watercourse and within the critical biodiversity areas as identified***

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
		in the Eastern Cape Biodiversity Conservation Plan (within Ecological Support Areas).
GN R324, 08 December 2014 (as amended on 07 April 2017)	12(a)(i)(ii)	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. a. Eastern Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans ***The Aberdeen Wind Facility 2 and associated infrastructure is within a CBA and ESA area and will require the removal of an area greater than 300 square metres of indigenous vegetation.***
GN R324, 08 December 2014 (as amended on 07 April 2017)	14(ii)(a)(a)(i)(ff)	The development of: (x) buildings exceeding 10 square metres in size; where such development occurs— (a) within a watercourse a. Eastern Cape (i) Outside urban areas (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; ***Aberdeen Wind Facility 2 will require the establishment of infrastructure (including internal access roads) with a physical footprint exceeding 10m2 within or within 32m of drainage features, ephemeral washes or streams present within the project site. The project site is located within the critical biodiversity areas as identified in the Eastern Cape Biodiversity Conservation Plan, and falls outside of an urban area***
GN R324, 08 December 2014 (as amended on 07 April 2017)	18(i)(ii)(aa)	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. a. Eastern Cape i. Outside urban areas: (ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined; ***Existing farm roads within the project site will be widened to up to 10m. The project site is located in the Eastern Cape, outside of an urban area, and within 100m of the edge of a watercourse.***

7.2.2 National Water Act (No. 36 of 1998) (NWA)

In accordance with the provisions of the National Water Act (No. 36 of 1998) (NWA), all water uses must be licensed with the Competent Authority (i.e. the Regional Department of Water and Sanitation). Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

Error! Reference source not found. lists the possible Water Uses associated with the proposed project and identified in terms of the NWA which require licensing either in the form of a General Authorisation (GA), or in the form of a Water Use License (WUL). The table also includes a description of those project activities which relate to the applicable Water Uses.

Table 7.2: List of Water Uses published under Section 21 of NWA, as amended.

Activity No.	Description of Water Use
Section 21 (c)	Impeding or diverting the flow of water in a watercourse. ***The project site considered for the establishment of the wind energy facility is associated with the presence of drainage features, ephemeral washes or streams. Activities pertaining to the establishment of the wind energy facility might encroach on the water features which may lead to an impediment and diversion of the flow of water in the features.***
Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse. ***The project site considered for the establishment of the wind energy facility is associated with the presence of drainage features, ephemeral washes or streams. Activities pertaining to the establishment of the wind energy facility might encroach on the water features which may lead to an altering of the bed, banks, course or characteristics of the features.***

In the event that the flow of water in the water features is affected and the bed, banks or course characteristics are altered then licensing would be required. An application would need to be made for a WUL as internal access roads will cross watercourses. This will need to be in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GN R267), or a GA registered in accordance with the requirements of Revision of General Authorisation. The process of applying for a WUL or GA registration will only be completed once a positive EA has been received. This is in line with the requirements of the Department of Water and Sanitation.

7.2.3 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

<u>Section 38: Heritage Resources Management</u>

1). *Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –*
    a. *the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
    b. *the construction of a bridge or similar structure exceeding 50m in length;*
    c. *any development or other activity which will change the character of a site –*

> i). *exceeding 5 000m² in extent; or*
> ii). *involving three or more existing erven or subdivisions thereof; or*
> iii). *involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
> iv). *the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the Aberdeen Wind Facility 2, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).

As the project is located within the Eastern Cape, the heritage decision-making authority will be the Eastern Cape Provincial Heritage Resources Authority. The Heritage Impact Assessment has been undertaken in line with the Guidelines for Heritage Impact Assessments required in terms of Section 38 of the National Heritage Resources Act (Act 25 of 1999) and the requirements of the Eastern Cape Provincial Heritage Resources Authority.

7.3 Overview of the Basic Assessment Process for the Aberdeen Wind Facility 2

Key tasks undertaken for the Basic Assessment included:

» Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
» Submission of the completed Application for Environmental Authorisation to the competent authority (i.e. DFFE) in terms of Regulations 5 and 6 of the EIA Regulations, 2014 (GNR 326), as amended.
» Undertaking a public participation process in accordance with Chapter 6 of GNR326, and the Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa (hereinafter referred to as "the Guidelines") in order to identify issues and concerns associated with the proposed project.
» Undertaking of independent specialist studies in accordance with Appendix 6 of the EIA Regulations, 2014 (GNR326), as amended, and the requirements of the Specialist Protocols published in Regulation GNR 320, issued 20 March 2020 and 30 October 2020.
» Preparation of a Basic Assessment Report and EMPr in accordance with the requirements of Appendix 1 and Appendix 4 of GN R326.
» 30-day public and authority review period of the BA report.
» Compilation of a C&R report detailing the comments raised by I&APs, addressing these comments in detail and finalisation of the Basic Assessment report.
» Submission of a final Basic Assessment report to the DFFE for review and decision-making.

The tasks are discussed in detail in the sub-sections below.

7.3.1. Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (as amended)

In terms of Government Notice 779 of 01 July 2016, the National Department of Forestry, Fisheries and the Environment (DFFE) is the competent authority for all projects related to the IRP. As the project is located within the Eastern Cape Province, the Provincial Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) is the commenting authority. Consultation with the regulating authorities (i.e. DFFE and DEDEAT) as well as with all other relevant Organs of State will continue throughout the BA process. To date, this consultation has included the following:

» Holding of a Pre-application Meeting with the DFFE on 25 January 2023 (via the Microsoft Teams Platform) during which the project details were presented.
» Submission of the application form for Environmental Authorisation to the DFFE via the use of the DFFE Novell Filr System.
» Submission of the Basic Assessment Report for review and comment by:
    * The competent and commenting authorities.
    * State departments that administer laws relating to a matter affecting the environment relevant to an application for Environmental Authorisation.
    * Organs of State which have jurisdiction in respect of the activity to which the application relates.

The submissions, as listed above, were undertaken electronically, as required by the DFFE (in line with the directions for new Applications for Environmental Authorisations provided for in GNR650 of 05 June 2020).

A record of all authority correspondence undertaken during the Basic Assessment process is included in **Appendix B** and **Appendix C**.

7.3.2. Public Participation Process

Public participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations 41 to 44 of the EIA Regulations 2014 (GN R326) (as amended). The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GN R326) (as amended) and is being followed for this proposed project.

The sharing of information forms the basis of the public participation process and offers the opportunity for I&APs to become actively involved in the Basic Assessment process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner. The public participation process affords I&APs opportunities to provide input into and receive information regarding the Basic Assessment process in the following ways:

During the Basic Assessment process:

» provide an opportunity to submit comments regarding the project;
» assist in identifying reasonable and feasible alternatives;
» contribute relevant local information and knowledge to the environmental assessment;
» allow registered I&APs to verify that their comments have been recorded, considered and addressed, where applicable, in the environmental investigations;

» foster trust and co-operation;
» generate a sense of joint responsibility and ownership of the environment; and
» comment on the findings of the environmental assessments.

During the decision-making phase:

» to advise I&APs of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The public participation process therefore aims to ensure that:

» Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs for their review.
» The information presented during the public participation process is presented in such a manner, i.e. local language and technical issues, that it avoids the possible alienation of the public and prevents them from participating.
» Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the project.
» Various ways are provided to I&APs to correspond and submit their comments i.e. fax, post, email, SMS, WhatsApp or by sending a Please-call-me notification.
» An adequate review period is provided for I&APs to comment on the findings of the BA Report.

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, as amended, the following key public participation tasks are required to be undertaken:

» Fix a notice board at a place conspicuous to the public at the boundary or on the fence of—
  (i) the site where the activity to which the application relates is or is to be undertaken; and
  (ii) any alternative site mentioned in the application;
» Give written notice to:
  (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  (v) the municipality which has jurisdiction in the area;
  (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
  (vii) any other party as required by the competent authority.
» Place an advertisement in one local newspaper.
» Open and maintain a register of I&APs and Organs of State.
» Release of a Basic Assessment Report for a 30-day review and comment period.
» Prepare a Comments and Responses (C&R) report which documents the comments received on the Basic Assessment process and during the 30-day review and comment period and the responses provided by the project team.

The Public Participation Process for Aberdeen Wind Facility 2 has been run concurrently with the public consultation for Aberdeen Wind Facility 2 and Aberdeen Wind Facility 3, located adjacent to the project site. The benefit to the stakeholder is that all information relevant to all related applications has been made available for review together, and not only for comments to be raised across the three (3) applications at one time, but also provided a complete picture of the potential for impacts and/or benefits related to the suite of projects located in close proximity to one another.

In compliance with the requirements of Chapter 6: Public Participation of the EIA Regulations, 2014 (as amended), the following summarises the key public participation activities implemented. The schematic below provides an overview of the tools that are available to I&APs and stakeholders to access project information and interact with the public participation team to obtain project information and resolve any queries that may arise, and to meet the requirements for public participation.

i. Stakeholder identification and register of I&APs	•Register as an I&AP on the online platform or via completion of a form and provison of contact information, by responding to an advert, or sending a 'please call me' which will be responded to with a telephone call. •State interest in the project. •Receive all project related information via email, post or other appropriate means.
ii. Advertisments and notifications	•Advertisements, site notices and radio announcements and notifications provide information and details on the projects and where to access project information. •Notifications regarding the BA process and availability of project report for public review to be sent via email, post or SMS notifications.
iii. Public Involvement and consultation	•Distribution of a BID providing details on the project and how I&APs can become involved in the process. •Submission of comments or queries via the online platform, email or post to the PP team. •Virtual presentations available via the online platform. •Availability of project information via the online platform, email, post and telephonic platforms such as WhatsApp, and including telephonic discussions to provide description of information verbally. •An opportunity for I&APs and stakeholders to request virtual meetings with the project team.
iv. Comment on the BA Report	•Availability of the project report via the online platform for 30-day comment period. Hard copies to be avaiable only where sanitary conditions can be assured, or on request. •Submission of comments via the online platform, email or post to the PP team. •Comments recorded and responded to, as part of the process.
v. Identification and recording of comments	•Comments and Responses Report, including all comments received to be included in the reporting. •Comments received prior to report release for review to be included in draft reports. •Comments received during full process to be included within the final Report for decision-making.

i. Stakeholder identification and Register of Interested and Affected Parties and the creation of an electronic database

42. A proponent or applicant must ensure the opening and maintenance of a register of I&APs and submit such a register to the competent authority, which register must contain the names, contact details and addresses of –
(a) All persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;
(b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and

(c) All organs of state which have jurisdiction in respect of the activity to which the application relates.

I&APs have been identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the greater surrounding area and a registration process involving the completion of a reply form. Key stakeholders and affected and surrounding landowners (including occupiers) have been identified and registered on the project database. Other stakeholders are required to formally register their interest in the project through either directly contacting the Savannah Environmental Public Participation team via phone, message (SMS and WhatsApp), email or fax, or registering their interest via the online stakeholder engagement platform. An initial list of the key stakeholders identified and registered is listed in **Table 7.3**.

Table 7.3: Initial list of Stakeholders identified for the inclusion in the project database during the public participation process for Aberdeen Wind Facility 2

Organs of State
National Government Departments
Department Forestry, Fisheries and the Environment (DFFE)
Department of Mineral Resources and Energy (DMRE)
Department of Agriculture, Land Reform, and Rural Development (DALRRD)
Department of Water and Sanitation (DWS)
Department of Communications and Digital Technologies
South African National Defence Force
Government Bodies and State-Owned Companies
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
Air Traffic Navigation Services (ATNS)
South African Civil Aviation Authority (SACAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
South African Radio Astronomy Observatory (SARAO)
Telkom SA SOC Limited
Transnet SA SOC Limited
South African National Parks
South African Weather Services
Provincial Government Departments
Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)
Eastern Cape Department of Transport
Eastern Cape Provincial Heritage Resources Authority
Eastern Cape Department of Rural Development and Agrarian Reform
Local Government Departments
Sarah Baartman District Municipality
Dr Beyer Naude Local Municipality – including the Ward Councillor, ward committee members
Commenting Stakeholders
AgriSA: National & Eastern Cape Province
TLU SA: National & Eastern Cape Province
Rate Payers Association, Community Representative and Local Community Forums members

BirdLife South Africa
South African Bat Assessment Advisory Panel (SABAAP)
Endangered Wildlife Trust (EWT)
SENTECH
Wildlife and Environment Society of South Africa (WESSA)
Affected landowners, tenants and occupiers
Neighbouring landowners, tenants and occupiers

As per Regulation 42 of the EIA Regulations, 2014 (as amended), all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix C1** for a listing of the recorded parties). In addition to the above-mentioned EIA Regulations, point 4.1 of the Public Participation Guidelines has also been followed. The register of I&APs contains the names[17] of:

» all persons who requested to be registered on the database through the use of the online stakeholder engagement platform or in writing and disclosed their interest in the project;
» all Organs of State which hold jurisdiction in respect of the activity to which the application relates; and
» all persons who submitted written comments or attended virtual meetings and viewed the narrated presentations on the Savannah Environmental online platform during the public participation process.

I&APs have been encouraged to register their interest in the BA process from the onset of the project, and the identification and registration of I&APs will be on-going for the duration of the BA process. The database of I&APs will be updated throughout the BA process and will act as a record of the I&APs involved in the public participation process.

ii. <u>Advertisements and Notifications</u>

40.(2)(a)	Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of – (i) The site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) Any alternative site.
40.(2)(b)	Giving written notice, in any of the manners provided for in section 47D of the Act, to – (i) The occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (ii) Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area; (iv) The municipality which has jurisdiction in the area; (v) Any organ of state having jurisdiction in respect of any aspect of the activity; and

[17] Contact details and addresses have not been included in the I&AP database as this information is protected by the Protection of Personal Information Act (No 4 of 2013).

	(vi) Any other party as required by the competent authority.
40.(2)(c)	Placing an advertisement in – (i) One local newspaper; or (ii) Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
40.(2)(d)	Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii); and
40.(2)(e)	Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to – (i) Illiteracy; (ii) Disability; or (iii) Any other disadvantage.

The BA process was announced with an invitation to the Organs of State, potentially affected and neighbouring landowners (including occupiers) and general public to register as I&APs and to actively participate in the process. This was achieved through the following:

» Compilation of a background information document (BID) (refer to **Appendix C3**) providing technical details on the project, details of the BA process being undertaken and how I&APs can become involved in the BA process. The BID and the BA process notification letter announcing the BA process and inviting I&APs to register on the project database were distributed via email on 06 February 2023. The evidence of the distribution is contained in **Appendix C4** and **Appendix C5** of the BA Report. The BID is also available electronically on the Savannah Environmental website (**https://savannahsa.com/public-documents/energy-generation/aberdeen-wind-energy-facilities/**).
» Placement of site notices announcing the BA process at visible points along the boundary of the project site (i.e. the boundaries of the affected property), in accordance with the requirements of the EIA Regulations. The site notices were placed on 13 February 2023, and photographs of the site notices are included in **Appendix C2** of the BA Report.
» Placement of an advertisement in Die Courier (on 24 February 2023) but due to the change of the BA Report's review and comment period, an extraction advert was placed in Die Courier (on 03 March 2023). An advert was placed in the Graaff-Reinet Advertiser (on 09 March 2023 in Afrikaans) and Die Courier (on 10 March 2023 in English) at the commencement of the 30-day review and comment period (refer to **Appendix C2**). The adverts:
  - announced the commencement of the BA process,
  - announced the availability of the BA report, the review period, and where it is accessible for review, and invited comment on the BA Report,
  - provided all relevant details to access the Savannah Environmental online stakeholder engagement platform.

  A copy of the newspaper advert as sent to the newspaper is included in **Appendix C2** of the BA Report. The newspaper advert tear sheets are included in the BA Report in **Appendix C2.**
» The BA Report has been made available for review to I&APs for a 30-day review and comment period from 10 March 2023 to 13 April 2023**.** The BA Report has been made available on the Savannah Environmental website and all registered I&APs have been notified of the availability on 10 March 2023 via email, which included the link to access the report on the Savannah Environmental website.

I&APs were offered the opportunity to contact the public participation office by the following means, and in the language of their choice:

» telephone (landline or on the dedicated public participation mobile number);
» fax; or
» E-mail

iii. Public Involvement and Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the surrounding area, as well as capture their views, comments, issues and concerns regarding the project, various opportunities have been and will continue to be provided to I&APs to note their comments and issues. I&APs are being consulted through the following means:

Table 7.4: Public involvement for the Aberdeen Wind Facility 2.

Activity	Date
Distribution of the BID, process notification letters and stakeholder reply form announcing the BA process and inviting I&APs to register on the project database. The BID and electronic reply form was also made available on the online stakeholder engagement platform.	06 February 2023
Placement of site notices along the affected property boundary at a visible and accessible location.	13 February 2023
An Information Sharing Discussion with affected and adjacent landowners were organised in order to share information on the project with them. Telecommunications with landowners were also held. Landowners around the site were requested to -provide information regarding occupiers based on affected and adjacent properties.	01 to 14 February 2023
Announcement of the availability of the BA Report for a 30-day review and comment period, including details on how to access the BA Report via the online stakeholder engagement platform, in the Graaff-Reinet Advertiser (on 09 March 2023 in Afrikaans) and Die Courier (on 10 March 2023 in English)))	10 March 2023 to 13 April 2023
Distribution of notification letters announcing the availability of the BA Report for a 30-day review and comment period. These letters were distributed to Organs of State, Government Departments, Ward Councillors, landowners within the surrounding area (including neighbouring landowners), registered I&APs and key stakeholder groups.	10 March 2023
30-day review and comment period of the BA Report.	10 March 2023 to 13 April 2023
Meetings through the use of virtual platforms or Face-to-Face, as determined through discussions with the relevant stakeholder group: » Landowners » Authorities and key stakeholders (including Organs of State, local municipality and official representatives of community-based organisations. » Where an I&AP did not have access to a computer and/or internet to participate in a virtual meeting, telephonic discussions (including WhatsApp video call where available) were set-up and	To be held during the 30-day review and comment period

minuted for inclusion. The preferred language of the I&AP was considered when setting up these discussions. Face-to-face meetings are to be held with landowners occupiers or person in control of the land as required.	
On-going consultation (i.e. telephone liaison; e-mail communication) with all I&APs.	Throughout BA process

iv. Registered I&APs entitled to Comment on the BA Report

43.(1) A registered I&AP is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application. (2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days. 44.(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations. (2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to – (a) A lack of skills to read or write; (b) Disability; or (c) Any other disadvantage; Reasonable alternative methods of recording comments must be provided for.

I&APs registered on the database have been notified via notification letter of the release of the Basic Assessment Report for a 30-day review and comment period, invited to provide comment on the Basic Assessment Report, and informed of the manner in which, and timeframe within which such comment must be made.

v. Identification and Recording of Comments

Comments raised by I&APs to date have been collated into a Comments and Responses (C&R) Report which is included in Appendix C9 of the BA Report. The C&R Report includes detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised. The C&R Report includes all written comments received.

Meeting notes of all meetings and discussions undertaken during the 30-day review and comment period will be included in Appendix C6 of the final Basic Assessment Report.

The C&R Report will be updated with all comments received during the 30-day review and comment period and will be included as Appendix C8 in the final Basic Assessment Report that will be submitted to the DFFE for decision-making.

7.4. Outcomes of the DFFE Web-Based Screening Tool

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulations 19 and 21 of the EIA Regulations.

The requirement for the submission of a Screening Report (included as **Appendix R** of the Basic Assessment Report) for the Aberdeen Wind Facility 2 is applicable as it triggers Regulation 19 of the EIA Regulations, 2014 (as amended). **Table 7.6** provides a summary of the specialist assessments identified in terms of the screening tool and responses to each assessment from the project team considering the project site under consideration.

Table 7.6: Sensitivity ratings from the DFFE web-based online Screening Tool associated with the development of Aberdeen Wind Facility 2

Environmental Theme/Specialist Assessment	**Sensitivity Rating and Specialist Input Identified in Terms of the DFFE Screening Tool**	**Verification of Site-Specific Sensitivity and Motivation of the Need for Specialist Investigation**
Agricultural Impact Assessment	Screening tool: Medium Sensitivity Required an agricultural impact assessment (in accordance with the protocol prescribed in GNR 320). Verified Sensitivity by Specialist: **Low-Medium**	The development area can be classified as having areas with Low and Medium Sensitivity. Most of the infrastructure components are located well within areas with Low Sensitivity with only the southern part having five wind turbines which falls in a Medium sensitive area. An Agricultural Compliance Statement is included as **Appendix L** of the Basic Assessment Report.
Landscape/Visual Impact Assessment	Screening tool: Very High Sensitivity (General Assessment Protocols) Verified Sensitivity by Specialist: **Moderate**	Based on the Site Sensitivity Verification assessment, it was found that the sensitivity of the visual environment for the proposed development is confirmed to be moderate due to: » The avoidance of placement of turbines on any steep slopes, mountain tops or ridges » Location of turbines within 500m of a topographical feature (i.e. ridgeline) » Location of an uninhabited homestead within the 1.2km shadow flicker buffer » Low occurrence of homesteads within 5km » Low VAC of the receiving environment » The placement of the development within the Beaufort REDZ » Scenic R61 arterial road located more than 2.5km but within 2.5km » Limited existing built infrastructure within and surrounding the development area.
Flicker and Shadow Assessment	Screening tool: Low Sensitivity (General Assessment Protocols) Verified Sensitivity by Specialist: **Moderate**	

		A Visual Impact Assessment has been undertaken for the Aberdeen Wind Facility 2 and is included in this BA Report as **Appendix I.**
Archaeological and Cultural Heritage Impact Assessment	Screening tool: Low Sensitivity Verified Sensitivity by Specialist: **Very High**	According to the DFFE Screening Tool analysis, the development area has low levels of sensitivity for impacts to archaeological and cultural heritage resources and very high levels of sensitivity for paleontology. The results of this assessment in terms of site sensitivity are summarised below: » The cultural value of the pristine Karoo Landscape is very high (Very High) » Some significant archaeological resources were identified within the development area (High) » No highly significant palaeontological resources were identified within the development area, however the geology underlying the development area is very sensitive for impacts to significant fossils (Very High) As per the findings of this assessment, and its supporting documentation, the outcome of the sensitivity verification confirms the results of the DFFE Screening Tool for Palaeontology and disputes the results of the screening tool for archaeology and cultural heritage - this should be considered to be Very High. A Heritage Impact Assessment (which covers both archaeological and cultural aspects of the development area and development footprint) has been undertaken for the Aberdeen Wind Facility 2 and is included in this Basic Assessment Report as **Appendix H.** The HIA complies with the requirements of the NHRA.
Paleontology Impact Assessment	Screening tool: Very High Sensitivity Verified Sensitivity by Specialist: **Very High**	
Terrestrial Biodiversity Impact Assessment	Screening tool: Very high Sensitivity Required a terrestrial biodiversity impact assessment (Terrestrial Biodiversity Assessment Protocols) Verified Sensitivity by Specialist: **Very high**	The overall combined Terrestrial Biodiversity theme indicates that the site consists entirely of Very High sensitivity areas due to the presence of ESAs and FEPA Sub catchments. Since these are anthropogenic conservation planning-based features, it is not really possible to verify these features in the field, apart from an assessment of their condition and characteristics. Based on the presence of these features within the site, a full terrestrial biodiversity assessment is required. A Biodiversity Assessment has been undertaken for the Aberdeen Wind Facility 2 and is included as **Appendix D** of the Basic Assessment Report.
Aquatic Biodiversity Impact Assessment	Screening tool: Very high Sensitivity Required an Aquatic Biodiversity impact assessment (in accordance with the protocol prescribed in GNR	Based on the DFFE Screening Tool, the site contains areas of very high sensitivity due to the presence of CBAs and rivers. The remaining area within the development footprint is deemed to be of low sensitivity. Based on the above outcomes, the specialist agrees with the environmental sensitivities identified on site. Although there is some overlap with the findings on site and the Screening

	320, Aquatic Biodiversity Assessment Protocols). Verified Sensitivity by Specialist: **Very high**	Tool's outcome, the development footprint will be developed with cognisance of these sensitivities. An Aquatic Impact Assessment has been undertaken for the Aberdeen Wind Facility 2 and is included as **Appendix E** of the Basic Assessment Report.
Avian Impact Assessment and animal species theme (avian)	Screening tool (avian): Low Sensitivity Screening tool (animal species): high Sensitivity Required an Avian Impact Assessment (in accordance with the protocol prescribed in GNR 320, Avian Biodiversity Assessment Protocols). Verified Sensitivity: **Very High**	The DFFE Screening tool classifies the site as having High Sensitivity. This is based on the potential presence of the following Red Data (RD) species: » Ludwig's bustard » Southern black korhaan » Martial eagle » Black harrier Of the above list of potentially present species, all but the Martial Eagle were observed during the monitoring campaign. However, given the number of other RD species identified and high passage rates through the area, the Specialist would classify the site as having Very High sensitivity. According to available information consulted during this study and based on the optimised layout for the Aberdeen Wind Facility 2, and the avoidance of the high-risk areas. It is the Specialists opinion, that there are no fatal flaws from an avifaunal sensitivity perspective, which should prevent the Aberdeen Wind Facility 2 from receiving Environmental Authorisation (EA). An Avifauna Impact Assessment has been undertaken for the Aberdeen Wind Facility 2 and is included as **Appendix F** of the Basic Assessment Report. The assessment has been undertaken in accordance with the requirements of the BirdLife SA Best Practice Guidelines for wind Developments.
Civil Aviation Assessment	Screening tool: Low Sensitivity Verified Sensitivity: **Low**	The South African Civil Aviation Authority (SACAA) and Air Traffic Navigation Services (ATNS) will be consulted throughout the Basic Assessment process to obtain input and details of any requirements for further studies. The project site is not located within close proximity of any aerodromes, landing strips or infrastructure. The low sensitivity rating is supported, and no study is required in this regard.
Defence Assessment	Screening tool: Low Sensitivity Verified Sensitivity: **Low**	The project site is not located within close proximity of any military base or infrastructure. The South African National Defense Force will be consulted throughout the Basic Assessment process.
RFI Assessment	Screening tool: High Sensitivity	The Aberdeen Wind Facility 2 is located outside of an Astronomy Advantage Area and within 1km of a telecommunication facility as classified as having high sensitivity for telecommunication.

	Verified Sensitivity: **Low**	Communication with Openserve indicated that the proposed Aberdeen Wind Facility 2 will not have an impact on their infrastructure. Therefore, a low sensitivity rating is supported, and no study is required in this regard.
Social Impact Assessment	The screening report does not indicate a rating for this theme.	A Social Impact Assessment has been undertaken for the Aberdeen Wind Facility 2 and is included in the Basic Assessment Report as **Appendix K.**
Noise Impact Assessment	Screening tool: Very High Sensitivity Verified Sensitivity: **Medium to Low**	The DFFE Screening tool classifies the site as having Very High Sensitivity. During the Noise Impact Assessment, residential areas, and potential noise-sensitive developments/receptors/communities (NSR) were identified using aerial images as well as a physical site visit. Based on the site sensitivity verification: • the online screening tool identified a number of areas with a "very high" sensitivity to noise in the vicinity of the proposed development. There are however no potential noise-sensitive receptors located in these areas and the finding of the online screening tool is disputed; and • there is a structure (NSR05) used on a temporary basis for residential purposes. This was not identified by the online screening tool. According to the specialist the significance of the noise impact is of medium to low sensitivity. A Noise Impact Assessment has been undertaken for the Aberdeen Wind Facility 2 and is included in the Basic Assessment Report as **Appendix J.**
Bats Impact Assessment	Screening tool: High Sensitivity Verified Sensitivity: **Medium**	The DFFE Screening Tool identified the site as being comprised of areas of high sensitivity. According to the specialist without mitigation, the proposed Aberdeen Wind Facility 2 is expected to have a Medium significant potential impact on bat roosts, and bat foraging habitat, a High significant potential impact in terms of turbine bat fatalities, and a Medium significant potential impact on bat ecosystem services. A Bat Impact Assessment has been undertaken for the Aberdeen Wind Facility 2 and is included in the Basic Assessment Report as **Appendix I.**
Traffic Impact Assessment	The screening report does not indicate a rating for this theme.	A Traffic Impact Assessment has been undertaken for the Aberdeen Wind Facility 2 and is included in the Basic Assessment Report as **Appendix M.**
Plant Species Assessment	Screening tool: Medium Sensitivity	The DFFE Screening Tool indicates that there are several potential botanical sensitivities from the Aberdeen Wind Facility 2 study area, with the result that the majority of the

	Necessitating a plant species assessment (General Assessment Protocols). Verified Sensitivity by Specialist: **High**	site is mapped as High Sensitivity for the Plant Species Theme. Of these species Sensitive species 1212 is confirmed present within the site, while none of the other three plant SCC were observed within the site. As a result, the site is considered high sensitivity for Sensitive Species 1212 and as a result, a full Plant Species Assessment is required for this species. The other plant SCC are considered absent, with the result that an assessment for these species is not considered to be required.
Animal Species assessment (terrestrial)	Screening tool: High Sensitivity Necessitating an animal species assessment (in accordance with Animal Species Assessment Protocols prescribed in GN 43855) Verified Sensitivity by Specialist: **Low**	The DFFE Screening Tool identified the entire site as having a medium and high animal sensitivity theme due to the presence of several bird species of concern. A medium sensitivity was assigned due to the possible presence of the Karoo Dwarf Tortoise, *Chersobius boulengeri*. The presence of the Karoo Dwarf Tortoise was not confirmed at the site. However, given the scarcity and low activity levels of this species, this does not in itself indicate that it is not present. However, the site inspection suggests that it is highly unlikely that this species is present on the site as the low gravel hills present do not contain much rock shelter for this species. In some areas it may occur within plains habitats. However, as this species was not observed, it is considered unlikely that the Karoo Dwarf Tortoise is present. As such, the site is considered low sensitivity for this species. In terms of other fauna of concern that may be present on the site, but which are not listed under the DFFE Screening Tool, several different species occur in the wider area and would potentially be present on the site including Mountain Reedbuck *Redunca fulvorufula* (EN) and Black-footed Cat *Felis nigripes* (VU). However, the site inspection suggests that none of these species are present within the site with the result that it is considered to be low sensitivity for these species.

7.5. Assessment of Issues Identified through the BA Process

Issues identified as requiring investigation, as well as the specialist consultants involved in the assessment of these impacts are indicated in **Table 7.6** below.

Table 7.6: Specialist consultants appointed to evaluate the potential impacts associated with the Aberdeen Wind Facility 2

Specialist	Field of Study	Appendix

3Foxes Biodiversity Solutions	Terrestrial Ecology[18]	Appendix D
Brian Colloty Consulting	Aquatics	Appendix E
Birds and bats unlimited	Avifauna	Appendix F
Inkululeko wildlife services	Bats	Appendix G
CTS Heritage	Heritage (including archaeology and palaeontology)	Appendix H
LOGIS	Visual Impact Assessment	Appendix I
Enviro Acoustic Research	Noise	Appendix J
Tony Barbour	Social Impact Assessment	Appendix K
Terra Africa	Soils and Agricultural Potential Assessment	Appendix L
JG Afrika	Traffic	Appendix M

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the Aberdeen Wind Facility 2. Issues were assessed in terms of the following criteria:

» The **nature**, a description of what causes the effect, what will be affected, and how it will be affected;
» The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high);
» The **duration**, wherein it is 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;
  * Permanent - assigned a score of 5.
» The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  * 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);
  * 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
» The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
  * Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  * Assigned a score of 2 is improbable (some possibility, but low likelihood);
  * Assigned a score of 3 is probable (distinct possibility);
  * Assigned a score of 4 is highly probable (most likely);
  * Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

[18] This will include a Terrestrial Biodiversity compliance statement, a plant species assessment and an animal species compliance statement.

» The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
» The **status**, which is 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 determined by combining the criteria in the following formula:

S = (E+D+M) P; where

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).

Specialist studies also considered cumulative impacts associated with similar developments within a 30km radius of the proposed project. The purpose 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). In this regard, specialist studies considered whether the construction of the proposed development will result in:

» Unacceptable risk
» Unacceptable loss
» Complete or whole-scale changes to the environment or sense of place
» Unacceptable increase in impact

A conclusion regarding whether the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports.

As the proponent has the responsibility to avoid or minimise impacts and plan for their management (in terms of the EIA Regulations, 2014 (as amended)), the mitigation of significant impacts is discussed. An assessment of impacts with mitigation is made in order to demonstrate the effectiveness of the proposed mitigation measures. An Environmental Management Programme (EMPr) that includes all the mitigation measures recommended by the specialists for the management of significant impacts is included as **Appendix N**. The Generic Environmental Management Programme (EMPr) for the Development and Expansion of Substation Infrastructure for the Transmission and Distribution of Electricity (as gazetted in GNR 435 of March 2019) is included for the on-site facility substation.

7.6 Assumptions and Limitations of the BA Process

The following assumptions and limitations are applicable to the studies undertaken within this Basic Assessment process:

- » All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- » It is assumed that the project site and development footprint identified by the developer represents a technically suitable site for the establishment of the Aberdeen Wind Facility 2 which is based on the design undertaken by technical consultants for the project.
- » This report and its investigations are project-specific, and consequently the environmental team did not evaluate any other power generation alternatives.

The specialist studies in **Appendices D – M** include specialist study-specific limitations.

7.7 Legislation and Guidelines that have informed the preparation of this Basic Assessment Report

The following legislation and guidelines have informed the scope and content of this BA Report:

- » National Environmental Management Act (Act No. 107 of 1998);
- » EIA Regulations of December 2014, published under Chapter 5 of NEMA (as amended);
- » Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations;
- » Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation; and
- » International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines).

Table 7.7 provides an outline of the legislative permitting requirements applicable to the Aberdeen Wind Facility 2 as identified at this stage in the project process.

Table 7.7: Applicable Legislation, Policies and/or Guidelines associated with the development of the Aberdeen Wind Facility 2

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "*Everyone has the right –* » *To an environment that is not harmful to their health or well-being, and* » *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:* ∗ *Prevent pollution and ecological degradation,* ∗ *Promote conservation, and* ∗ *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*"	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No 107 of 1998) (NEMA)	The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326). In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. Considering the location of the project site within the Beaufort West Renewable Energy Development Zone and the requirements GNR114 of 16 February 2018, a Basic Assessment Process is required to be undertaken for	DFFE – Competent Authority DEDEAT – Commenting Authority	The listed activities triggered by the project have been identified and are being assessed as part of the BA process. The Basic Assessment process will culminate in the submission of a final Basic Assessment Report to the competent authority in support of the application for EA.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	the proposed project. All relevant listing notices for the project (GN R327, GN R325 and GN R324) will be applied for.		
National Environmental Management Act (No 107 of 1998) (NEMA)	In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	DFFE DEDEAT	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section finds application through the consideration of potential cumulative, direct, and indirect impacts. It will continue to apply throughout the life cycle of the project.
Environment Conservation Act (No. 73 of 1989) (ECA)	The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces. The Noise Control Regulations cover the powers of a local authority, general prohibitions, prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties. In terms of the Noise Control Regulations, no person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof (Regulation 04).	DFFE DEDEAT Dr Beyers Naude Local Municipality	Noise impacts are expected to be associated with the construction and operation phases of the project. A Noise Impact Assessment (**Appendix J**) has been undertaken for the Aberdeen Wind Facility 2 which indicates that the impact of the project will be of low significance, with the implementation of mitigation measures.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Water Act (No. 36 of 1998) (NWA)	A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in Schedule 1 of the NWA (i.e. is an existing lawful use), is permissible under a GA, or if a responsible authority waives the need for a licence. Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)). Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)).	Regional Department of Water and Sanitation	The project site considered for the establishment of the wind farm and associated infrastructure is associated with the presence of Ganneleegte and Kraai River systems as identified in the Aquatic Impact Assessment (**Appendix E**). Where the development activities impede or divert the flow of water in a watercourse, or alter the bed, banks, course or characteristics of a watercourse, Section 21(c) and 21(i) of the NWA (Act 36 of 1998) would be triggered and the project proponent would need to apply for a WUL or register a GA with the DWS.
Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)	In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.	Department of Mineral Resources and Energy (DMRE)	Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the project, and as a result a mining permit or EA in this regard is not required to be obtained.
	Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely		In terms of Section 53 of the MPRDA approval is required from the Minister of Mineral Resources and Energy to ensure

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	to impede any such object must apply to the Minister for approval in the prescribed manner.		that the proposed development does not sterilise a mineral resource that might occur on site.
National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)	The National Dust Control Regulations (GNR 827) published under Section 32 of NEM:AQA prescribe the general measures for the control of dust in all areas, and provide a standard for acceptable dustfall rates for residential and non-residential areas. In accordance with the Regulations (GNR 827) any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dustfall monitoring programme. Any person who has exceeded the dustfall standard set out in Regulation 03 must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval.	DEDEAT Sarah Baartman District Municipality	In the event that the project results in the generation of excessive levels of dust the possibility could exist that a dustfall monitoring programme would be required for the project, in which case dustfall monitoring results from the dustfall monitoring programme would need to be included in a dust monitoring report, and a dust management plan would need to be developed. However, with mitigation measures implemented, the Aberdeen Wind Facility 2 is not anticipated to result in significant dust generation with mitigation.
National Heritage Resources Act (No. 25 of 1999) (NHRA)	Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance. Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites. Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority.	South African Heritage Resources Agency (SAHRA) Eastern Cape Provincial Heritage Resources Authority	A full Heritage Impact Assessment (HIA) (with field work) has been undertaken as part of the Basic Assessment process (refer to **Appendix H** of this Basic Assessment Report). Sites of varying significance, including cultural landscapes, have been identified within the project site and specific mitigation measures have been recommended by the specialist with regards to each identified find.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development. Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction.		Should a heritage resource be impacted upon, a permit may be required from SAHRA or Eastern Cape Provincial Heritage Resources Authority in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668). This will be determined as part of the final walk-through survey once the final location of the development footprint and its associated infrastructure has been determined.
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process. Three government notices have been published in terms of Section 56(1) of NEM:BA as follows: » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and	DFFE DEDEAT	Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species. The Ecological Impact Assessment (**Appendix D**) has identified species of conservation concern present at the project site. *Peersia frithii; Tridentea virescens*; Sensitive Species 1212 and Sensitive Species 1039 were noted as potential plant species of conservation concern within the broader area, with only Sensitive Species 1212 occurring on site. The Mountain Reedbuck, Black-footed Cat and Karoo Dwarf Tortoise are potential animal species of conservation concern known to occur within the broader area, but with not confirmed as occurring on site.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	summary statistics and national maps of listed ecosystems (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014).		
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out. Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).	DFFE DEDEAT	The Ecological Impact Assessment (**Appendix D**) has been undertaken as part of the EIA process to identify the presence of any alien and invasive species present on site.
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)	Section 05 of CARA provides for the prohibition of the spreading of weeds. Regulation 15 of GN R1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E of GN R1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.	Department of Agriculture, Land Reform and Rural Development (DALRD)	CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented. In terms of Regulation 15E (GN R1048) where Category 1, 2 or 3 plants occur a land user is required to control such plants by means of one or more of the following methods: » Uprooting, felling, cutting or burning. » Treatment with a weed killer that is registered for use in connection with such plants in accordance with the

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			directions for the use of such a weed killer. » Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that has as its object the control of plants concerned, subject to the provisions of sub-regulation 4. » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.
National Forests Act (No. 84 of 1998) (NFA)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734. The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister".	Department of Agriculture, Land Reform and Rural Development (DALRD)	A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals. The Ecological Impact Assessment undertaken as part of the BA Report included the identification of any protected tree species which may require

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			a license in terms of the NFA (No. 84 of 1998) within the development footprint (refer to **Appendix D** of this BA Report).
National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it. Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.	DFFE	While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the Aberdeen Wind Facility 2, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and trained personnel for firefighting purposes.
Hazardous Substances Act (No. 15 of 1973) (HAS)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger, to provide	Department of Health (DoH)	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored or handled. If applicable, a license would be required to be obtained from the Department of Health (DoH).

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product, and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.		
National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of NEM:WA (GNR 912), a BA or EIA is required to be undertaken for identified listed activities. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:	DFFE– Hazardous Waste DEDEAT – general waste	No waste listed activities are triggered by the Aberdeen Wind Facility 2, therefore, no Waste Management License is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM:WA will need to be considered in this regard.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» The containers in which any waste is stored, are intact and not corroded or in » Any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise, and » Pollution of the environment and harm to health are prevented.		
National Road Traffic Act (No. 93 of 1996) (NRTA)	The technical recommendations for highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads” outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of	South African National Roads Agency (SANRAL) – national roads Eastern Cape Department of Transport	An abnormal load/vehicle permit will be required to transport the various components to site for construction. These include: » Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. » Transport vehicles exceeding the dimensional limitations (length) of 22m. » Depending on the trailer configuration and height when loaded, some of the project components may not meet specified dimensional limitations (height and width).

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	the National Road Traffic Act and the relevant Regulations.		
Astronomy Geographic Advantage Act (Act No. 21 of 2007)	The Astronomy Geographic Advantage (AGA) Act (No. 21 of 2007) provides for the preservation and protection of areas within South Africa that are uniquely suited for optical and radio astronomy; for intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas and for matters connected thereto. Chapter 2 of the Act allows for the declaration of astronomy advantage areas whilst Chapter 3 pertains to the management and control of astronomy advantage areas. Management and control of astronomy advantage areas include, amongst others, the following: * Restrictions on use of radio frequency spectrum in astronomy advantage areas * Declared activities in core or central astronomy advantage area * Identified activities in coordinated astronomy advantage area; and * Authorisation to undertake identified activities.	Department of Science and Technology.	The site proposed for the development of the Aberdeen Wind Facility 2 is located within the Eastern Cape Province and therefore falls outside of the area considered to be uniquely suited in terms of nationally significant astronomy advantage areas.
Aviation Act (Act No 74 of 1962) 13th amendment of the Civil Aviation Regulations (CARS) 1997	Any structure exceeding 45m above ground level or structures where the top of the structure exceeds 150m above the mean ground level, the mean ground level considered to be the lowest point in a 3km radius around such structure.	South African Civil Aviation Authority (SACAA)	This Act will find application during the operation phase of Aberdeen Wind Facility 2. Appropriate marking on the project infrastructure is required to meet the specifications as detailed in the CAR Part 139.01.33. An obstacle approval for the wind energy facility is required to be obtained from the SACAA

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Structures lower than 45m, which are considered as a danger to aviation shall be marked as such when specified. Overhead wires, cables etc., crossing a river, valley or major roads shall be marked and in addition their supporting towers marked and lighted if an aeronautical study indicates it could constitute a hazard to aircraft. Section 14 of Obstacle limitations and marking outside aerodrome or heliport – CAR Part 139.01.33 relates specifically to appropriate marking of wind energy facilities.		
	Provincial Policies / Legislation		
Nature and Environmental Conservation Ordinance (Act 19 of 1974) as amended.	The Nature and Environmental Ordinance 19 of 1974 defines the protection status of plants as follows: • ‘‘endangered flora’’ means flora of any species which is in danger of extinction and is specified in Schedule 3 or Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include flora of any species specified in such Appendix and Schedule 4; (therefore all Schedule 3 species) • ‘‘protected flora’’ means any species of flora specified in Schedule 4 or Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include any species of flora specified in such Appendix and Schedule 3 • ‘‘indigenous unprotected flora’’ means any species of indigenous flora not specified in Schedule 3 or 4.	Eastern Cape DEDEAT	Where protected plants are to be disturbed or destroyed by the development of the wind farm, the relevant permits need to be obtained. A collection/destruction permit must be obtained from the Eastern Cape DEDEAT for the removal of any protected plant or animal species found on site. Ground truthing confirmed Species of Conservation Concern to be present within the study area (**Appendix D**). Based on the SANBI POSA records for the site and surrounding area, other species of conservation concern are potentially present on the site.

7.7.1 The IFC EHS Guidelines

The IFC EHS Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The following IFC EHS Guidelines have relevance to the Aberdeen Wind Facility 2:

- » IFC EHS General Guidelines
- » IFC EHS Guidelines for Electric Power Transmission and Distribution

The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines. The application of the General EHS Guidelines should be tailored to the hazards and risks associated with a project, and should take into consideration site-specific variables which may be applicable, such as host country context, assimilative capacity of the environment, and other project factors. In instances where host country regulations differ from the standards presented in the EHS Guidelines, whichever is the more stringent of the two in this regard should be applied.

The General EHS Guidelines include consideration of the following:

- » Environmental:
  - ∗ Air Emissions and Ambient Air Quality
  - ∗ Energy Conservation
  - ∗ Wastewater and Ambient Water Quality
  - ∗ Water Conservation
  - ∗ Hazardous Materials Management
  - ∗ Waste Management
  - ∗ Noise
  - ∗ Contaminated Land
- » Occupational Health and Safety:
  - ∗ General Facility Design and Operation
  - ∗ Communication and Training
  - ∗ Physical Hazards
  - ∗ Chemical Hazards
  - ∗ Biological Hazards
  - ∗ Radiological Hazards
  - ∗ Personal Protective Equipment (PPE)
  - ∗ Special Hazard Environments
  - ∗ Monitoring
- » Community Health and Safety:
  - ∗ Water Quality and Availability
  - ∗ Structural Safety of Project Infrastructure
  - ∗ Life and Fire Safety (L&FS)
  - ∗ Traffic Safety
  - ∗ Transport of Hazardous Materials
  - ∗ Disease Prevention
  - ∗ Emergency Preparedness and Response
- » Construction and Decommissioning:
  - ∗ Environment

- Occupational Health & Safety
- Community Health & Safety

7.7.2 IFC Environmental, Health and Safety Guidelines for Wind Energy (August, 2015)

The EHS Guidelines for wind energy include information relevant to environmental, health, and safety aspects of onshore and offshore wind energy facilities. It should be applied to wind energy facilities from the earliest feasibility assessments, as well as the environmental impact assessment, and continue to be applied throughout the construction and operation phases.

The guidelines list issues associated with wind energy facilities which need to be considered. These include:

» Environmental impacts associated with the construction, operation, and decommissioning of wind energy facilities activities may include, among others, impacts on the physical environment (such as noise or visual impact) and biodiversity (affecting birds and bats, for instance).
» Due to the typically remote location of wind energy facilities, the transport of equipment and materials during construction and decommissioning may present logistical challenges (e.g., transportation of long, rigid structures such as blades, and heavy tower sections).
» Environmental issues specific to the construction, operation, and decommissioning of wind energy projects and facilities include the following:
    - Landscape, Seascape, and Visual impacts
    - Noise
    - Biodiversity
    - Shadow Flicker
    - Water Quality

These issues, as well as others identified, have been addressed through this BA report.

CHAPTER 8: DESCRIPTION OF THE RECEIVING ENVIRONMENT

This chapter provides a description of the local environment that will be affected by the development of Aberdeen Wind Facility 2. This information is provided to assist the reader in understanding the features present within the project site and the possible effects of the project on the environment within which it is proposed. Aspects of the biophysical, social, and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from both existing information available for the area as well as collected field data by specialist consultants and aims to provide the context within which this BA process is being conducted.

8.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(h)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The environmental attributes associated with the project site, as well as the broader environment, are described and considered within this chapter and includes the following: » The regional setting within which the project site is located is described in section 8.2. » The climatic conditions of the area within which the project site is located is discussed in section 8.3. » The biophysical characteristics of the project site and the surrounding areas is described in section 8.4. This includes the topography and terrain, geology, soils and agricultural potential and the ecological profile of the site (i.e. broad-scale vegetation patterns, fine-scale vegetation patterns, critical biodiversity areas and broad-scale processes, surface water features, terrestrial fauna, bats and avifauna). » The heritage of the project site and the surrounding areas (including the archaeology, palaeontology, and cultural landscape) is discussed in section 8.5. » The noise levels and developments sensitive to noise are described in section 8.6. » The visual quality of the affected environment is discussed in section 8.7. » The current traffic conditions for the area surrounding the project site are included in section 8.8. » The social context within which the project site is located is described in section 8.9.

A more detailed description of each aspect of the affected environment is included in the specialist reports included as **Appendices D - M**.

8.2. Regional Setting

The project site is located within the Ward 1 of the Dr Beyers Naude Local Municipality which forms part of the greater Sarah Baartman District Municipality. The Sarah Baartman District Municipality is a Category C municipality situated in the northwest section of the Eastern Cape. The District Municipality is the biggest municipality in the province covering an area of 58 245km² and is also one of the largest contributors to the provincial GDP. Large commercial farms in the Karoo produce high-quality meat, wool and mohair, while the coastal belt has dairy farming and some forestry. The Kouga Valley is a large producer of deciduous fruit, while the Kirkwood/Addo area is known for its abundance of citrus. Sarah Baartman District Municipality has three of the region's national parks and several private game farms. Makana hosts the National Arts Festival, Rhodes University and several fine schools. The seat of the Sarah Baartman District Municipality is the city of Gqeberha although Gqeberha is not itself in the district. Other prominent cities and towns located within the DM include, Cookhouse, Graaff- Reinet, Makhanda and Somerset East. The main agricultural production within this district municipality include red meat, wool & mohair, dairy, poultry, pork, chicory, and pineapple. The three biggest sectors in 2016 were Trade (21%), Community Services (19%) and Agriculture (16%).

The Sarah Baartman DM comprises seven (7) local municipalities (LMs), namely Blue Crane Route, Dr Beyers Naude, Kouga, Koukamma, Makana, Ndlambe, and Sundays River Valley (refer to **Figure 8.1**).

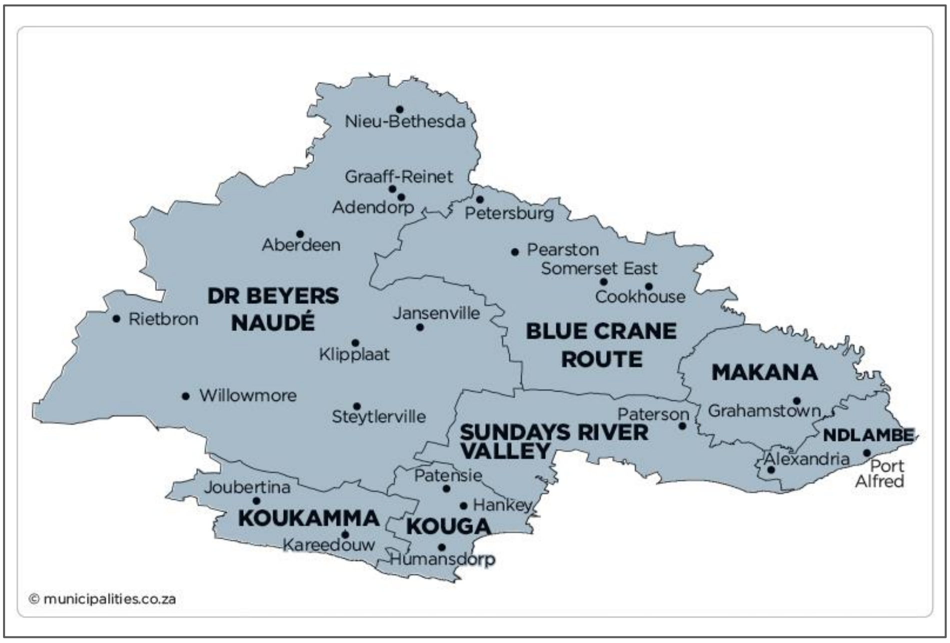

Figure 8.1: Local Municipalities of the Sarah Baartman DM (Source: Municipalities of South Africa)

The broader project site for the development of the Aberdeen Wind Facility 2 is located within the Dr Beyers Naude Local Municipality, which is a Category B municipality.

The Aberdeen Wind Facility 2 project site is situated in the northern portion of the vast Central Karoo plain, near the transition into the Great Escarpment, ~20km west Aberdeen. Aberdeen, while being a small town, is the largest town in the Beyers Naude Local Municipality and serves as a regional services centre. The town is located at the intersection of the R61and R338 regional roads and the N9 national road which all pass through the town. Aberdeen is typical of a Karoo grid kerkdorp, and is renowned for its Victorian architecture and, wool and mohair. Aberdeen and surrounding farmsteads are the only major urban settlements within the local area. The area is sparsely populated (less than 10 people per km²) and consists of very little development. The soils, low rainfall and scarcity of water has as a consequence resulted that the region has not been transformed by dryland agriculture.

The tarred R61 main road forms the northern boundary of the project site and links the area to Beaufort West, located 140km north west. The N9 road, which passes through the town of Aberdeen, is located to the east of the site. The site is traversed by two ephemeral watercourses, namely the Kraai River (north eastern portion) and the Gannaleegte River (western portion). The plains veld consists of karroid scrub, with trees essentially limited to ephemeral watercourses and farm yards. Farm residences (homesteads) dot the landscape at an irregular interval. These homesteads are generally located at great distances from each other.

Figure 8.2 indicates the regional setting of the Aberdeen Wind Facility 2 project site. The entire project site is located within the Beaufort West Renewable Energy Development Zone (REDZ) (**Figure 8.3**) and adjacent to the authorised Eskom Aberdeen Wind Farm. Other infrastructure in the area includes the Aberdeen Substation and Skietkop/Aberdeen 1 66kV power line located southwest of the site.

Figure 8.2: Photographs providing a sense of the general landscape within which the Aberdeen Wind Facility 2 project site is located.

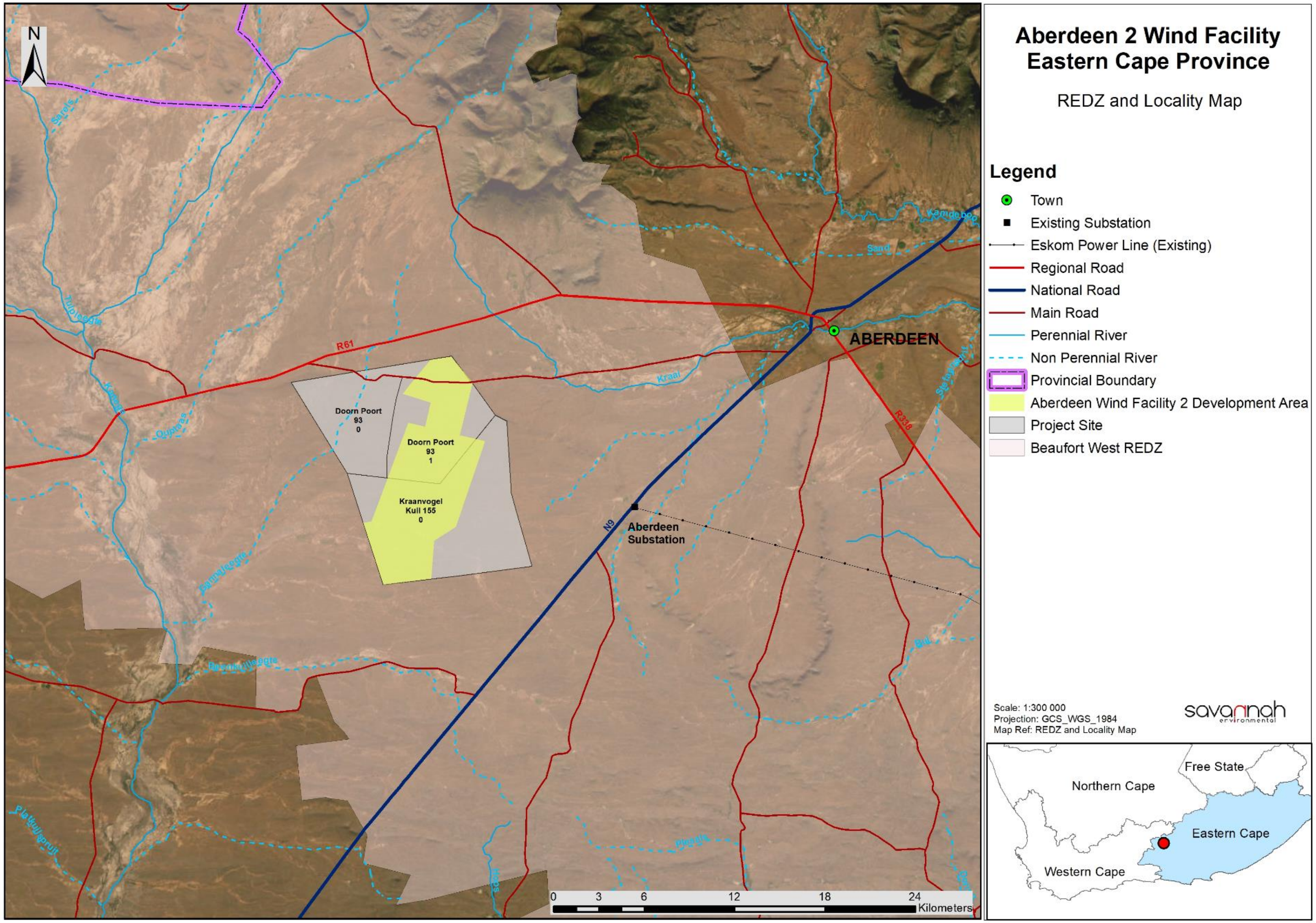

Figure 8.3: Maps showing location of Aberdeen Wind Facility 2 within the Beaufort West REDZ.

8.3. Climatic Conditions

The Aberdeen area is considered cold semi-arid to arid. The average annual temperature is 17.5°C and the average annual rainfall is 260mm. The driest month is June with an average of 15mm of precipitation, with precipitation peaking in March with an average of 58mm. At an average temperature of 22.7 °C, January is the hottest month of the year and July is the coldest month, with temperatures averaging 11.6°C (refer to **Figure 8.4**).

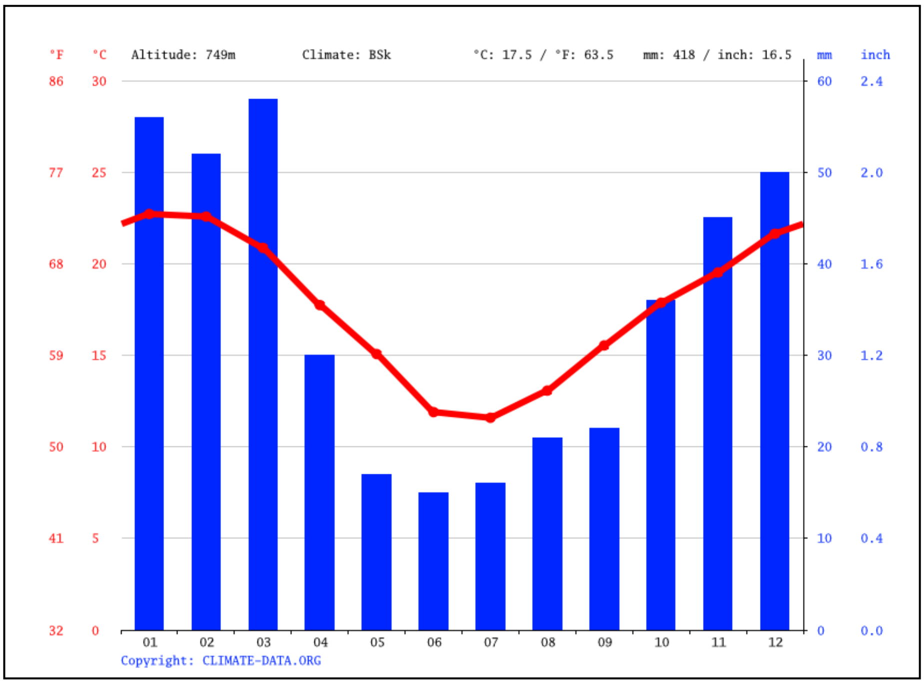

Figure 8.4: Climate graph indicating temperature and rainfall of Aberdeen, Eastern Cape Province (https://en.climate-data.org/africa/south-africa/eastern-cape/aberdeen-11239/)

8.4. Biophysical Characteristics of the Aberdeen Wind Facility 2 Project Site and surrounding area.

8.4.1. Topography and Terrain

The broader area surrounding the project site (and including the project site) occupies land that ranges in elevation from approximately 750m in the south west to 1,950m at the top of the mountains north of the R61 arterial road. The terrain surrounding the proposed development area is predominantly flat with an even slope towards the south west and north east respectively. This valley, or large plain, known as the Plains of Camdeboo, is flanked to the north by the Camdeboo Mountains (Kamdebooberg) and the Oorlogspoortberge (further north-west of the development site and the R61). Wolwekop is topographical landmark lying just north of the R61 and the proposed wind farm site.

The project site occurs on land that ranges in average elevation from 800m to 850m above sea level. The site is predominantly flat, with limited undulation. The overall terrain morphological description of the study area is Plains interrupted by some dolerite dykes, butts and mesas. Due to the flat topography and arid climate, several non-perennial drainage lines traverse across the surrounding area. The Gannaleegte non-perennial river passes through the east of the project site. The nearby perennial Kraai River also drains from the southern slops of the Cambedoo Mountains to the east towards the Aberdeen Nature Reserve (also known as the Fonteinbos Nature Reserve) which features a natural spring. The perennial spring, located out of the project site but close to Aberdeen, is known as Die Oog (The Eye) and supplies water to the town of Aberdeen, as well as irrigation to a large area of arable land. A number of man-made farm dams are also scattered through the study area.

8.4.2. Geology, Soils and Agricultural Potential

Geological Setting of the Project Site

The Aberdeen Wind Facility 2 project site consists predominantly of land with low soil sensitivity with smaller areas of medium soil sensitivity. The areas with low soil sensitivity are associated with shallow effective soil depths with pedocutanic horizons. The arid climate reduces the land capability of the area significantly.

Soil Form, Land Capability and Agricultural Potential of the Project Site

Four different soil forms were identified within the development footprint. The soil forms include the Glenrosa, Nkonkoni, Swartland and Valsrivier soil forms soil forms. **Table 8.1** provides a summary of each form and **Figure 8.5** provides a map of the soil forms present.

Table 8.1: Soil classification of soil forms present within the project site

<table>
<tr><th>Soil Classification Group</th><th>Summary</th></tr>
<tr><td>Glenrosa</td><td>» The dominant soil form found on site was the Glenrosa soil form (1530ha)
» The depths of these soil did not reach 200 mm and in some observation solid rock was found.
» 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 position of the observation.</td></tr>
<tr><td>Nkonkoni</td><td>» The Nkonkoni soil form covered the second largest of the development footprint (170.2ha).
» The Nkonkoni consists of an orthic A, overlying a red apedal with a lithic underneath. The Nkonkoni had a moderate depth of 0.6m 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.</td></tr>
<tr><td>Swartland</td><td rowspan="2">» The Swartland and Valsrivier soil forms are found in one area of the study area and covered approximately 26.9ha and 2.8ha respectively.
» The Swartland soil form consist of an orthic horizon overlying a pedocutanic horizon with lithic material underneath.
» The Valsrivier only consist of an orthic horizon overlying a pedocutanic horizon.
» Cutans were clearly present within the pedocutanic horizon.
» The lithic horizon was also saprolthic as most of the area consist of rock of the Adelaide Sbgrp, Beaufort grp which are Siliciclastic.
» The depth of the pedocutanic varied between 0.5m to 1.2 m</td></tr>
<tr><td>Valsrivier</td></tr>
</table>

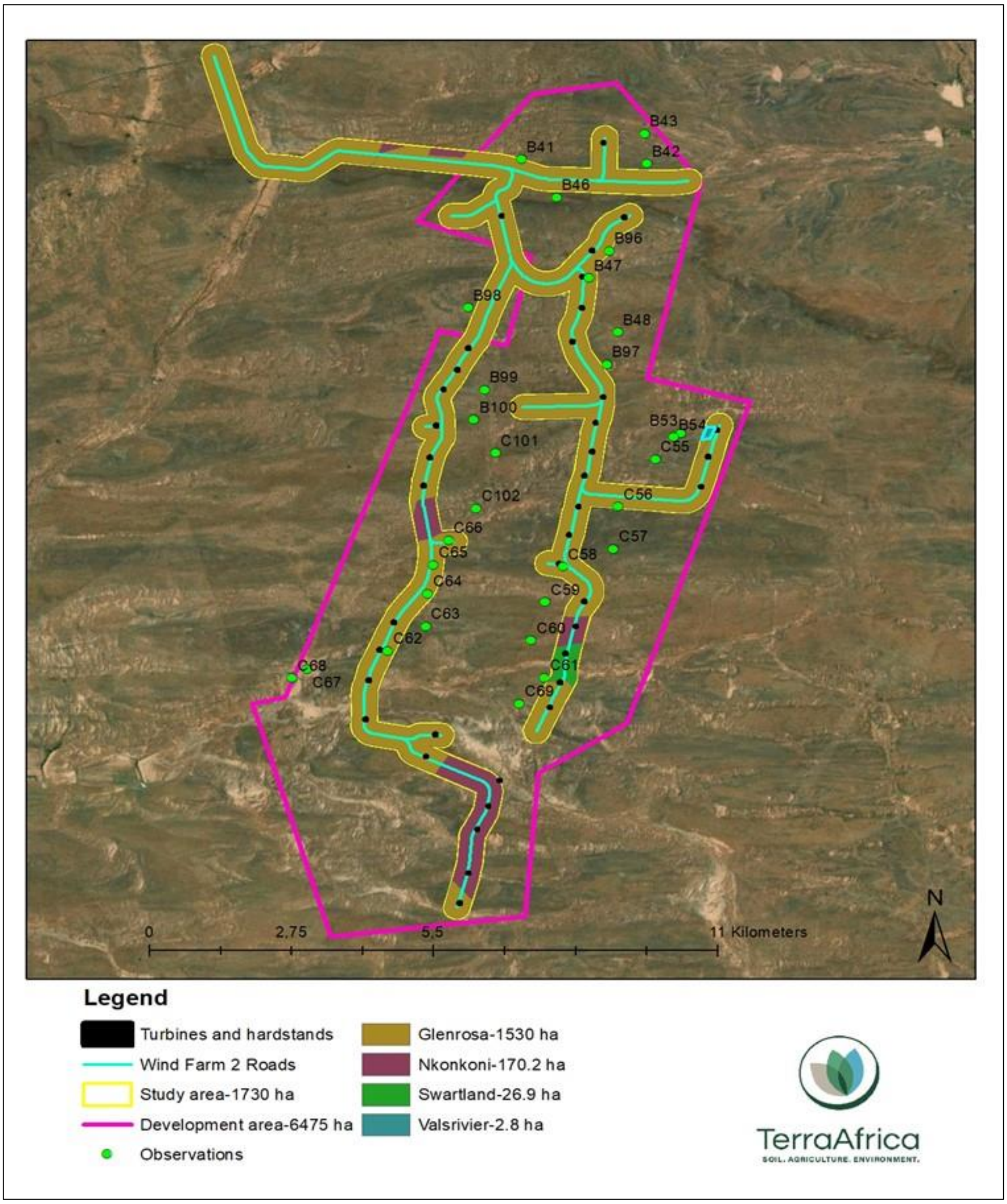

Figure 8.5: Soil classification of the Aberdeen Wind Facility 2 development footprint.

The development footprint can be classified into two different land capability classes (refer to **Figure 8.6**). The Low (5) land capability was associated with the Glenrosa, Swartland and Valsrivier soil form and is mainly due to the shallow depth of the Glenrosa and the pedocutanic of the Valsrivier and Swartland. In addition, the climate capability is Low-Moderate for the development area (Class 04) further decreasing the land capability. The absence of cultivated land within the majority of the development area also lowers the land capability. The Low-Moderate (Class 07) is allocated to the Nkonkoni soil form due the drainable depth (0.6m) of the red apedal.

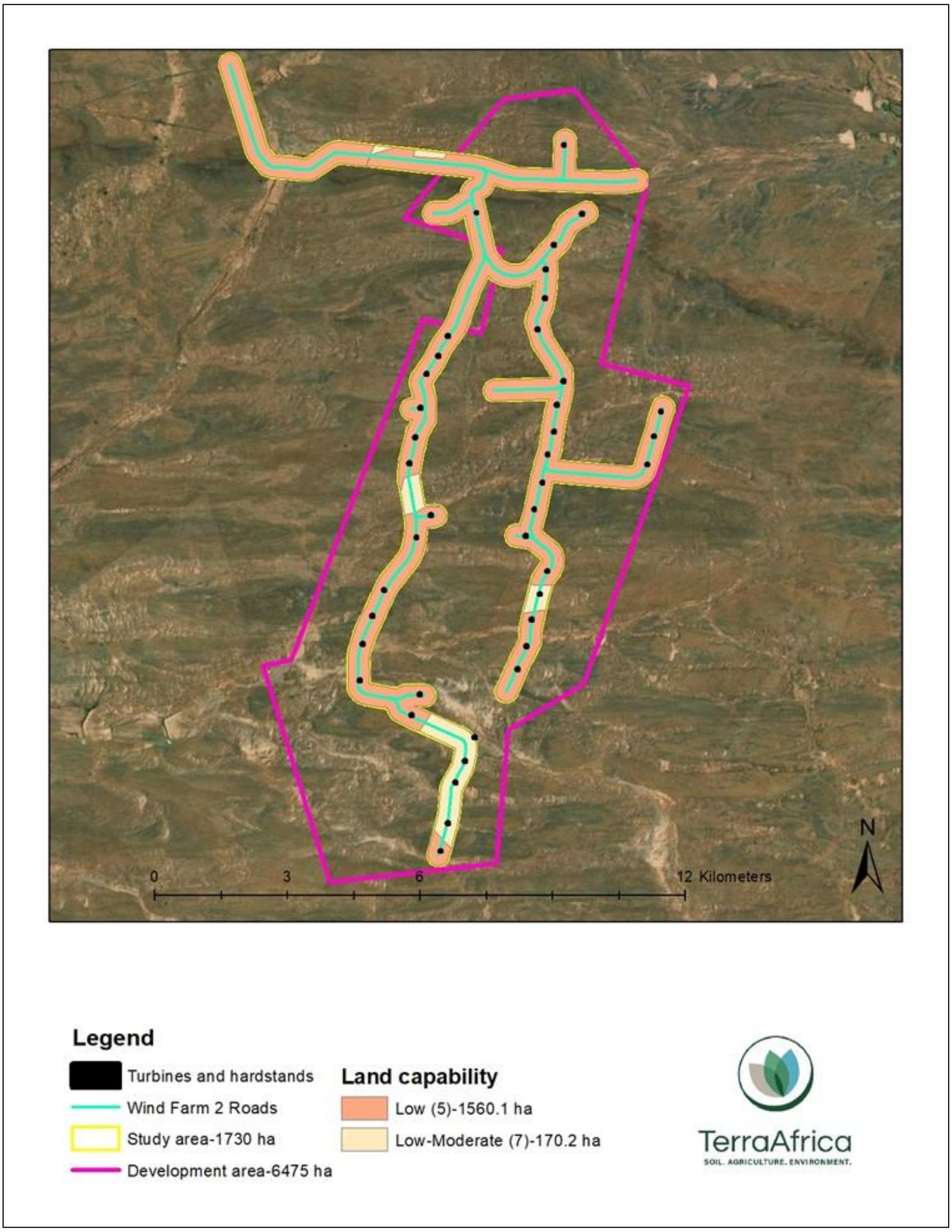

Figure 8.6: Land capability classification of the Aberdeen Wind Facility development footprint.

The development footprint is mainly used for livestock grazing (see **Figure 8.7**), but due to heavy droughts, the number of livestock for the development area had decreased significantly.

Figure 8.7: Evidence of grazing land use activities undertaken within the project site.

8.4.3. Ecological Profile of the Broader Study Area and the Project Site

i. Broad-Scale Vegetation Patterns

The Aberdeen Wind Facility 2 project site falls entirely within the Eastern Lower Karoo vegetation type. Although there is some variation in vegetation composition within the site depending on soil depth, underlying geology and rockiness, these differences represent different communities rather than different vegetation types. These are briefly described below and illustrated in **Figure 8.10**.

» *Eastern Lower Karoo*

Eastern Lower Karoo occurs in the Eastern Cape and Western Cape Provinces, where it is distributed on the plains east of the Kariega and Buffels Rivers in the area south of the Camdebo Mountains and the line of mountains linking to the Coetzeesberge encompassing Aberdeen, Graaff-Reinet and Pearston (region called Camdebo) and plains south of Aberdeen to Klipplaat and Miller. Within the study area, common and dominant species include trees and tall shrubs such as *Vachellia karroo, Lycium oxycarpum, Carissa haematocarpa, Grewia robusta* and *Rhigozum obovatum*; Lower shrubs such as *Eriocephalus ericoides subsp. ericoides, Pentzia incana, Rosenia humilis, Asparagus suaveolens, Blepharis capensis, Chrysocoma ciliata, Euryops anthemoides, Felicia muricata, Galenia secunda, Garuleum latifolium, Helichrysum zeyheri, Hermannia cuneifolia, Indigofera sessilifolia, Pegolettia retrofracta, Phymaspermum parvifolium, Plinthus karooicus, Pteronia adenocarpa, P. glauca, P. sordida, Selago fruticosa and Zygophyllum microphyllum;* with a variable mix of succulent shrubs comprising *mostly Ruschia cradockensis subsp. cradockensis, Mesembryanthemum coriarium, Drosanthemum lique, Euphorbia ferox,* and *Sarcocaulon camdeboense*. The grass layer is variable but at the time of the site visits comprised a significant proportion of annual grasses which had likely increased in response to the rains following the extended drought which had opened up the vegetation to some degree. Common and dominant grasses present include *Aristida adscensionis, Eragrostis lehmanniana, E.obtusa, Tragus berteronianus, T.koelerioides, Cynodon incompletus* and *Enneapogon desvauxii*. Common forbs and geophytes include *Gazania krebsiana, Albuca setosa, Drimia anomala* and *Moraea polystachya*.

Figure 8.8: Example of the open plains habitat that dominates the Aberdeen Wind Facility 2 study area, corresponding with the Eastern Lower Karoo vegetation type.

Figure 8.9: The typical open plains from within Aberdeen Wind Facility 2 site are relatively homogenous with few notable features present.

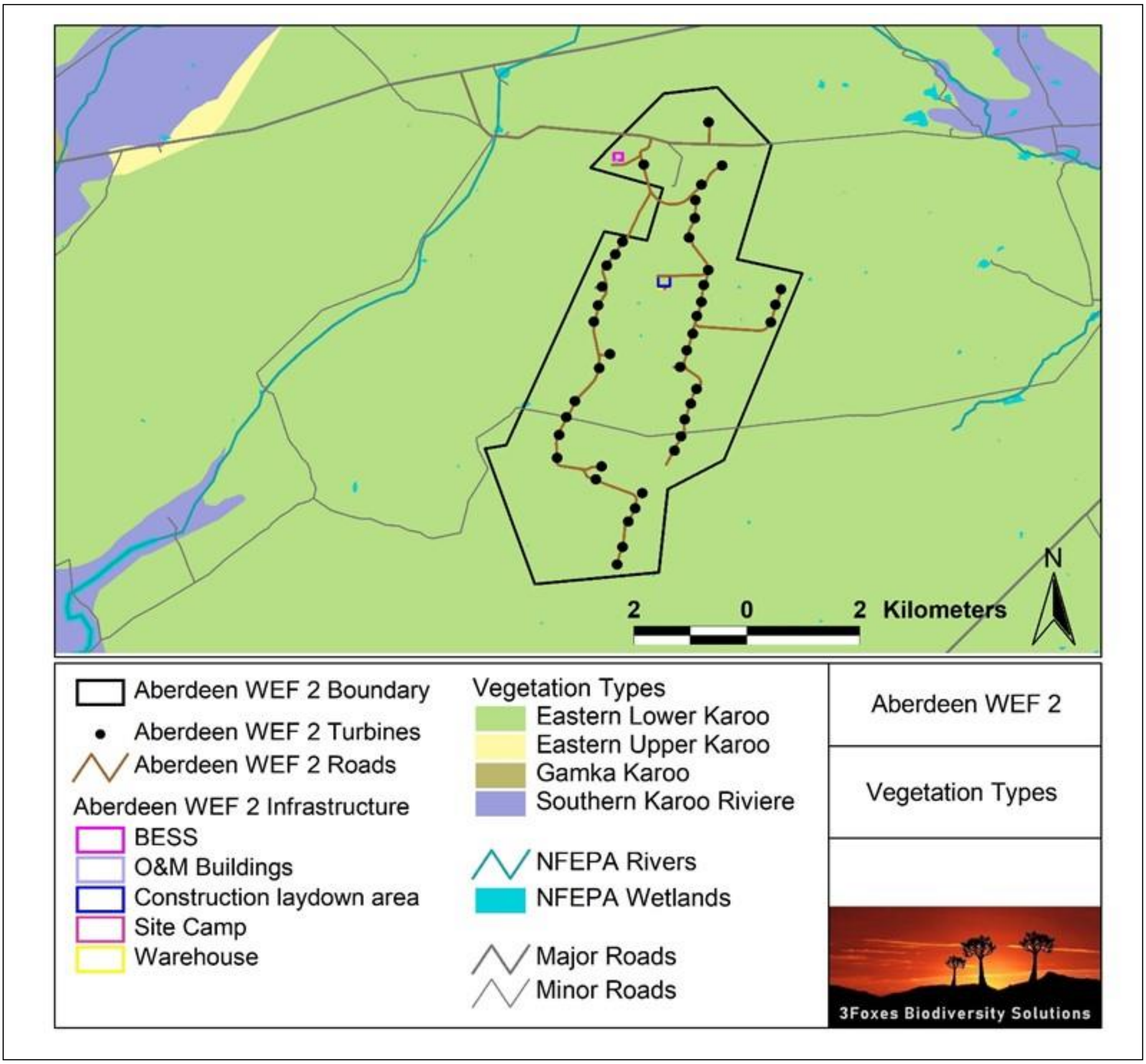

Figure 8.10: Vegetation types, as per the national vegetation showing that the Aberdeen Wind Facility 2 Development area consists of the Eastern Lower Karoo vegetation type.

ii. Listed Plant Species

According to the DFFE Screening Tool, there are four plant species of concern that may occur within the Aberdeen Wind Facility 2 site (**Table 8.2**). Only Sensitive Species 1212 was observed at the site, and it is considered unlikely to very unlikely that any of the other three species are present within the Aberdeen Wind Facilty1 development area. No other plant Species of conservation concern (SCC) were observed within the site.

Table 8.2: Sensitive Species as listed by the DFFE Screening Tool for the Aberdeen Wind Facility 2 site and the likely presence of these species within the site

Name	IUCN Status	Possible presence within the Aberdeen WEF cluster site
Peersia frithii	VU	Occurs from Laingsburg to Aberdeen. A species previously collected widely throughout the southern Nama Karoo with an historic extent of occurrence (EOO) of 28913 km². It has only been recorded seven times since 1990 and is suspected to be extant at 6 locations from a current EOO of 690 km². Decline is suspected to be the result of livestock overgrazing and trampling. Not observed within the Aberdeen site and is considered absent from the site.
Tridentea virescens	Rare	A widespread species that occurs in the Northern Eastern and Western Cape as sporadic small subpopulations of up to six plants. No threats are known to impact this species. It occurs on stony ground, or hard loam in floodplains. Not observed within the Aberdeen site and is considered absent.
Sensitive Species 1212	VU	Willowmore to Beaufort West and Aberdeen. EOO <7 000 km², known from fewer than 10 locations and habitat quality and number of mature individuals are declining as a result of livestock (sheep and goat) overgrazing and illegal collection for the succulent plant trade. Confirmed present within the Aberdeen site.
Sensitive Species 1039	VU	This taxon occurs in the southern Great Karoo from Aberdeen and Graaff-Reinet southwards to Rietbron and eastwards to Willowmore, Klipplaat and Steytlerville. It occurs on flat areas between low hills on slightly gravelly ground, rarely on hill slopes. Not observed within the site and considered absent from the site.

iii. Critical Biodiversity Areas (CBA) and Broad-Scale Processes

There are no CBAs within the Aberdeen Wind Facility 2 site and only a small extent of Ecological Support Area 2 buffer along the Gannaleegte River (**Figure 8.11**). This corridor is over 4km wide and is presumably designed to act as a movement corridor for fauna through the area. The minor footprint of the Aberdeen WEF 2 within this area would not significantly impact the ESA or its ecological functioning. As a result, impacts on the ESA and its functioning within the site would be minor and is considered acceptable.

In terms of the conservation planning priorities and features of the site, there are no NPAES Focus Areas within the site. Given the low transformation rate and extensive nature of the affected vegetation types, the development would have minimal impact on the future ability to meet conservation targets for these vegetation types.

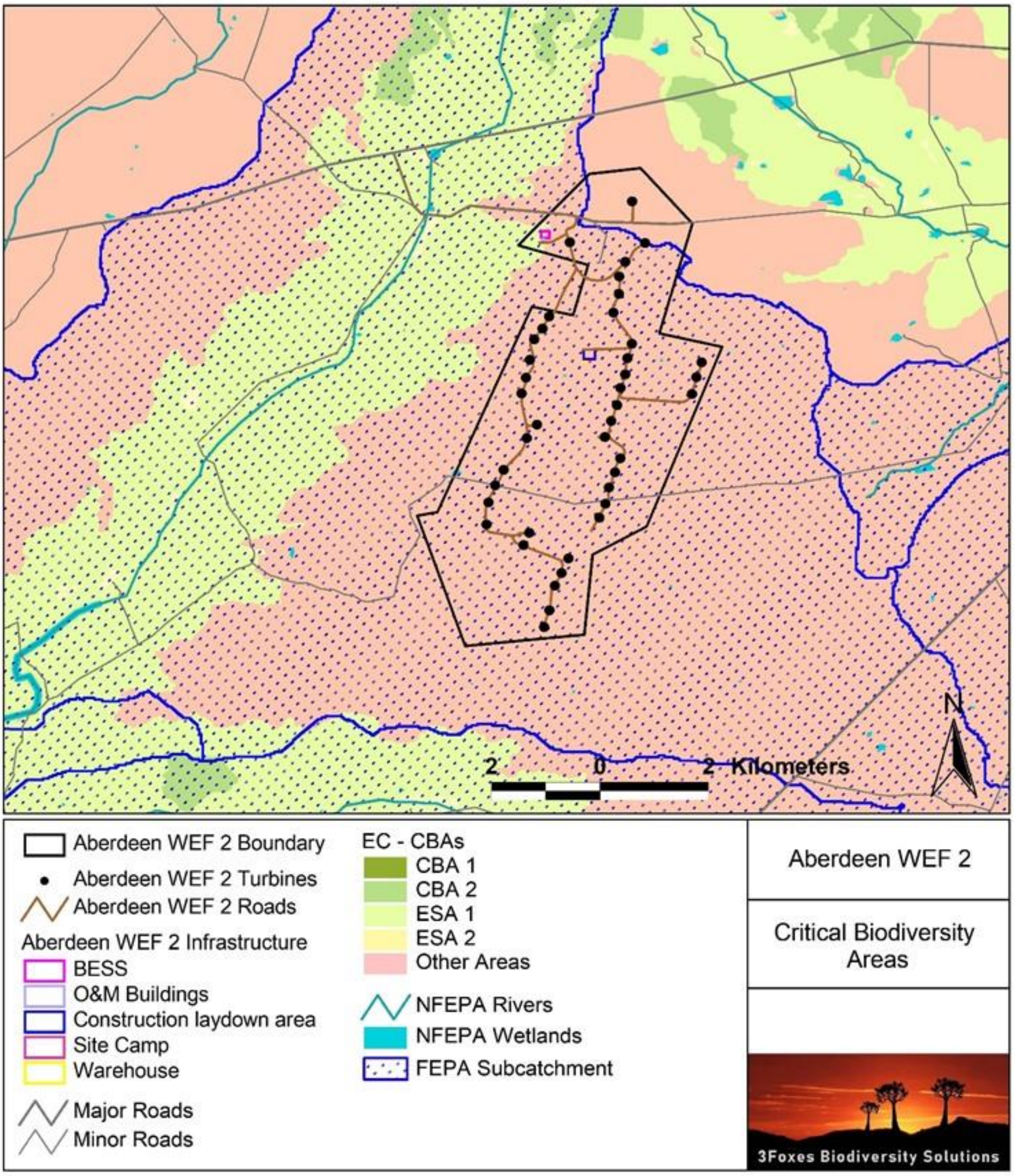

Figure 8.11: Eastern Cape CBA map showing the mapped CBAs within the Aberdeen Wind Facility 2 development area.

iv. Aquatics

The area within and surround the Aberdeen Wind Facility 2 project site is dominated by two types of natural aquatic features and a small number of artificial barriers associated with catchments and rivers, characterised as follows:

- Ephemeral main watercourse - alluvial systems with or without riparian vegetation. These range from narrow channels to broad flood plain areas. Of importance are the channel areas with riparian vegetation as these remain functional, i.e., contain flows on a more regular basis, while the sandy alluvial

areas, are only active during peak flood events with no permanent aquatic habitat or riparian systems (refer to **Figure 8.12**)
- Ephemeral minor watercourses (refer to **Figure 8.12**)
- Dams and weirs / berms with no wetland or aquatic features.

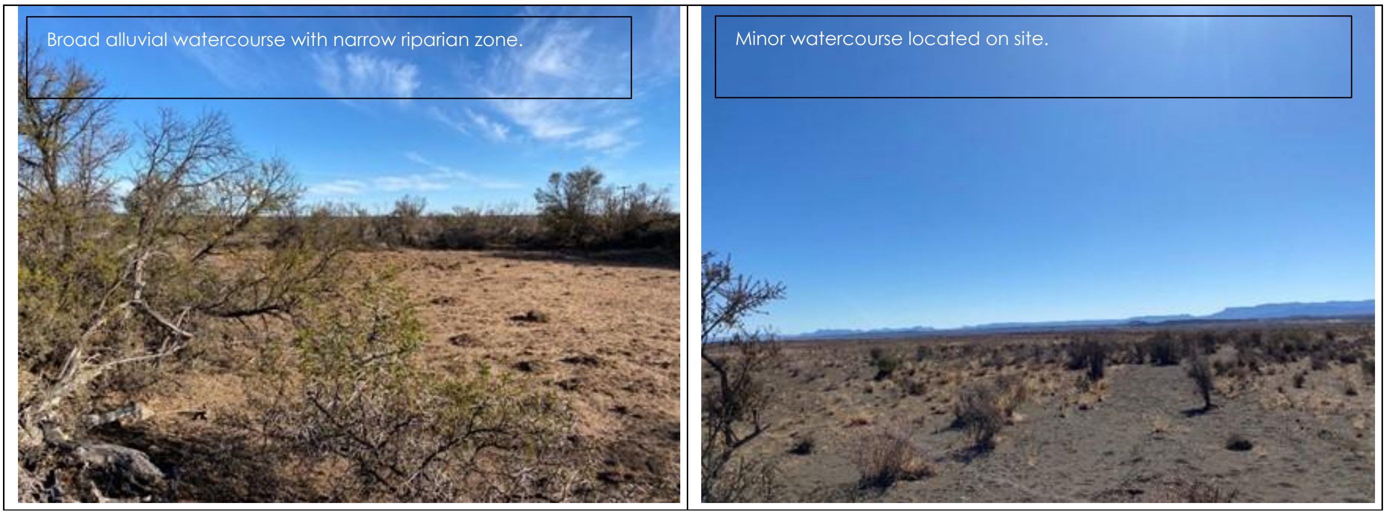

Figure 8.12: Photographs showing an example of a main watercourse and minor watercourse

Most of the aquatic features within the Aberdeen Wind Facility 2 project site are located within L23B (Gannaleegte) and N14A (Kraai) Quartenary Catchment of the Great Karoo Ecoregion in the Mzimvubu-Tsitsikamma Catchment Management Agency (refer to **Figure 8.13**). The study area therefore forms the upper catchment of the Gamtoos and Sundays River systems respectively. The presence of the Gannaleegte and Kraai rivers are included as National Freshwater Priority Ecosystem Areas (NFEPAs).

The study area is not located within a Strategic Water Resource Area and did not contain any wetland clusters or listed Threatened Ecosystems. Only riverine features such as alluvial floodplains and riparian thickets dominated by *Vachellia karroo*, *Searsia lancea*, *Euclea undulata* and *Gymonsporia buxifolia* were recorded.

No listed or protected aquatic plant species were observed to occur within the watercourses, especially any conservation-worthy species (Listed or Protected). Records collected of species observed in the main channel areas of the Gannaleegte and Kraai river systems substantiated the importance of these habitats as refugia in an arid environment for Least Concern amphibians and crab species.

The presence of the African bullfrog (*Pyxicephalus adspersus*) (although not considered a species of special concern by the IUCN, locally this species is considered Near Threatened) is considered unlikely for this site based on observations, and it is considered more likely to occur downstream in the river systems.

The Aberdeen Wind Facility 2 site falls within a FEPA subcatchment. The extent of the FEPA subcatchment is over 50 000ha, of which the development footprint constitutes less than 0.5%.

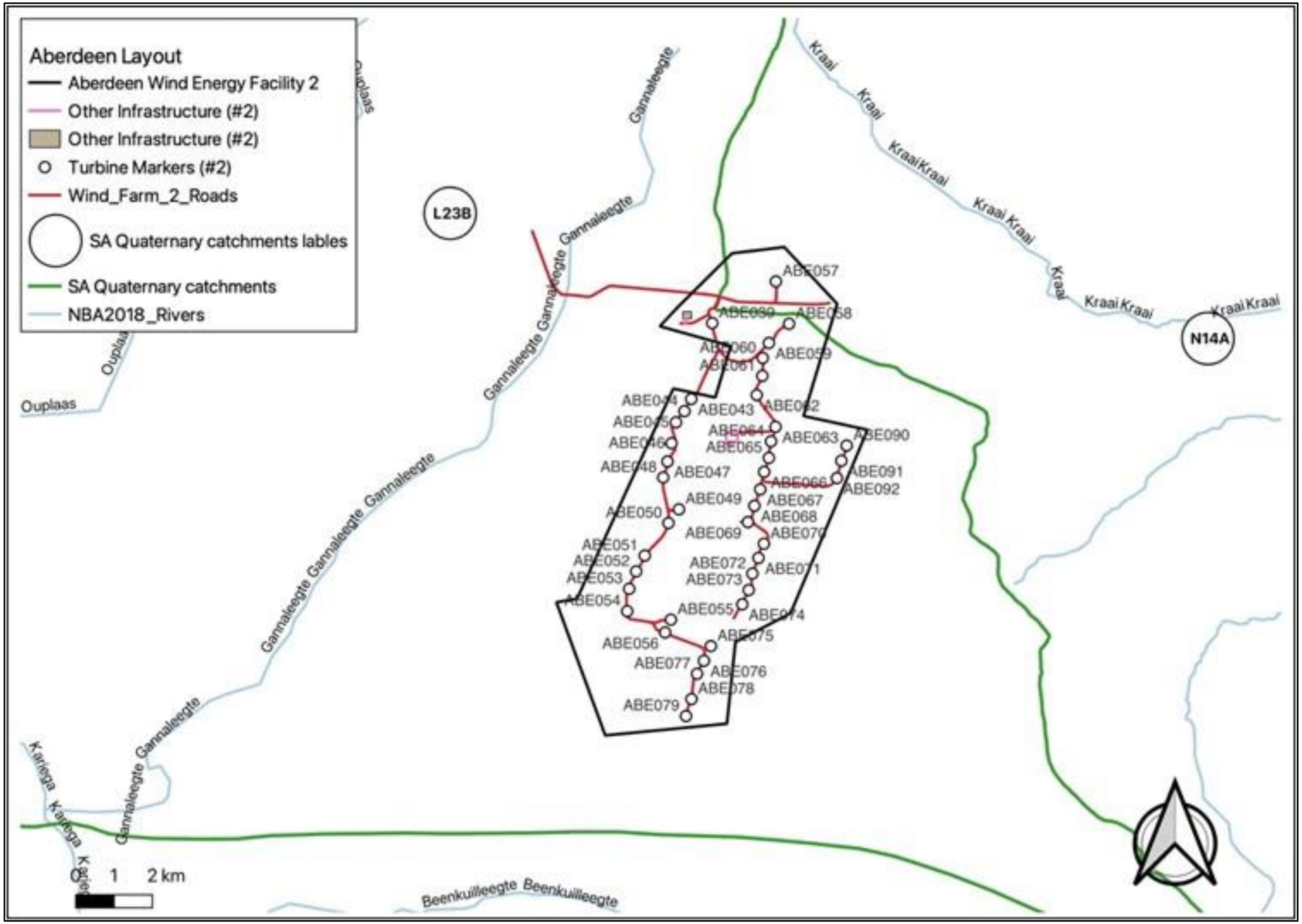

Figure 8.13: Map indicating the various quaternary catchments and mainstem rivers within the Aberdeen Wind Facility 2 Development Area.

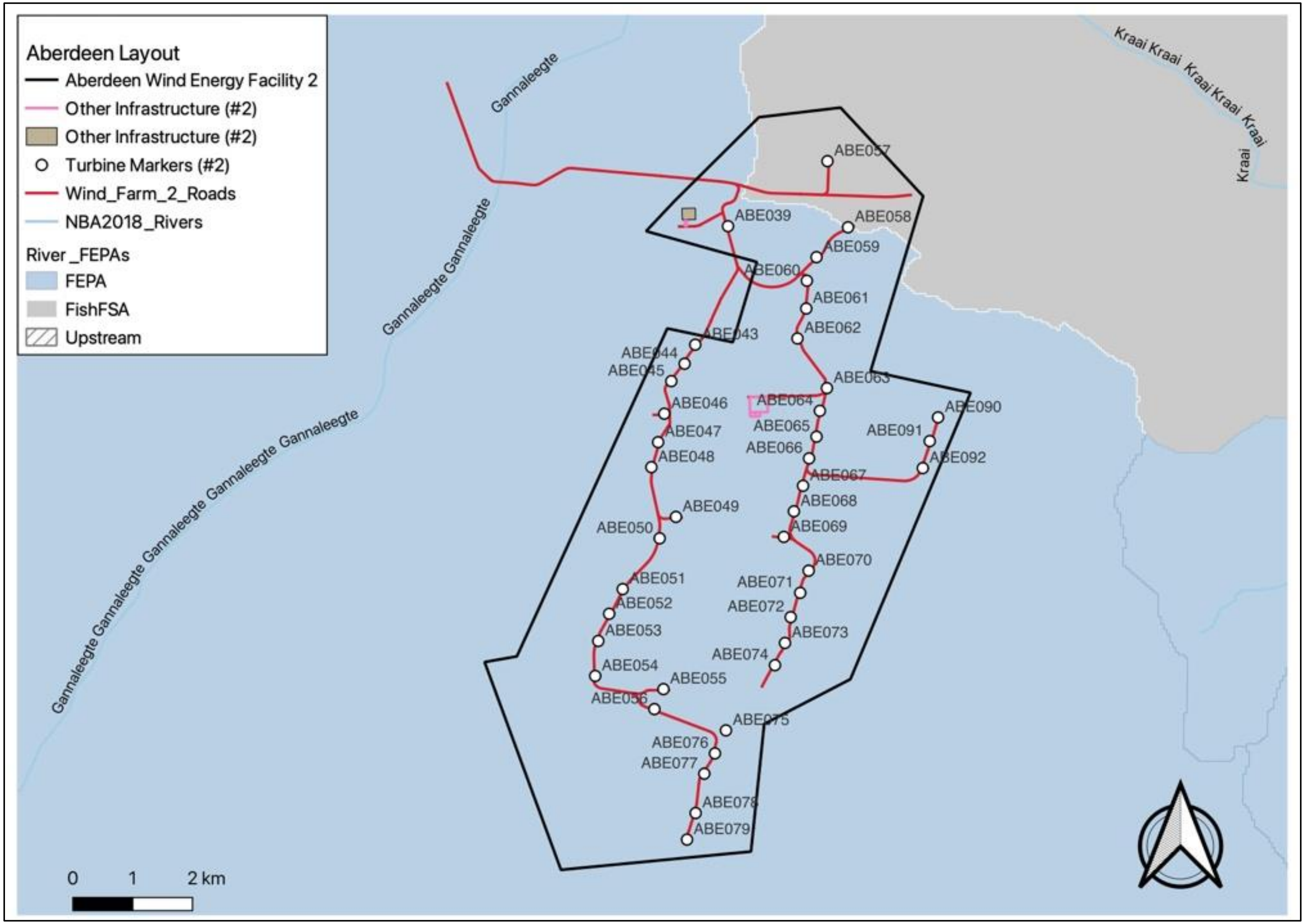

Figure 8.14: Map showing the Freshwater Ecosystem Priority Areas for the Aberdeen Wind Facility 2 development area (Nel et al, 2011).

v. Terrestrial Fauna

Mammals

As many as 60 mammals are listed for the wider study area in the MammalMap database, but many of these are introduced or conservation-dependent and approximately 45 can be considered to be free-roaming and potentially impacted by the development. This includes two red-listed species, the Black-footed Cat Felis nigripes (vulnerable) and Mountain Reedbuck (Endangered). The Mountain Reedbuck occurs in the wider area but as there is no suitable habitat for this species within the site, the site is considered low sensitivity for the Mountain Reedbuck and it is confirmed as absent from the site. The Black-footed Cat is also known from occasional records from the wider area, but prefers areas with a mix of more open and higher cover areas. As this is a shy and secretive species, it is difficult to confirm as absent or present within a site. However, given the generally sparse cover at the site, it is considered to have a low favourableness for this species. No other mammals of concern were observed at the site and it is unlikely that any such species are present.

Reptiles

In terms of reptiles, only 14 species have been recorded from the four quarter-degree squares closest to the site, suggesting that the area has not been well-sampled in the past. When this is expanded to encompass the majority of the Eastern Lower Karoo, this rises to 45 species, which is a more realistic total for the wider area. Diversity within the site is however likely to be relatively low as the habitat is relatively homogenous and there are no significant rocky outcrops present that would attract rupiculous species. A total of 15 species are considered likely to be present within the site. The only red-listed species that may be present is the Karoo Dwarf Tortoise (endangered). This small tortoise is seldom observed, even when specifically targeted during herpetofaunal surveys as it is active for only very short parts of the day and may also aestivate for extended periods during unfavourable environmental conditions. They are associated with dolerite ridges and rocky outcrops of the southern Succulent and Nama Karoo biomes. Threats to this species include habitat degradation due to agricultural activities and overgrazing, and predation by the Pied Crows which, in recent decades, have expanded in distribution range. There is however little to no suitable habitat for this species within the site and it is considered absent from the site. No other reptile species of concern are likely to be present within the site.

Amphibians

The site is relatively unfavourable for amphibians, given the lack of permanent water within the site. Species observed within the site include the Common Caco, Common Platanna and Giant Bullfrog. No species of concern are known from the area with the result that the site is considered low sensitivity for amphibians and it is only the drainage features that are considered to be of significance for amphibians.

vi. Bats

Pre-construction monitoring was undertaken for bats between 20 September 2021 and 7 October 2022 (inclusive of 7 visits to the site). During this period the baseline environment was investigated by using acoustic monitoring to document bat activity. **Table 8.3** shows detected and potentially occurring bat species in the study area. **Figure 8:15** shows the species identity based on calls.

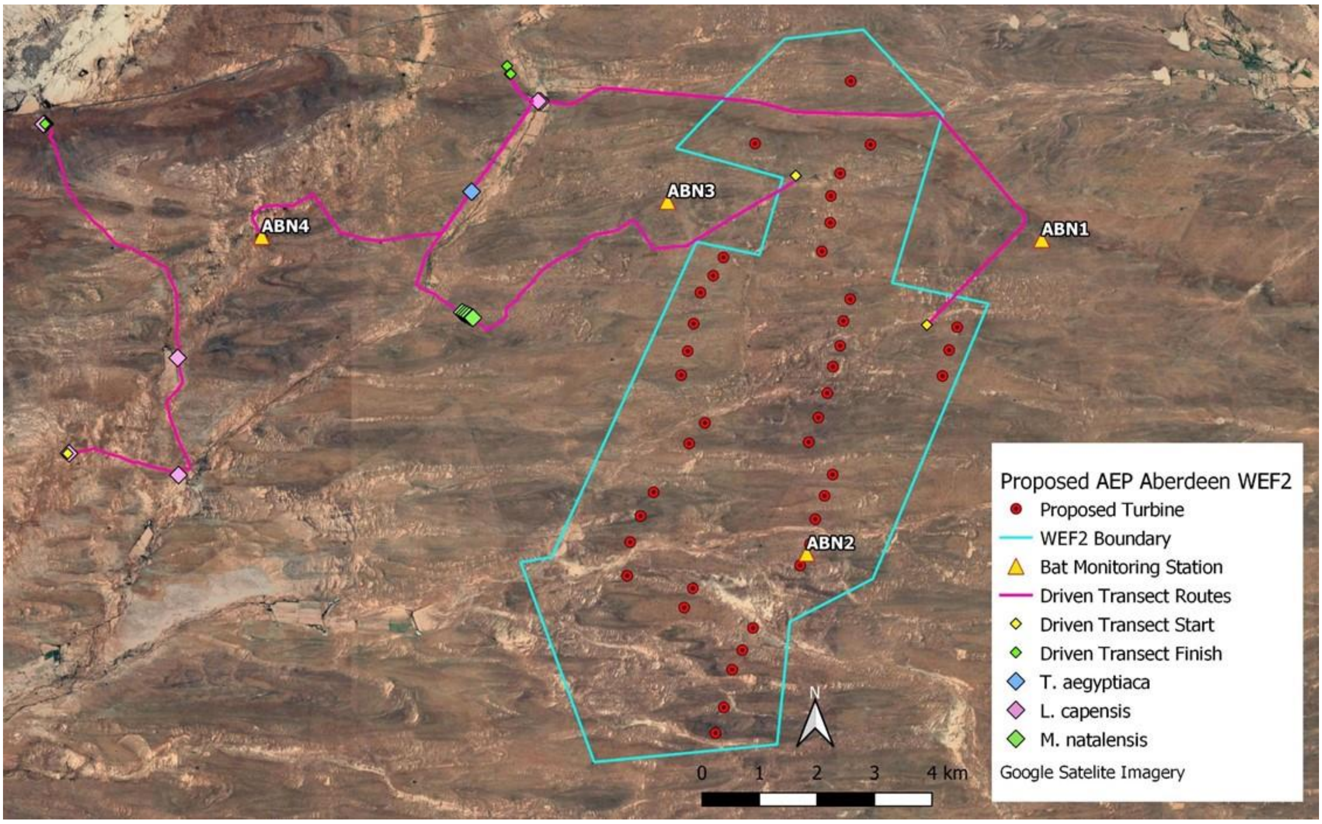

Figure 8.15: Driven transect routes in the study area, showing the locations and species identity of recorded bat calls.

Based on available species records and published distribution maps, 10 bat species potentially occur in the study area (see **Table 8.3**). Of these, four species were detected on-site (viz. the Egyptian Free-tailed Bat, Cape Serotine, Natal Long-fingered Bat, and Mauritian Tomb Bat) and three were detected off-site as part of a separate study (Long-tailed Serotine, Geoffroy's Horseshoe Bat and Cape Horseshoe Bat).

Of the detected species (onsite and offsite), four (viz. the Egyptian Free-tailed Bat, Cape Serotine, Natal Long-fingered Bat, and Mauritian Tomb Bat) have a high fatality risk of collision with turbines and one (viz. the Long-tailed Serotine) has a Medium fatality risk. Of the potentially occurring species, one (viz. Temminck's Myotis) has a Medium-High fatality risk.

Of the detected species (onsite and offsite), the following three listed bat species are regarded by the specialist as having the highest conservation priority:

- Cape Horseshoe Bat (Rhinolophus capensis): Endemic to the southern edge of South Africa and possibly Namibia (Monadjem et al. 2020).
- Lesueur's Hairy Bat (Cistugo lesueuri): Endemic in South Africa, especially the Cape Fold and Drakensberg mountains (Monadjem et al. 2020; IUCN 2021-1).
- Natal Long-fingered Bat (M. natalensis): known to roost in large numbers (sometimes hundreds or thousands) and to migrate hundreds of kilometres (Miller-Butterworth et al. 2003; MacEwan et al. 2016).

Table 8.3: Bat species anticipated to occur at the project site

FAMILY	SPECIES	COMMON NAME	LIKELIHOOD OF OCCURRENCE	RED LIST STATUS		SPECIES OF CONSERVATION CONCERN	TURBINE FATATLITY RISK
				Global	National		
MOLOSSIDAE	*Tadarida aegyptiaca*	Egyptian Free-tailed Bat	**Recorded onsite**	LC (U)	LC		**High**
VESPERTILIONIDAE	*Laeophotis capensis*	Cape Serotine Bat	**Recorded onsite**	LC (S)	LC		**High**
RHINOLOPHIDAE	*Rhinolophus clivosus*	Geoffroy's Horseshoe Bat	**Previously recorded offsite**	LC (U)	LC		Low
MINIOPTERIDAE	*Miniopterus natalensis*	Natal Long-fingered Bat	**Recorded onsite**	LC (U)	LC	**Migratory**	**High**
RHINOLOPHIDAE	*Rhinolophus capensis*	Cape Horseshoe Bat	**Previously recorded offsite**	LC (S)	LC	**SA endemic**	Low
VESPERTILIONIDAE	*Eptesicus hottentotus*	Long-tailed Serotine Bat	**Previously recorded offsite**	LC (U)	LC		**Medium**
EMBALLONURIDAE	*Taphozous mauritianus*	Mauritian Tomb Bat	**Recorded onsite**	LC (U)	LC		**High**
NYCTERIDAE	*Nycteris thebaica*	Egyptian Slit-faced Bat	High	LC (U)	LC		Low
CISTUGIDAE	*Cistugo lesueuri*	Leseur's Wing-gland Bat	High	LC (D)	LC	**SA endemic**	Low
VESPERTILIONIDAE	*Myotis tricolor*	Temminck's Myotis	Low	LC (U)	LC		**Medium-High**

An overall average of 32 bat passes (bp) per night (or 3 bp per hour) at 130m, 59 bp per night (5 bp per hour) at 80m, and 54 bat passes (bp) per night (5 bp per hour) near ground level was recorded on site.

The Egyptian Free-tailed Bat was the dominant species recorded within the turbine rotor sweep height (between 80 and 130 m a.g.l.), with >98% of recorded calls made by this species. This suggests that during operation of the wind farm, this species will comprise most of the turbine-related bat fatalities.

The Egyptian Free-tailed Bat was also the dominant species near ground level (at approximately 10 m above). However, near ground level, a greater relative (call) abundance of the other three species was recorded, which is a typical occurrence across most of South Africa (MacEwan et al. 2020b). These findings suggest that a greater diversity (species richness and abundance) of bats will be at risk of fatality from turbines with blades that approach close to ground level.

The on-site levels of bat activity are slightly higher than the analogous average values of bat activity recorded at other wind energy facility sites in the Nama Karoo shrublands ecoregion. On-site bat activity was essentially a reflection of the activity of the predominant Egyptian Free-tailed Bat (the only listed species belonging to the Molossidae family), which exhibited high activity during spring, and especially summer and autumn. The Cape Serotine (the only recorded species belonging to the family *Vespertilionidae*) was similarly most active in spring, summer, and autumn. The Natal Long-fingered Bat (the only recorded species belonging to the family Miniopteridae) was most active during autumn, winter, and spring (in descending order). The recorded low levels of Natal Long-fingered Bat activity (below 10 bp/night) are not indicative of migration through the site, which would be revealed by high seasonal peaks in the activity peaks of this species. However, since bat migration in South Africa is poorly understood, the possibility of this happening locally in future cannot be ruled out. The Mauritian Tomb Bat (the only recorded species belonging to the family Emballonuridae) was most active during summer.

High levels of Egyptian Free-tailed Bat activity were recorded until sunrise, likely due to their commute from/to the mountains in the surrounding region.

Resources present within the project site that are important for foraging bats include rivers, farms dams, and reservoirs. Secondary drainage lines also serve as areas for drinking, foraging, navigation, and movement. Buildings and woody vegetation also serve as areas where bats may potentially roost. Areas with dolerite which may be associated with karst formations (although no obvious cavities suitable for bat roosting were observed within the Project Site).

vii. Avifauna

Avian habitats around the project site comprises of open stony grassy plains where larks and bustards are found. These areas also support the small karoo population of Blue Cranes, that are concentrated around farm dams and flooded areas following good rains. Abundant rains, that are known to promote high avian species richness and abundance in Nama Karoo areas (Seymour et al. 2015), bring influxes of insect-eating kestrels and other falcons onto the plains, and a roost of Lesser Kestrels *Falco naummani* and Amur Falcons *F. amurensis* is known in the town of Aberdeen, 20 km east.

The Camdeboo mountains, north of the project site, offer a slightly different (cooler and wetter) environment which in turns supports more grasses, bushes, agriculture and (dammed) water bodies and vlei's. This also provides habitat for several red data species in the form of cliff sites for nesting eagles, and wet areas for breeding Black Harriers.

Four seasonally timed site visits conducted over the course of 12 months across the entire 288 km^2 study area[19] were undertaken to record all flights of Priority species. The site visits recorded 2447 flights of 15 Priority species, of which seven were Red Data (RD) species and six were Least Concern (LC). The study area experienced high rainfall following years of drought which brought in locust swarms, mosquitos, and a rich diversity of birds. 1012 flights were recorded in 1467 hours in the wind energy facility giving a medium-high Passage Rate of 0.69 RD flights per hour. Majority of flights were by Blue Cranes *Anthropoides paradiseus* (47% of all flights) and Ludwig's Bustards *Neotis ludwigii* (29%). Among Least Concern (LC) species the small falcons combined (Lesser Kestrel *Falco naumanni*, Amur Falcon *F. amurensis* and the rare European Hobby *F. subbuteo*) were also common. Least Concern species had a high (combined) Passage Rate of 1.6 flights

[19] The avifauna study conducted included an assessment of the entire Aberdeen Wind Cluster, i.e., Aberdeen Wind Facilities 1, 2 and 3.

per hour. Red Data species alone had Passage Rates of 0.69 flights per hour across the Aberdeen Wind Facility 2 site. Additional data were provided by the GPS-tagging of the male Black Harrier "Gulliver" in the Camdeboo Mountains. The bird data indicated that his vast foraging area (~530-km^2) across the plains of Camdeboo did not intersect the Aberdeen Wind Facility 2 site anywhere. Previous satellite-tracking of Black Harriers here indicated that only three of the 123 proposed turbines included as part of the Aberdeen Wind Cluster intersected the foraging kernels, and these were the least used (5%) section of the range of the female Black Harrier "Moraea".

Table 8.4 All 15 collision-prone Priority and Red Data species recorded within the Aberdeen Wind Cluster during the surveys of 2022. In total, eight Red Data species and seven Least Concern species were recorded in the proposed Aberdeen Wind Facility 2 site.

Species	Scientific name	Status	Collision ranking
Black Harrier	*Circus maurus*	Endangered	6
Ludwig's Bustard	*Neotis ludwigii*	Endangered	10
Blue Crane	*Anthropoides paradiseus*	Near Threatened	11
Secretarybird	*Saggitarius serpentarius*	Endangered	12
Lanner Falcon	*Falco biarmicus*	Vulnerable	22
Southern Black Korhaan	*Afrotis afra*	Vulnerable	35
Kori Bustard	*Ardeotis kori*	Near Threatened	37
Jackal Buzzard	*Buteo rufofuscus*	Least Concern	42
Karoo Korhaan	*Eupodotis vigorsii*	Near Threatened	49
Booted Eagle	*Aquila pennatus*	Least Concern	55
Falcons (Amur, Lesser, Hobby)	*Falco spp*	Least Concern	(66,62,136)
Pale-chanting Goshawk	*Melierax canorus*	Least Concern	73
Black-winged Kite	*Elanus caeruleus*	Least Concern	96
Greater Kestrel	*Falco rupicoloides*	Least Concern	97
Spotted Eagle-Owl	*Bubo africanus*	Least Concern	100

The site is not located within an Important Bird Area (IBA) area.

8.5. Integrated Heritage including Archaeology, Palaeontology and the Cultural Landscape

8.5.1 Cultural landscape

The concept of cultural landscape gives spatial and temporal expression to the processes and products of the interaction between people and the environment. It may therefore be conceived as a particular configuration of topography, geology, vegetation, land use and settlement pattern and associations which establishes some coherence of natural and cultural processes.

The overall landscape of the study area is a vast, open, barren, largely featureless plain. It lies to the west of an area of high scenic value framed to the north by the south-west sector of the Camdeboo Mountains, notably the Sleeping Giant. The R61 and N9 are regional linkage routes traversing a representative Karoo landscape and having some scenic heritage value in terms of its sense of remoteness.

The Camdeboo Plains and mountain backdrop, with its core lying east of the proposed development area, is of high local historical, aesthetic architectural and social significance. Of particular heritage significance is the town of Aberdeen, which is worthy of Grade IIIA heritage status in terms of the following:

- Historical value dating to the mid-19th century and including its local role in the South African War.
- Architectural and aesthetic value in terms of its street pattern, streetscape and townscape, concentration of conservation worthy buildings, and its relationship with its setting, notably its mountain backdrop to the north.
- Cultural landscape value as providing a focal and destination point within a vast open flat landscape and at the intersection of two regional routes.

The cultural landscape to the west of Aberdeen and forming part of the landscape affected by the proposed wind farm has historical value in terms of forming part of a pattern of land grants dating to the mid-19th century. Natural features and patterns of use over time contribute to its landscape character (watercourses, topographical features, routes, farmsteads, stone kraals). While the landscape itself is not worthy of formal protection in terms of the NHRA, it possesses conservation-worthy landscape elements for aesthetic (visual, place making) and historical reasons.

Various Landscape Elements of Cultural Value have been identified within and around the Aberdeen Wind Facility 2 project site (**Figure 8.16**):

- Topographical Features
  - Wolwekop peak situated just north of the R61 near the Murraysburg secondary road. This is a distinctive landmark feature.
  - Camdeboo Mountains and the "Sleeping Giant" formation framing the long views northwards.
- Water courses and infrastructure
  - The route of the periodical Kraai River crossing a portion of the site and informing a pattern of settlement.
  - Dams, wind pumps and water furrows.
- Planting Patterns
  - Clumps of trees typically founds around homesteads as shelter from the sun/wind and as place-making elements.
- Scenic and historic routes
  - The R61 as a regional linkage route of some scenic value with dramatic views towards the mountain backdrop to the north.
  - The combination of the intersection of the R61 and the Murraysberg Road, change in topography and the landmark qualities of the Wolwekop providing a threshold condition.
  - The east-west historic route running parallel to the R61 and through the site, which has structured a historical pattern of settlement.
- Settlements
  - Aberdeen town of suggested Grade IIIA heritage value and situated approximately 16 km east of the proposed Wind farm.
  - A number of farmsteads and stone kraals situated within or adjacent to the proposed WEF of mostly Grade IIIC heritage value and in some instances of suggested Grade IIIB heritage value.

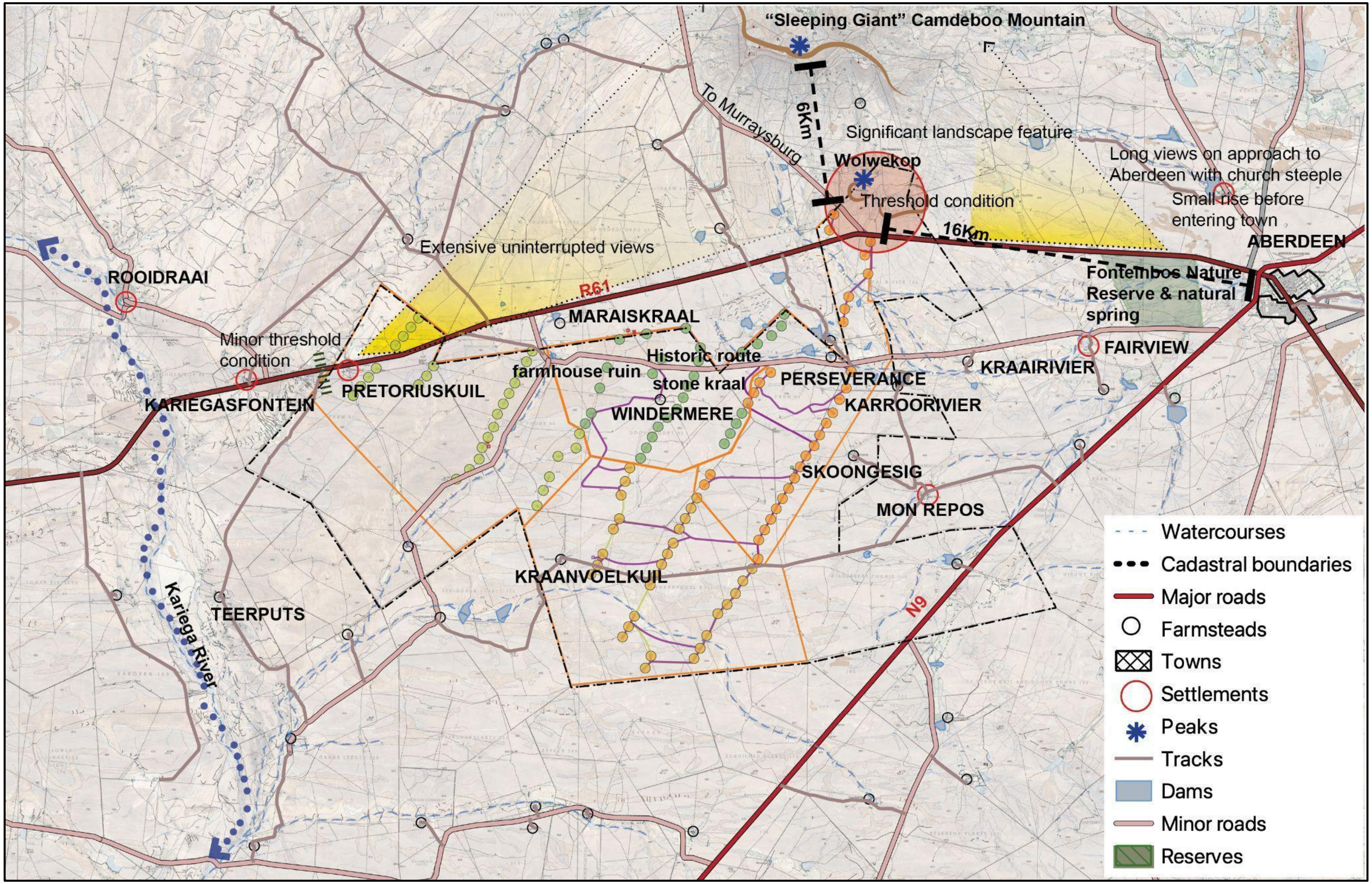

Figure 8.16: Map showing cultural landscape elements within and surrounding the Aberdeen Wind Facility 2 Project site (Winter et al. 2022). This map reflects an early turbine layout. The recommendations of the heritage assessment have been adopted for the final facility layout.

8.5.2. Archaeology

A survey of the project site was conducted by an archaeologist between 15 to 20 July 2022. Different areas were sampled across the landscape. The field assessment should be understood relative to the findings made by Booth to the north of the R61 (undertaken for the Eskom Wind Farm (not built yet) in 2013). Given the lack of natural rock shelters on the landscape and absence of dolerite boulders favoured by rock engravers during the Later Stone Age, the vast majority of the observations consisted of open air scatters of Middle and Later Stone Age artefact scatters. The MSA material found clearly spanned a very wide period of time as many examples of early MSA artefacts were found along with diagnostic pieces such as blade flakes, blanks, unifacial points, radial cores and bifacially retouched flakes. Locally abundant raw materials were extensively utilised as siltstones and hornfels contributed most of the stone used to make artefacts as well as a smaller but significant percentage of chert, particularly in the LSA assemblages. The artefacts are spread thinly but widely throughout the area with no particular focal points other than the slightly elevated ridges that are no more than 10-20m higher than the surrounding landscape (refer to **Figure 8.17**). Archaeological features found within the Aberdeen Wind Facility 2 project site are included in **Table 8.5** below:

Table 8.5 Archaeological resources recorded within and surrounding the proposed Aberdeen Wind Facility 2 development area.

POINT	Description	Density/m²	Period	Co-ordinates		Grading
ABD109	Sandstone walled old kraal	n/a	Historic	-32.514289	23.788289	IIIB
ABD110	Windermere farmhouse complex	n/a	Historic	-32.52117	23.784322	IIIC

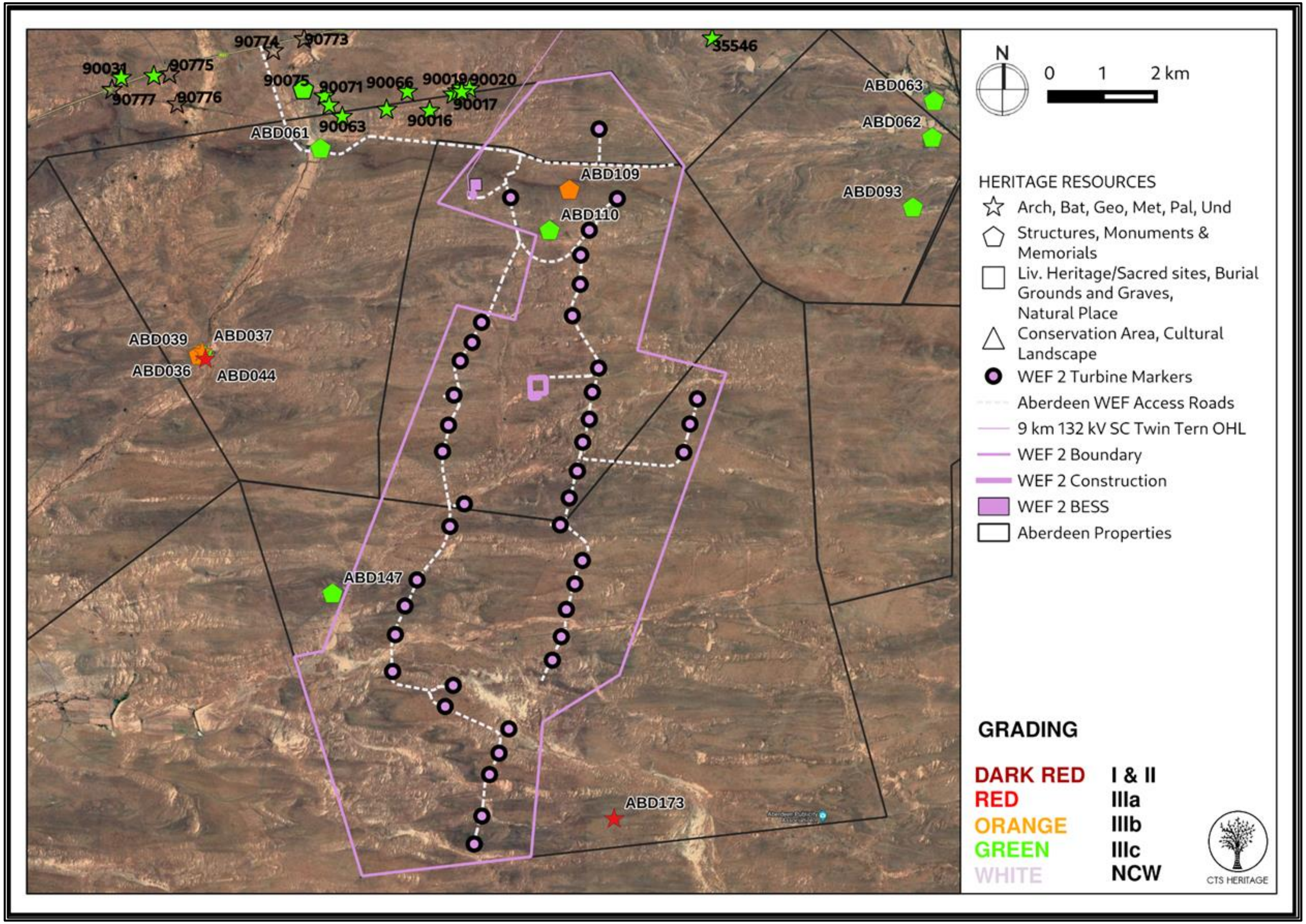

Figure 8.17: Map showing Archaeological resources within and surrounding the Aberdeen Wind Facility 2 development area.

8.5.3. Palaeontology

The area surrounding the Aberdeen Wind Facility 2 project area is underlain at depth by potentially fossiliferous continental (fluvial / lacustrine) bedrocks of the Lower Beaufort Group (Adelaide Subgroup) that probably belong to the Middle Permian Abrahamskraal Formation. There are no historical records of fossil vertebrates from this area; this is largely due to the extremely poor levels of bedrock exposure found here. During the 4-day palaeontological field assessment (30 July to 2 August 2022) only two occurrences of fossil vertebrates were recorded both comprising material reworked into superficial gravels rather than in situ (refer to **Figure 8.18**). Both fossil vertebrate sites have been adequately sampled and do not require further mitigation. Occasional trace fossil assemblages comprise low diversity, small-scale invertebrate burrows of limited scientific interest.

A background scatter of numerous petrified (silicified) wood blocks reworked from the Lower Beaufort Group bedrocks occurs within surface gravels and sands of eluvial and alluvial origin throughout most of the wind energy facility cluster project area; only a small sample of such occurrences have been recorded here. Much of the fossil wood material is poorly preserved and of limited scientific value. However, a small minority of blocks show well-developed seasonal growth rings and excellent preservation of the original woody fabric; these are potentially identifiable and may be of biostratigraphic and palaeoecological interest.

Table 8.6 Palaeontological resources recorded within and surrounding the proposed Aberdeen Wind Facility 2 development area.

POINT ID	Description	Co-ordinates		Grading
149	Farm Kraanvogel Kuil 155. Blocks of petrified wood among surface gravels. Proposed Field Rating IIIC Local Resource.	-32.62246	23.778256	IIIC
156	Farm Kraanvogel Kuil 155. Blocks of petrified wood with very variable quality of preservation among surface gravels. Proposed Field Rating IIIC Local Resource.	-32.601308	23.751004	IIIC
160	Farm Kraanvogel Kuil 155. Blocks of petrified wood among surface gravels. Proposed Field Rating IIIC Local Resource..	-32.584051	23.760231	IIIC
161	Farm Kraanvogel Kuil 155. Abundant blocks of petrified wood, some substantial and well-preserved, among surface gravels. Proposed Field Rating IIIC Local Resource.	-32.587424	23.767689	IIIC

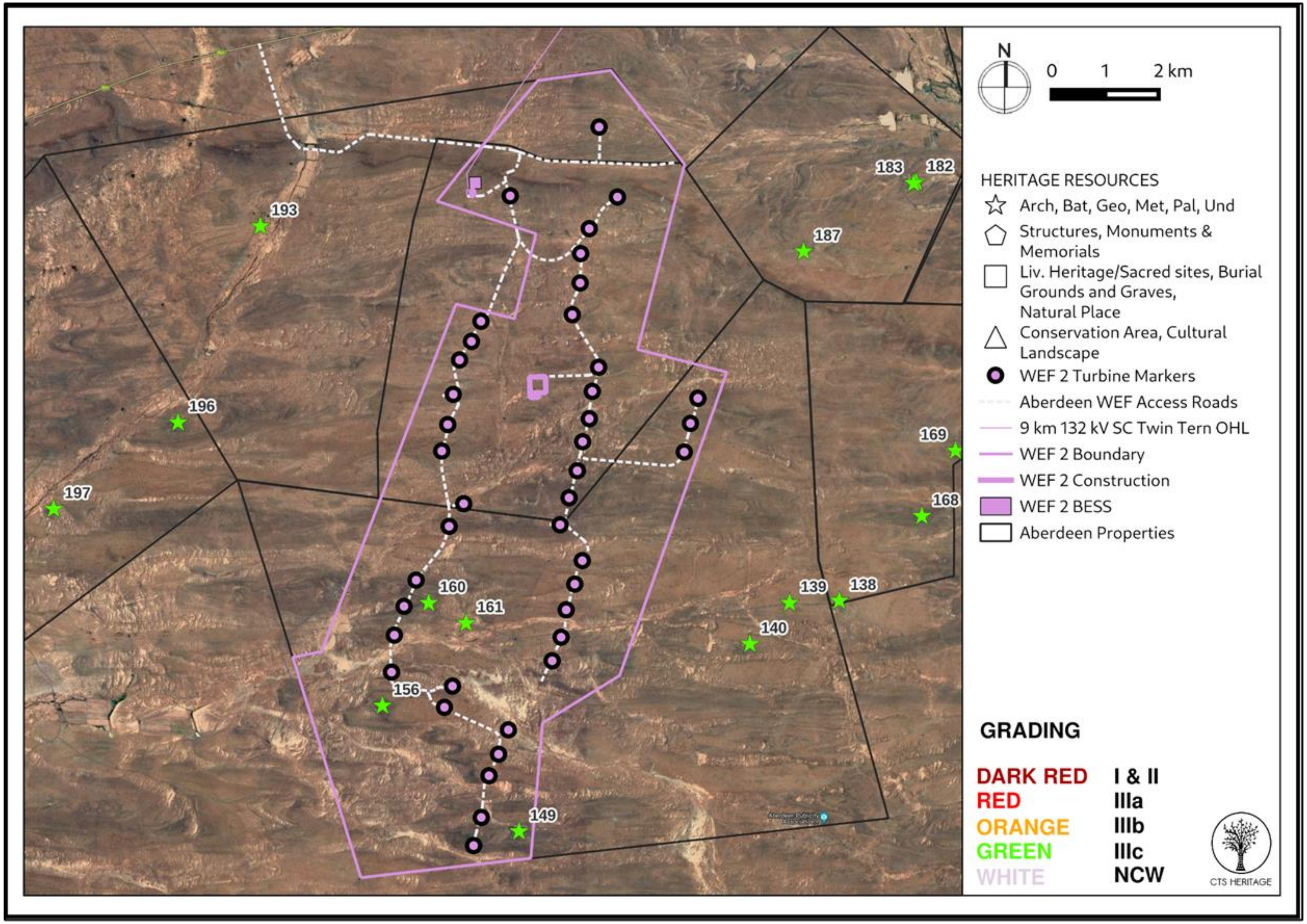

Figure 8.18: Locations of Paleontological resources identified within and surrounding the Aberdeen Wind Facility 2 development area.

8.6. Ambient sound levels and Noise Sensitive Developments

Most dwellings featuring in the vicinity of Aberdeen Wind Facility 2 are scattered in a heterogeneous fashion, typical of a rural farming area. Most of the surrounding areas can be considered wilderness with tourism (and game farming) as well as agricultural activities (sheep farming). None of these activities will influence the ambient sound levels. Ambient sound levels are generally less during the colder months (due to less faunal communication) and higher during the warmer months do, increase as wind speeds increase.

Residential areas and potential noise-sensitive developments/receptors/communities (NSR) were identified using aerial images as well as a physical site visit, with only one location identified that is used on a temporary basis for residential purposes within the project site (refer to **Figure 8.19**).

Figure 8.19: Location of noise-sensitive receptors located within the surrounding area and the project site of Aberdeen Wind Facility 2

8.7. Visual Quality

Viewer incidence relates to the number of observers, and their perception of a structure determines the concept of visual impact. If there are no observers or if the visual perception of the structure is favourable to all the observers, there would be no visual impact.

The core, uninterrupted area of visual exposure of the wind turbines is likely to be experienced by sensitive receptors within a 0 - 10km radius of the structures. This is due to the generally flat nature of the topography. The frequency of visual exposure (number of turbines visible) is expected to be slightly reduced where the plains are interrupted by lower lying drainage lines located to the east, south and west of the proposed site. It is expected that the wind turbine structures will be highly visible from homesteads within this zone, as well as, from the R61 arterial road and secondary road traversing north of the project site.

Additional visual exposure on the plains in between 10 – 20km of the turbine structures is slightly more scattered and primarily to the north, east and south respectively, as well as, along the south-western facing slopes of the Kamdebooberg and the south-eastern facing slopes of the Oorlogspoortberge. The frequency of visual exposure (number of turbines visible) has become more reduced and it is expected that some wind turbines may only be partially visible i.e. mainly the blades. This is due to the mountains to the north-east and to the north-west of the proposed turbine layout, thereby largely restricting the visual exposure to the plains beyond these mountains, as well as, the numerous lower lying drainage lines located to the east and west of the proposed site.

The frequency of visual exposure beyond 20km from the turbine structures is once again expected to subside, as well as, the sections of wind turbines that may be exposed. Visibility of the turbine structures will be scattered throughout this area with visually screened areas lying beyond the Kamdebooberg and Oorlogspoortberge to the north-east, north-west respectively, as well as, a large visually screened area lying to the south-east.

Viewers located within the area include the following homesteads and roads:

Less than 5km from the wind turbines:

- Maraiskraal (authorised Aberdeen Wind)
- Pretoriuskuil
- Springbokvlakte Noord
- Windermere (Aberdeen Wind Facility 2)

Kraanvoëlkuil (Aberdeen Wind Facility 1)

Located within a 5 - 10km radius:

- De Kroon
- Perseverance (2) (Aberdeen Wind Facility 3)
- Karroorivier
- Skoongesig (Aberdeen Wind Facility 3)
- Mon Repos
- Springbokvlakte Noord
- Rooidam
- Sypher
- Blouboskuil
- New Farm

Located within a 10 - 20km radius:

Residents of/visitors to:

- Vriespoort
- Ouplaas
- Klipstawel
- Dowefontein
- Waaikraal
- Mimosadale
- Uitkyk
- Klipdrift
- Sandrivier
- Hare Flats
- Benekraal
- Fairview (2)
- Kraairivier
- Pretoriuskuil
- Kariegasfontein
- Maxton
- Belmont
- Fairwell
- Lower Kiewietskuil
- Nuwerus
- Kaapse Poortjie
- Teerputs
- Klipkoppies
- Gannaleegte
- Bakoond
- Graafwater
- Voorspoed
- Steenbokvlakte
- Benekuil
- Spes Bona
- Wynlaagte
- Leeukop
- Poffertjiesleegte
- Rooidraai – Karoo Secret Farm Stay
-

Located beyond 20km:

- Komskloof
- Middelplaas
- Glencliff
- Windmere
- Waterkloof
- Vriespoort
- Sarelsrivier

- Kalkgat
- Kunna
- Tafelkop
- Koringdal
- De Kruis
- Louisan
- Vaalvlei
- Upper Kiewietskuil
- Rooidraai – Karoo Secret Farm Stay
- Kiewietskuil
- Vlakfontein
- Eureka
- Jongetjiesleegte
- Wapadsleegte
- Gannahoek
- Breipaal
- Hoekdoorns
- Dawn
- Rooirand
- Bekkersvlei
- Aberdeen Nature Reserve
- Residents of the outskirts of the town of Aberdeen

Observers travelling along the:
- The R61 arterial road
- Various secondary roads
- Portions of the N9 national road
- Observers travelling along the secondary road traversing the northern portion of the proposed wind farm

It is envisaged that the structures, where visible from short to medium distances (e.g. less than 10km), may constitute a high visual prominence, potentially resulting in moderate to high visual impacts.

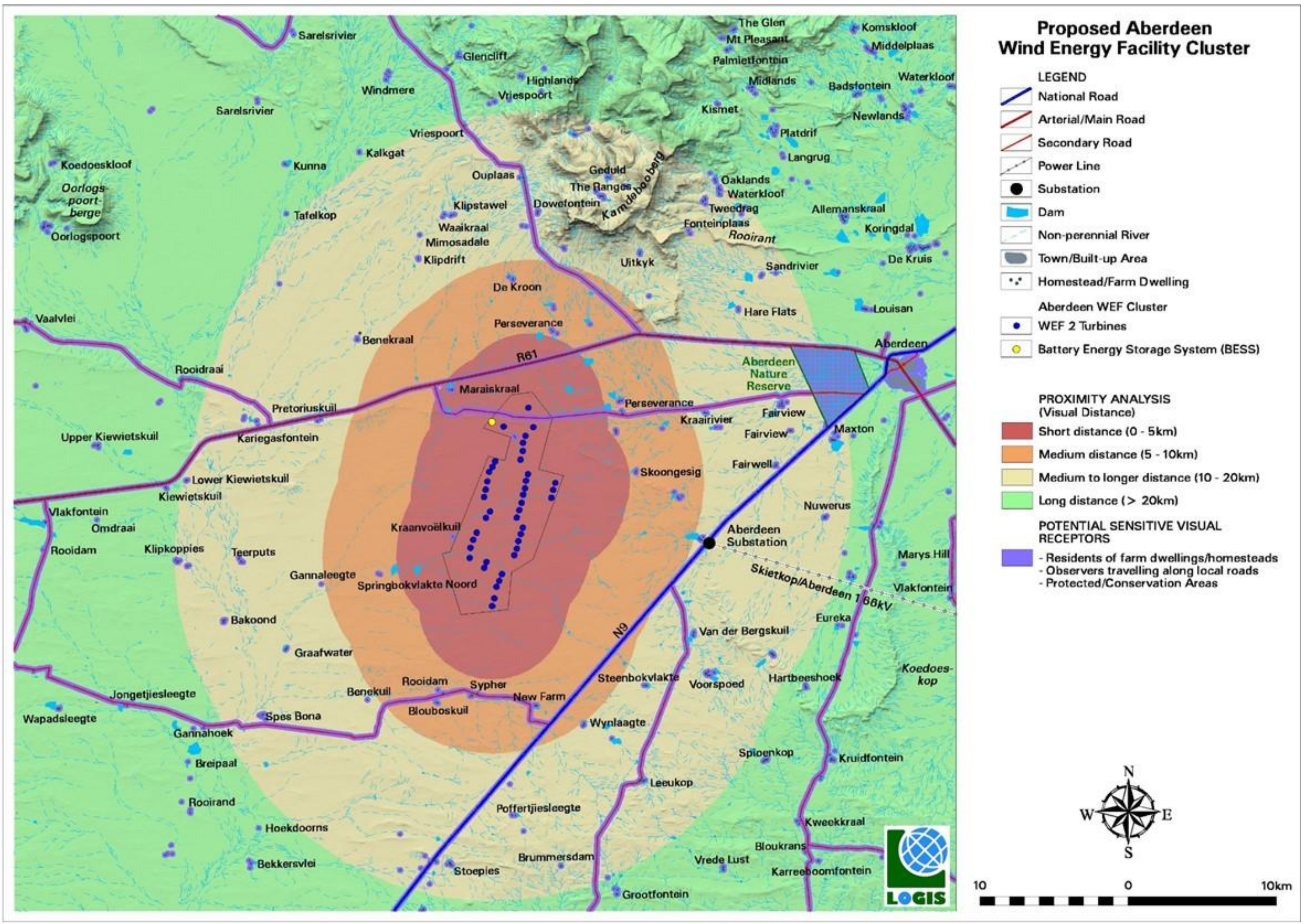

Figure 8.20: Proximity analysis and potential sensitive visual receptors that may be affected by the development of the wind farm.

8.8 Traffic Conditions

The project site is located north of the N9 and the R61 straddles the site on the northern boundary. The proposed access point is an existing gravel access road located on 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 (refer to **Figure 8.21**). In general, the traffic of the area is considered to be low.

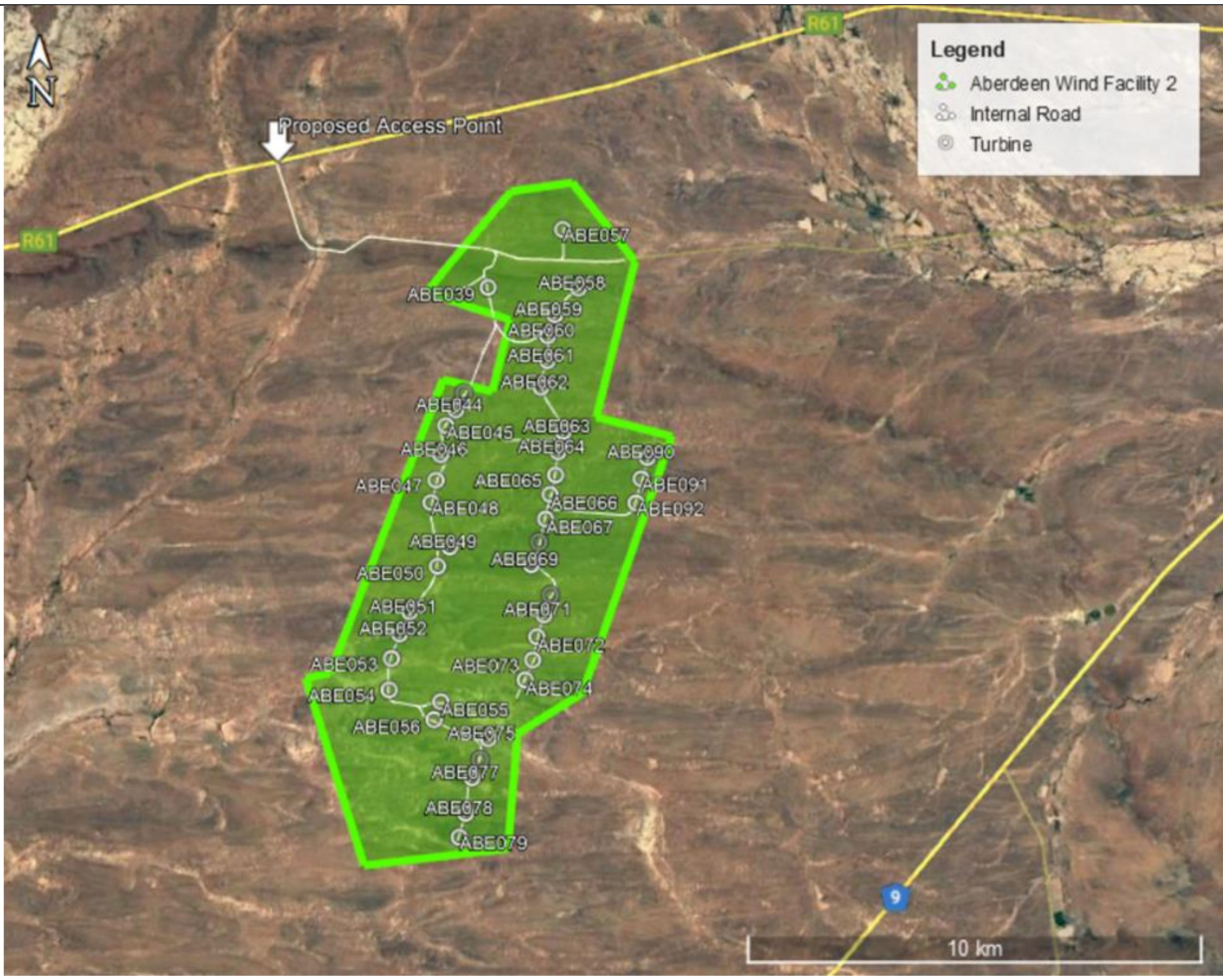

Figure 8.21: Map and photo of the existing gravel road providing direct access to the project site.

8.9 Socio-Economic Context

The Sarah Baartman District Municipality is the third largest economy in the Eastern Cape Province, and the largest economy outside the largely "urban economies" of the Nelson Mandela Bay Municipality and Buffalo City Municipality. The predominant sectors in terms the District's economy are agriculture and tourism. The key established agricultural sub-sectors in the Sarah Baartman District Municipality are red meat, wool & mohair, dairy, poultry, pork, chicory, and pineapple. The three biggest sectors in 2016 were Trade (21%), Community Services (19%) and Agriculture (16%). The study area economy is strongly anchored in agriculture, with extensive small stock grazing the predominant land use. Cropping activities are limited, and largely confined to the banks of ephemeral watercourses.

A large portion of the population in the Sarah Baartman District Municipality are unemployed (30% - 33%). In comparison the Dr Beyer Naude Local Municipality similarly has a high unemployment rate (26% - 33%). An estimated 27% of the Ward 1 population is unemployed, with a larger amount employed (35%) and 37% not economically active.

Dr Beyer Naude Local Municipality has a population of approximately 82 197 people comprising of approximately 20 749 households. The Dr Beyers Naude Local Municipality accounts for 17.5% of the population within the Sarah Baartman District Municipality. In the Dr Beyer Naude Local Municipality 5.4% of the population over the age of 20 has had no form of schooling.

Within Ward 1 in which the project site is based, 14.7% of the population over the age of 20 had no education. Around 26.6% of the population over the age of 20 in Dr Beyer Naude Local Municipality have matric. Within Ward 1, 11.6% had matric, and 3% has an undergraduate qualification. The low education levels in Ward 1 are linked to the rural nature of the area and create challenges in terms of meeting local employment targets during the construction phase. The ward has an unemployment rate of 27% with unemployment a major challenge identified for the area.

The area immediately the project site is sparsely populated with Aberdeen the only town in close proximity. Aberdeen, 20kms east of the Aberdeen Wind Facility 2, serves an important agricultural service centre to the surrounding community who practice primary stock and game farming activities. Furthermore, the town is surrounded by primarily privately owned agricultural land units. The urban area comprises of Aberdeen Town, Lotusville and Thembalesizwe settlements. The population of Aberdeen was 5 133, made up of 1 407 households. The local economy is strongly anchored in agriculture, with extensive small stock grazing the predominant land use. In terms of local tourism, only one proclaimed nature reserve is located in close proximity to the site, namely the Aberdeen Nature Reserve, located approximately 10 km to the east of the site. There are few other tourist facilities located in close proximity of the site. This was confirmed by the local landowners interviewed.

CHAPTER 9: SENSITIVITY ANALYSIS

This chapter serves to provide the reader with an understanding of the sensitivities associated with the environmental features, areas and habitats as identified within the affected environment (Chapter 8) within which the Aberdeen Wind Facility 2 is proposed to be developed. With an understanding of the sensitivities applied to the environmental characteristics present, the reader can place value on the features present within the area that may be impacted by the proposed development. It must be noted that this analysis is based on quantitative information and specialist field studies with on-the-ground findings. Consideration of social aspects (including viewsheds) and traffic are not included here as these aspects do not directly influence the micro-siting of infrastructure within the project site.

Where specific features or areas of sensitivity have been identified which need to be considered for the placement of infrastructure, these features are analysed and detailed in the sections which follow. The impact assessment provided in Chapter 10 is based on the sensitivity analysis and the outcomes detailed in this chapter. The sensitivity analysis focusses on the development area and the development footprint of the Aberdeen Wind Facility 2 and provides input considered as part of the mitigation hierarchy applied to the project, with the main objective being avoidance of sensitive features and areas within the affected environment.

The development footprint assessed within this BA Report was designed by the project developer in order to respond to and avoid the sensitive environmental and social features located within the development area. This approach ensured the application of the mitigation hierarchy (i.e. avoid, minimise, mitigate and offset).

9.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(l)(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers	The chapter provides an overall understanding of the areas of sensitivity of the project site, and specifically the development area (including a detailed sensitivity map) against the development footprint, and informed the necessary avoidance measures required through the micro-siting/placement of infrastructure.

9.2. Terrestrial Ecological Features and Associated Sensitivity

Various ecological features and habitats are present within the project site within which the development footprint has been sited. These features, their location within the project site and the associated ecological sensitivity are described below. An ecological sensitivity map has been included in **Figure 9.1**.

Areas and features mapped as very high ecological sensitivity identified within the development area, which consist of areas of high relief (ridges) restricted to the northern areas of the development area.

These ridges are considered as no-go areas for wind turbines and all associated infrastructure. These areas are critical and unique habitats that serve as habitat for rare or endangered species. Where linear features of very high sensitivity (for example major drainage lines) need to be traversed, existing roads or disturbance footprints should be used as far as possible.

Areas and features of high ecological sensitivity represent other sensitive features such as minor slopes to the northern boundary of the development area. Areas of high sensitivity are based on the high biodiversity value and the sensitivity or important ecological role of the feature. Development within these areas is undesirable and should only proceed with caution. Turbine and associated infrastructure placement within these areas is not permitted. Where roads are required through these areas, existing access roads should be used as this reduces both the impact and the footprint of any access roads.

Areas and features of medium ecological sensitivity are distributed primarily within the southern and central parts of the development area, with a small section included to the north. These areas include certain low ridges, sheetwash, plains, rocky and stony ground areas that occur within the development area.

Areas and features of low ecological sensitivity are located within the majority of the project site which includes open plain habitat of the site which represents the Eastern Lower Karoo vegetation type. These areas are predominantly located within the northern and central portions of the development area.

While there are no CBAs within the development footprint, there is a small extent of an Ecological Support Area 2 which acts as a buffer along the Gannaleegte River (refer to **Figure 9.2**). This corridor is over 4km wide and is considered to provide a movement corridor for fauna through the area. Under the layout assessed, only the substation hub and some roads are located within the ESA. It is unlikely that the presence of the turbines and the operation of the wind farm would significantly compromise the ecological functioning of the broad-scale ESA corridor. The impact of the development on the ESA is therefore considered local in nature and of an acceptable magnitude. Based on the field assessment, there are no significant issues with the location of the turbines considering the CBAs of the area and their potential impact on fauna and flora.

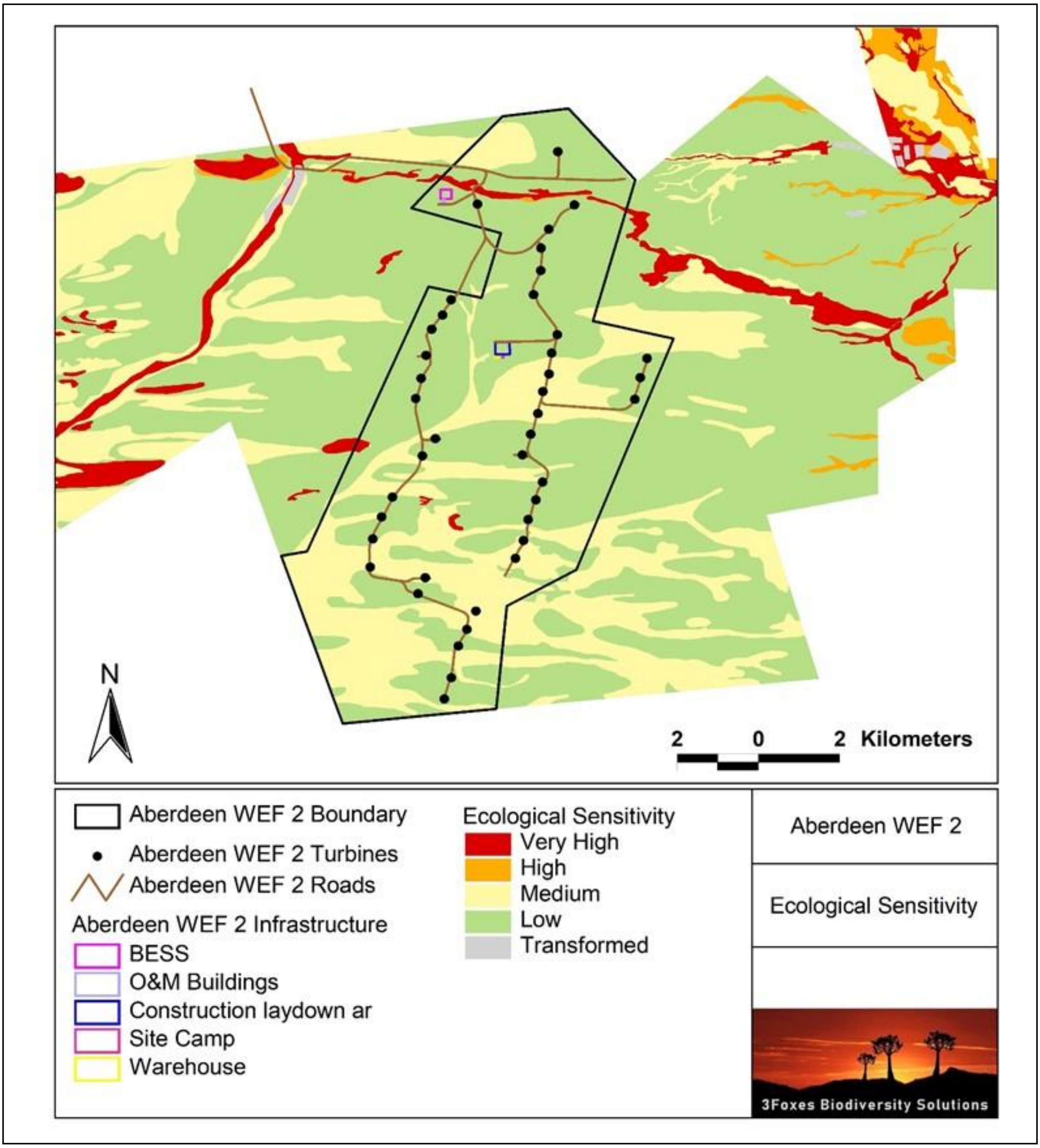

Figure 9.1: Ecological sensitivity map illustrating the sensitive ecological areas and features present within the development area and the ecological sensitivity ratings associated with the identified features.

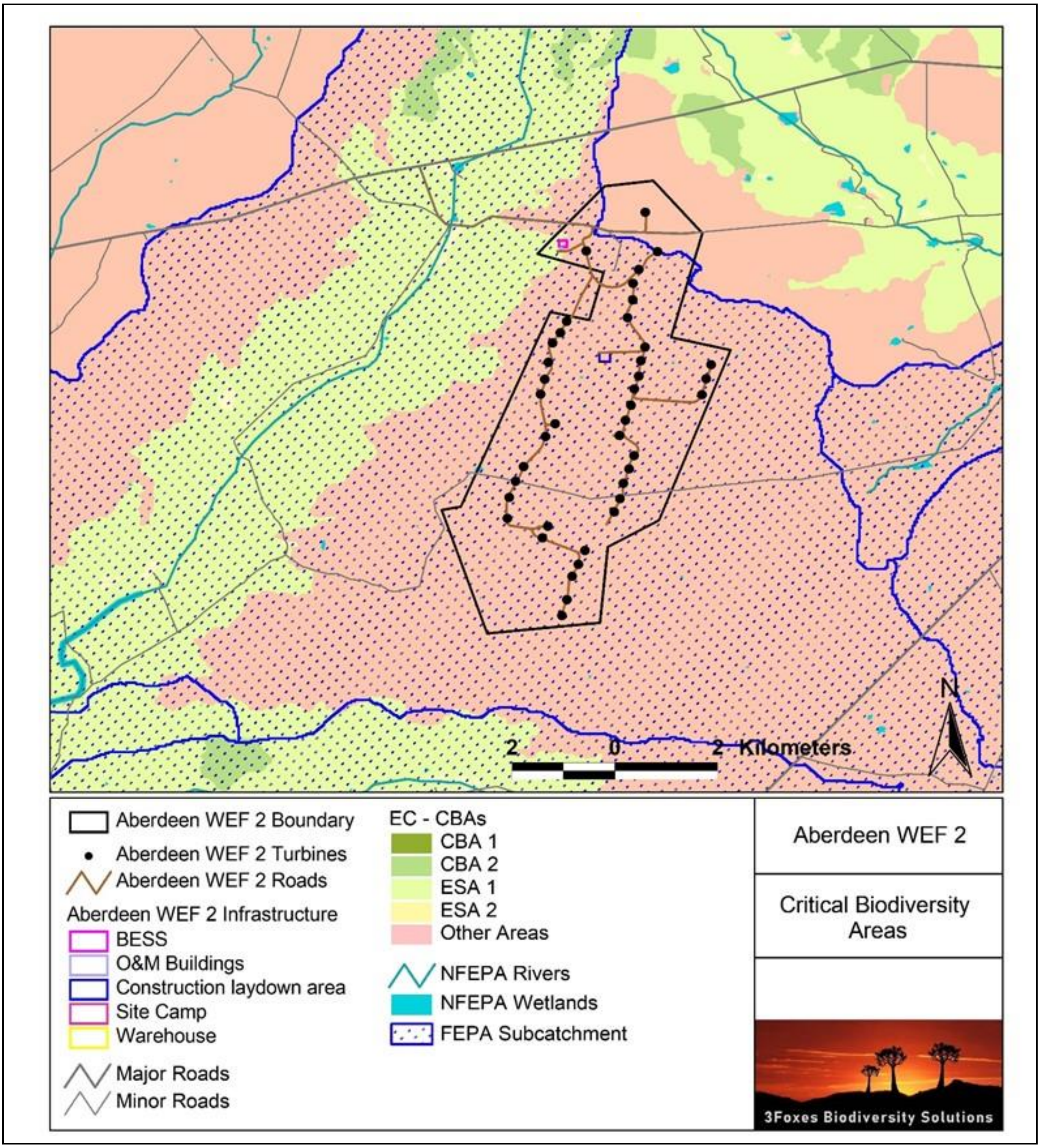

Figure 9.2: Extract of the Eastern Cape CBA map for the Aberdeen Wind Facility 2 and surrounds

9.2.1 *Sensitivity Analysis against the development footprint*

A detailed assessment of the development footprint confirms that there are no turbines located within the Very High and High ecological sensitivity areas. As a result, the development of the Aberdeen Wind Facility 2 would avoid significant impact on the major ecological features of the site. As a result, there are no fatal flaws. Although there is limited footprint within the Very High sensitivity areas, this is associated with existing road alignments. Given the avoidance of sensitive features at the site by the facility layout no high impacts are likely to occur as a result of the development.

9.3. Aquatics and Associated Sensitivity

The area surrounding the project site is dominated by two types of natural aquatic freshwater features and a small number of artificial barriers associated with catchments and rivers, characterised as follows:

» Ephemeral main watercourse - alluvial systems with or without riparian vegetation. These range from narrow channels to broad floodplain areas. Of importance are the channel areas with riparian vegetation as these remain functional, i.e., contain flows on a more regular basis, while the sandy alluvial areas, are only active during peak flood events with no permanent aquatic habitat or riparian systems. The aquatic areas and drainage systems occur in the far northern, southern, and central areas of the development area and have been buffered by 25m.
» Minor watercourses features – systems running across the development area and located all over the site have been buffered by 12m.
» Artificial barriers - dams and weirs / berms with no wetland or aquatic features.

Buffers for the high sensitivity, medium sensitivity and low sensitivity features have been identified and implemented which are considered to be appropriate for the features and the activities proposed to be undertaken within the development area. The buffers are detailed in **Table 9.1** below:

Table 9.1: Table indicating sensitivity of aquatic features.

Development Component	Waterbody type	Sensitivity rating of the respective waterbody type against the development type and the required buffer	Sensitivity rating override if an impact such as a road already occurs within the proposed footprint
Turbines	Alluvial Rivers with or without riparian vegetation	No-go with 25m buffer	-
	Minor watercourses	No-go with 12m buffer	-
	Artificial dams	Not Applicable = As these systems have no biological value, structures could be placed within the dams, or dams could be demolished if required	-
Hardstands, Buildings/ Substations & BESS	Alluvial Rivers with or without riparian vegetation	No-go with 25m buffer	-
	Minor watercourses	No-go with 12m buffer	-
	Artificial dams (off channel only)	Not Applicable = as these systems have no biological value, structures could be placed within the dams, or dams could be demolished if required	-

Roads	Alluvial Rivers with or without riparian vegetation	Moderate sensitivity related to roads, and as crossings will be required no buffer is applicable	Low if an existing crossing / road or impact is already present, that must then be included in the potential road network
	Minor watercourses		
	Artificial dams (off channel only)	Not Applicable = as these systems have no biological value, structures could be placed within the dams, or dams could be demolished if required	-

9.3.1 Sensitivity Analysis against the development footprint

Considering the aquatic resource sensitivity, the facility layout indicates limited impacts on the aquatic environment as the micro-siting ensured that the proposed wind turbine positions are all located outside of the delineated aquatic features and recommended buffer areas.

All laydown and compound areas are located outside the delineated aquatic resource features as well as their buffer areas. The facility substation, BESS and O&M hub are located outside the delineated aquatic resource features.

Road infrastructure is considered to comprise a moderate sensitivity to aquatic features and considered acceptable. Existing road crossings are considered to have a low sensitivity to all delineated watercourse and acceptable to be used/upgraded.

The development footprint is considered as acceptable in terms of aquatic resources.

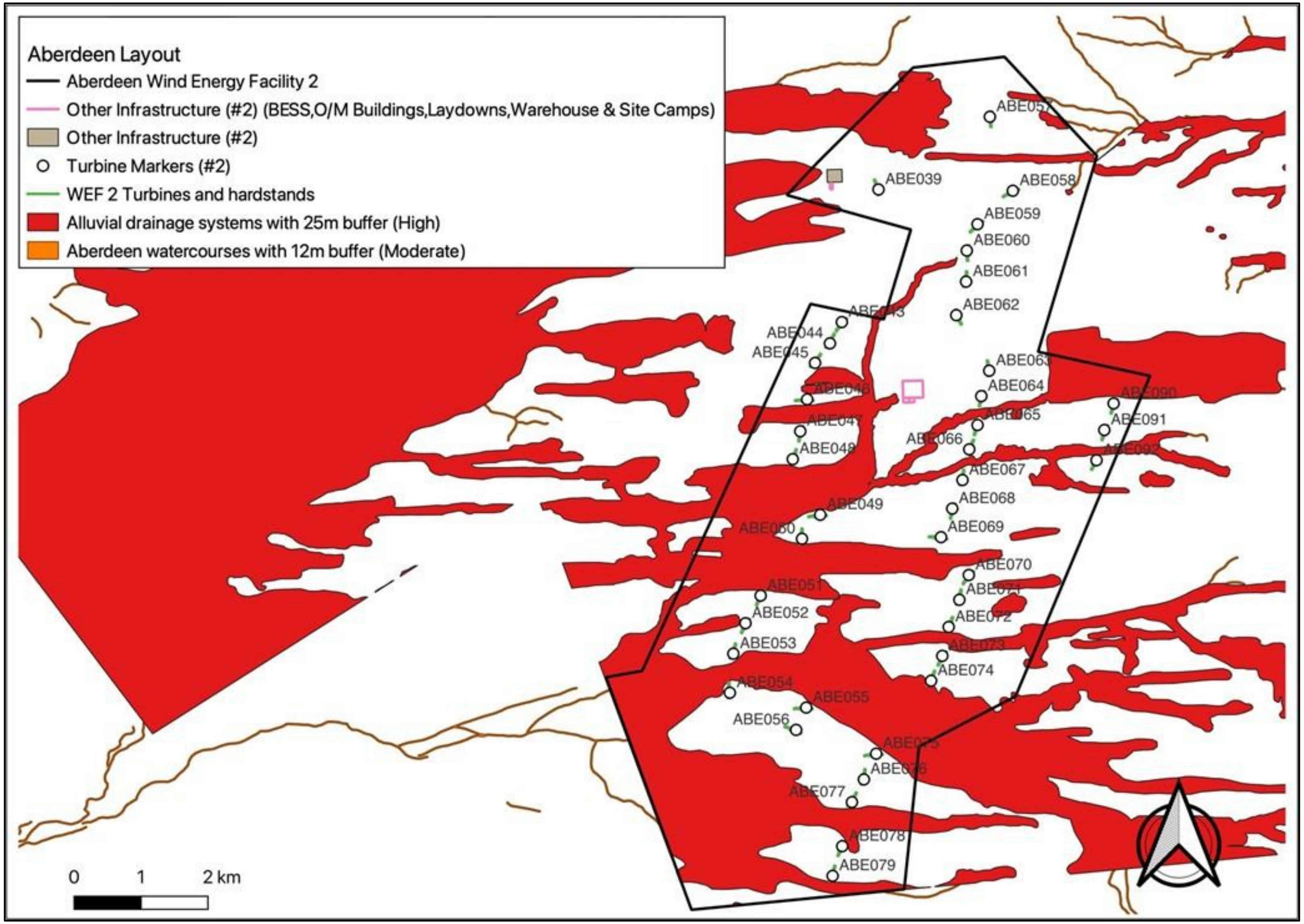

Figure 9.3: The delineated watercourses inclusive of the respective buffers together the applied sensitivity rating applied to wind turbine towers, buildings, substation and BESS

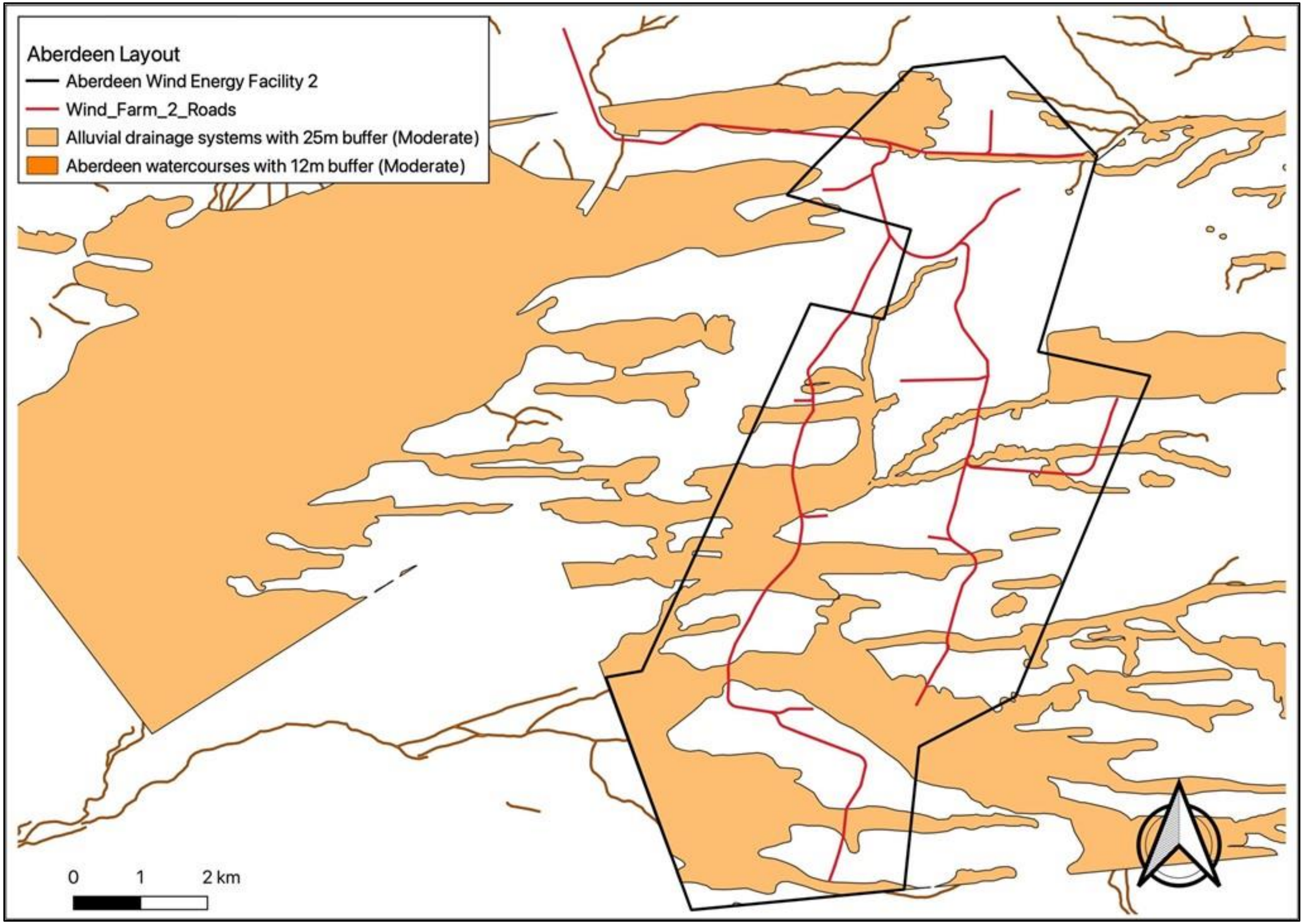

Figure 9.4: The delineated watercourses inclusive of the respective buffers together the applied sensitivity rating applied to roads

9.4. Avifauna and Associated Sensitivity

Avian habitats on the site range from the open stony grassy plains where larks and bustards are found. These areas also support the small karoo population of Blue Cranes, that tend to concentrate around farm dams and flooded areas following good rains.

Abundant rains, that are known to promote high avian species richness and abundance in Nama Karoo areas (Seymour et al. 2015), bring influxes of insect-eating kestrels and other falcons onto the plains, and a roost of Lesser Kestrels Falco naummani and Amur Falcons F. amurensis is known in the town of Aberdeen, 20 km east.

The Aberdeen site, lying as it does in the arid summer rainfall portion of the eastern Nama-Karoo Karoo, is not expected to be of particularly high sensitivity for birds. It does not fall within any Important Bird Areas (IBAs : Marnewick et al. 2015) and the closest protected area is the Camdeboo National Park centred on Graaff Reinet, 80 km north-east. The area is generally overgrazed reducing its productivity and thus its capacity to support high species richness. The Camdeboo mountains in the north, however with higher rainfall may support higher species richness. The Birdlife South Africa sensitivity map. indicates a patchwork of low to medium-high sensitivities for collision-prone birds.

Collision Risk Modelling (CRM) was used in this study to identify areas where priority collision-prone species are at risk of being impacted by turbines (refer to **Figure 9.5**). Based on the outcomes of the CRM, the following areas (and associated risk profiles) were identified:

- Areas where priority collision-prone species are most at risk ("High Risk")(Risk Areas / Classes 5.5 and above). These areas need to be avoided;
- Areas where the level of risk is deemed acceptable subject to mitigation ("Medium Risk")(Risk Areas / Classes 4 – 5); and
- Areas where level of risk is deemed low to negligiable ("Low Risk")(Risk Areas / Classes >4). Development is acceptable within these areas and mitigation might be required subject to operational monitoring fatality thresholds.

The results of the Collision Risk Modelling (refer to **Figure 9.5**) indicated that the highest risk areas (class 5.5 and above) were clumped in the northern sections of the development area. These areas were classified as too risky for development and allocated as No-Go areas, covering 12.6% of the area. This may arise because better wind resources are known from the north, topographic highs (aiding lift) are apparent there and rainfall tends to be higher. Other areas classified as medium risk to birds were identified. Areas comprising lower sensitivity (and thus open to development) are situated in the east, west, and south of the proposed development area.

9.4.1 Sensitivity Analysis against the development footprint

All proposed turbines have been located into medium or low risk areas. The Specialist has noted that three turbines that comprise the Aberdeen Wind Facility cluster fall within the perimeter of a previous track of a female Black Harrier (Moraea) that foraged here in 2010 and 2011. Given that this represents a negligible portion of her large foraging range this is acceptable, particularly as the contemporary range of another known Black Harrier in the area avoids the wind energy facility entirely. Therefore, it is the specialist opinion that the current proposed layout is acceptable.

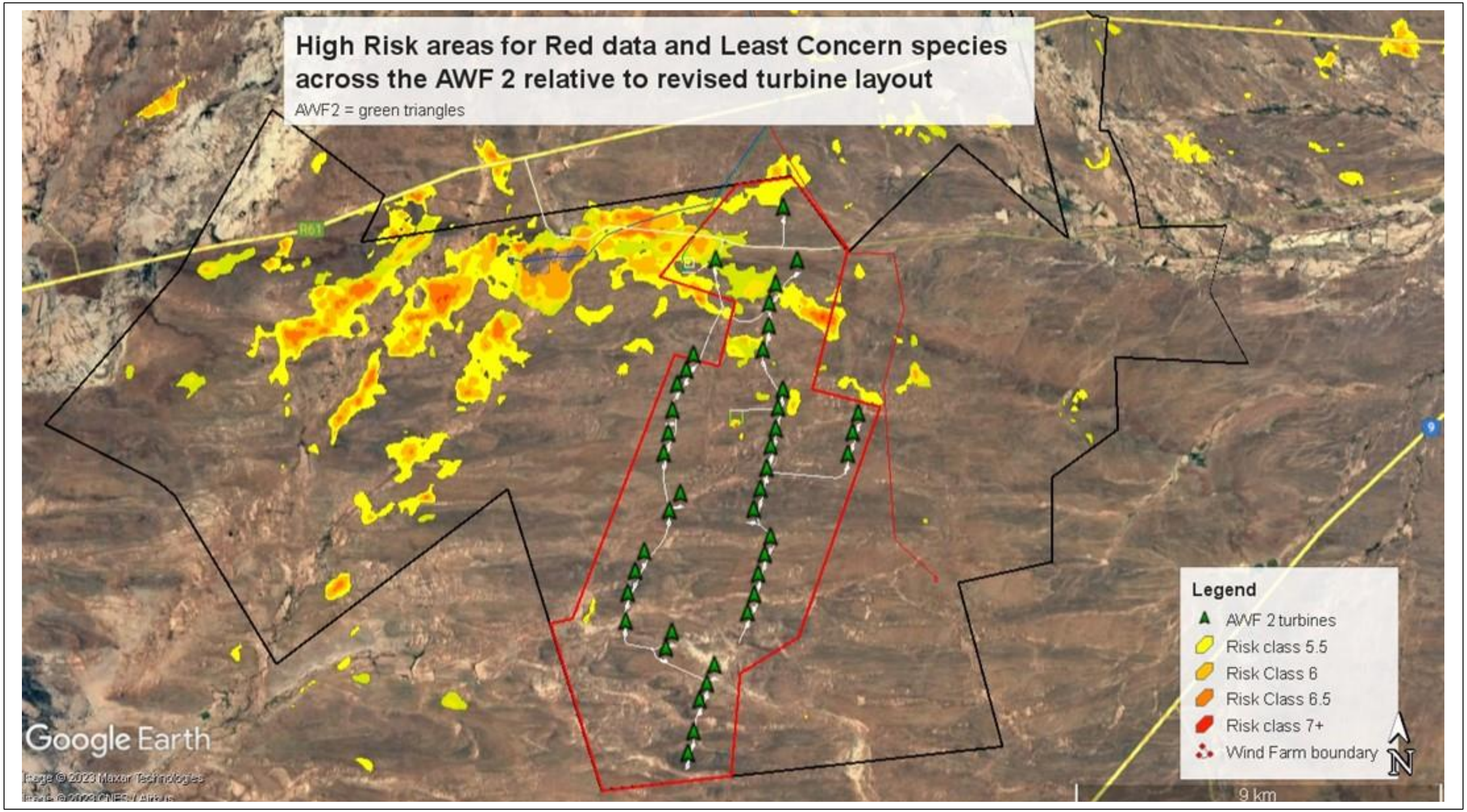

Figure 9.5: Areas of avifaunal sensitivity identified within the Aberdeen Wind Facility 2 project site overlain with the development footprint

9.5. Bats and Associated Sensitivity

Key habitat features have been identified for bats within the development area. These habitat features present specific uses and opportunities for bats including roosts, foraging resources and commuting resources. Resources within the development area that are important for foraging bats include:

» Natural and artificial permanent, seasonal, and ephemeral surface water resources,
» Geological layers, such as dolerite, which may be associated with karst formations,
» Riparian and other woody vegetation and tree clumps, and
» Local buildings and ruins, which are of great importance as these may serve as suitable sites for the roosting of bats and support of their foraging habits.

Buffers have been placed around important habitat for bats and include (**Figure 9.6**):

» High sensitivity features and areas:
  - Confirmed bat roosts of Cape Serotines and possibly some Egyptian Free-tailed Bats) in the south-western corner of the development area, must be buffered by 500m.
  - All rivers and streams (traversing throughout the development area) all of which have been buffered by 500m.
  - All farm dams and reservoirs, all which have been buffered by 500m.

The high bat sensitivity areas represent no-go areas for the construction of wind farm infrastructure, and in particular the turbines (including all blades plus a 2m pressure buffer around these), substations, offices, battery energy storage systems, quarries, construction camps, or laydown areas (to avoid disturbing key bat roosting, foraging, and/or commuting habitat, and to avoid high bat fatalities in these areas where high bat activity is anticipated).

» Medium to high sensitivity features and areas include secondary drainage lines that cut across the site , especially within the central and southern portions of the development area, all which have been buffered by 200m.
» Potential on-site bat roosts that are scattered across the development area.

The Medium to High Bat Sensitive Areas represent areas where the construction of infrastructure and other disturbances should be avoided where possible (to avoid areas where bat roosting, foraging, commuting, and/or migration may be concentrated).

» Low-Medium features and areas include all remaining areas of the development area (which is the majority of the area). The sensitivity rating is relative to the above-average levels of Egyptian Free-tailed Bat activity recorded on site.

9.5.1 Sensitivity Analysis against the development footprint

Considering the bat sensitivity, there is no encroachment into any high (no-go) sensitivity areas by any turbines, or the battery energy storage system, operation and maintenance buildings, warehouse, construction camp or laydown areas. Most (~66%) of the proposed turbine positions coincide with Medium-Low and or Medium sensitive areas

The development footprint is considered as acceptable in terms of bat sensitivity.

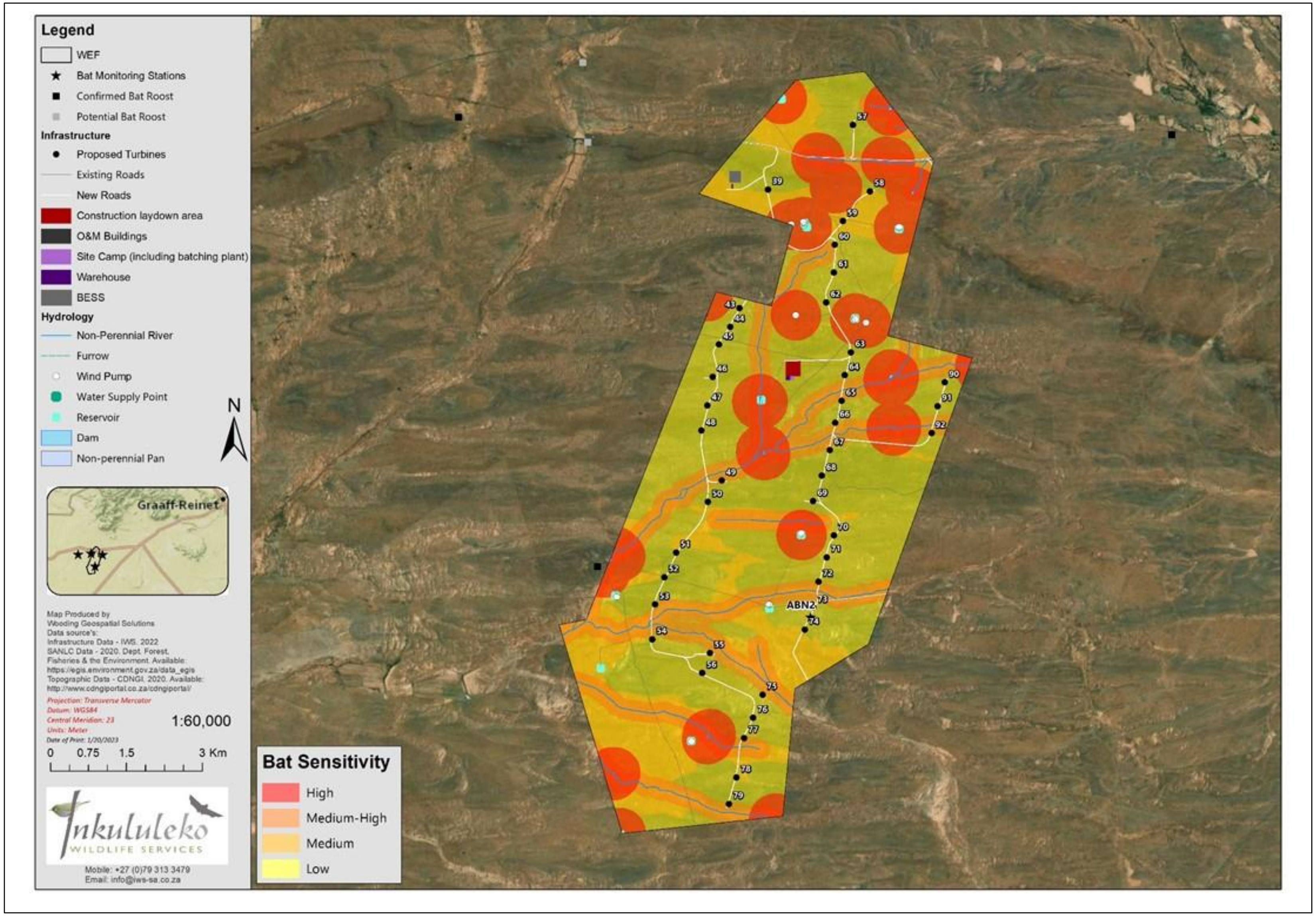

Figure 9.6: Bat sensitivity map showing all no-go area buffers which needs to be considered for the placement of wind turbines

9.6. Agriculture and Associated Sensitivity

The project development footprint includes areas of medium and low sensitivity (refer to **Figure 9.7**). 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. Only the southern and eastern central portion of the development area has a small area which could be considered to have a medium sensitivity. High sensitivity areas are not present within the Aberdeen Wind Facility 2.

All turbines are located well within areas with low or medium sensitivity. These 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. 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 development footprint is considered as acceptable in terms of agricultural resources.

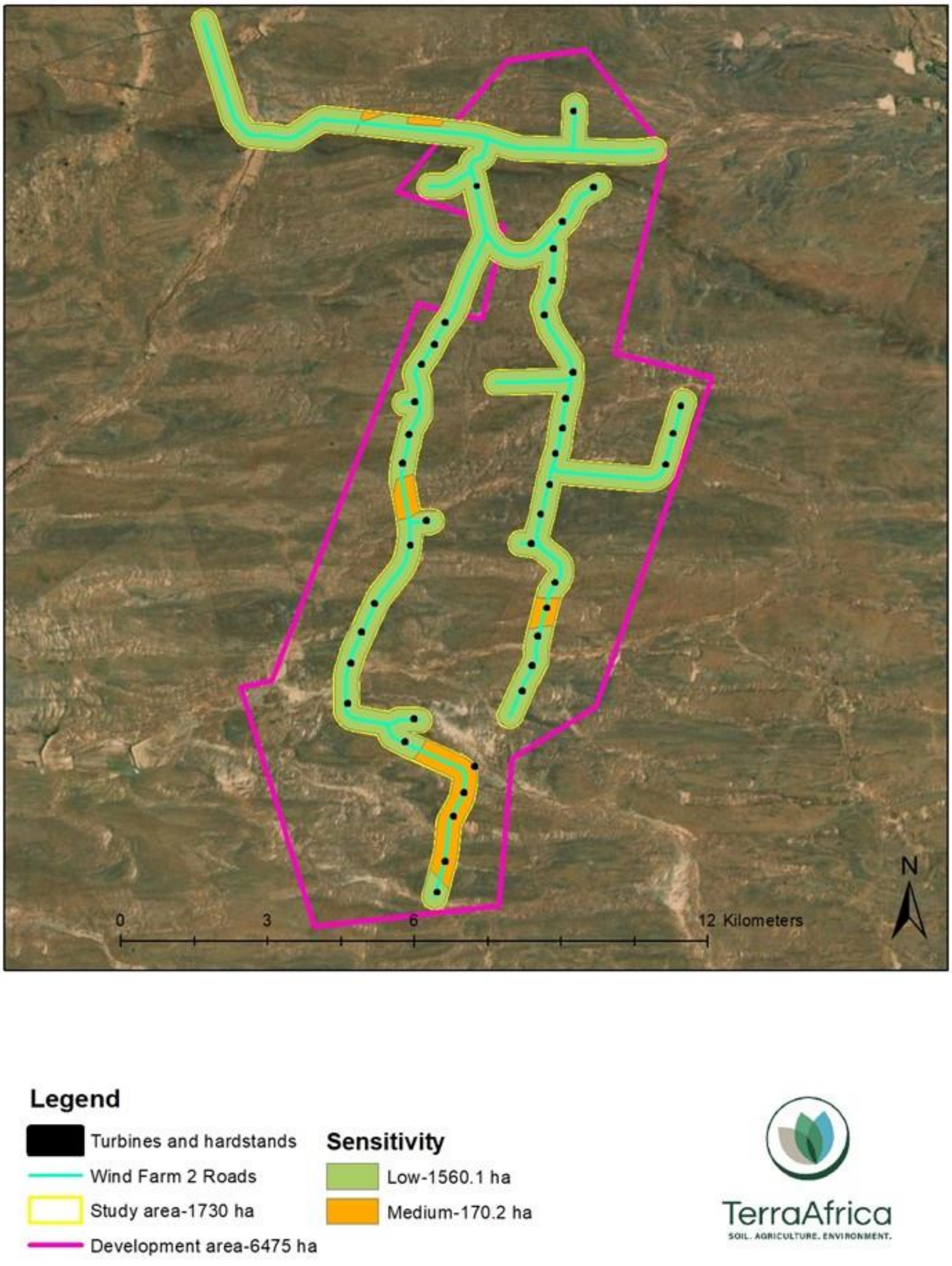

Figure 9.7: Soils and agricultural sensitive areas associated with the Aberdeen Wind Facility 2 project

9.6.1 Sensitivity Analysis against the development footprint

For the placement of the wind turbines, it is confirmed that the majority of the turbines are located within the Low sensitivity areas. No turbines in the layout directly impacted land with High Sensitivity. The placement of the turbines as proposed is considered to be acceptable with no adjustments to the development footprint required.

For the placement of the Facility substation, BESS, O&M hub it is confirmed that the footprint of the infrastructure will be placed within areas of low sensitivity. Therefore, the placement of the infrastructure is considered to be acceptable.

In terms of linear infrastructure proposed, various sections of the access roads crosses through primarily low sensitivity soil resources. The placement of the infrastructure is considered to be acceptable.

9.7. Heritage Resources and Associated Sensitivity

Archaeology

A total of 42 observations were made within the Aberdeen Wind Facility 2 development area (**Figure 9.8**) of these, the majority are low density Middle Stone Age or Later Stone Age artefact scatters that have been determined to have limited scientific value and have been determined to be not conservation worthy.

Two of the archaeological resources identified within this area (Site were determined to be conservation-worthy, the first site consists of a sandstone walled old kraal graded IIIB. This site is located approximately 150m from an existing road and is located more than 600m from the nearest proposed turbine. It is recommended that a 500m no-development buffer be implemented around this site in order to retain a sense of place for the kraal. The second site is the Windermere farmhouse complex (Graded IIIC). As this site is located more than 900m from the nearest proposed turbines, no direct or indirect impact is anticipated.

Based on the assessment completed, the area proposed for development has a very high archaeological sensitivity

Cultural

The development site lies between the R61 and N9, both of which are considered to have scenic qualities with dramatic views towards the Camdeboo mountain backdrop to the north. A development setback of by at least 1km on either side of the R61 and N9 has been recommended by the specialist. The historical route that intersects the site to the north also has a 500m buffer assigned to it. The Wolwekop peak, situated just north of the R61 and is considered a distinctive landmark feature. It is recommended that the nearest turbine be located more than 2.5km from this peak. A historical farmsteads, Windermere, is located within the development area (Grade IIIC) is found on site. The Kraanvoelkuil farm werf is found outside the site but has a buffer that intersects the development area to the south west. A 500m no development buffer was assigned to these farms.

As the site possesses a number of landscape elements contributing to a composite cultural landscape including topographical features, open plains, water features, historic scenic routes and farmsteads, the area proposed for development is considered to be of very high cultural sensitivity.

Palaeontology

At a regional scale, the project is located to the south of the Great Escarpment, to the west of the distinctive Camdeboo Plains and at considerable distance from the cluster of Nature Reserves around Graaff Reinet.

At the local scale, the project is generally located away from major scenic topographical features and beyond 16km from the town of Aberdeen and beyond 10km from the Fonteinbos Nature Reserve.

No highly significant palaeontological resources were identified within the development area, however the geology underlying the development area is very sensitive for impacts to significant fossils and therefore the development area has being assessed as having a very high sensitivity. .

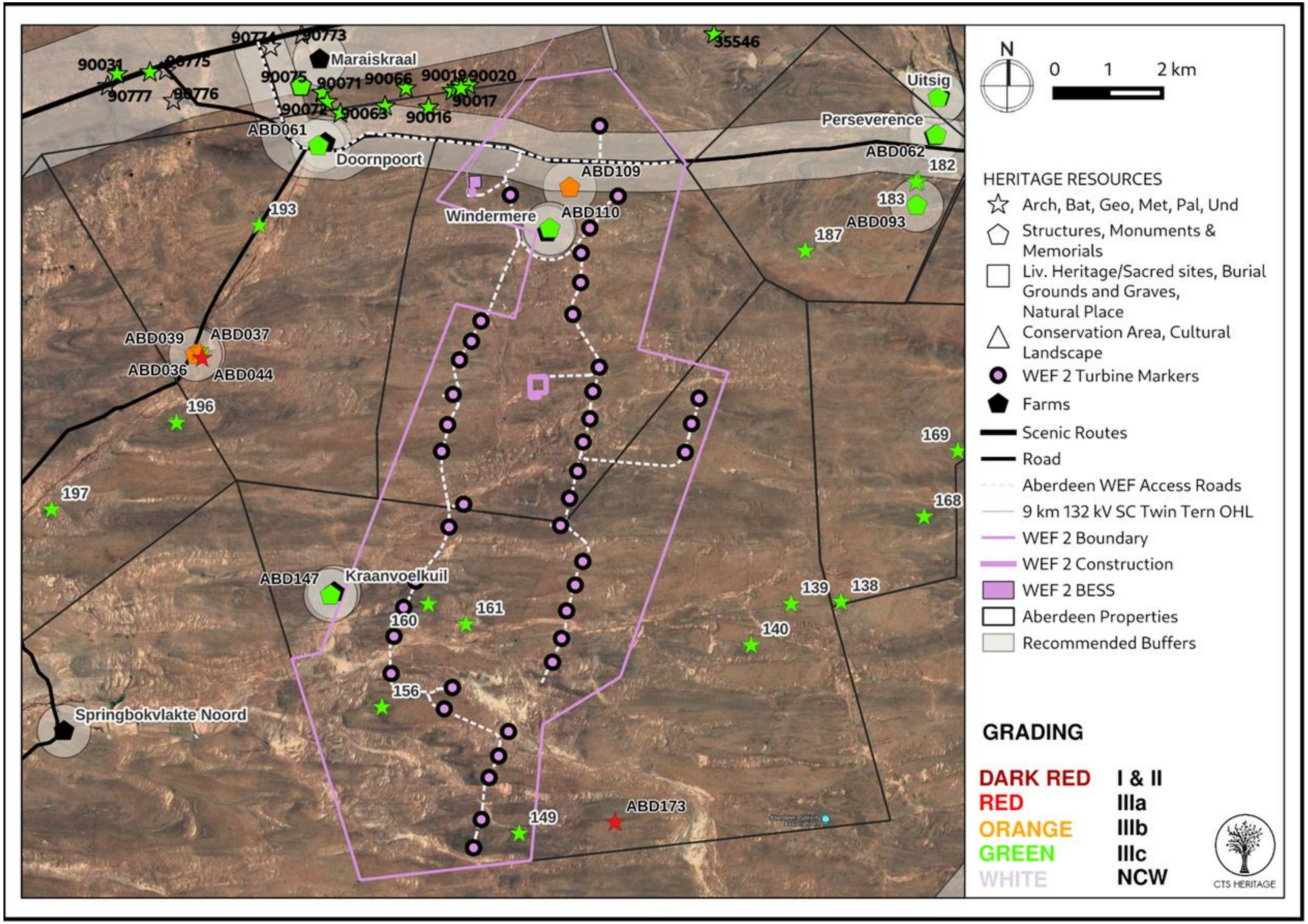

Figure 9.8: Location of heritage resources within and surrounding the Aberdeen Wind Facility 2 development area

9.7.1 Sensitivity Analysis against the development footprint

For the placement of the wind turbines, it is confirmed that all of the turbines are located within the Low sensitivity areas. No turbines in the layout fall within any of the no-go buffers. The placement of the turbines as proposed is considered to be acceptable with no adjustments to the development footprint required.

For the placement of the Facility substation, BESS, O&M hub it is confirmed that the footprint of the infrastructure will be placed within areas of low sensitivity. Therefore, the placement of the infrastructure is considered to be acceptable.

In terms of linear infrastructure proposed, all roads have been planned to run through low sensitivity areas. The roads planned within the no-go buffers on the map are not considered high sensitivity as there are already existing roads present and only a very small area is otherwise encroached on. The placement of the infrastructure is considered to be acceptable.

9.8. Noise and Associated Sensitivity

There is no residential area close to the proposed development. The closest community is the town of Aberdeen, located more than 20km east of the project site, which is too far from the project site for sound to be of any concern. The area surrounding the development area consists of dispersed residences. No potential noise sensitive developments (NSDs) were identified within the development area. However, the were NSDs located close to the development area. **Figure 9.9** illustrates the NSDs identified and the potential sensitivity in terms of noise that may be experienced at the locations.

9.8.1 Sensitivity Analysis against the development footprint

Based on the results of the Noise Impact Assessment no adjustments to the development footprint is required.

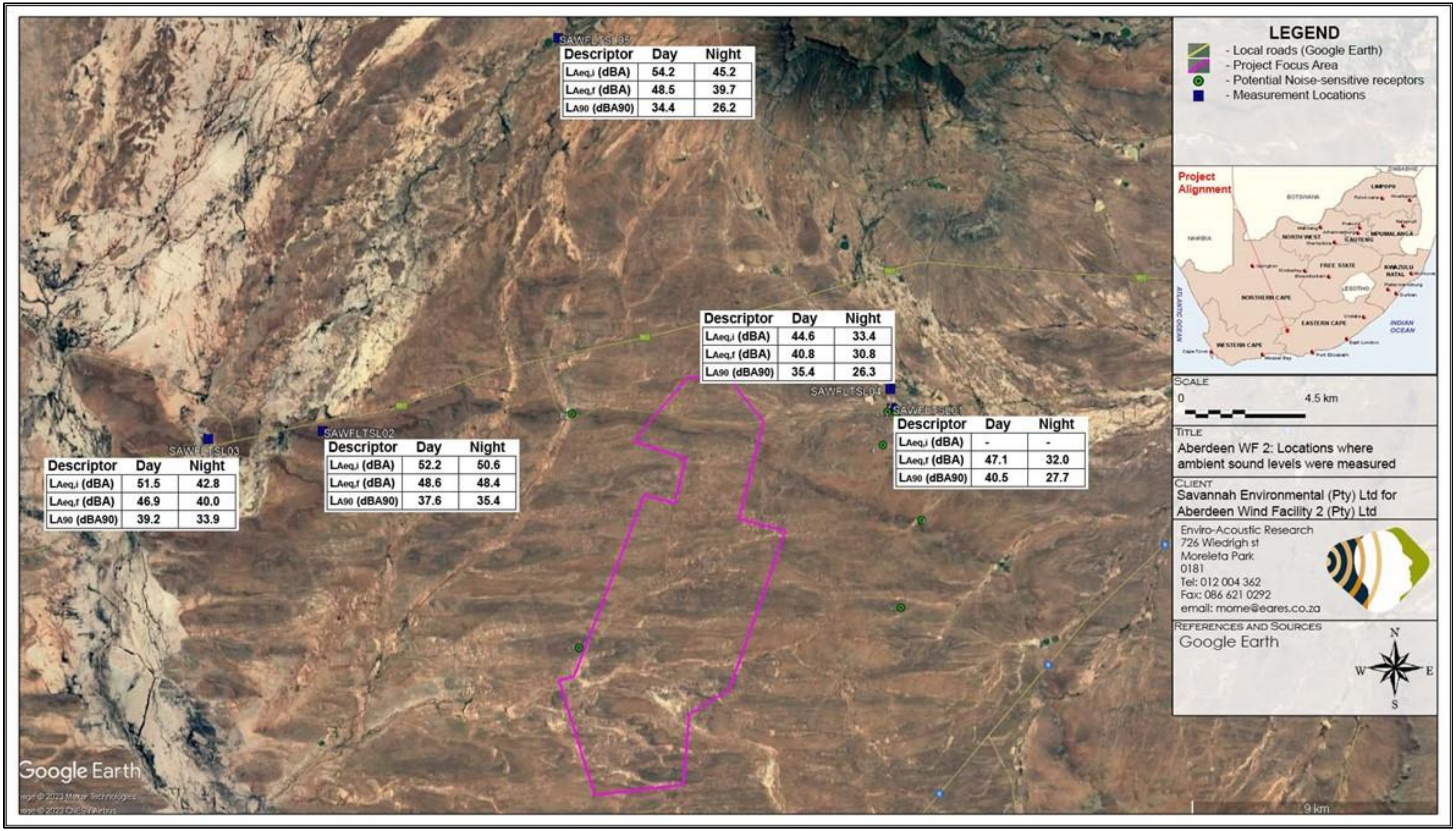

Figure 9.9: Noise site sensitivity and closest identified noise sensitive developments in relation to the Aberdeen Wind Facility 2

9.9. Overall Sensitivity Measured Against the Development Footprint

The features and areas of sensitivity identified in the project site have been considered and measured against the development footprint – which includes the facility infrastructure such as turbine positions, access roads, Facility substation, switching Station, BESS and O&M hubs locations, and laydown areas. The turbines have been located outside of sensitive environments including the elevated terrain, rocky outcrops, larger freshwater resources including the buffers for alluvial features as well as minor drainage areas, outside of identified bird and bat high activity areas, and away from homesteads and heritage features. The majority of the open plain habitat of the site represent the Eastern Lower Karoo vegetation type and considered to be low sensitivity, and offer sufficient areas for the positioning of the wind turbines and other associated infrastructure.

Figure 9.10 provides a combined environmental sensitivity map for the development area, and indicates those environmental sensitivities of very high, high, and medium-high sensitivity.

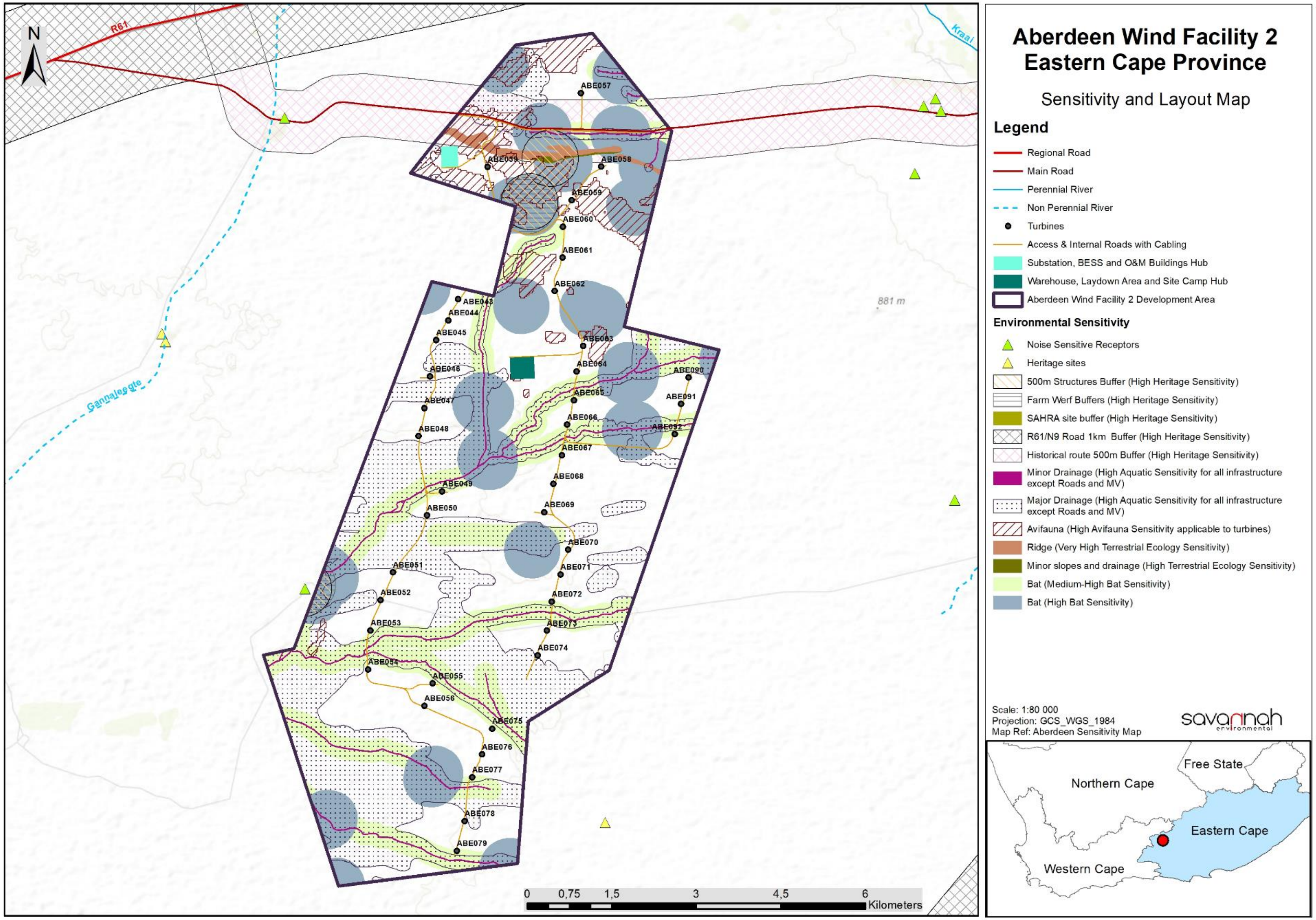

Figure 9.10: Combined environmental sensitivity and layout map for the Aberdeen Wind Facility 2 development area.

CHAPTER 10: ASSESSMENT OF IMPACTS

This chapter serves to assess the significance of the positive and negative environmental impacts (direct and indirect) expected to be associated with the development of the Aberdeen Wind Facility 2 and associated infrastructure. This assessment has considered the construction of a wind energy facility with a contracted capacity of up to 240MW, within a development footprint[20] of up to120ha. The development footprint includes the following infrastructure:

» Up to 41 wind turbines with a maximum hub height of up to 200m. The tip height of the turbines will be up to 300m.
» Concrete turbine foundations and turbine hardstands. The turbine foundations will have a combined permanent footprint of 6ha and 13ha for all turbine crane hardstands is required.
» 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.
» Upgrade to a main access road of approximately 5.7km in length and up to 10m in width.
» Medium-voltage (MV) power lines internal to the wind farm trenched and located adjacent to internal access roads, where feasible.
» Substation, BESS and O&M buildings hub, including:
  - On-site facility substation (132kV) up to 2ha in extent.
  - Battery Energy Storage System (BESS) with a footprint of up to 5ha.
  - Operation and Maintenance buildings, including control centre of up to 2ha.
» Warehouse, laydown area and site camp hub, including:
  - Construction laydown areas up to 9ha
  - Site camp up to 1 ha in extent
  - Warehousing and buildings (including offices, gatehouse, warehouses, workshop, canteen, visitors centre, staff lockers, etc.): up to 1 ha in extent.

The full extent of the development area [21](~6475ha) was considered through the BA process. This development area formed a portion of the project site[22]. On-site sensitivities were identified through the screening of existing information, desk-top evaluations and field surveys. The development footprint assessed within this BA Report was designed by the project developer in order to respond to and avoid the

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[20] The development footprint is the defined area (located within the development area) where the wind farm and other associated infrastructure for the facility is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

[21] The development area is that identified area where the 240MW wind farm is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints. The development area is ~6475ha in extent.

[22] The project site is that identified area within which the development area and development footprint are located. It is the broader geographic area assessed as part of the BA process, within which indirect and direct effects of the project may occur. The project site is ~15 800ha in extent. The project site is the entire extent of all properties for the wind farm, namely the Remainder of the Farm Doorn Poort 93, Portion 1 of Farm Doorn Poort 93, and Farm Kraanvogel Kuil 155.

sensitive environmental and social features located within the development area. This approach ensured that where specialists identified and confirmed specific areas and features of sensitivity that need to be avoided in terms of the placement of turbines, that the application of the mitigation hierarchy (i.e. avoid, minimise, mitigate and offset) was applied. The application of the mitigation hierarchy aimed at avoidance as the first level of mitigation, and this was taking into account through the micro-siting of the turbines within the development area. The specialist assessments undertaken as part of this BA process have considered the entire development area and the proposed development footprint (refer to **Figure 10.1**) which was provided by the developer.

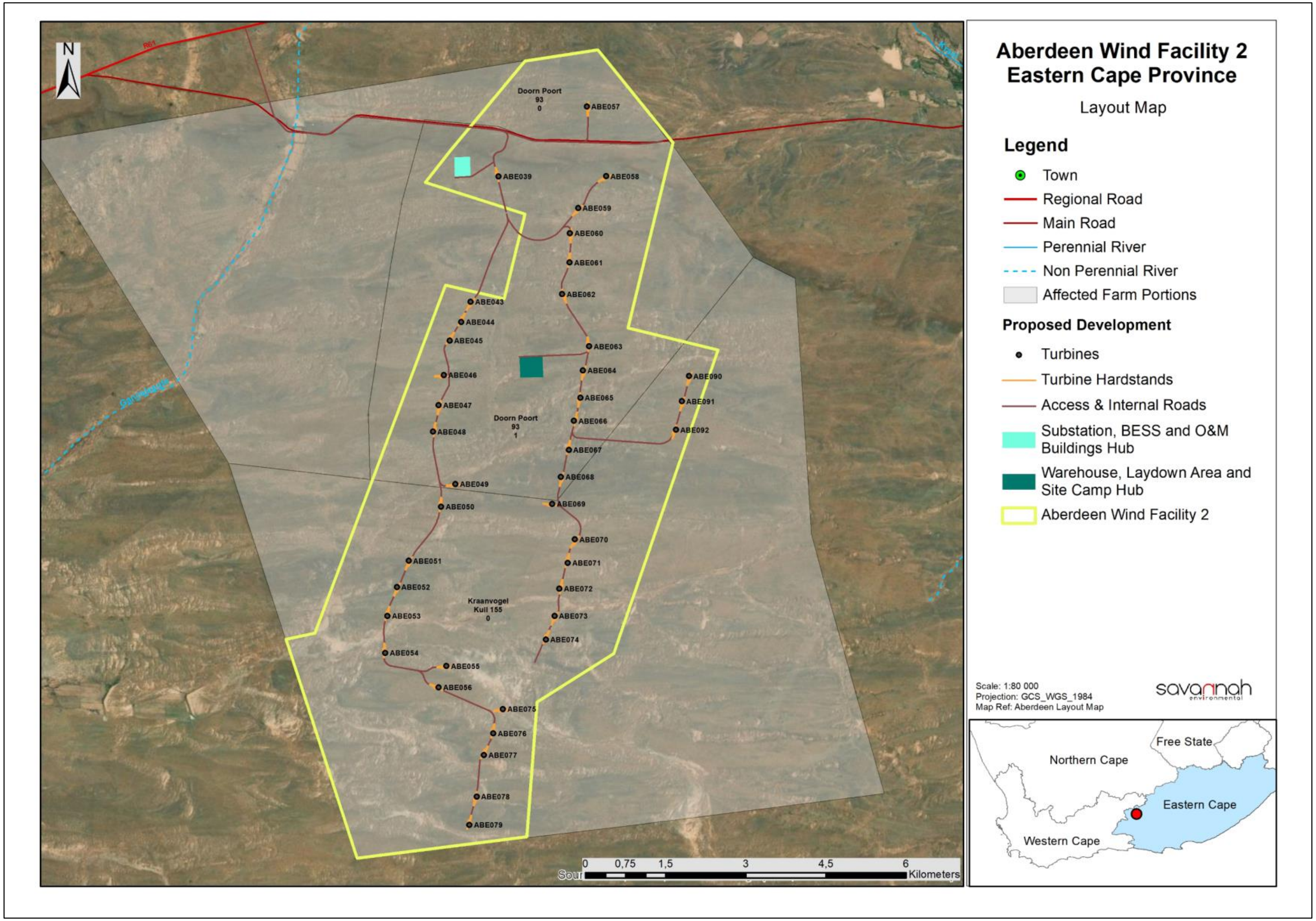

Figure 10.1: Map showing the development footprint for the Aberdeen Wind Facility 2 and associated infrastructure placed within the project site and assessed as part of this BA process

The sections which follow provide a summary of the specialist assessment for each field of study in terms of the impacts which are expected to occur relative to the facility layout, the significance of the impacts, the opportunity for mitigation of high sensitivity impacts to an acceptable level, as well as the appropriate mitigation measures recommended for the further reduction of the impact significance. Note that impacts associated with decommissioning are expected to be similar to those associated with construction activities, however where specific decommissioning impacts have been identified these are covered and assessed. This section of the report must be read together with the detailed specialist studies contained in **Appendix D** to **M.**

Where specific features or areas of sensitivity have been identified which need to be considered for the placement of infrastructure, these features are analysed and detailed in Chapter 9, which provides a sensitivity analysis of the project site and development footprint. The impact assessment provided below is based on the sensitivity analysis and the outcomes thereof.

The development of the Aberdeen Wind Facility 2 will comprise the following phases:

» *Pre-Construction and Construction* – will include pre-construction surveys; site preparation; establishment of access roads, construction camps, batching plant, laydown areas, and facility infrastructure; construction of foundations involving excavations and cement pouring; the transportation of components/construction equipment to site, manoeuvring and operating cranes for unloading and installation of equipment; laying cabling; and commissioning of new equipment and site rehabilitation. The construction phase for the Aberdeen Wind Facility 2 is dependent on the number of turbines to be erected, but is estimated to be between 24 and 30 months.
» *Operation* – will include the operation of the wind energy facility and the generation of electricity, which will be fed into the national grid. The operation phase of the Aberdeen Wind Facility 2 is expected to be approximately 20 to 25 years (with maintenance).
» *Decommissioning* – depending on the economic viability of the wind energy facility, the length of the operation phase may be extended beyond a 20 to 25 year period. At the end of the project's life, decommissioning will include site preparation, disassembling of the components of the wind energy facility, clearance of the relevant infrastructure at the site and rehabilitation.

10.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(h)(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed, (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, managed or mitigated.	The impacts and risk associated with the development of the Aberdeen Wind Facility 2, including the nature, significance, consequence, extent, duration and probability of the impacts and the degree to which the impact can be reversed and cause an irreplaceable loss of resources are included in sections 10.3.2, 10.4.2, 10.5.2, 10.6.2, 10.7.2, 10.8.2, 10.9.2, 10.10.2, 10.11.2 and 10.12.2.
3(h)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the	The positive and negative impacts associated with the development of the Aberdeen Wind Facility 2 are included in sections 10.3.2, 10.4.2, 10.5.2, 10.6.2, 10.7.2, 10.8.2, 10.9.2, 10.10.2, 10.11.2 and 10.12.

Requirement	Relevant Section
geographical, physical, biological, social, economic, heritage and cultural aspects	
3(h)(viii) the possible mitigation measures that could be applied and the level of residual risk.	The mitigation measures that can be applied to the impacts associated with the Aberdeen Wind Facility 2 are included in sections 10.3.2, 10.4.2, 10.5.2, 10.6.2, 10.7.2, 10.8.2, 10.9.2, 10.10.2, 10.11.2 and 10.12.
3(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures,.	A description of all environmental impacts identified for the Aberdeen Wind Facility 2 during the BA process, and the extent to which the impact significance can be reduced through the implementation of the recommended mitigation measures provided by the specialists are included in sections 10.3.2, 10.4.2, 10.5.2, 10.6.2, 10.7.2, 10.8.2, 10.9.2, 10.10.2, 10.11.2 and 10.12.
3(j) an assessment of each identified potentially significant impact and risk, including (i) cumulative impacts, (ii) the nature, significance and consequences of the impact and risk, (iii) the extent and duration of the impact and risk, (iv) the probability of the impact and risk occurring, (v) the degree to which the impact and risk can be reversed, (vi) the degree to which the impact and risk may cause irreplaceable loss of resources and, (vii) the degree to which the impact and risk can be avoided, managed or mitigated.	An assessment of each impact associated with the development of the Aberdeen Wind Facility 2, including the nature and significance, the extent and duration, the probability, the reversibility, and the potential loss of irreplaceable resources, as well as the degree to which the significance of the impacts can be mitigated are included in sections 10.3.2, 10.4.2, 10.5.2, 10.6.2, 10.7.2, 10.8.2, 10.9.2, 10.10.2, 10.11.2 and 10.12.
3(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr.	Mitigation measures recommended by the various specialists for the reduction of the impact significance are included in sections 10.3.2, 10.4.2, 10.5.2, 10.6.2, 10.7.2, 10.8.2, 10.9.2, 10.10.2, 10.11.2 and 10.12.

10.2. Quantification of Areas of Disturbance on the Site

Site-specific impacts associated with the construction and operation of the Aberdeen Wind Facility 2 relate to the direct loss of habitat, species, or biophysical, landscape or social features. A wind energy facility is, however, dissimilar to most other power generation facilities in that it does not result in whole-scale disturbance or loss to a site (from a biophysical perspective). In order to assess the impacts associated with Aberdeen Wind Facility 2, it is necessary to understand the extent of the affected area.

The development footprint (**Figure 10.1**) includes all affected/impacted areas, and comprises:

» Up to 41 wind turbines with a maximum hub height of up to 200m. The tip height of the turbines will be up to 300m.
» Concrete turbine foundations (6ha), crane hardstands (13ha) and blade hardstands (15ha).
» A boom assembly area (25ha)
» 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 (30ha).

» Upgrade to a main access road of approximately 5.7km in length and up to 10m in width.
» Medium-voltage (MV) power lines internal to the wind farm trenched and located adjacent to internal access roads, where feasible.
» Substation, BESS and O&M buildings hub in a 14ha area that will, include:
  - On-site facility substation (132kV) up to 2ha in extent.
  - Battery Energy Storage System (BESS) with a footprint of up to 5ha.
  - Operation and Maintenance buildings, including control centre of up to 2ha.
» Warehouse, laydown area and site camp hub in a 16ha area that will include:
  - Construction laydown areas up to 9ha
  - Site camp up to 1 ha in extent
  - Warehousing and buildings (including offices, gatehouse, warehouses, workshop, canteen, visitors centre, staff lockers, etc.): up to 1.5 ha in extent.

During the construction phase ~120ha will be disturbed/transformed, however 51ha will be rehabilitated which will result in a permanent development footprint of approximately 58.5ha.

A main access road up to 5.7km in length and up to 10m in width will provide access to the facility, and ultimately to all three planned wind farm sites (that is, a shared access route). The access to the facility/ies will be via an existing (unnamed) gravel road off the R61 between Beaufort West and Aberdeen. The gravel road is well established (~10m wide excluding road reserve), however it's likely portions of this road will require upgrading to accommodate the movement of heavy vehicles. This road traverses Portion 4 of Farm Sambokdoorns 92.

Based on the above, it can be concluded that considering the 41 turbine facility layout up to 120ha of the development area will be transformed and disturbed for the development footprint of the Aberdeen Wind Facility 2.

10.3. Potential Impacts on Terrestrial Ecology (Ecology, Flora and Fauna)

The development of the Aberdeen Wind Facility 2 is likely to result in a variety of impacts, associated largely with the disturbance, loss and transformation of intact vegetation and faunal habitat to hard infrastructure such as turbine foundations and service areas, roads, operations buildings etc. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix D** for more details). The terrestrial ecology impacts associated with the development have been assessed on the facility layout which avoids all high sensitivity areas. Terrestrial Ecological impacts include impacts to terrestrial ecology, flora and fauna.

10.3.1 Description of Terrestrial Ecological Impacts

A detailed assessment of the development footprint confirms that there are no turbines located within the Very High and High ecological sensitivity areas. As a result, the development of the Aberdeen Wind Facility 2 would avoid significant impact on the major ecological features of the site. Impacts on the ecology of the project site are expected to occur during the construction and operation phases of the Aberdeen Wind Facility 2. As per the proposed development footprint, the following impacts are identified and assessed for the project.

» Impacts on Ecological Support Areas – The project Substation hub is located within the extended ESA along the Gannaleegte River. The sensitivity mapping conducted as part of this study indicates that his is not an intrinsically sensitive area and the impact of the development on the ESA would be minor.

» Impacts on FEPA Priority Subcatchments – The majoirty of the site falls within a FEPA Priority Subcatchment, and the development would potentially have some impact on this subcatchment and the delivery of ecosystem services from this area. The total footprint of the development would represent less than 0.2% of the subcatchment, with the result that with the implementation of suitable mitigation, this impact would be localized and not of high likely overall long-term significance.

10.3.2 Impact tables summarising the significance of impacts on ecology during construction, operation and decommissioning (with and without mitigation)

Construction Phase Impacts

Nature: *Construction phase impact on Ecological Support Areas* Transformation and presence of the facility will contribute to cumulative habitat loss within ESAs and impacts on broad-scale ecological processes such as fragmentation.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Minor (1)
Probability	Highly Likely (4)	Probable (3)
Significance	**Low (28)**	**Low (18)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, negative impacts can be reduced.	
Mitigation: » Minimise the development footprint as far as possible. » Locate temporary-use areas such as construction camps and lay-down areas in low sensitivity or previously disturbed areas. » Minimise the development footprint in areas mapped as high sensitivity (i.e. near watercourses and other ecologically significant features). » Clearly demarcate riparian areas near to the development footprint as No-Go areas with appropriate signage and barriers. » Appropriate design of roads and other infrastructure to minimise faunal impacts and allow fauna to pass over, through or underneath these features as appropriate. » The fencing around substations or other infrastructure should not have any electrified strands within 30cm of the ground as this may result in tortoises being electrocuted. Alternatively, guard wires or mesh can be placed outside of the fence to prevent tortoises from accessing the electrified fence. » Monitoring of construction activities to ensure that the development footprint within sensitive areas is restricted to the authorised development footprint.		
Residual Impacts: Although habitat loss within the ESA cannot be fully mitigated or avoided, the footprint in this area is minimal and there are low residual risks associated with the development components within the ESA.		

Nature: *Construction phase Impact on FEPA Subcatchments*

Impacts on ecosystem services within the affected FEPA Priority Subcatchment as a result of construction phase activities, including disturbance and soil erosion.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (3)	Minor (2)
Probability	Certain (5)	Probable (3)
Significance	**Medium (40)**	**Low (21)**
Status	Negative	Negative
Reversibility	Moderate	Moderate
Can impacts be mitigated?	Yes, degradation and negative impacts on the FEPA Subcatchment can be largely mitigated.	
Mitigation: » Disturbance within or near the drainage lines should be kept to a minimum and any disturbance in these areas should be rehabilitated as quickly as possible. » An erosion monitoring programme should be put in place for at least 3 years after construction. Any problems observed should be rectified as soon as possible using the appropriate revegetation and erosion control works.		
Residual Impacts: Habitat loss within the FEPA Subcatchment cannot be fully mitigated or avoided with the result that some residual disturbance and degradation will occur during operation of the facility		

Nature: *Habitat loss and increased risk of illegal collection as a result of construction activity on the site.* There is a low risk that some individuals of Sensitive Species 1212 were missed in the field and that some individuals would be impacted by habitat loss during construction as a result. However, a greater risk would be illegal collection of individuals of Sensitive Species 1212 by construction personnel or other people as a result of increased accessibility of the site.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (3)	Minor (2)
Probability	Likely (4)	Improbable (2)
Significance	**Medium (32)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	To some degree, but the habitat loss associated with the project is largely unavoidable.	
Mitigation: » Preconstruction walk-though of the development footprint to ensure that there are no individuals of Sensitive Species 1212 within the development footprint. » Access control onto the site during construction. » Monitoring of construction activities to ensure that personell remain within the demarcate development footprint.		
Residual Impacts: There may be some residual risk of illegal collection despite monitoring and mitigation.		

Operation Phase Impacts

Nature: Operation phase impact on Ecological Support Areas The presence and operation of the facility will contribute to cumulative habitat loss within ESAs and impacts on broad-scale ecological processes such as fragmentation.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (3)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Low (21)**
Status	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	To some degree, but some residual disturbance associated with the project is likely unavoidable.	
Mitigation: » Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. » If any parts of the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs and HPS bulbs), which attract fewer insects. » All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. » All vehicles accessing the site should adhere to a low speed limit (30km/h max for heavy vehicles and 40km/h for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises. » If any parts of the facility are fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences because they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the security fence and not the outside.		
Residual Impacts: Habitat loss within the ESAs cannot be fully mitigated or avoided with the result that some residual habitat and local disturbance, for affected fauna and flora will occur during operation of the facility.		

Nature: Operation phase Impact on FEPA Subcatchments Disturbance created during construction will leave the site and its immediate surroundings vulnerable to erosion and alien plant invasion for several years into the operational phase, with associated negative impacts on the affected FEPA Priority Subcatchment and the provision of associated ecosystem services.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Medium-term (2)	Short-term (1)
Magnitude	Medium (4)	Low (3)
Probability	Likely (4)	Likely (3)
Significance	**Low (28)**	**Low (15)**
Status	Negative	Negative
Reversibility	Medium	High
Irreplaceable loss of resources	Moderate	Low
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	
Mitigation: » Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan. This should make provision for annual monitoring and rehabilitation.		

» All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. » There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs, grasses and trees from the local area. » Alien management at the site should take place according to the Alien Invasive Management Plan. » Regular (annual) monitoring for alien plants during operation to ensure that no alien invasive problems have developed as result of the disturbance, as per the Alien Management Plan for the project. » Woody aliens should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present.
Residual Impacts: Some erosion and alien plant invasion is likely to occur even with the implementation of control measures, but would have a low impact if effectively managed

Nature: *Increased risk of illegal collection during operation* During operation, impacts would be largely restricted to illegal collection of individuals of Sensitive Species 1212. As the density of this species is relatively low and recruitment is infrequent, even relatively low levels of persistent harvesting would be detrimental to the local population.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Minor (2)
Probability	Highly Probable (4)	Improbable (2)
Significance	**Medium (28)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	To a large degree, but some residual risk of poaching likely remains.	
Mitigation: » Site access control and monitoring of personell on site to ensure that people remain within the operational areas of the wind farm. » Monitoring of select populations of Sensitive Species 1212 near to the development footprint to ensure that these popualtions are not being impacted. Should it become apparent that individuals are being lost, seed from locally sourced individuals should be used to cultivate seedlings that can be placed into the wild to replace the lost indivudals.		
Residual Impacts: Although residual risks are low, there is some residual risk of increased illegal collection.		

Decommissioning Phase Impacts

Nature: *Decommissioning phase impact on Ecological Support Areas* The decommissioning of the facility will contribute to cumulative habitat loss within ESAs and impacts on broad-scale ecological processes such as fragmentation.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Unlikely (2)
Significance	**Low (21)**	**Low (14)**

Status	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	To a large degree, through erosion control.	

Mitigation:

- » All vehicles should adhere to a low-speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h.
- » Any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities should be removed to a safe location prior to the commencement of decommissioning activities.
- » All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- » No excavated holes or trenches should be left open for extended periods as fauna may fall in become trapped.
- » All above-ground infrastructures should be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables may generate additional disturbance and impact, however, this should be in accordance with the facilities' decommissioning and recycling plan.

Residual Impacts:

There may be some residual risks of degradation after decommissioning, but ultimately the functioning of the site should be restored through rehabilitation and revegetation of disturbed areas.

Impact Nature: *Decommissioning phase impact on FEPA subcatchments*

Disturbance created during decommissioning will leave the site and its immediate surroundings vulnerable to erosion and alien plant invasion for several years after decommissioning, with associated negative impacts on the affected FEPA Priority Subcatchment.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Medium-term (2)	Short-term (1)
Magnitude	Medium (4)	Low (3)
Probability	Likely (4)	Likely (3)
Significance	**Low (28)**	**Low (15)**
Status	Negative	Negative
Reversibility	Medium	High
Irreplaceable loss of resources	Moderate	Low
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	

Mitigation:

- » Decommissioning disturbance within or near the drainage lines should be kept to a minimum and any disturbance in these areas should be rehabilitated as quickly as possible.
- » An erosion monitoring programme should be put in place for at least 3 years after decommissioning and should make provision for annual monitoring and rehabilitation.
- » All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.
- » There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs, grasses and trees from the local area.
- » Alien management at the site should be implemented post-decommissioning in accordance with an Alien Invasive Management Plan.
- » Regular (annual) monitoring for alien plants during decommissioning to ensure that no alien invasive problems have developed as result of the disturbance, as per the Alien Management Plan for the project.
- » Woody aliens should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present.

Residual Impacts:
Some erosion and alien plant invasion is likely to occur even with the implementation of control measures but would have a low impact if effectively managed.

10.3.3 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of impacts of the Aberdeen Wind Facility 2 will be low. On-site mitigation is viewed as the most practical and appropriate action, and viable options for reducing the overall impact of the development on these areas is detailed below:

» No turbines to be developed in areas mapped as very high sensitivity (i.e. major slope areas such as ridges).
» Minimise the development footprint as far as possible in areas mapped as high sensitivity (i.e. minor drainage and slope areas).
» Where linear features of very high sensitivity (for example major ridge) need to be traversed, existing roads or disturbance footprints should be used as far as possible.

10.3.4 Overall Result

The Ecological Impact Assessment has identified impacts of medium significance to be associated with the development of the Aberdeen Wind Facility 2 prior to the implementation of appropriate recommendations and mitigation measures. There are no impacts associated with the development of the Aberdeen Wind Facility 2 on terrestrial biodiversity that cannot be mitigated to a low and acceptable level. As such, should all the proposed mitigation measures be implemented, the development is deemed acceptable from a terrestrial ecological impact perspective. No impacts of a high significance or fatal flaws are expected to occur after implementation of the recommended mitigation measures.

10.4. Potential Impacts on Aquatics

The development of the Aberdeen Wind Facility 2 is likely to result in a variety of impacts, associated largely with the direct disturbance or impacts to freshwater features. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix E** for more details). The impacts on aquatics associated with the development have been assessed on the facility layout which avoids all high sensitivity areas.

10.4.1 Description of Impacts on Aquatics

A detailed assessment of the development footprint confirms that there are no turbines located within the High aquatic sensitivity areas. As a result, the development of the Aberdeen Wind Facility 2 would avoid significant impact on the major aquatic features of the site.

Impacts on aquatic resources are expected to occur during the construction, operation and decommissioning phases of the project. Direct and indirect impacts are expected to occur. These are related to risk factors and contributing activities associated with the development. The following impacts are expected to occur:

- Loss of moderate sensitivity systems, through physical disturbance.
- Impact on watercourses (low sensitivity), through physical disturbance
- Impact on all watercourse through the possible increase in surface water runoff on riparian form and function through hydrological changes.
- Increases in sedimentation and erosion.
- Risks on the aquatic environment due to water quality impacts.
- Impact of National Ecosystem Priority Areas (NFEPAs)

10.4.2 Impact tables summarising the significance of impacts on aquatic ecology during construction, operation and decommissioning (with and without mitigation)

Construction Phase Impacts

Nature: Loss of Moderate Sensitivity systems, through physical disturbance, as the proposed layout is located within these areas inclusive of the associated buffers		
	Without mitigation	**With mitigation**
Extent	Regional (3)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	High (7)	Low (4)
Probability	Definite (5)	Probable (3)
Significance	**High (70)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	

Mitigation:

- The most significant form of mitigation would be to select a development area, which contained no drainage lines. It is therefore recommended that any tracks avoid these areas, or make use of existing access across these systems.
- A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the revision of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout.
- Where large cut and fill areas are required, these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation.
- Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).

To minimise the impact of the access roads:

- Use existing roads or upgrade existing tracks rather than constructing entirely new roads wherever possible.
- Use the smallest possible working corridor. Outside the working corridor, all watercourses are to be considered no go areas. Any unnecessary intrusion into these areas is prohibited. Where intrusion is required, the working corridor must be kept to a minimum and demarcated clearly, before any construction commences.
- Removal of vegetation must only be when essential for the continuation of the project. Do not allow any disturbance to the adjoining natural vegetation cover or soils.
- All pipe culverts must be removed and replaced with suitable sized box culverts, where road levels are raised. Crossings that are installed below the natural ground level are to be constructed with an appropriate drop inlet structure on the upstream side to ensure that headcut erosion does not develop as a result of the gradient change from the natural ground level to the invert level of the culvert.

» The channel profile, regardless of the current state of the river / water course, will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown. » Water diversions must be temporary in nature and no permanent walls, berms or dams may be installed within a watercourse. Sandbags used in any diversion or for any other activity within a watercourse must be in a good condition, so that they do not burst and empty sediment into the watercourse. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns. Under no circumstance shall a new channel or drainage canals be excavated to divert water away from construction activities. » Any fauna (frogs, snakes, etc.) that are found within the construction area must be moved to the closest point of similar habitat type outside of the areas to be impacted. » All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated. » It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas.
Residual impacts: Possible impact on the remaining catchment due to changes in run-off characteristics in the development area.

Nature: *Impact on watercourses (Low Sensitivity), through physical disturbance during the construction phase.* The physical disturbance of low sensitivity area associated with minor watercourses; however, this would be localised to small drainage areas that will need road crossings.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (4)
Probability	Definite (5)	Probable (3)
Significance	**Medium (45)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	
Mitigation: » None		
Residual impacts: Sizable portion of intact natural environment remain within the greater region.		

Nature: - *Impact on NFEPA catchments* The whole of the Aberdeen Wind Facility 2 site falls within a FEPA quinary catchment. Although the development would potentially have negative impacts on the riparian environment through disturbance and changes to water quality downstream of the site as a result of erosion, pollution and other forms of disturbance and associated degradation of the freshwater ecosystems of the site, these negative impacts can be well-mitigated. The majority of the site is relatively flat with the result that water erosion risk is relatively low, while wind-erosion potential is moderate but can be effectively reduced through dust suppression during construction. The development footprint, which is estimated at 162ha is less than 0.5% of the extent of the FEPA which is over 50 000ha. As a result, with the effective implementation of mitigation and avoidance, it is unlikely that the development of the Aberdeen Wind Facility 2 would significantly compromise the long-term ecological integrity and associated ecosystem services of the affected FEPA.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Low (1)
Probability	Definite (5)	Probable (3)
Significance	**Medium (35)**	**Low (18)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes (high)	

Mitigation:

» The most significant form of mitigation would be to select development options that avoided all aquatic features that were rated with a High sensitivity, which will not be possible due to the technical constraints of this project. However detailed assessment of the habitats, with differentiation of functional watercourse habitat (typically with riparian habitat) was undertaken, and the present layout has avoided these areas, by being located within the sandy alluvial areas. This would then also minimise any additional risk to the FEPA.

» This may impact on construction during high rainfall events; thus it is highly recommended that a detailed walk down is conducted by the aquatic specialist to ensure that the functional watercourses have been avoided, coupled to a detailed stormwater management plan is developed that will account for working in these areas.

» If possible, that size of blade laydowns, hardstands must also be limited to reduce the overall footprint, which should be achievable as the areas are flat, thus cut/fill embankments to create level areas should also minimal.

» It is further recommended that a comprehensive rehabilitation / monitoring plan be implemented from the project onset i.e., during the detailed design phase prior to construction, to ensure a net benefit to the environment within all areas that will remain undisturbed. This must apply to any temporary laydown, crane pads etc, to minimise footprints.

Residual impacts:

Residual impacts will be negligible after appropriate mitigation.

Operation Phase Impacts

Nature: - _Impact on all watercourse systems through the possible increase in surface water runoff that could alter the aquatic state and function through hydrological changes during the operation phase_

Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within the aquatic systems, which are currently ephemeral, i.e. aquatic vegetation species composition changes, which then results in habitat change / loss.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Low (2)
Probability	Definite (5)	Probable (3)
Significance	**Medium (35)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	

Mitigation:

» A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout.

» Where large cut and fill areas are required, these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation. » Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc). » If possible, that size of blade laydowns, hardstands must also be limited to reduce the overall footprint, which should be achievable as the areas are flat, thus cut/fill embankments to create level areas should also minimal.
Residual impacts: Possible impact on the remaining catchment due to changes in run-off characteristics in the development area.

***Nature**: <u>Increase in sedimentation and erosion within the development footprint during the operation phase</u>* An increase in hard surface areas, and or roads that require stormwater management increases runoff from a site through the concentration of surface water flows. These higher volume flows, with increased velocity can result in downstream erosion and sedimentation if not managed.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Low (1)
Probability	Definite (5)	Probable (3)
Significance	**Medium (35)**	**Low (18)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	
Mitigation: » A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed areas that previously contained vegetation.		
Residual impacts: Possible impact on the remaining catchment due to changes in run-off characteristics in the development area.		

Construction and Operation Phase Impacts

***Nature**: <u>Impact on localised surface water quality</u>* During both preconstruction, construction and, to a limited degree, the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction activities, as well as maintenance activities, could be washed downslope via the watercourses.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Low (1)
Probability	Definite (5)	Probable (3)
Significance	**Medium (35)**	**Low (18)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No

Can impacts be mitigated	Yes (high)	
Mitigation: » Strict use and management of all hazardous materials used on site. » Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.) within demarcated / bunded areas » Containment of all contaminated water by means of careful run-off management on site. » Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. These regularly maintained. » Appropriate waste management and disposal.		
Residual impacts: Residual impacts will be negligible after appropriate mitigation.		

10.4.3 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of impacts of the Aberdeen Wind Facility 2 will be low. On-site mitigation is viewed as the most practical and appropriate action, and viable options for reducing the overall impact of the development on these areas is detailed below:

» A 25m no-go buffer around alluvial rivers with or without riparian vegetation for the placement of turbines, hardstands, substation hub and laydown area hub.
» A 12m no-go buffer around minor watercourses for the placement of turbines, hardstands, substation hub and laydown area hub.
» No buffers are required for linear infrastructure (i.e. road network) as this is considered to be medium sensitivity.
» Existing crossing / road or areas should preferentially form part of the potential road network.

10.4.4 Overall Result

Impacts of a medium and high significance on aquatic resources have been identified to be associated with the development of the Aberdeen Wind Facility 2. With the implementation of the mitigation measures, all impacts would be reduced to a moderate or low significance which is considered to be acceptable. There are no fatal flaws associated with the development footprint. Although there is limited footprint within the high sensitivity areas, this is associated with existing road alignments. Given the avoidance of sensitive features at the site by the facility layout no high impacts are likely to occur as a result of the development.

10.5. Potential Impacts on Avifauna

Various impacts have been identified to be associated with the development of the Aberdeen Wind Facility 2 from an avifaunal perspective. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix F** for more details). The avifaunal impacts associated with the development have been assessed on the facility layout which avoids all high sensitivity areas.

10.5.1 Description of Avifaunal Impacts

The effects of a wind energy facility on birds are highly variable and depend on a wide range of factors including the specification of the development, the topography of the surrounding land, the habitats affected and the number and species of birds present, density of the prey and types of bird. Each of these potential effects can interact with each other, either increasing the overall impact on birds or, in some cases, reducing a particular impact (for example where habitat loss or displacement causes a reduction in birds using an area which might then reduce the risk of collision).

The principal areas of concern with regard to impacts on birds are listed below:

» *Disturbance and loss of foraging habitat around the wind energy facility* - Some habitat destruction and alteration inevitably take place during the construction of substation and associated roadways. These activities have an impact on birds breeding, foraging, and roosting in or close to the servitude, and retention of cleared servitudes can have the effect of altering bird community structure along the length of any road.

» *Mortality due to collisions with the wind turbines* – considering the site and based on general observations it is assumed that priority species could potentially be vulnerable to collisions. Breeding male raptors are particularly susceptible to impacts, including both Martial Eagles and Black Harriers, flying frequently at rotor-swept height. Given that these birds are providing food for females and young at the time there are also hidden cost to fatalities.

It is important to note that the assessment is made on the *status quo* as it is currently on site. The possible change in land use in the broader development site is not taken into account because the extent and nature of future developments (not only wind energy development) are unknown at this stage. It is, however, highly unlikely that the land use will change in the foreseeable future due to climatic limitations.

10.5.2 Impact tables summarising the significance of impacts on avifauna during construction, operation and decommissioning (with and without mitigation)

Construction Phase Impacts

Nature of Impact: Displacement of priority species due to disturbance associated with the construction of the wind turbines and associated infrastructure. Generally negative due to displacement of priority species due to disturbance associated with the construction of the wind turbines and associated infrastructure. No direct fatalities of birds expected during this phase. Generally short term (approx. 24 months).		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (7)	Moderate (6)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (40)**	**Medium (27)**
Status	Negative	Negative
Reversibility	For habitat no: it will be permanently altered,	Yes: duration only for construction phase

	For disturbance yes, birds temporarily displaced by disturbance are likely to return once construction complete	
Irreplaceable loss of species?	No	No
Can impacts be mitigated?	Yes	Yes

Mitigation:

- » Construction activity should be restricted to the immediate footprint of the infrastructure as far as possible. and should and avoid all sensitive areas (e.g., CRM-designated high-risk areas, wetlands).
- » Measures to control noise and dust should be applied according to current best practice in the industry.
- » Roads and tracks to avoid all identified sensitive areas wherever possible.
- » An avifaunal walk down should be conducted to confirm final layout and identify any sensitivities that may arise between the conclusion of the EIA process and the construction phase.

Residual impacts:

The disturbance of birds is somewhat inevitable by activities on site, although the most sensitive receptors (e.g., CRM-designated high-risk areas) have already been protected through avoidance, through the application of no-go buffers. Post-construction monitoring recommended by Birdlife South Africa guidelines will help identify residual impacts should they occur and recommend any further mitigations required.

Operation Phase Impacts

Nature of Impact: Displacement and collisions with turbines associated with the operational phase.
Generally negative due to potential for collision and displacement of six Red Data species or seven Least Concern species through the operation of the turbines and activity on site.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (4)	Short-term (4)
Magnitude	High (8)	Moderate (7)
Probability	Probable (4)	Probable (3)
Significance	**High (52)**	**Medium (36)**
Status	Negative	Negative
Reversibility	Yes, with appropriate contemporary mitigations	Yes, with appropriate contemporary mitigations
Irreplaceable loss of species?	Possibly	Possibly
Can impacts be mitigated?	Yes	Moving all turbines that fall within the high-risk areas as delineated by the CRM will reduce this significantly (and this has been carried out in consultation with clients)

» ***Mitigation:***

- » Re-position all turbines that fall within the high-risk zones delineated by the CRM to lower risk areas (as delineated by the CRM). Additionally, re-locate any turbines that were risky to either (i) Blue Cranes or (ii) the three falcon species to lower risk areas. The constraint high-risk zones delineated by the CRM should be adhered to. It should be noted that this mitigation has already being implemented.
- » The high-risk no-go zones delineated by the CRM should be adhered to.
- » A post-construction programme must be conducted by an avifaunal specialist (following the Birds and Renewable Energy Specialist Group guidelines) to (i) assess turbine-related fatalities and (ii) confirm that all aspects have been appropriately handled and in particular that road and hard stand verges do not provide additional substrate for raptor prey species. It is essential that the new wind farm does not create favourable conditions for such mammals in high-risk areas.

» A bird fatality threshold and adaptive management policy must be designed by an ornithologist for the site, prior to construction. This policy should form an annexure of the operational EMP for the facility. This policy should identify most importantly the number of bird fatalities of priority species which will trigger a management response, appropriate responses, and timelines for such responses. In general BBU recommends that should 1 RD species or 2 or more LC species be killed per turbine per year then those turbines will require further mitigation. » Should the identified priority bird species fatality thresholds be exceeded in Year 1 and 2, either (i) an observer-led turbine Shutdown on Demand (SDOD) programme or (ii) and appropriate alternative mitigation (e.g. striped blade, automated SDOD) must be implemented on site The former programme must consist of a suitably qualified, trained and resourced team of observers present on site for all daylight hours 365 days of the year. This team must be stationed at vantage points with full visible coverage of all turbine locations (typically 1 VP covering four turbines). The observers must detect incoming priority bird species, track their flights, judge when they enter a turbine proximity threshold, and alert the control room to shut down the relevant turbine until the risk has passed. A full detailed method statement or protocol must be designed by an ornithologist. **NB note that that the applicant (Aberdeen Wind Farm 2 (Pty) Ltd , have complied with both recommendations in their revised layout of early December 2022**
Residual impacts: Direct mortality through collision, or area avoidance, may occur if cranes, raptors and bustards remain here and the mitigations are insufficient. This possibility can be gauged from a systematic monitoring programme. There is some uncertainty around the effectiveness of bird-turbine collision mitigation at this stage in SA. As a result, the significance remains at Moderate post mitigation

Nature of Impact: *Bird collision with overhead power lines*[23] Generally negative from birds colliding with overhead power lines, particularly RD bustards and cranes		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	High (7)	Low (5)
Probability	Highly Probable (4)	Probable (3)
Significance (E+	**Medium-high (52)**	**Medium-Low (33)**
Status (+ve or –ve)	Negative	Negative
Reversibility	Yes, with appropriate contemporary mitigations	
Irreplaceable loss of species?	Possibly	Possibly
Can impacts be mitigated?	Yes	Yes
Mitigation measures: » Underground cabling should be used as much as practically possible.		

[23] It should be noted that only MV (<33kV) transmission lines are proposed as part of this application and will be trenched underground. The WEF will however be connected to the national grid via a 132kV OHL which is not included in the scope of this project and will be assessed in a separate BAR process. Regardless, the two (the wind farm and the Eskom infrastructure) are co-dependant and from an avifaunal perspective should be viewed holistically.

» Because the majority of power line victims uncovered here were bustards, that do not see overhead lines, the newly proposed mitigation of staggered pylons must be implemented on site (Pallett et al. 2022): running new lines adjacent and parallel with existing lines is strongly recommended. » Bird flight diverters must also be installed on all the overhead line sections for the full span length according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). These devices must be installed as soon as the conductors are strung. » If the use of overhead lines is unavoidable due to technical reasons, the Avifaunal Specialist must be consulted to ensure that a raptor friendly pole design to avoid electrocutions. The rule of thumb here is that all conductors be strung below the support structures. Where this is not possible, insulation of live components will be required to prevent electrocutions on terminal structures and transformers.
Residual impacts: Mitigation for this impact should be relatively effective if the overhead lines are designed correctly, with staggered pylons and diverters. If not, then further input must be sought from an avifaunal specialist and Eskom's birds and power line group, to add additional mitigations.

10.5.3 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of impacts of the Aberdeen Wind Facility 2 will be medium. On-site mitigation is viewed as the most practical and appropriate action, and viable options for reducing the overall impact of the development on avifaunal species is detailed below:

» Ensure the facility layout avoids all high avifauna sensitive areas (that is, CRM-designated high-risk areas, wetlands or nests).

10.5.4 Overall Result

The Avifauna Impact Assessment identified that all impacts associated with the development of the Aberdeen Wind Facility development footprint will be of a medium to high significance before mitigation and can be mitigated to an acceptable level of impact (i.e. medium). No impacts of a high significance or fatal flaws are expected to occur with the implementation of the recommended mitigation measures.

10.6. Potential Impacts on Bats

Various impacts have been identified for bats with the development of the Aberdeen Wind Facility 2. The potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix G** for more details). The impacts on bats associated with the development have been assessed on the facility layout which avoids all high sensitivity areas.

10.6.1 Description of Bat Impacts

Wind energy facilities have the potential to impact bats directly through collisions (with spinning turbine blades) and barotrauma resulting in mortality, and indirectly through the modification of habitats. Similarly, their associated grid connection may also impact bats directly through collisions, and indirectly through habitat modification. Modification of habitat includes roost destruction, roost disturbance, and displacement from foraging areas and/or commuting routes. Direct impacts pose the greatest risk to bats and, in the context of the project, habitat modification impacts should not pose a significant risk because the project footprint (i.e. turbines, roads and other associated infrastructure) is small and because of limited roosting spaces at the site.

Direct impacts to bats posed by the turbines at the Aberdeen Wind Facility 2 will be limited to species that make use of the airspace in the rotor-swept zone of the wind turbines. Four of the bat species that were recorded on the project site exhibit behaviour that may bring them into contact with wind turbine blades. They are therefore potentially at risk of negative impacts if not properly mitigated. This includes three high risk species (Egyptian free-tailed bat, Natal long-fingered bat Mauritian Tomb Bat and Cape Serotine). The Egyptian free-tailed bat, Natal long-fingered bat and Cape serotine have all suffered mortality at operational wind energy facilities in South Africa.

10.6.2 Impact tables summarising the significance of impacts on bats during the construction, operation and decommissioning phases (with and without mitigation)

Construction and Operation Phase Impacts

Nature: Roost disturbance Impact description: During construction of infrastructure for the wind energy facility, potential bat roosts (roosting bats and/or roost sites) in trees, buildings, or elsewhere could be disturbed or destroyed (during possible tree felling, demolishment of old buildings, blasting, etc.) if overlooked and/or not adequately avoided.		
	Without mitigation	**With mitigation**
Extent	On-site (1)	On-site (1)
Duration	Permanent (5)	Short-term (2)
Magnitude	High (8)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Medium (42)**	**Low (15)**
Status (positive or negative)	Negative	Negative
Can impacts be mitigated?		
Mitigation: » Avoid High sensitive areas (especially confirmed roosts, and the prescribed buffers around these). » Avoid blasting within 2 km of a confirmed roost. » Minimize disturbance of Medium-High sensitive areas (especially potential roosts, and the prescribed buffers around these). » Minimize the length and breadth of proposed roads to thus minimize the clearing and disturbance of natural areas (including potential bat roosting habitat). » Minimize degradation of terrestrial habitat (potential bat roosting habitat) by implementing and maintaining effective invasive alien plant, stormwater, erosion, sediment, and dust control measures. » Minimize artificial lighting on site (excluding compulsory civil aviation lighting) - especially high-intensity, steady-burning, sodium vapour, quartz, halogen, and other bright lights at substations, offices, and turbines (to avoid disturbing roosts of certain sensitive bat species). All non-aviation lights should be hooded downward and directed to minimise horizontal and skyward illumination. Where possible, solar-powered motion-sensitive lights should be used.		
Residual Impacts: Some roosting bats could be impacted wherever trees are cleared for construction of the wind farm. Since trees are scattered throughout the study area, it is presumed that impacted bats should find alternative trees for roosting.		

Nature: Destruction, degradation, and fragmentation of and displacement from foraging habitat Impact description: Construction of the wind energy facility will cause destruction, degradation, and fragmentation of natural shrubland and trees where, respectively, aerial-foraging, and clutter and clutter-edge foraging bat

species are likely to forage. Without careful planning, there could during construction also be destruction or disturbance of dams, reservoirs, drainage lines, and flood plains which provide bats (permanently, seasonally, or occasionally) with essential drinking water, concentrated insect prey, and/or which may represent important beacons or pathways for bat navigation and commuting. Furthermore, during operation, certain bats may be displaced from suitable foraging areas if they avoid the wind energy facility (e.g. due to light pollution or obstruction to movement) or suffer fatality from collision with turbines.

	Without mitigation	**With mitigation**
Extent	On-site (1)	On-site (1)
Duration	Permanent (5)	Long-term (4)
Magnitude	High (5)	Minor (2)
Probability	Definite (5)	Highly Probable (4)
Significance	**Medium (55)**	**Low (28)**
Status (positive or negative)	Negative	Negative
Can impacts be mitigated?		

Mitigation:

» Avoid High sensitive areas (especially dams, functional reservoirs, and major drainage lines, and the prescribed buffers around these).
» Minimize disturbance of Medium-High sensitive areas (secondary drainage lines, and the prescribed buffers around these).
» Minimize the length and breadth of proposed roads to thus minimize the clearing and disturbance of natural areas (including potential bat foraging habitat).
» Minimize degradation of terrestrial habitat (potential bat foraging habitat) by implementing and maintaining effective invasive alien plant, stormwater, erosion, sediment, and dust control measures.
» Minimize artificial lighting on site (excluding compulsory civil aviation lighting) - especially high-intensity, steady-burning, sodium vapour, quartz, halogen, and other bright lights at substations, offices, and turbines (to avoid disturbing certain sensitive bat species). All non-aviation lights should be hooded downward and directed to minimise horizontal and skyward illumination. Where possible, solar-powered motion-sensitive lights should be used.
» Rehabilitate disturbed terrestrial habitat and water resources (bat foraging habitat) based on consultation with an appropriate experienced specialist(s)

Residual Impacts:

Terrestrial habitat will be permanently lost wherever wind energy facility infrastructure is developed. Even if all the infrastructure is decommissioned, it is unlikely that the footprint will be rehabilitated to allow natural habitat to fully recover.

Nature: *Bat fatalities from collision with turbines, and potential population declines*

During operation of the wind energy facility, there will be inevitable fatality of bats from their collision with turbines, and possible barotrauma.

	Without mitigation	**With mitigation**
Extent	Regional (3)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	High (8)	Low (4)
Probability	Definite (5)	Probable (3)
Significance	**High (75)**	**Medium (30)**
Status (positive or negative)	Negative	Negative
Reversibility		
Irreplaceable loss of resources?		
Can impacts be mitigated?		

Mitigation:

» Avoid High sensitive areas (including all confirmed roosts, dams, functional reservoirs, and major drainage lines, and the prescribed buffers around these). » Minimize disturbance of Medium-High sensitive areas (including all potential roosts, secondary drainage lines, and the prescribed buffers around these). » Minimize artificial lighting on site (excluding compulsory civil aviation lighting) - especially high-intensity, steady-burning, sodium vapour, quartz, halogen, and other bright lights at substations, offices, and turbines (to avoid attracting certain insects and bats into the wind energy facility site). All non-aviation lights should be hooded downward and directed to minimise horizontal and skyward illumination. Where possible, solar-powered motion-sensitive lights should be used. » Monitor bat fatalities (and ideally also live bat activity) as soon as the first turbine is operational - as per the latest SABAA guideline for this (Aronson et al. 2020 or later) - during the wind energy facility 's first two years of operation, and then every fifth year thereafter. The monitoring and data analysis are to be conducted to a high standard so that there is confidence in the estimated numbers of actual bat fatalities. » Mitigate bat fatalities adaptively by consulting the latest SABAA guideline for this (Aronson et al. 2020 or later), and the best available relevant scientific information. Adequate financial provision should be made to permit effective monitoring, management, and mitigation of bat fatalities throughout the life of the wind energy facility. If the monitoring and data analysis are not conducted properly, and/or if/when fatalities exceed the wind energy facility s bat fatality threshold (to be calculated as per MacEwan et al. 2018 or later), and unless reliable and comprehensive operational monitoring data and a suitably experienced bat specialist indicate otherwise: » Reduce fatalities by implementing curtailment of all turbines below an initial cut-in speed of 6 m/s during temperatures of 12 °C or warmer from sunset to sunrise in February, March, and September. The 6 m/s turbine cut-in wind speed represents the wind speed associated with approximately 50% of bat activity recorded at 130 m above ground level in 2021/2022 by IWS. » Report the annual operational bat monitoring results to SABAA (the South African Bat Assessment Association), EWT (the Endangered Wildlife Trust), and DFFE (the national Department of Forestry, Fisheries, and the Environment). » Forward all (live and fatality) bat monitoring data to the database recommended by SABAA to expand the scientific knowledge base for more informed decision making and mitigation.
Residual Impacts: Bat fatalities will occur unless bat fatality mitigation measures are 100% effective.

Nature: Decline or loss of bat ecosystem services Impact description: If high bat fatalities lead to declines in certain species populations, the ecosystem services that these populations provide will be compromised. As locally occurring bat species are insectivorous, their eco-services relate to insect (including pest) species predation and population regulation.		
	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Short-term (1)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (36)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Can impacts be mitigated?		
Mitigation: » Avoid High sensitive areas (including all confirmed roosts, dams, functional reservoirs, and major drainage lines, and the prescribed buffers around these). » Avoid blasting within 2 km of a confirmed roost. » Minimize disturbance of Medium-High sensitive areas (including all potential roosts, secondary drainage lines, and the prescribed buffers around these).		

» Minimize artificial lighting on site (excluding compulsory civil aviation lighting) - especially high-intensity, steady-burning, sodium vapour, quartz, halogen, and other bright lights at substations, offices, and turbines (to avoid attracting certain insects and bats into the wind energy facility site). All non-aviation lights should be hooded downward and directed to minimise horizontal and skyward illumination. Where possible, solar-powered motion-sensitive lights should be used. » Monitor bat fatalities (and ideally also live bat activity) as soon as the first turbine is operational - as per the latest SABAA guideline for this (Aronson et al. 2020 or later) - during the wind energy facility 's first two years of operation, and then every fifth year thereafter. The monitoring and data analysis are to be conducted to a high standard so that there is confidence in the estimated numbers of actual bat fatalities. » Mitigate bat fatalities adaptively by consulting the latest SABAA guideline for this (Aronson et al. 2020 or later), and the best available relevant scientific information. Adequate financial provision should be made to permit effective monitoring, management, and mitigation of bat fatalities throughout the life of the wind energy facility. If the monitoring and data analysis are not conducted properly, and/or if/when fatalities exceed the wind energy facility 's bat fatality threshold (to be calculated as per MacEwan et al. 2018 or later), and unless reliable and comprehensive operational monitoring data and a suitably experienced bat specialist indicate otherwise: • Reduce fatalities by implementing curtailment of all turbines below an initial cut-in speed of 6 m/s during temperatures of 12 °C or warmer from sunset to sunrise in February, March, and September. The 6 m/s turbine cut-in wind speed represents the wind speed associated with approximately 50% of bat activity recorded at 130 m above ground level in 2021/2022 by IWS. » Report the annual operational bat monitoring results to SABAA, EWT, and DFFE. » Forward all (live and fatality) bat monitoring data to the database recommended by SABAA to expand the scientific knowledge base for more informed decision making and mitigation.
Residual Impacts: This is difficult to predict since bat ecosystem services are poorly understood.

The impacts to the bats during the decommissioning phase are likely to be restricted to disturbance. This impact is expected to be low and therefore not assessed in any detail.

10.6.3 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of impacts of the Aberdeen Wind Facility 2 will be medium. On-site mitigation is viewed as the most practical and appropriate action, and viable options for reducing the overall impact of the development on these areas is detailed below:

» A 500m (+ blades length, plus a 2 m pressure buffer) no development buffer around bat roosts near the south-western corner of the Aberdeen Wind Facility 2 site.
» A 500m (+ blades length, plus a 2 m pressure buffer) no development buffer around rivers, streams, wetlands, farms dams, and reservoirs.
» A 500m (+ blades length, plus a 2 m pressure buffer) buffer where the construction of infrastructure and other disturbances should be avoided where possible around potential onsite bat roosts in buildings, and woody vegetation.
» A 200m (+ blades length, plus a 2 m pressure buffer) buffer where the construction of infrastructure and other disturbances should be avoided where possible around secondary drainage lines.

10.6.4 Overall Result

Based on the bat activity recorded at the Aberdeen Wind Facility 2 project site the significance ratings for the majority of the impacts to bats posed by the development are predicted to be medium or high before mitigation, depending on the impact being considered. After mitigation, all impacts are predicted to be of a medium to low significance. Based on the opportunity for reduction of the impacts through appropriate mitigation measures from a high or medium significance to a low or medium acceptable significance, no fatal flaws are expected to occur.

10.7. Assessment of Impacts on Agriculture

Various impacts have been identified with the development of the Aberdeen Wind Facility 2 from an agricultural perspective. The potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix L** for more details). The impacts on soil and agricultural potential associated with the development have been assessed on the facility layout which avoids all high sensitivity areas.

10.7.1 Description of the Impacts on Agriculture

It is anticipated that the most significant change to the soil profiles of the project site 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. The following impacts are relevant to the construction phase:

» <u>Reduction of land with natural vegetation for livestock grazing</u> - Earth-moving equipment will be used to clear the vegetation from the access road areas as well as from 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.

» <u>Soil erosion</u> - 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 site is in an arid climate, the intensity of 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.

» <u>Soil pollution</u> - 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.

» <u>Soil compaction</u> - 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.

During the operation 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 following impacts are relevant to the operation phase:

» <u>Soil erosion</u> - The areas where vegetation was cleared during construction, 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.

» <u>Soil pollution</u> - 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.

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.

10.7.2 Impact tables summarising the significance of impacts on agriculture during the construction, operation and decommissioning phases (with and without mitigation)

Construction phase

Nature: <u>*Reduction of land with natural vegetation for livestock grazing.*</u> 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: » Vegetation clearance must be restricted to infrastructure and access road areas. » Materials and equipment must only be stored in the pre-determined laydown areas. » Removal of obstacles to allow for access of construction vehicles must be kept to only were essential. » 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. » No boundary fence must be opened without the landowner or neighbouring landowners' permission. » No open fires made by the construction teams are allowable during the construction phase. » The supporting infrastructure must be constructed as closely as possible together to avoid fragmentation of the entire project site. » The project developer 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.		

<table>
<tr><td colspan="3">Nature: <u>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</u>. 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.</td></tr>
<tr><td></td><td>Without mitigation</td><td>With mitigation</td></tr>
<tr><td>Extent</td><td>Local (1)</td><td>Local (1)</td></tr>
<tr><td>Duration</td><td>Medium-term (3)</td><td>Medium-term (3)</td></tr>
<tr><td>Magnitude</td><td>Moderate (6)</td><td>Low (4)</td></tr>
<tr><td>Probability</td><td>Probable (3)</td><td>Improbable (2)</td></tr>
<tr><td>Significance</td><td>Medium (30)</td><td>Low (16)</td></tr>
<tr><td>Status (positive or negative)</td><td>Negative</td><td>Negative</td></tr>
<tr><td>Reversibility</td><td>Low</td><td>Low</td></tr>
<tr><td>Irreplaceable loss of resources?</td><td>Yes</td><td>No</td></tr>
<tr><td>Can impacts be mitigated?</td><td>Yes</td><td>N/A</td></tr>
<tr><td colspan="3">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.</td></tr>
<tr><td colspan="3">Residual Impacts:
The residual impact from the construction of the Aberdeen Wind Facility 2 project on the susceptibility to erosion is considered low.</td></tr>
</table>

<table>
<tr><td colspan="3">Nature: <u>Soil pollution</u>
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.</td></tr>
<tr><td></td><td>Without mitigation</td><td>With mitigation</td></tr>
<tr><td>Extent</td><td>Local (1)</td><td>Local (1)</td></tr>
<tr><td>Duration</td><td>Short-term (2)</td><td>Short-term (2)</td></tr>
<tr><td>Magnitude</td><td>Moderate (6)</td><td>Low (4)</td></tr>
<tr><td>Probability</td><td>Low (4)</td><td>Improbable (2)</td></tr>
<tr><td>Significance</td><td>Medium (36)</td><td>Low (14)</td></tr>
<tr><td>Status (positive or negative)</td><td>Negative</td><td>Negative</td></tr>
<tr><td>Reversibility</td><td>Low</td><td>Low</td></tr>
<tr><td>Irreplaceable loss of resources?</td><td>Yes</td><td>No</td></tr>
<tr><td>Can impacts be mitigated?</td><td>Yes</td><td>N/A</td></tr>
</table>

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.		

Nature: <u>*Soil compaction*</u> 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.		

Operation phase

Nature: <u>*Soil erosion*</u> 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: » The project site must regularly be monitored to detect early signs of soil erosion on-set. » If soil erosion is detected, the area must be stabilised by the use of geo-textiles and facilitated re-vegetation.		

Residual Impacts:
The residual impact from the operation of the proposed Aberdeen Wind Facility 2 on the susceptibility to erosion is considered low.

Nature: Soil pollution During the operation phase of the project, the following activities can result in the chemical pollution of the soil: » Petroleum hydrocarbon (present in oil and diesel) spills by maintenance machinery and vehicles. » 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: » Maintenance must be undertaken regularly on all vehicles and maintenance machinery to prevent hydrocarbon spills. » 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: The residual impact from the operation of the proposed project will be low to negligible.		

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 Facility 2 was decommissioned.

10.7.4 Overall Result

Majority of the impacts of the Aberdeen Wind Facility 2 from an agricultural perspective will be medium prior to the implementation of mitigation, with one impact of a low significance prior to mitigation. With the implementation of the recommended mitigation measures, all impacts can be reduced to a low acceptable level. No impacts of a high significance are expected to occur, and no fatal flaws are associated with the development from an agricultural perspective. Given the avoidance of sensitive features at the site by the facility layout no high impacts are likely to occur as a result of the development.

10.8. Assessment of Impacts on Heritage Resources

Negative impacts on heritage resources have been identified based on the resources identified and discovered during the site survey. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix H**). The impacts on heritage resources associated with the development have been assessed on the facility layout which avoids all high sensitivity areas.

10.8.1 Description of the Heritage Impacts

There are limited impacts anticipated to cultural, archaeological and palaeontological heritage. It is recommended that a no-development buffer of 500m is implemented around sites ABD109, and ABD110. Significant fossil finds such as vertebrate bones, teeth and well-preserved petrified logs should be safeguarded and reported at the earliest opportunity to the Eastern Cape Provincial Heritage Resources Authority. A 1km buffer is to be implemented around the R61 road and 500m buffer around the historical route that runs through the site.

10.8.2 Impact tables summarising the significance of impacts on heritage during construction (with and without mitigation)

Nature: Impacts on heritage resources (cultural landscape) The broader context of the area proposed for development has cultural significance that may be impacted by the proposed development.		
	Without mitigation	**With mitigation**
Extent	Regional (5)	Regional (5)
Duration	Short-term (4)	Short-term (4)
Magnitude	High (8)	High (8)
Probability	Permanent (5)	Small (2)
Significance	**High (85)**	**Medium (34)**
Status (positive or negative)	Neutral	Neutral
Reversibility	Any impacts to heritage resources that do occur are reversible once the infrastructure is removed	Any impacts to heritage resources that do occur are reversible once the infrastructure is removed
Irreplaceable loss of resources?	Low/Unlikely	Low/Unlikely
Can impacts be mitigated?	N/A	N/A
Mitigation: » Setback from the N9 and the R61 by at least 1km on either side. » Avoid steep or elevated topography, ridgelines or koppies, with a no development buffer of at least 2.5km from Wolwekop » Setback from graded resources and farmstead settlements IIIB and IIIC, by 500m. » Setback from farmsteads forming part of the settlement pattern by at least 500m		
Residual Impacts: NA		

Nature: Impacts on heritage resources (archaeological resources) The area proposed for development is known to conserve heritage resources of archaeological significance that may be impacted by the proposed development.		
	Without mitigation	**With mitigation**
Extent	Site only (1)1	Site only (1)
Duration	Short-term (5)	Short-term (5)
Magnitude	Moderate (7)	Moderate (7)
Probability	Minor (4)	Small (1)
Significance	**Medium (52)**	**Low (13)**
Status (positive or negative)	Neutral	Neutral

Reversibility	Any impacts to heritage resources that do occur are irreversible	Any impacts to heritage resources that do occur are irreversible
Irreplaceable loss of resources?	Low/Unlikely	Low/Unlikely
Can impacts be mitigated?	Yes	
Mitigation: » A 500m no development buffer area must be implemented around sites ABD109, and ABD110 » Should any significant archaeological resources be uncovered during the course of the construction phase, work must cease in the area of the find and ECPHRA must be contacted regarding an appropriate way forward		
Residual Impacts: Should any significant archaeological resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources		

Nature: Impacts on heritage resources (palaeontological resources) The area proposed for development is known to conserve heritage resources of palaeontological significance that may be impacted by the proposed development.		
	Without mitigation	**With mitigation**
Extent	Site -only (1)	Site only (1)
Duration	Short-term (5)	Short-term (5)
Magnitude	High (8)	High (8)
Probability	Permanent (5)	Small (1)
Significance	**High (70)**	**Low (14)**
Status (positive or negative)	Neutral	Neutral
Reversibility	Any impacts to heritage resources that do occur are irreversible	Any impacts to heritage resources that do occur are irreversible
Irreplaceable loss of resources?	Likely	Low/Unlikely
Can impacts be mitigated?	Yes	
Mitigation: » The Chance Fossil Finds Procedure must be implemented for the duration of construction activities		
Residual Impacts: Should any significant palaeontological resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources		

The main impacts expected to occur on the heritage resources associated with the development of the Aberdeen Wind Facility 2 will be during the construction phase, with the operation and decommissioning phases unlikely to involve further impacts.

10.8.3 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of impacts of the Aberdeen Wind Facility 2 will be high. On-site mitigation is viewed as the most practical and appropriate action, and viable options for reducing the overall impact of the development on these areas is detailed below:

» A 1km no development buffer on either side of the R61 and N9.
» A 500m no development buffer on either side of the east-west historic road running parallel to the R61 and through the site.

- » Avoid steep or elevated topography, ridgelines or koppies, with a no development buffer of at least 2.5km from Wolwekop.
- » A No development buffer around certain graded resources and farmstead settlements IIIB and IIIC, by 500m.
- » A 500m no development buffer area must be implemented around sites ABD109, and ABD110

10.8.4 Overall Result

Given the avoidance of sensitive features at the site by the facility layout no high impacts are likely to occur as a result of the development. All impacts identified on the heritage resources (including archaeology, palaeontology and cultural landscape) are of a medium to high significance prior to the implementation of mitigation measures. With the implementation of the mitigation measures the impact significance will be reduced to impacts of a medium to low significance. With the opportunities presented for the reduction of impact through the implementation of the recommended mitigation measures, no unacceptable impacts of a high significance are expected to occur. No fatal flaws are therefore associated with the Aberdeen Wind Facility 2 from a heritage perspective.

10.9. Assessment of Noise Impacts

Wind turbines produce sound, primarily due to mechanical operations and aerodynamic effects of the blades. Modern wind turbine manufacturers have virtually eliminated the noise impact caused by mechanical sources and instituted measures to reduce the aerodynamic effects. As with many other activities, the wind turbines emit sound power levels at a level that can impact on areas at some distance away. When potentially sensitive receptors are nearby, care must be taken to ensure that the operations at the wind energy facility do not cause undue annoyance or otherwise interfere with the quality of life of the receptors. Potential noise impacts and the relative significance of the impacts are summarised below (refer to **Appendix J**). The noise impacts associated with the development have been assessed on the facility layout which avoids all high sensitivity areas.

10.9.1 Description of Noise Impacts

During the construction phase, the undertaking of specific activities will result in noise impacts. The activities include:

- » Site survey and preparation;
- » Establishment of site entrance, internal access roads, contractors compound and passing places;
- » Civil works to sections of the public roads to facilitate turbine delivery;
- » Construction of foundations;
- » Transport of components and equipment to site;
- » Establishment of laydown and hard standing areas;
- » Erection of the turbines;
- » Construction of the substation;
- » Establishment of ancillary infrastructure; and
- » Site rehabilitation.

10.9.2 *Impact tables summarising the significance of impacts on Noise during construction, operation and decommissioning (with and without mitigation)*

Construction Phase Impacts

Nature: <u>*Construction of access roads*</u> Daytime ambient sound levels could range from 24 dBA to more than 73 dBA, averaging at 45.1 dBA. Daytime ambient sound levels are thus typical of a rural noise district most of the times, though it is expected that introduced noises will be audible over large distances during quiet periods (during low wind conditions). Road construction activities will increase ambient sound levels due to air-borne noise.		
	Without mitigation	**With mitigation**
Magnitude	Very High (10)	Very High (10)
Extent	Local (2)	Local (2)
Duration	Temporary (1)	Temporary (1)
Probability	Improbable (1)	Improbable (1)
Significance	**Low (13)**	**Low (13)**
Status	Negative	Negative
Reversibility	High	High
Loss of resources?	No	No
Can impacts be mitigated?	Yes, but not required	Yes, but not required
Mitigation: » The significance of the noise impact is low for access road construction activities and no additional mitigation is required or recommended.		
Residual Risks: There is no risk of any residual noises.		

Nature: <u>*Construction traffic noises*</u> Daytime ambient sound levels could range from 24 dBA to more than 73 dBA, averaging at 45.1 dBA. Daytime ambient sound levels are thus typical of a rural noise district most of the times, though it is expected that introduced noises will be audible over large distances during quiet periods (during low wind conditions). Road construction activities will increase ambient sound levels due to air-borne noise.		
	Without mitigation	**With mitigation**
Magnitude	High (8)	High (8)
Extent	Local (2)	Local (2)
Duration	Short-term (2)	Short-term (2)
Probability	Improbable (1)	Improbable (1)
Significance	**Low (12)**	**Low (12)**
Status	Negative	Negative
Reversibility	High	High
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: » The significance of noises due to construction traffic is low no additional mitigation is required or recommended		
Residual Risks: There is no risk of any residual noises.		

Nature: *Daytime WTG construction activities* Daytime ambient sound levels could range from 24 dBA to more than 73 dBA, averaging at 45.1 dBA. Daytime ambient sound levels are thus typical of a rural noise district most of the times, though it is expected that introduced noises will be audible over large distances during quiet periods (during low wind conditions). Various construction activities (development of laydown areas and the hard standing areas, excavation of foundations, concreting of foundations and the assembly of the wind turbines tower and components, as well as construction of other infrastructure) taking place simultaneously during the day will increase ambient sound levels due to air-borne noise.		
	Without mitigation	**With mitigation**
Magnitude	Minor (2)	Minor (2)
Extent	Local (2)	Local (2)
Duration	Short-term (2)	Short-term (2)
Probability	Improbable (1)	Improbable (1)
Significance	**Low (6)**	**Low (6)**
Status	Negative	Negative
Reversibility	High	High
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: » The significance of the noise impact is low for daytime construction activities and no additional mitigation is required or recommended.		
Residual Risks: There is no risk of any residual noises.		

Nature: *Night time WTG construction activities* Night-time ambient sound levels could range between 21 dBA to more than 60 dBA, averaging at 36.9 dBA. Ambient sound levels are expected to be low during period of low winds, and it is expected that introduced noises will be audible over large distances during quiet periods (during low wind conditions). Various construction activities (likely limited to the pouring of concrete as well as erection of WTG components) taking place simultaneously at night will increase ambient sound levels due to air-borne noise.		
	Without mitigation	**With mitigation**
Magnitude	High (8)	High (8)
Extent	Regional (3)	Regional (3)
Duration	Short-term (2)	Short-term (2)
Probability	Possible (2)	Improbable (1)
Significance	**Medium (26)**	**Low (13)**
Status	Negative	Negative
Reversibility	High	High
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: » The significance of the noise impact is low and additional mitigation is not required or recommended.		
Residual Risks: There is no risk of any residual noises.		

Operation phase

Nature: <u>*Daytime operation of WTG considering the worst-case SPL*</u> WTG will only operate during period with increased winds, when ambient sound levels are higher than periods with no or low winds. Numerous WTG of the Aberdeen WF 1 operating simultaneously during the day will increase ambient sound levels due to air-borne noise from the WTG. The projected noise levels and the change in ambient sound levels is defined for the identified NSR		
	Without mitigation	**With mitigation**
Magnitude	Minor (2)	Minor (2)
Extent	Local (2)	Local (2)
Duration	Long-term (4)	Long-term (4)
Probability	Improbable (1)	Improbable (1)
Significance	**Low (8)**	**Low (8)**
Status	Negative	Negative
Reversibility	High	High
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: » The significance of the noise impact is low and no additional mitigation is recommended.		
Residual Risks: There is no risk of any residual noises.		

Nature: <u>*Night-time operation of WTG considering the worst-case SPL*</u> WTG will only operate during period with increased winds, when ambient sound levels are higher than periods with no or low winds. Ambient sound levels will likely be higher with this assessment assuming an ambient sound level of 41.5 dBA. Numerous WTG of the Aberdeen WF 1 operating simultaneously at night will increase ambient sound levels due to air-borne noise from the WTG. The projected noise levels, the change in ambient sound levels as well as the potential noise impact is defined per NSR and summarized in this table. The potential noise level (and significance) when using a quieter WTG (such as the Nordex N163 5.X WTG with the reported SPL of 106.4 dBA re 1 pW) is considered.		
	Without mitigation	**With mitigation**
Magnitude	Minor (2)	Minor (2)
Extent	Regional (3)	Regional (3)
Duration	Long-term (4)	Long-term (4)
Probability	Improbable (1)	Improbable (1)
Significance	**Low (9)**	**Low (9)**
Status	Negative	Negative
Reversibility	High	High
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: » The significance of the noise impact is low and no additional mitigation is recommended, though future noise-monitoring is recommended should the structures at NSR05 be used for residential purposes.		
Residual Risks: There is no risk of any residual noises.		

Decommissioning phase

Final decommissioning activities will have a noise impact lower than either the construction or operation phases. This is because decommissioning and closure activities normally take place during the day using minimal equipment (due to the decreased urgency of the project). While there may be various activities, there is a very small risk for a noise impact. The significance of any noise impact would be low and similar to the construction noise impact.

10.9.3 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of impacts of the Aberdeen Wind Facility 2 will be low.

10.9.4 Overall Result

From the noise impacts assessed there will be a low significance for daytime construction activities, a medium or low significance for night-time construction activities (with mitigation proposed to reduce the significance to low), and a low significance for night-time facility operation activities and an impact to ambient sound levels at noise-sensitive receptors due to air-borne noise from the wind turbines. No impacts of a high significance or fatal flaws were identified.

It was determined that the potential noise impacts, without mitigation, would be:
» of a low significance for the construction of access roads;
» of a low significance relating to noises from construction traffic;
» of a low significance for the daytime construction activities (hard standing areas, excavation and concreting of foundations and the assembly of the WTG and other infrastructure);
» of a low significance for the night-time construction activities (the pouring of concrete, erection of WTG).

Mitigation measures are available and were included in this report, that should reduce the significance of the noise impact to low:
» of a low significance for daytime operational activities (noises from wind turbines) when considering the worst-case SPL; and
» of a low significance for night-time operational activities (noises from wind turbines) when considering the worst-case SPL.

No impacts of a high significance or fatal flaws were identified.

10.10. Assessment of Visual Impacts

Negative impacts on sensitive visual receptors will occur during the undertaking of construction activities and the operation of the Aberdeen Wind Facility 2. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix I**). The Visual impacts associated with the development have been assessed on the current proposed layout which avoids all high sensitivity areas.

10.10.1 Visual Assessment

During the construction phase of the Aberdeen Wind Facility 2 a noticeable increase in heavy vehicles utilising the roads to the project site may occur. This will result in a visual nuisance to other road users and landowners within the surrounding area. Construction activities may potentially result in a high temporary visual impact, that may be mitigated to moderate.

The operation of the Aberdeen Wind Facility 2 will have a very high visual impact (which can be mitigated to high) on observers/visitors residing at homesteads within a 5km radius of the proposed wind turbine structures. These homesteads include Maraiskraal, Windermere and Kraanvoëlkuil and are located within the proposed wind farm cluster. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

The operation of the Aberdeen Wind Facility 2 is expected to have a high visual impact on observers traveling along the roads within a 5km radius of the wind turbines. This includes observers travelling along the secondary roads located to the north of the project site, namely the R61 arterial road and the secondary road traversing the north-eastern corner of the proposed wind energy facility. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

The Aberdeen Wind Facility 2 could have a high visual impact on residents of (or visitors to) homesteads within a 5 - 10km radius of the wind turbine structures. These include residents of/visitors to Karroorivier, Mon Repos, Springbokvlakte Noord, Rooidam, Sypher, Blouboskuil and New Farm, as well as observers travelling along the R61 arterial road, Portions of the N9 national road and various secondary roads. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

The following homesteads are also potentially impacted due to their location on a proposed development property and their assumed support for wind energy facility developments within the region.

» De Kroon
» Perseverance (2)
» Skoongesig

The Aberdeen Wind Facility 2 could have a moderate visual impact on residents of (or visitors to) homesteads within a 10-20km radius of the wind turbines. Residents of/visitors to:

» Rooidraai
» Vriespoort
» Ouplaas
» Dowefontein
» Waaikraal
» Mimosadale
» Uitkyk
» Sandrivier
» Hare Flats
» Benekraal
» Fairview (2)
» Kraairivier
» Pretoriuskuil
» Kariegasfontein

- Maxton
- Belmont
- Fairwell
- Lower Kiewietskuil
- Nuwerus
- Kaapse Poortjie
- Teerputs
- Klipkoppies
- Gannaleegte
- Bakoond
- Graafwater
- Voorspoed
- Steenbokvlakte
- Benekuil
- Spes Bona
- Wynlaagte
- Leeukop
- Poffertjiesleegte
- Klipstawel
- Klipdrift

Observers travelling along the:

- The R61 arterial road
- Various secondary roads
- Portions of the N9 national road

No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

Shadow flicker is an impact relevant to the operation of the turbines. Shadow flicker only occurs when the sky is clear, and when the turbine rotor blades are between the sun and the receptor (i.e. when the sun is low). Most shadow impact is associated with 3-4 times the height of the object. Based on this research, an 1.2km buffer along the edge of the outer most turbines were identified as the zone within which there is a risk of shadow flicker occurring. One homestead, namely Windermere, is located within the 1.2km buffer of turbine ABE059. Of note is that this homestead is located on a property involved in this development and is uninhabited, thereby reducing the probability of this impact occurring. It is therefore assumed that they are in fact aware of and to a certain extent accepting of the shadow flicker associated with these turbines thereby, not constituting a shadow flicker visual impact of concern for this receptor.

The area immediately surrounding the proposed facility has a relatively low incidence of lighting impacts receptors and light sources, so light trespass and glare from the security and after-hours operational lighting for the facility will have little significance for visual receptors in close proximity.

Another source of glare light, albeit not as intense as flood lighting, is the aircraft warning lights mounted on top of the hub of the wind turbines. These lights are less aggravating due to the toned-down red colour, but have the potential to be visible from a great distance. This is especially true due to the strobing effect of the lights, a function specifically designed to attract the observer's attention. The South African Civil

Aviation Authority (SACAA) prescribes these warning lights and the potential to mitigate their visual impacts have traditionally been very low other than to restrict the number of lights to turbines that delineate the outer perimeter of the facility.

Some ground-breaking new technology in the development of strobing lights that only activate when an aircraft is detected nearby may aid in restricting light pollution at night and should be investigated and implemented by the project proponent, if available and permissible by the CAA. This new technology is referred to as needs-based night lights, which deactivates the wind turbine's night lights when there is no flying object within the airspace of the wind energy facility. The system relies on the active detection of aircraft by radar sensors, which relays a switch-on signal to the central wind farm control to activate the obstacle lights.

Further lighting impacts have the potential for sky glow. Sky glow is the condition where the night sky is illuminated when light reflects off particles in the atmosphere such as moisture, dust or smog. The sky glow intensifies with the increase in the amount of light sources. Each new light source, especially upwardly directed lighting, contribute to the increase in sky glow.

This anticipated lighting impact during operation is likely to be of high significance, and may be mitigated to moderate, especially within a 5km to 10km radius of the wind turbine structures.

In terms of ancillary infrastructure, the range of visual exposure will fall within that of the turbines. The anticipated visual impact resulting from this infrastructure is likely to be of low significance both before and after mitigation.

An impact on the sense of place for the area is also identified from a visual perspective. Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. The greater environment has a rural, undeveloped character and a natural appearance. These generally undeveloped landscapes are considered to have a high visual quality. The significance of the visual impacts on the sense of place within the region (i.e. beyond a 20km radius of the development and within the greater region) is expected to be of low significance. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

10.10.2 Impact table summarising the significance of visual impacts during construction, operation and decommissioning (with and without mitigation)

Construction Phase Impacts

Nature: Visual impact of construction activities on sensitive visual receptors Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed wind energy facility.		
	Without mitigation	***With mitigation***
Extent	Very Short distance (4)	Very Short distance (4)
Duration	Short term (2)	Short term (2)
Magnitude	Very high (10)	High (8)

Probability	Highly Probable (4)	Probable (3)
Significance	**High (64)**	**Moderate (42)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

Planning:

» Retain and maintain natural vegetation in all areas outside of the development footprint, but within the project site.

Construction:

» Ensure that vegetation is not unnecessarily removed during the construction period.
» Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) where possible.
» Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
» Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities.
» Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
» Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.
» Rehabilitate all disturbed areas immediately after the completion of construction works.

Residual impacts:

None, provided that rehabilitation works are carried out as required.

Operation Phase Impacts

Nature: *Visual impact on sensitive visual receptors (residents and visitors) located within a 5km radius of the wind turbine structures*

Visual impact on observers (residents at homesteads and visitors/tourists) in close proximity (i.e. within 5km) to the wind turbine structures.

	Without mitigation	***With mitigation***
Extent	Very Short distance (4)	Very Short distance (4)
Duration	Long term (4)	Long term (4)
Magnitude	Very high (10)	Very high (10)
Probability	Definite (5)	Definite (5)
Significance	**Very High (90)**	**High (90)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practice management measures can be implemented.	

Generic best practise mitigation/management measures:

Planning:

» Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Operations:

» Maintain the general appearance of the facility as a whole.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use.
» Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.

Residual impacts:

The visual impact will be removed after decommissioning, provided the wind energy facility infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Nature: *Potential visual impact on sensitive visual receptors (observers travelling along roads) located within a 5km radius of the wind turbine structures*

Visual impact on observers travelling along the secondary roads in close proximity (i.e. within 5km) to the wind turbine structures

	Without mitigation	***With mitigation***
Extent	Very Short distance (4)	Very Short distance (4)
Duration	Long term (4)	Long term (4)
Magnitude	Very high (10)	Very high (10)
Probability	Highly probable (4)	Highly probable (4)
Significance	**High (72)**	**High (72)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practice management measures can be implemented.	

Generic best practise mitigation/management measures:

Planning:

» Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Operations:

» Maintain the general appearance of the facility as a whole.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use.
» Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.

Residual impacts:

The visual impact will be removed after decommissioning, provided the wind energy facility infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Nature: *Potential visual impact on sensitive visual receptors within the region (5 – 10km radius)*

Visual impact on observers travelling along the roads and residents at homesteads within a 5 – 10km radius of the wind turbine structures.

	Without mitigation	***With mitigation***
Extent	Short distance (3)	Short distance (3)

Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Highly probable (4)	Highly probable (4)
Significance	**High (60)**	**High (60)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures: Planning: » Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. Operations: » Maintain the general appearance of the facility as a whole. Decommissioning: » Remove infrastructure not required for the post-decommissioning use. » Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.		
Residual impacts: The visual impact will be removed after decommissioning, provided the wind energy facility infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.		

Nature: *Potential visual impact on sensitive visual receptors within the region (10 – 20km radius)* Visual impact on observers travelling along the roads and residents at homesteads within a 10 – 20km radius of the wind turbine structures		
	Without mitigation	***With mitigation***
Extent	Medium distance (2)	Medium distance (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Moderate (48)**	**Moderate (48)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures: Planning: » Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site. Operations: » Maintain the general appearance of the facility as a whole. Decommissioning: » Remove infrastructure not required for the post-decommissioning use. » Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.		
Residual impacts: The visual impact will be removed after decommissioning, provided the wind energy facility infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.		

Nature: <u>*Shadow Flicker*</u> Visual impact of shadow flicker on sensitive visual receptors in close proximity to the wind energy facility.		
	Without mitigation	***With mitigation***
Extent	Very Short distance (4)	Very Short distance (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Moderate (42)**	**Moderate (42)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	N.A. due to the low probability of occurrence	
Generic best practise mitigation/management measures: N.A.		
Residual impacts: N.A.		

Nature: <u>*Visual impact of operational, safety and security lighting of the facility at night.*</u> Visual impact of lighting at night on sensitive visual receptors		
	No mitigation	***Mitigation considered***
Extent	Short/Medium (3)	Short/Medium (3)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Highly probable (4)	Probable (3)
Significance	**High (60)**	**Moderate (45)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: <u>Planning & operation</u>: » Implement needs-based night lighting if considered acceptable by the SACAA. » Limit aircraft warning lights to the turbines on the perimeter according to SACAA requirements, thereby reducing the overall impact. » Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). » Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights. » Make use of minimum lumen or wattage in fixtures. » Make use of down-lighters, or shielded fixtures. » Make use of Low-Pressure Sodium lighting or other types of low impact lighting. » Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.		
Residual impacts: The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.		

Nature: Visual impact of ancillary infrastructure

Visual impact of the ancillary infrastructure on observers in close proximity to the structures.

	Without mitigation	**With mitigation**
Extent	Very Short distance (4)	Very Short distance (4)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (24)**	**Low (24)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	

Generic best practise mitigation/management measures:

Planning:

» Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Operations:

» Maintain the general appearance of the infrastructure.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use.
» Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.

Residual impacts:

The visual impact will be removed after decommissioning, provided the ancillary infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Nature: Visual impact on the sense of place

The potential impact on the sense of place of the region. The significance of the visual impacts on the sense of place within the region (i.e. beyond a 20km radius of the development and within the greater region) is expected to be of low significance.

	Current scenario	**Future scenario**
Extent	Long distance (1)	Long distance (1)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Moderate (6)
Probability	Highly probable (4)	Probable (3)
Significance	**High (52)**	**Moderate (33)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	

Generic best practise mitigation/management measures:

Planning:

» Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude, but within the project site.

Operations:

» Maintain the general appearance of the facility as a whole.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use. » Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.
Residual impacts: The visual impact will be removed after decommissioning, provided the wind energy facility infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

Decommissioning Phase Impacts

The visual impact will be removed after decommissioning, provided the wind energy facility infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

10.10.3 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of impacts of the Aberdeen Wind Facility 2 will be medium. On-site mitigation is viewed as the most practical and appropriate action, and viable options for reducing the overall impact of the development on these areas is detailed below:

» Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) where possible.

10.10.4 Overall Result

The primary visual impact, namely the appearance of the wind energy facility (the wind turbines) is not possible to mitigate. The functional design of the turbines cannot be changed in order to reduce visual impacts. Alternative colour schemes (i.e. painting the turbines sky-blue, grey or darker shades of white) are currently not permissible as the SACAA's Marking of Obstacles expressly states, "Wind turbines shall be painted bright white to provide the maximum daytime conspicuousness". Failure to adhere to the prescribed colour specifications will result in the fitting of supplementary daytime lighting to the wind turbines, once again aggravating the visual impact. Night-time lighting impacts can be mitigated through the implementation of needs-based night lighting, if this is considered acceptable by the SACAA and ICASA.

Overall, the significance of the visual impacts associated with the proposed Aberdeen Wind Facility 2 is expected to be high as a result of the generally undeveloped character of the landscape. The facility would be visible within an area that contains certain sensitive visual receptors who could consider visual exposure to this type of infrastructure to be intrusive. Such visual receptors include people travelling along the national, arterial and secondary roads, as well as residents of rural homesteads and tourists passing through or holidaying in the region.

Conventional mitigation (e.g. such as screening of the structures) of the potential visual impacts is highly unlikely to succeed due to the nature of the development and the receiving environment. The overall potential for mitigation is therefore generally low.

Even though it is possible that the potential visual impacts may exceed acceptable levels within the context of the receiving environment, the proposed development is not considered to be fatally flawed.

10.11. Assessment of Social Impact Assessment

Potential social and social impact assessment impacts and the relative significance of the impacts associated with the development of the Aberdeen Wind Facility 2 are summarised below (refer to **Appendix K**).

10.11.1 Description of Social Impacts

Impacts are expected to occur with the development of the Aberdeen Wind Facility 2 during the construction, operation and decommissioning phases. Both positive and negative impacts are identified and assessed.

Positive impacts during construction includes:
» Creation of employment and business opportunities, and
» The opportunity for skills development and on-site training.

Negative impacts during construction includes:
» Impacts associated with the presence of construction workers on local communities.
» Impacts related to the potential influx of jobseekers.
» Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
» Increased risk of grass fires associated with construction related activities.
» Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
» Impact on productive farmland.

Positive impacts during operation includes:
» The establishment of infrastructure to improve energy security and support renewable sector.
» Creation of employment opportunities.
» Benefits for local landowners.
» Benefits associated with socio-economic contributions to community development.

Negative impacts during operation includes:
» Noise impacts associated with the operation of the plant.
» Visual impacts and associated impacts on sense of place.
» Potential impact on property values.
» Potential impact on tourism.

The wake loss impact of the Aberdeen Wind Facility 2 on the Eskom Wind Energy Facility was determined to be of low significance. This was based on the findings of the wake loss study (2023) which assessed the potential wake loss impact on the economic viability of the adjacent Eskom Wind Facility.

10.11.2 Impact tables summarising the significance of socio-economic impacts during construction, operation and decommissioning (with and without mitigation measures)

Construction Phase Impacts

Nature: <u>*Creation of employment and business opportunities during the construction phase*</u> The creation of jobs in the area which will allow for the earning of an income and skills development.		
	Without Mitigation	**With Enhancement**
Extent	Local – Regional (2)	Local – Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Medium (40)**	**Medium (44)**
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impact be enhanced?	Yes	

Enhancement:

In order to enhance local employment and business opportunities associated with the construction phase, the following measures should be implemented:

Employment

» Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
» Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
» Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.
» Before the construction phase commences the proponent should meet with representatives from the DM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase.
» The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.
» Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
» The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

» The proponent should liaise with the DBNLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.

Residual impacts: Improved pool of skills and experience in the local area.

Nature: <u>*Potential impacts on family structures and social networks associated with the presence of construction workers*</u>

The disruption of existing family structures and social networks and risks linked to potentially risky behaviour such as:

- An increase in alcohol and drug use.

- An increase in crime levels.
- The loss of girlfriends and/or wives to construction workers.
- An increase in teenage and unwanted pregnancies.
- An increase in prostitution.
- An increase in sexually transmitted diseases (STDs), including HIV

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short term for community as a whole (2)	Short term for community as a whole (2)
Magnitude	Moderate for the community as a whole (6)	Low for community as a whole (4)
Probability	Probable (3)	Probable (3)
Significance	**Medium for the community as a whole (30)**	**Low for the community as a whole (21)**
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	

Mitigation:

» Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
» Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
» The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report resolve incidents.
» Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.
» The proponent should consider the option of establishing a Monitoring Committee (MC) for the construction phase that representatives from local landowners, farming associations, and the local municipality. This MC should be established prior to commencement of the construction phase and form part of the SEP.
» The proponent and contractor should develop a Code of Conduct (CoC) for construction workers. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation. The CoC should be signed by the proponent and the contractors before the contractors move onto site. The CoC should form part of the CHSSP.
» The proponent and the contractor should implement an HIV/AIDS, COVID-19 and Tuberculosis (TB) awareness programme for all construction workers at the outset of the construction phase. The programmes should form part of the CHSSP.
» The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site.
» The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end.
» No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

Residual impacts: Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.

Nature: *Potential impacts on family structures, social networks and community services associated with the influx of job seekers*

The main areas of concern associated with the influx of job seekers include:

- Impacts on existing social networks and community structures.
- Competition for housing, specifically low-cost housing.
- Competition for scarce jobs.
- Increase in incidences of crime.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short term (2)	Short term (2)
Magnitude	Low (2)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (18)**	**Low (15)**
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	

Mitigation:

It is impossible to stop people from coming to the area in search of employment. However, the proponent should ensure that the employment criteria favour residents from the area. In addition:

» Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
» Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
» The proponent, in consultation with the DM, should investigate the option of establishing a MC to monitor and identify potential problems that may arise due to the influx of job seekers to the area.
» The proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities.
» The proponent should implement a policy that no employment will be available at the gate.
» The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end.
» No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

Residual impacts: Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.

Nature: *Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site*

The presence on and movement of construction workers on and off the site poses a potential safety threat to local famers and farm workers in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged, or stock theft linked either directly or indirectly to the presence of farm workers on the site.

	Without Mitigation	**With Mitigation**
Extent	Local (3)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Medium (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Medium (33)**	**Low (24)**
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock losses and damage to farm infrastructure etc.	Yes, compensation paid for stock losses and damage to farm infrastructure etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	Yes

Mitigation:

» The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.
» All farm gates must be closed after passing through.
» Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site.
» The proponent should consider the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before construction activities commence.
» The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below).
» The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.
» Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.
» Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation.
» It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

Residual impacts No, provided losses are compensated for.

Nature: *Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires*

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could, in turn pose, a threat to livestock, crops, wildlife and farm infrastructure. The potential risk of grass fires will be higher during the dry, windy winter months from May to October.

	Without Mitigation	**With Mitigation**
Extent	Local (4)	Local (2)
Duration	Short term (2)	short term (2)

Magnitude	Moderate due to reliance on agriculture for maintaining livelihoods (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock and crop losses etc.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	

Mitigation:

» The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.
» All farm gates must be closed after passing through.
» Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site.
» The proponent should consider the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site.
» The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below).
» The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.
» Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.
» Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation.
» It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.
» As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.

Residual impacts No, provided losses are compensated for.

Nature: _Potential noise, dust and safety impacts associated with construction related activities_
Construction related activities, including the movement of heavy construction vehicles of and on the site, has the potential to create dust, noise and safety impacts and damage roads.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short Term (2)	Short Term (2)
Magnitude	Medium (6)	Minor (2)

Probability	Probable (3)	Probable (3)
Significance	**Medium (30)**	**Low (15)**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation: The potential impacts associated with heavy vehicles can be effectively mitigated. The mitigation measures include: » The movement of construction vehicles on the site should be confined to agreed access road/s. » Establishment of a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads. » The movement of heavy vehicles associated with the construction phase should be timed to avoid times and days of the week, such as weekends, when the volume of traffic travelling along the access roads may be higher. » Establishment of a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads. » Dust suppression measures should be implemented, such as wetting on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. » All vehicles must be road worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. »		
Residual impacts If damage to local farm roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.		

Nature: *<u>The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the project etc. will damage farmlands and result in a loss of farmlands for grazing.</u>* The activities associated with the construction phase and establishment of the proposed project and associated infrastructure will result in the disturbance and loss of land available for grazing.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long term-permanent if disturbed areas are not effectively rehabilitated (5)	Short term if damaged areas are rehabilitated (2)
Magnitude	Medium (6)	Minor (2)
Probability	Probable (3)	Highly Probable (4)
Significance	**Medium (36)**	**Low (20)**
Status	Negative	Negative
Reversibility	Yes, disturbed areas can be rehabilitated	Yes, disturbed areas can be rehabilitated
Irreplaceable loss of resources?	Yes, loss of farmland. However, disturbed areas can be rehabilitated	Yes, loss of farmland. However, disturbed areas can be rehabilitated
Can impact be mitigated?	Yes, however, loss of farmland cannot be avoided	Yes, however, loss of farmland cannot be avoided
Mitigation: » An Environmental Control Officer (ECO) should be appointed to monitor the construction phase.		

» Existing internal roads should be used where possible. In the event that new roads are required, these roads should be rehabilitated on completion of the construction phase. » The footprint associated with the construction related activities (access roads, construction camps, workshop etc.) should be minimised. » All areas disturbed by construction related activities, such as access roads on the site, construction camps etc., should be rehabilitated at the end of the construction phase. » The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be included in the EMPr. » The implementation of the Rehabilitation Programme should be monitored by the ECO.
***Residual impacts*:** Overall loss of farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. However, disturbed areas can be rehabilitated.

Operational Phase Impacts

***Nature*:** <u>*Development of infrastructure to improve energy security and support the renewable sector*</u> The positive benefits associated with energy security and the provision of green energy.		
	Without Enhancement	**With Enhancement**
Extent	Local, Regional and National (4)	Local, Regional and National (5)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Highly Probable (4)	Definite (5)
Significance	**High (64)**	**High (85)**
Status	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	Reduced CO_2 emissions and impact on climate change
Can impact be mitigated?	Yes	
Enhancement Measures: In order to enhance local employment and business opportunities associated with the construction phase, the following measures should be implemented: » Employment • Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. • Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. • Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria. • Before the construction phase commences the proponent should meet with representatives from the DM to establish the existence of a skills database for the area. If such a database exists, it should be made available to the contractors appointed for the construction phase. • The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project. • Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.		

- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

» Business
- The proponent should liaise with the DBNLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.
»

Residual impacts: Overall reduction in CO_2 emission, reduction in water consumption for energy generation, contribution to establishing an economically viable commercial renewables generation sector in the Northern Cape and South Africa.

Nature: *Creation of employment and business opportunities associated with the operational phase*
The proposed development will create in the region of 40-50 full time employment opportunities during the operational phase, of which 55% will be unskilled, 35% semi-skilled, and 15% skilled.

	Without Enhancement	**With Enhancement**
Extent	Local and Regional (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	**Low (28)**	**Medium (40)**
Status	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources?	No	
Can impact be enhanced?	Yes	

Enhancement:
Employment
» Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
» Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
» Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.
» Before the construction phase commences the proponent should meet with representatives from the DM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase.
» The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.
» Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.

» The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. **Business** » The proponent should liaise with the DBNLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work. Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.
***Residual impacts*:** Creation of permanent employment and skills development opportunities for members from the local community and creation of additional business and economic opportunities in the area

Nature: *The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.* In terms of the rental agreement, the affected landowner will be paid an annual amount dependent upon the number of wind turbines located on the property. The additional income will reduce the risk to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as fuel, feed etc.		
	Without Enhancement	**With Enhancement**
Extent	Local (1)	Local (3)
Duration	Long term (4)	Long term (4)
Intensity	Low (4)	Moderate (6)
Likelihood	Probable (3)	Definite (5)
Significance	**Low (27)**	**High (65)**
Status	Positive	Positive
Reversibility	Yes	Yes
Can impact be enhanced?	Yes	
***Enhancement*:** » Implement agreements with affected landowners.		
***Residual impacts*:** Support for local agricultural sector and farming		

Nature: *Benefits associated with support for local community's form SED contributions* The establishment of Community Trusts projects create significant benefits for local rural communities, such as financial security. However, Community Trusts can also be mismanaged. This is an issue that will need to be addressed when setting up the trust.		
	Without Enhancement	**With Enhancement[24]**
Extent	Local and Regional (2)	Local and Regional (3)
Duration	Long term (4)	Long term (4)

Intensity	Low (4)	Moderate (6)
Likelihood	Probable (3)	Definite (5)
Significance	**Medium (30)**	**High (65)**
Status	Positive	Positive
Reversibility	Yes	Yes
Can impact be enhanced?	Yes	
Enhancement: » To maximise the benefits and minimise the potential for corruption and misappropriation of funds the following measures should be implemented: • The proponents should liaise with the DBNLM to identify projects that can be supported by SED contributions. • Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community. • Strict financial management controls, including annual audits, should be instituted to manage the SED contributions.		
Residual impacts: Promotion of social and economic development and improvement in the overall well-being of the community		

Nature: *<u>Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the area's rural sense of place.</u>* The proposed wind farm has the potential to impact on the areas existing rural sense of place		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Medium (36)**
Status	Negative	Negative
Reversibility	Yes, wind farm components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	
Can impact be mitigated?	Yes	
Mitigation: » The recommendations contained in the VIA should be implemented.		
Residual impacts: Potential impact on current rural sense of place.		

Nature: *<u>Potential impact of the wind farm on property values</u>* The wind farm will impact on the property values of surrounding areas		
	Without Mitigation	**With Enhancement / Mitigation**
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Low (21)**
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No

Can impact be enhanced?	Yes
Enhancement: » The recommendations contained in the VIA should be implemented	
***Residual impacts*:** Linked to visual impact on sense of place.	

Nature: *<u>Potential impact of the wind farm on local tourism</u>* The impact of the facility on tourism in the surrounding area.		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (24)**	**Low (21)**
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	
***Enhancement*:** » The recommendations contained in the VIA should be implemented.		
***Residual impacts*:** Linked to visual impact on sense of place.		

Decommissioning Phase Impacts

Upon the expiry of the Aberdeen Wind Facility 2 lifespan, the facility would need to be disbanded, although the facility would likely be upgraded in order to maintain and prolong the lifespan of the facility. If the facility is decommissioned, the land will be rehabilitated in order to return it to pre-project conditions. This also means that all impacts whether positive or negative, which take place during the operation phase will cease to exist. At the same time spending on the disassembly of the components and rehabilitation of land will increase the demand for construction services and other industries, therefore stimulating economic activity in the local area, albeit over a temporary period.

Socio-economic impacts stimulated during the decommissioning phase are expected to be similar to those that took place during the construction phase. They will also be temporary in nature, but most likely will take a much shorter time than the construction phase. They will also be associated with some expenditure, although it will be considerably less than the investment required during the construction phase. Besides the positive impacts on production, employment, household income and government revenue that could ensure from the project, some negative impacts could also occur. These would largely be related to a slight increase in noise in the area surrounding the site, increase in traffic congestion and concerns over local safety and security due to a greater number of people accessing the area.

All of the positive impacts can be enhanced to increase the benefits to the local communities, while the negative impacts could be mitigated. Mitigations and enhancement measures suggested for the construction phase would apply. Overall, the impact that would ensue during the decommissioning phase will mostly be of low significance and is therefore considered to be acceptable.

10.11.3 Overall Result

The positive effects and impacts of Aberdeen Wind Facility 2 would outweigh the negative effects. This is largely due to the fact that the project is expected to have a positive net impact on economic development, employment, household earnings, government revenue and skills development in the country and most importantly in the local community that experiences a high unemployment rate as well as a small economic base. The negative impacts that are expected to occur as a result of the project will be far more localised and would affect a significantly smaller number of people and households than in the case of the net benefits that would be derived by the project.

No negative impacts with an unacceptable level of significance following the implementation of mitigation is expected to occur from a social perspective.

10.12. Assessment of Impacts on Traffic

Potential impacts on the traffic components of the affected area and the relative significance of the impacts associated with the development of the Aberdeen Wind Facility 2 are summarised below (refer to **Appendix M**).

10.12.1 Description of Traffic Impacts

The traffic expected to be generated by the development of the Aberdeen Wind Facility 2 can be divided into the three phases of the project, namely:

» *Construction Phase* – The construction phase includes the transportation of people, construction materials and equipment to the project site. This phase also includes the construction of roads, excavation of turbine footings, trenching for electrical cables and other ancillary construction works that will temporarily generate the largest amount of traffic. Potential traffic congestion and delays on the surrounding road network and associated noise and dust pollution are expected to occur. Traffic generated by the construction of the facility will have a low to medium significant impact on the surrounding road network. The exact number of trips generated during construction will be determined by the contractor and the haulage company transporting the components to site, the staff requirements and where equipment is sourced from.

» *Operation Phase* – During operation, it is expected that staff and security will visit the facility. Approximately 40-50 full-time employees will be stationed on site (subject to change). Based on experience with similar projects, the number of full-time employees is generally low and consequently, the associated trips are negligible. The traffic generated during this phase will be minimal and will have a nominal impact on the surrounding road network.

» *Decommissioning Phase* – The decommissioning phase will generate construction related traffic including the transportation of people, construction materials, water and equipment (i.e. abnormal trucks transporting turbine components). The potential traffic impact will be of medium significance before mitigation measures during the construction and decommissioning phases. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level of low significance.

10.12.2 Impact tables summarising the significance of impacts on traffic during the construction and operation phases (with and without mitigation)

Construction Phase Impacts

Nature: <u>*Traffic impacts expected during the construction phase*</u> Traffic congestion due to an increase in traffic caused by the transportation of equipment, material and staff to site		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (1)
Duration	Short (2)	Short (2)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Probable (3)
Significance	**Medium (50)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	Completely reversible	Completely reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: » Stagger component delivery to site » Reduce the construction period » The use of mobile batching plants and quarries in close proximity to the site » Staff and general trips should occur outside of peak traffic periods. » Regular maintenance of gravel roads by the Contractor during the construction phase.		
Residual Impacts: The proposed mitigation measures for the construction traffic will result in a reduction of the impact on the surrounding road network. Traffic will return to normal levels after construction is completed.		

Nature: <u>*Dust pollution due to traffic in the construction phase*</u> Construction traffic on roads will generate dust. Air quality will be affected by dust pollution		
	Without mitigation	**With mitigation**
Extent	Low (1)	Low (1)
Duration	Short (2)	Short (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (4)	Probable (3)
Significance	**Medium (36)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	Completely reversible	Completely reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: » Dust Suppression of gravel roads during the construction phase, as required. » Regular maintenance of gravel roads by the Contractor during the construction phase.		
Residual Impacts: Dust pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact**.** Dust pollution is limited to the construction period.		

Nature: <u>*Noise pollution due to traffic in the construction phase*</u> Construction traffic on roads will generate noise i.e. noise pollution due to increased traffic.

	Without mitigation	**With mitigation**
Extent	Low (2)	Low (1)
Duration	Short (2)	Short (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (4)	Probable (3)
Significance	**Medium (40)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	Completely reversible	Completely reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: » Stagger component delivery to site » Reduce the construction period » The use of mobile batching plants and quarries in close proximity to the site » Staff and general trips should occur outside of peak traffic periods		
Residual Impacts: Noise pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact**.** Noise pollution is limited to the construction period.		

The traffic generated during the operational phase will be minimal and will have not have any impact on the surrounding road network. The decommissioning phase impacts will be the same as the impacts associated with the construction phase which includes traffic congestion, dust pollution and noise pollution. This is based on the fact that similar trips/movements are expected.

10.12.3 Overall Result

The traffic generated during the construction phase, although significant, will be temporary and impacts are considered to be negative and of medium significance before and of low significance after mitigation. The operation phase impacts would be minimal. The decommissioning phase will result in the same impact as the construction phase as similar trips are expected. The potential traffic impact will be of medium significance before mitigation measures during the construction and decommissioning phases. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level of low significance.

No impacts of high significance were identified and no fatal flaws are associated with the Aberdeen Wind Facility 2 from a traffic perspective.

10.13. Assessment of the 'Do Nothing' Alternative

The 'do-nothing' alternative (i.e. no-go alternative) is the option of not constructing the Aberdeen Wind Facility 2. Should this alternative be selected, there would be no environmental impacts (biophysical changes due to transformation) on the site due to the construction and operation activities of a wind energy facility.

a) Land use and transformation

The affected property (i.e. project site) was previously used for livestock grazing. The proposed development footprint of the Aberdeen Wind Facility 2 would allow the limited on-going grazing to continue on areas of the affected properties that will not house wind energy facility infrastructure. The development footprint is less than 1% of the total extent of the project site. Therefore, the current land-use will be retained, while also generating renewable energy from the wind. The impact on agricultural activities, with appropriate mitigation measures in place, as a result of the project is expected to be low.

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.

The implementation of the 'do-nothing' alternative would leave the land-use restricted to the current livestock grazing and limitations, losing out on the opportunity to generate renewable energy from wind as additive thereto (i.e. current activities would continue). Therefore, from a land-use perspective, the 'do-nothing' alternative is not preferred as there is a perceived loss of a viable and compatible land use.

In addition, the landowner would obtain an income from the wind energy facility (as the developer would pay a portion of the revenue generated to the landowner in accordance with the lease agreement for the use of the land). This would contribute towards the financial stability of the landowner which would in turn contribute to the financial viability of the farming practices on the property. The implementation of the 'do nothing' alternative would retain the current land-use, fore-going the opportunity to generate renewable energy from the wind and at the same time continue the current agricultural activities on areas that fall outside of the proposed infrastructure.

The 'do nothing' alternative would result in a lost opportunity for the landowner (in terms of implementing a compatible land use option, while still retaining the current land use, as well as a loss in long-term revenue) and the country (in terms of renewable energy). From this perspective the no-go alternative is not preferred when considering land use and agricultural aspects of the project site. Use of the identified site for the development of the proposed wind energy facility is considered to be a preferred land use as the benefits will outweigh the impacts.

From a visual perspective, however, the implementation of the 'do-nothing' alternative will conserve the landscape as it currently is. Transformation will lead to a change in the sense of place for the area, however no fatal flaws have been identified in this regard.

b) Socio-economic impact

Social: The impacts of pursuing the no-go alternative are both positive and negative as follows:

» The benefits would be that there is no disruption from an influx of jobseekers into the area, nuisance impacts (noise and dust during construction), visual impacts and safety and security impacts. The impact is therefore neutral.
» There would also be an opportunity lost in terms of job creation, skills development and associated economic business opportunities for the local economy, as well as a loss of the opportunity to generate energy from a renewable resource without creating detrimental effects on the environment.

Foregoing the proposed development would not necessarily compromise the development of renewable energy facilities in South Africa. However, the socio-economic benefits for local communities at this location and within the surrounding area would be forfeited. The area has experienced social challenges which has resulted in the need for socio-economic upliftment.

Therefore, from a socio-economic perspective, the 'do-nothing' alternative is not preferred as there is a perceived loss of socio-economic benefits, when considering the current socio-economic conditions of the area.

New Business: Some of the positive spin off effects that are to ensue from the project expenditure will be localised in the communities located near the site, such as the towns of Aberdeen. The local services sector and specifically the trade, transportation, catering and accommodation, renting services, personal services and business services are expected to benefit the most from the project activities during the construction phase. New business sales that will be stimulated as a result of the establishment of the wind energy facility, albeit for a temporary period, will be lost with the implementation of the 'do nothing' alternative. Therefore, from a business perspective, the 'do-nothing' alternative is not preferred as there is a loss of new business opportunities.

Employment: The development of the Aberdeen Wind Facility 2 will aid in a reduction of the unemployment rate; however, if the wind energy facility is not developed then the unemployment rate will not be positively influenced by the proposed development. The upliftment and socio-economic benefits for individuals within local communities would be forfeited with the implementation of the 'do nothing' alternative. Therefore, from an employment perspective, the 'do-nothing' alternative is not preferred as there is a perceived loss of employment opportunities.

Skills development: The establishment of the Aberdeen Wind Facility 2 will offer numerous opportunities for skills transfer and development. This is relevant for both on-site activities and manufacturing activities. Various wind energy facilities are proposed to be developed in the area and in the Eastern Cape Province, which means that the transfer of skills from foreign experts to the local engineers and construction workers will take place, similar to what has taken place where wind energy facilities have been constructed and operated within the Province. The skills training and transfer benefits for individuals within local communities would be forfeited with the implementation of the 'do nothing' alternative.

Municipal goals: The Dr Beyers Naude Local Municipality Integrated Development Plan indicates that opportunities for renewable energy and electricity are present within the municipal area, which is required for electricity provision to all in need and the upgrading of electricity infrastructure. The no-go alternative will therefore result in the above opportunities not being realised and a subsequent loss of income and opportunities and growth to local people. From this perspective the no-go alternative is not preferred.

c) Impact on electricity supply and targets regarding renewable energy

At a broader scale, the benefits of additional capacity to the electricity grid and those associated with the introduction of renewable energy would not be realised. The Eastern Cape has an ample wind resource. Although the Aberdeen Wind Facility 2is only proposed to contribute a contracted capacity of up to 240MW to the grid capacity. The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa. These benefits include:

» Increased energy security;
» Resource saving (i.e. fossil fuels and water);
» Exploitation of South Africa's significant renewable energy resource;
» Pollution reduction;
» Climate friendly development;
» Support for international agreements;
» Employment creation;
» Acceptability to society; and
» Support to a new industry sector.

At present, South Africa is some way off from fully exploiting the diverse gains from renewable energy and from achieving a considerable market share in the renewable energy industry. South Africa's electricity supply remains heavily dominated by coal-based power generation, with the country's significant renewable energy potential largely untapped to date. Energy supply constraints and the associated load shedding have had a significant impact on the economic development of the South African economy. South Africa is also one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer of carbon emissions.

The Integrated Resource Plan (IRP) (2019) provides for the development of 17 743MW of capacity from large scale wind energy facilities by 2030, with an annual contribution of 1600MW from 2022. The IRP essentially drives the assortment of energy to be implemented for South Africa which is known as the energy mix of the country, considering various generation technologies.

The 'do-nothing' alternative will do little to influence the renewable energy targets set by government. However, as the project site experiences ample wind resource and optimal grid connection opportunities are available, not developing the Aberdeen Wind Facility 2 would see such an opportunity being lost. As current land use activities can continue on the site once the project is operational, the loss of the land to this project during the operation phase (less than 1% of the project site) is not considered significant. In addition, the Eastern Cape Province will not benefit from additional generated power being evacuated directly into the Province's grid. The transition to clean, renewable energy will also not be realised. Therefore, from a regional perspective, the 'do-nothing' alternative is not preferred as there is a perceived loss of benefits for the regional area.

d) Conclusion

From the specialist studies undertaken, no environmental fatal flaws were identified to be associated with the Aberdeen Wind Facility 2. All impacts associated with the project can be mitigated to acceptable levels. If the wind energy facility is not developed the following positive impacts will not be realised:

» Job creation from the construction and operation phases.
» Economic benefit to participating landowners due to the revenue that will be gained from leasing the land to the developer.
» Meeting of energy generation mix in a most economic and rapid manner.
» Provision of clean, renewable energy in an area where it is optimally available.

As detailed above, the 'do-nothing' alternative will result in a number of lost opportunities. The 'do nothing' alternative is therefore not preferred and not proposed to be implemented for the development of the Aberdeen Wind Facility 2.

CHAPTER 11: ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS

As identified and assessed in Chapter 10, a wind energy facility development may have effects (positive and negative) on natural resources, the social environment and on the people living in a project area. The preceding impact assessment chapter has reported on the assessment of the impacts associated with the Aberdeen Wind Facility 2 largely in isolation (from other similar developments).

The Aberdeen Wind Facility 2 falls within the Beaufort West REDZs which has been identified by the DFFE as an area highly suitable for wind energy facilities given a range of factors considered. Therefore, DFFE envisages dealing with multiple applications and cumulative issues within a REDZ area. The REDZ are of strategic importance for large scale wind and solar photovoltaic development, in terms of Strategic Integrated Project (SIP) 8. These zones are considered to be areas where significant negative impacts on the environment are limited and socio-economic benefits to the country can be enhanced. One other renewable energy project within the immediate area surrounding the Aberdeen Wind Facility 2 has been authorised for future development. The Aberdeen Wind Facility 2 will contribute to cumulative impact experienced within the area.

This chapter assesses the potential for the impacts associated with the Aberdeen Wind Facility to become more significant when considered in combination with the other operating or proposed wind energy facilities within the area.

11.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(j)(i) an assessment of each identified potentially significant impact and risk, including cumulative impacts.	The cumulative impacts associated with the development of the Aberdeen Wind Facility 2 are included and assessed within this chapter.

11.2 Approach taken to Assess Cumulative Impacts

The cumulative impacts that have the potential to be compounded through the development of the wind energy facility and its associated infrastructure in proximity to other similar developments include impacts such as those listed below. The role of the cumulative assessment is to confirm if such impacts are relevant to the Aberdeen Wind Facility 2 within the project site being considered for the development. This assessment considers whether the cumulative impact will result in:

» Unacceptable loss of threatened or protected vegetation types or species through clearing, resulting in an impact on the conservation status of such flora or ecological functioning;
» Unacceptable loss to sensitive aquatic features;
» Unacceptable risk to avifauna through collision, avoidance and displacement;

» Unacceptable risk to bats through loss of habitat, infringement on roosting or breeding areas, or risk to collision-prone species;
» Unacceptable loss of high agricultural potential areas presenting a risk to food security and increased soil erosion;
» Complete or whole-scale change in sense of place and character of an area and unacceptable visual intrusion;
» Unacceptable loss of heritage resources;
» Unacceptable negative socio-economic impact;
» Unacceptable increase in ambient noise levels, resulting in an impact on the normal functioning of the occupants of the area;
» Unacceptable risk to the operation of the wind energy facility due to the potential wake loss effect and the social implications from an operational point of view; and
» Unacceptable impact to the traffic network.

Further to the above, positive cumulative impacts are also expected and will be associated with socio-economic aspects and benefits.

Figure 11.1 indicates the location of the Aberdeen Wind Facility 2 in relation to other proposed wind energy facilities located within the surrounding area of the project site. These projects were identified using the Department of Forestry, Fisheries and the Environment Renewable Energy Database and current knowledge of projects operating and being proposed in the area. No operational wind farms exist in the area. For the assessment of cumulative impacts only developments within a 30km radius from the Aberdeen Wind Facility 2 were considered, which is in line with the Department of Forestry, Fisheries and the Environment requirements.

There is one (1) authorised wind energy facility, for which construction has not commenced, located within a 30km radius of the Aberdeen Wind Facility 2 site (refer to **Figure 11.1** and **Table 11.1**). Other projects considered for the area (Aberdeen Wind Facility 1 and Aberdeen Wind Facility 3) which form part of the Aberdeen Wind Facility Cluster are currently in progress of an application for environmental authorisation. The potential for cumulative impacts is summarised in the sections which follow and have been considered within the specialist studies (refer to **Appendices D – M**).

Table 11.1: Wind energy facilities planned within the broader area (within a 30km radius) of the Aberdeen Wind Facility 2 project site

Project Name	Capacity	Location from the Aberdeen Wind Facility 2 project site	Project Status
Eskom Aberdeen Wind Farm	200MW	Adjacent to and north of Aberdeen Wind Facility 2	Authorised No planned construction date
Aberdeen Wind Facility 1	240MW	Adjacent to and west of Aberdeen Wind Facility 2	EA Application currently in progress
Aberdeen Wind Facility 3	240MW	East of Aberdeen Wind Facility 2	EA Application currently in progress

Not all the wind energy facilities presently under consideration by various wind energy developers will be authorised and/or built for operation. Not all proposed developments will be granted the relevant permits by the relevant authorities (DFFE, DMRE, NERSA and Eskom) and this is because of the following reasons:

- There may be limitations to the capacity of the existing or future Eskom grid;
- Not all applications will receive a positive environmental authorisation;
- There are stringent requirements to be met by applicants in terms of the REIPPP Programme and a highly competitive process that only selects the most competitive projects;
- Not all proposed wind energy facilities will be able to reduce the associated negative impacts to acceptable levels or be able to mitigate the impacts to acceptable levels (fatally flawed);
- Not all proposed facilities will eventually be granted a generation license by NERSA and sign a Power Purchase Agreement; and
- Not all developers will be successful in securing financial support to advance their projects further.

As there is uncertainty whether the above-mentioned Eskom Aberdeen Wind Farm will be implemented, it is also difficult to quantitatively assess the potential cumulative impacts. The cumulative impacts of other known wind energy facilities in the broader area and the Aberdeen Wind Facility 2 are therefore qualitatively assessed in this Chapter.

It is important to explore the potential for cumulative impacts on a qualitative basis as this will lead to a better understanding of these impacts and the potential for mitigation that may be required. The scale at which the cumulative impacts are assessed is important. For example, the significance of the cumulative impact on the regional or national economy will be influenced by wind energy developments throughout South Africa, while the significance of the cumulative impact on visual amenity may only be influenced by developments that are in closer proximity to each other, i.e., up to 30 km apart. For practical purposes a sub-regional scale of 30km has been selected for this cumulative impact evaluation.

In the sections below a summary of the potential for cumulative impacts resulting from several wind energy facilities within a 30km radius of the Aberdeen Wind Facility 2 are explored (refer also to the specialist reports contained in **Appendix D** to **M**). Impacts are assessed accordingly in terms of the proposed project in isolation and the impact considering other projects within the area or the cumulative impact with and without mitigation, as was deemed relevant by the specialist. The approach taken by the various specialists in assessing cumulative impacts is informed by the scale at which the impact is likely to occur.

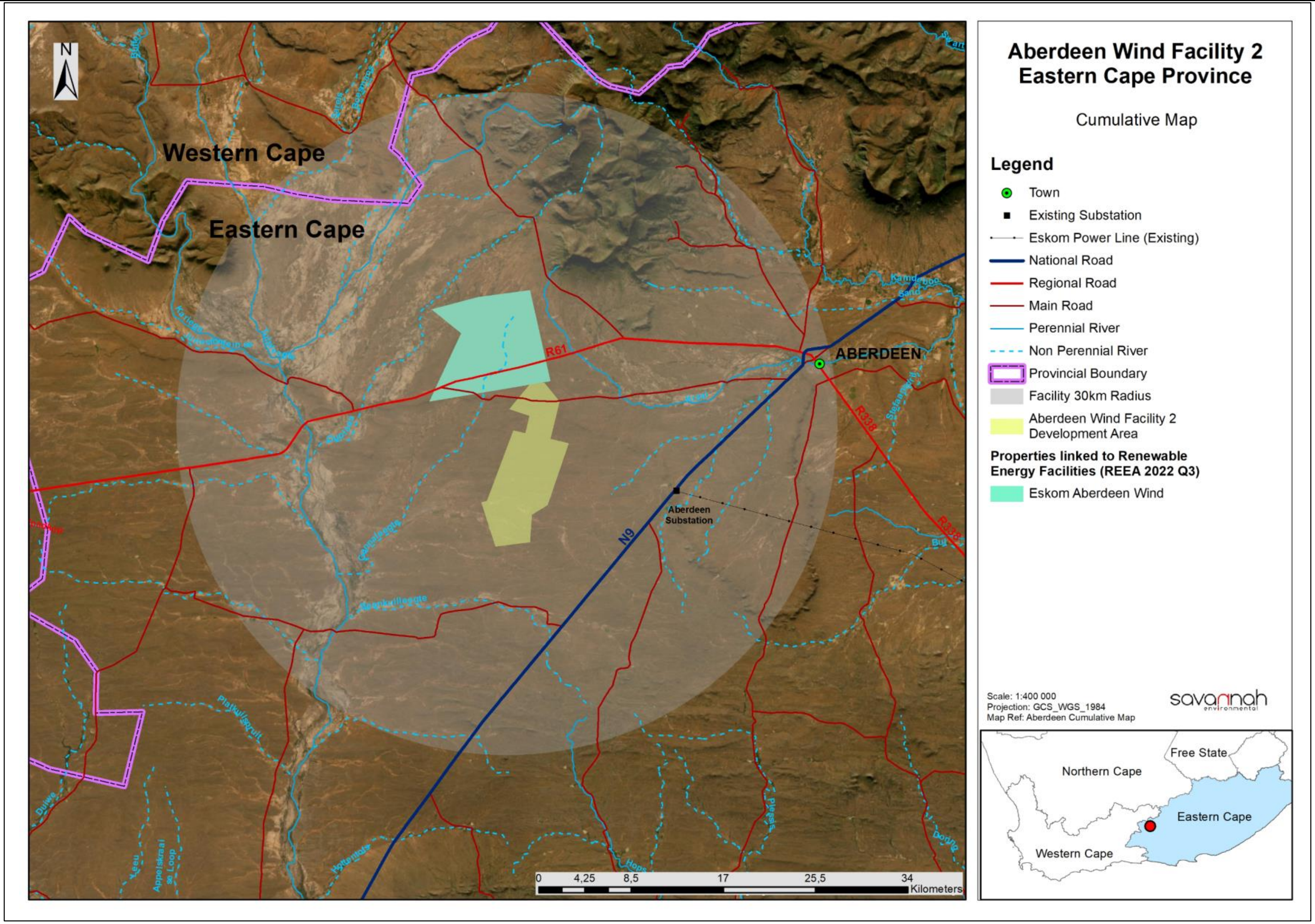

Figure 11.1: Wind farm projects located within the surrounding area of the Aberdeen Wind Facility 2 project site that are considered as part of the cumulative impact assessment

11.3 Cumulative Impacts on Ecological Processes

Current levels of cumulative impact from renewable energy facilities are considered very low as there are no constructed facilities within 30kms of the Aberdeen Wind Facility 2.

There are no observable corridors or gradients evident on site that would be likely to be disrupted by the development. It is likely that most species would at least be able to move through the Aberdeen Wind Facility 2 site for migration or movement purposes if required.

The development of the facility infrastructure would result in habitat loss and an increase in overall cumulative impacts on fauna and flora in the area. However, as the affected Eastern Lower Karoo vegetation type and the broader area is still largely intact, the extent of habitat loss would not be significant relative to the overall extent of the affected vegetation types. The development of the Aberdeen Wind Facility 2 would not change the overall threat status of any vegetation types or special habitats. As such, the contribution of the Aberdeen Wind Facility 2 to habitat loss and the overall level of cumulative impact in the area is considered to be low and acceptable.

The overall cumulative impact of the proposed project when considered in isolation was rated with low significance. When considered in combination with other projects in the area, the overall cumulative impact of these were also rated with low significance.

Nature: *Cumulative impact on terrestrial ecology.* Development of the Aberdeen Wind Facility 2 may impact on broad-scale ecological processes such as the ability of fauna to disperse. The development would potentially contribute to habitat degradation and the loss of landscape connectivity and ecosystem function within the area, but this is likely to be relatively low as most species are likely to be able to move through the facility as large turbine-free areas are likely to remain available to fauna for movement.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (3)	Low (4)
Probability	Improbable (2)	Probable (3)
Significance	**Low (16)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Only partly as a significant proportion of the impact results from the presence and operation of the facility which cannot be well mitigated.	
Mitigation: » Avoid impact on the sensitive features of the site such as the larger drainage features and low hills of the site. » Ensure that the mitigation hierarchy is applied with a particular emphasis on reducing the development footprint, rehabilitating disturbed areas and minimising degradation around the site. » An open space management plan should be developed for the site, which should include management of biodiversity within the affected areas, as well as that in the adjacent veld.		

Nature: *The development of the Aberdeen Wind Facility 2 will contribute towards cumulative impacts on Sensitive Species 1212 due to habitat loss and increased illegal collection risk.* The development would contribute towards cumulative impacts on Sensitive Species 1212 as a result of habitat loss, and illegal collection. There are a number of planned wind energy facilities in the area, several of which includes areas with confirmed presence of Sensitive Species 1212, with the result that there would be a significant potential impact on this species.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Medium (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (14)**	**Low (18)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, through avoidance and strict access control.	
Mitigation: » Monitoring of populations of Sensitive Species 1212 to ensure that individuals are not being lost to illegal collection.		

11.4 Cumulative Impacts on Aquatic Resources

In the assessment of this project, and Wind Energy Facilities within 30kms of the Aberdeen Wind Facility 2, have been assessed. Projects include the Aberdeen Wind Facility 1, Aberdeen Wind Facility 2 and Aberdeen Wind Facility 3, and the approved Eskom Aberdeen Wind Farm. The development of the Aberdeen Wind Facility 2 is likely to result in a variety of impacts from a freshwater resource perspective. Potential impacts and the relative significance of the impacts are summarised below:

All of the projects have indicated that their intention with regard to mitigation, i.e. selecting the best possible sites to minimise the local and regional impacts, or improving the drainage or hydrological conditions within these rivers, and therefore the cumulative impact could be seen as a net benefit. However, the worst-case scenario has been assessed below, i.e. only the minimum of mitigation be implemented by the other projects such as stormwater management, and that flows within these systems are sporadic.

The overall cumulative impact of the proposed project when considered in isolation was rated with low significance. When considered in combination with the Eskom Aberdeen Wind Farm, the overall cumulative impact of these was rated as medium significance.

Possible cumulative impacts include:

» The increase in surface run-off velocities and a reduction in the potential for groundwater infiltration is likely to occur, considering that the development area is near several drainage area, but with stormwater management the impacts can be mitigated.
» Downstream erosion and sedimentation of the downstream systems and farming operations. During flood events, the unstable banks (eroded areas) and sediment bars (sedimentation downstream) already deposited downstream will be washed into the mainstem systems, that already have high sediment loads.

» The cumulative impact assessment considers the combined impact of the surrounding wind farms on the natural environment. Although the current state of the surrounding landscape is largely natural the cumulative impact would be Negligible, coupled to the fact that the aquatic systems are largely ephemeral.

***Nature**: Cumulative Impact on aquatic ecology* » Minimise the local and regional impacts » Improving the drainage or hydrological conditions within these rivers		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (1)	Low (2)
Probability	Probable (3)	Definite (5)
Significance	**Low (18)**	**Medium (35)**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	Medium
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes (high)	
***Mitigation**:* » Improve the current stormwater and energy dissipation features not currently found along the tracks and roads within the region by local landowners / public works entities where possible » Install properly sized culverts with erosion protection measures at the present road / track crossings where already installed by local landowners / public works entities		

11.5 Cumulative Impacts on Avifauna

The Aberdeen Wind Facility 2 will consist of up to 41 turbines and 240MW, which constitute a 120% increase in the total authorised capacity within the area. Wind energy facilities are estimated to cause 2.0 + 1.3 birds/MW/year fatalities. This will lead to a combined estimated 400 bird fatalities per year. If 36% of these are raptors, then we expect about 144 raptor fatalities of which approximately 24 (17%) may be threatened Red Data raptors per year. This does not include species that may be displaced from these developments and excludes fatalities due to power line collisions. These are medium-high totals and suggest cumulative totals must be ranked a medium and significant.

***Nature:** Cumulative impacts on avifauna* Cumulative impacts in terms of: » Displacement of priority species due to disturbance during construction phase. » Displacement of priority species due to habitat loss in the operation phase. » Mortality of priority species due to collisions with the turbines in the operation phase. » Mortality of priority species due to electrocutions on overhead MV network and in the substation yard.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Small (1)	Regional (2)
Duration	Short -term (4)	Short-term (4)
Magnitude	Moderate (7)	Moderate (8)

Probability	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Medium-high (42)**
Status (positive or negative)	Negative	Negative
Reversibility	High	Low
Irreplaceable loss of resources?	Possibly, yes	Possibly, yes
Can impacts be mitigated?	Yes	

Mitigation:

» The wind farm north of Aberdeen should ideally undertake the same CRM process undertaken for the Aberdeen Wind Facility 2.
» All high-risk zones as delineated by any CRM should be adhered to (as outlined in this report) at both farms
» Post-construction programmes must be conducted by an avifaunal specialist (following the Birds and Renewable Energy Specialist Group guidelines) to (i) assess turbine-related fatalities and (ii) confirm that all aspects have been appropriately handled and that road and hard stand verges do not provide additional substrate for raptor prey species. It is essential that the new wind farms do not create favourable conditions for such mammals in high-risk areas.
» A bird fatality threshold and adaptive management policy must be designed by an ornithologist for the site, prior to construction. This policy should form an annexure of the operational EMP for the facility. This policy should identify most importantly the number of bird fatalities of priority species which will trigger an appropriate management response, and timelines for such responses. In general, BBU recommends that should 1 RD species or 2 or more LC species be killed per turbine per year then those turbines will require further mitigation.
» Should the identified priority bird species fatality thresholds be exceeded in Year 1 and 2, either (i) an observer-led turbine Shutdown on Demand (SDOD) programme or (ii) and appropriate alternative mitigation (e.g. striped blade, automated SDOD) must be implemented on site. The former programme must consist of a suitably qualified, trained and resourced team of observers present on site for all daylight hours 365 days of the year. This team must be stationed at vantage points with full visible coverage of all turbine locations (typically 1 VP covering four turbines). The observers must detect incoming priority bird species timeously, track their flights, and when adjudged to have entered a turbine proximity threshold, alert the control room to shut down the relevant turbine. A full detailed method statement or protocol must be designed by an ornithologist.
» It is not known if a CRM is or has been undertaken at the other Wind farm north of Aberdeen Wind Facility 2, but given the success of its application here by Aberdeen Wind Facility 2 (Pty) Ltd in re-locating turbines BBU recommend it for all future wind farms in the area.

11.6 Cumulative Impacts on Bats

The overall cumulative impact of the proposed project when considered in isolation was rated as medium significance. When considered in combination with the Aberdeen Wind Facility 2, Aberdeen Wind Facility 3 and the Eskom Aberdeen Wind Farm, the overall cumulative impact of these was rated with High significance.

Cumulative impacts that may occur include those on bat species, bat habitats, and bat ecosystem services:

» Bat roosts in buildings, trees, and elsewhere (e.g. in rocky terrain and caves) are likely to be increasingly impacted by ongoing agriculture (including possible further overgrazing), urban settlement (involving e.g. possible persecution of bats in rooves, and light pollution), and especially the development of multiple approved and proposed wind energy facilities within a 30km radius of the proposed Aberdeen Wind Facility 2.
» Hydrological features, trees, shrubland, and other natural terrestrial habitat (e.g. rocky terrain) are likely to be increasingly impacted by ongoing livestock, crop farming, and other agricultural activities, urban

settlement, and especially the development of multiple approved and proposed wind energy facilities within a 30km radius of the proposed Aberdeen Wind Facility 2.

- Bat fatalities will escalate, and bat population declines will therefore become probable with continued urban settlement (involving e.g. possible eviction and persecution of bats in rooves), and especially the development of multiple approved and proposed wind energy facilities within a 30km radius of the proposed Aberdeen Wind Facility 2.
- Bat ecoservices could be increasingly compromised if bat fatalities escalate and bat population declines occur with development of multiple approved and wind energy facilities within a 30km radius of the proposed Aberdeen Wind Facility 2.

Cumulative impacts on bats could increase as new facilities are constructed but are difficult to accurately predict or assess without baseline data on bat population size and demographics and these data are lacking for many South African bat species. It is possible that cumulative impacts could be mitigated with the appropriate measures applied to wind farm design and operation.

Cumulative impacts could result in declines in populations of even those species of bats currently listed as Least Concern, if they happen to be more susceptible to mortality from wind turbines (e.g. high-flying open air foragers such as free-tailed and fruit bats) even if the appropriate mitigation measures are applied.

<table>
<tr><td colspan="3">Nature: <u>Impact on bat species, bat habitats, and bat ecosystem services</u>

Terrestrial habitat will be permanently lost wherever WEF infrastructure is developed. Bat fatalities will occur at every WEF unless fatality mitigation measures are 100% effective.</td></tr>
<tr><td></td><td>Overall impact of the proposed project considered in isolation</td><td>Cumulative impact of the project and other projects in the area</td></tr>
<tr><td>Extent</td><td>Local (2)</td><td>Regional (3)</td></tr>
<tr><td>Duration</td><td>Long-term (4)</td><td>Long-term (4)</td></tr>
<tr><td>Magnitude</td><td>Moderate (7)</td><td>Very High (10)</td></tr>
<tr><td>Probability</td><td>Probable (3)</td><td>Highly probable (4)</td></tr>
<tr><td>Significance</td><td>Medium (39)</td><td>High (68)</td></tr>
<tr><td>Status (positive or negative)</td><td>Negative</td><td>Negative</td></tr>
<tr><td>Reversibility</td><td>High</td><td>Medium</td></tr>
<tr><td>Irreplaceable loss of resources?</td><td colspan="2">No</td></tr>
<tr><td>Can impacts be mitigated?</td><td colspan="2">Yes</td></tr>
<tr><td colspan="3">Mitigation:
Each and every wind energy facility should:
» Avoid High sensitive areas.
» Avoid blasting within 2 km of a confirmed roost.
» Minimise and rehabilitate disturbed natural areas.
» Minimise artificial lighting.
» Monitor bat fatalities as per the latest SABAA guideline for this (Aronson et al. 2020 or later).
» Mitigate bat fatalities adaptively by consulting the latest SABAA guideline for this (Aronson et al. 2020 or later), and the best available relevant scientific information.
» Report annual operational bat monitoring results to SABAA, EWT, and DFFE.
» Forward all bat monitoring data to the database recommended by SABAA.</td></tr>
</table>

11.7 Cumulative Impacts on Agriculture

Cumulative impacts have been identified from an agricultural perspective. These include a cumulative impact on areas susceptible to soil erosion, areas with compacted soils and an increased risk of soil pollution. The overall impact of the proposed project when considered in isolation was assessed as low. The cumulative impact of the project and other projects in the area were assessed to be medium.

Nature: Cumulative impact of areas susceptible to soil erosion Increase in areas susceptible to soil erosion		
	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?	No	Yes
Can impacts be mitigated?	Yes	No
Mitigation: Each of the projects should adhere to the highest standards for soil erosion prevention and management		

Nature: Cumulative impact of areas with compacted soils 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
Mitigation: Each of the projects should adhere to the highest standards for soil erosion prevention and management		

Nature: Cumulative impact of increased risk of soil pollution 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
Mitigation: Each of the projects should adhere to the highest standards for soil pollution prevention and management.		

11.8 Cumulative Impacts on Heritage (including archaeology, palaeontology and cultural landscape)

There is the potential for the cumulative impact of proposed renewable energy facilities in the area to negatively impact the cultural landscape due to a change in the landscape character from natural wilderness to semi-industrial. This project falls within a REDZ area and it is noted that it is preferable to have renewable energy facility development clustered in an area such as a REDZ.

Based on the wind energy facilities within a 30km radius of the proposed Aberdeen Wind Facility 2, the cumulative visual impact of combined projects will be high. However, this cumulative impact does not represent a fatal flaw from a cultural landscape perspective.

To address concerns about the cumulative impact of Renewable Energy facilities within the greater Karoo region, a cautious approach is required in terms of assessing the desirability of such development from a cultural landscape perspective. The proposed site is located adjacent to an existing infrastructural corridor associated with the national grid, which suggests a level of suitability of Renewable Energy facilities which can link in with the grid. Notwithstanding the existing infrastructure, the placement of Renewable Energy facilities, and Wind Energy turbines, must take cognisance of the very high visual impact on a relatively intact and representative cultural landscape, and the extremely limited ability to visually screen this infrastructural development, particularly in the case of the wind turbines.

The cumulative impact of the proposed renewable energy facilities has the potential to negatively impact on the cultural landscape, as well as the distribution and integrity of archaeological and palaeontological resources.

Nature: <u>Cumulative impact to the cultural landscape (sense of place) as well as archaeological and palaeontological resources.</u>		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Regional (3)	Regional (3)
Duration	Where manifest, the impact will be long term - for the duration of the grid infrastructure lifetime (4)	Where manifest, the impact will be long term - for the duration of the grid infrastructure lifetime (4)
Magnitude	The cultural value of the pristine Karoo Landscape is very high and the location of the proposed development will impact this significance (5)	The cultural value of the pristine Karoo Landscape is very high and the location of the proposed development will impact this significance (5)
Probability	It is extremely likely that a significant cultural landscape resources will be impacted (5)	It is extremely likely that a significant cultural landscape resources will be impacted (5)
Significance	**Medium (60)**	**HIGH (60)**

Status (positive or negative)	Negative	Negative
Reversibility	High	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: » Setback from the N9 and the R61 by at least 1km on either side. » Avoid steep or elevated topography, ridgelines or koppies, with a no development buffer of at least 2.5km from Wolwekop » Setback from graded resources and farmstead settlements IIIB and IIIC, by 500m. » Setback from farmsteads forming part of the settlement pattern by at least 500m		

11.9 Cumulative Noise Impacts

The noise specialist has considered the cumulative noise impact with the development of the Aberdeen Wind Facility 2 on total cumulative noise emissions. There is a very low risk of cumulative noise emissions during the construction phase, because it is unlikely that construction activities will take place simultaneously at the different wind energy facilities. However, a number of turbines are proposed within 5000m from Noise sensitive receptor 08 (though this NSR is not noise-sensitive) during the operations phase and there is a slight potential for a cumulative noise impact at this NSR. For the layouts evaluated, there is a definite cumulative noise impact at noise sensitive receptor 05. Projected noise levels will exceed 45dBA for the worst-case cumulative scenario at all noise sensitive receptors. It should be noted that noise from the WTG may be audible up to 2000m at night.

There is a medium significance for a cumulative noise impact to occur during the operations phase. Mitigation measures are available and were included in this report, that should reduce the significance of the cumulative noise impact to low.

Nature: *Cumulative noise impacts* Projected noise levels, the potential change in ambient sound levels as well as the significance of the potential noise impact defined per noise sensitive receptor.		
	Overall impact of the proposed project considered in isolation (post mitigation)	**Cumulative impact of the project and other projects in the area**
Magnitude	Minor (2)	Moderate (6)
Extent	Regional (3)	Regional (3)
Duration	Long-term (4)	Long-term (4)
Probability	Improbable (1)	Likely (3)
Significance	**Low (9)**	**Medium (39)**
Status	Negative	Negative
Reversibility	High	High
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: The significance of the potential cumulative noise impact is medium and additional mitigation is required. It is therefore recommended that the applicant discuss the potential cumulative noise level with Aberdeen Wind Facility 2 (Pty) Ltd, and together and select appropriate measures to reduce the total cumulative noise levels at NSR05 to less than 45 dBA (if the structures are used for residential purposes). Potential measures that Aberdeen Wind Facility 2 may consider include:		

- » Selecting a WTG with a lower SPL (less than 108 dBA re 1 pW) within 3,000 m from NSR05 (when the structure is used for residential purposes); and/or
- » That the applicant designs a noise abatement programme to ensure that the projected noise levels are less than 45 dBA at NSR05 (during periods when the NSR05 is used for residential purposes). This could include using a WTG (within 3,000 m from NSR05) that has different sound reduction modes (such as a WTG with a noise emission level less than 108 dBA re 1 pW); and/or
- » To change to layout to locate WTG ABE051, ABE052 and ABE053 further than 2,000 m from NSR05, or to remove at least one of these WTG.

11.10 Cumulative Visual Impacts

Viewshed analyses were undertaken from all proposed and authorised wind energy facilities within a 30km radius of the proposed Aberdeen Wind Facility 2, of which the wind turbine layouts were available at the time of drafting this report.

Visibility analyses of the three (3) proposed Aberdeen Wind Facilities were undertaken individually from each of the wind energy facility wind turbine positions at an offset off 300m above ground level (the approximate/estimated tip-height). The results of these viewshed analyses were overlain in order to determine areas where all three wind energy facilities may theoretically be visible, areas where three may be visible, areas where two may be visible and ultimately areas where turbines from only a single wind farm may be visible.

The cumulative viewshed analysis is displayed (**Figure 11.2**) and the number of wind farms visible is indicated in the legend, e.g. an area where wind turbines from just one wind farm is visible are indicated in yellow, and an area where wind turbines from all three wind farms may be visible are indicated in orange.

The approximate 123 wind turbine positions (excluding the already authorised wind energy facility located in the study area for which no layouts were available) are spread out across a very large surface area. The areas of highest potential cumulative visual exposure within a 30km radius from the Aberdeen Wind Facility 2. This is due to the unobstructed vistas brought about by the flat topography of the plains. Terrain located within the valleys of the more mountainous landscapes or located within lower lying drainage lines are generally more shielded from the cumulative visual exposure of the wind turbine structures. The opposite effect occurs along the more elevated ridges and hills where the terrain may be exposed to more turbines, e.g. along the south-western facing slopes of the Kamdebooberg and the south-eastern facing slopes of the Oorlogspoortberge.

The areas of higher cumulative visual exposure (especially along the plains) contain sensitive visual receptors in the form of residents of homesteads and observers travelling along the national (N9), arterial (R61) and secondary roads traversing the plains. It is expected that should all 123 wind turbines of the Aberdeen Wind Facility Cluster (and the additional turbines from the Eskom wind energy facility) be constructed, the potential cumulative visual impacts may range from moderate (where observers are absent i.e. vacant natural land) to high significance (where observers are present i.e. at homesteads and along roads).

It is clear that the Eskom wind energy facility is located on more elevated terrain located adjacent to the proposed Aberdeen Wind Facility Cluster (with Aberdeen Wind Facility 2 under assessment in this report). Should this wind energy facility be constructed then these facilities will most likely be experienced as one facility by observers in the area.

The cumulative visual exposure (and potential cumulative visual impact) is not an unintended consequence of renewable energy facility developments within the region, but rather a concerted effort to concentrate renewable energy facilities within the Beaufort West REDZ. This is an effort to prevent the scattered proliferation of renewable energy generation infrastructure beyond the REDZ and throughout the greater region.

The cumulative visual impact is expected to be high, depending on the observer's sensitivity to wind turbine structures. In spite of this, the cumulative visual impact is still considered to be within acceptable limits, due to the generally remote location of the Beaufort West REDZ and the limited number of affected sensitive visual receptors.

Nature of Impact: *Potential cumulative visual impacts* The potential cumulative visual impact of wind farms on the visual quality of the landscape		
	Overall impact of the proposed project considered in isolation	***Cumulative impact of the project and other projects in the area***
Extent	Medium distance (2)	Medium distance (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Very high (10)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Moderate (56)**	**High (64)**
Status	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	

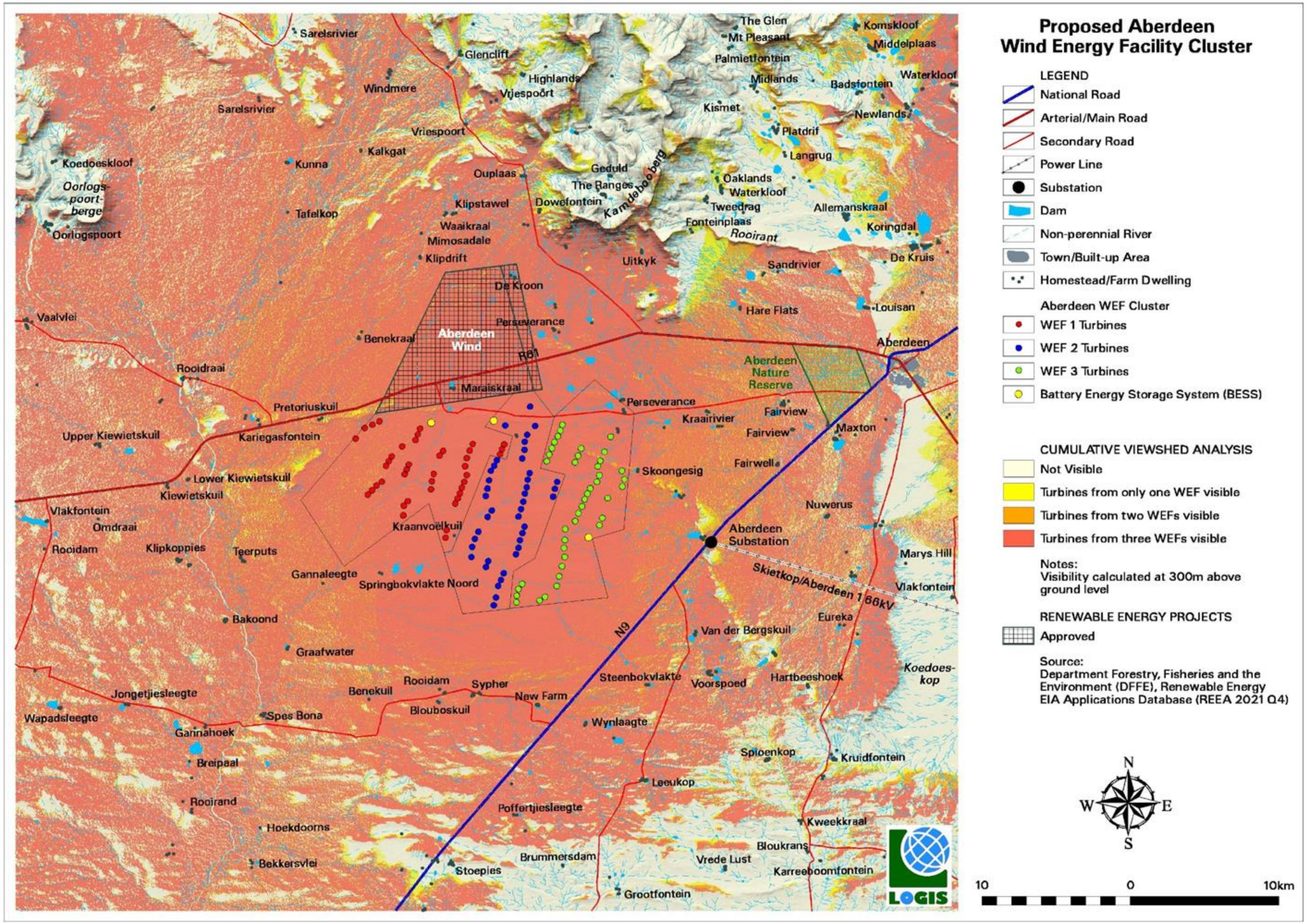

Figure 11.2: Cumulative viewshed analysis of the proposed, existing and authorised wind turbines present within the area

11.12 Cumulative Social Impacts

From a social impact perspective cumulative impacts have been identified for both the construction and operation phases, and within each phase positive and negative impacts have been identified.

The potential cumulative impacts on the area's sense of place will be largely linked to potential visual impacts. In this regard, the Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. The relevant issues identified by Scottish Natural Heritage study include:

- Combined visibility (whether two or more wind farms will be visible from one location).
- Sequential visibility (e.g., the effect of seeing two or more wind farms along a single journey, e.g., road or walking trail).
- The visual compatibility of different wind farms in the same vicinity.
- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g., viewing type or feature) across a character type caused by developments across that character type.

Nature: Visual impacts associated with the establishment of more than one WEF and the potential impact on the area's rural sense of place and character of the landscape.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Local and regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low** (27)	**Medium** (30)
Status (positive/negative)	Negative	Negative
Reversibility	Yes. WEF components and other infrastructure can be removed.	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Confidence in findings: High.		
Mitigation: The recommendations of the VIA should be implemented.		

In addition to the potential negative impacts, the establishment of renewable energy facilities and associated infrastructure, including the proposed WEF, will also create several socio-economic opportunities for the DBNLM. The positive cumulative opportunities include creation of employment, skills development and training opportunities, and downstream business opportunities.

The review of the REIPPPP (December 2021) indicates that to date (across BW1-4) a total contribution of R22.8 billion has been committed to SED initiatives. Assuming an even, annual revenue spread, the average contribution per year would be R1.1 billion. Of the total commitment, R18.5 billion is specifically allocated for local communities where the IPPs operate. With every new IPP on the grid, revenues and the respective SED contributions will increase.

The potential cumulative benefits for the local and regional economy are therefore associated with both the construction and operational phase of renewable energy projects and associated infrastructure and extend over a period of 20-25 years. However, steps must be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes.

Nature: The establishment of renewable energy facilities and associated projects, such as the WEF, in the DBNLM will create employment, skills development and training opportunities, creation of downstream business opportunities.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Local and regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	High (8)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	**Medium** (36)	**High** (60)
Status (positive/negative)	Positive	Positive
Reversibility	Yes. WEF components and other infrastructure can be removed.	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Confidence in findings: High.		
Mitigation: The proposed establishment of suitably sited renewable energy facilities and associated projects, such as the proposed WEF, within the DBNLM should be supported.		

The establishment of the proposed wind farm and other facilities in the area does have the potential to place pressure on the local towns in the Dr Beyers Naude Local Municipality and the Beaufort West REDZ, including Aberdeen and Graff Reinet. The impact will depend on the timing of the construction phase for the different projects. However, the potential impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of the proposed facility and associated renewable energy projects in the Beaufort West REDZ and the Dr Beyers Naude Local Municipality. These benefits will create opportunities for investment in the Dr Beyers Naude Local Municipality, including the opportunity to up-grade and expand existing services and the construction of new houses. Socio-economic development (SED) contributions also represent an important focus of the REIPPPP and is aimed at ensuring that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. The proposed wind energy facility is also required to contribute a percentage of projected revenues accrued over the 20-year period to SED. This will provide revenue that can be used by the Dr Beyers Naude Local Municipality to invest in up-grading local services where required. It should also be noted that it is the function of national, provincial, and local government to address the needs created by development and provide the required services. The additional demand for services and accommodation created by the establishment of development renewable energy projects should therefore be addressed in the Integrated Development Planning process undertaken by the Dr Beyers Naude Local Municipality.

Nature: The establishment of a number of renewable energy facilities and associated projects in the Dr Beyers Naude Local Municipality has the potential to place pressure on local services, specifically medical, education and accommodation.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Local and regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Medium (30)**[25]
Status	Negative	Negative
Reversibility	Yes. Wind energy facility components and other infrastructure can be removed.	
Loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: The proponent should liaise with the DBNLM to address potential impacts on local services.		

In addition to the potential negative impacts, the establishment of renewable energy facilities and associated infrastructure, including the proposed wind energy facility, will also create several socio-economic opportunities for the Dr Beyers Naude Local Municipality. The positive cumulative opportunities include creation of employment, skills development and training opportunities, and downstream business opportunities.

The potential cumulative benefits for the local and regional economy are therefore associated with both the construction and operational phase of renewable energy projects and associated infrastructure and extend over a period of 20-25 years. However, steps must be taken to maximise employment opportunities for members from the local communities in the area and support skills development and training programmes.

11.13 Cumulative Traffic Impacts

For the assessment of cumulative traffic impacts, it was assumed that all renewable energy projects within 30km currently proposed and authorized, would be constructed at the same time. This is the precautionary approach as in reality; these projects would be subject to a highly competitive bidding process and not all the projects may be successful. Even if all the facilities are constructed and decommissioned at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.

The construction and decommissioning phases of a wind energy facility are the only significant traffic generators. The duration of these phases is short term, i.e. the potential impact of the traffic generated during the construction and decommissioning phases of the facility on the surrounding road network is

[25] With effective mitigation and planning, the significance will be Low Negative.

temporary. When operational, wind farms do not add any significant traffic to the road network. The cumulative impacts (i.e. impacts of all projects under construction at the same time) were assessed to be of low significance.

Nature: *Cumulative traffic impacts* Traffic generated by the proposed development and the associated noise and dust pollution.		
	Overall impact of the proposed project considered in isolation (post mitigation)	**Cumulative impact of the project and other projects in the area**
Extent	Low (1)	High (5)
Duration	Short (2)	Medium-term (3)
Magnitude	Low (4)	High (8)
Probability	Probable (3)	Improbable (2)
Significance	**Low (21)**	**Medium (32)**
Status	Negative	Negative
Reversibility	Completely reversible	High
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation: » *Stagger component delivery to site* » *Dust suppression* » *Reduce the construction period* » *The use of mobile batch plants and quarries in close proximity to the site* » *Staff and general trips should occur outside of peak traffic periods*		

11.14 Conclusion regarding Cumulative Impacts

Cumulative impacts are expected to occur with the development of the Aberdeen Wind Facility 2 throughout all phases of the project life cycle and within all areas of study considered as part of this BA report. The main aim for the assessment of cumulative impacts considering the Aberdeen Wind Facility 2 is to test and determine whether the development will be acceptable within the landscape proposed for the development, and whether the loss, from an environmental and social perspective, will be acceptable without whole-scale change.

The following conclusions can be drawn regarding the cumulative impacts associated with the project:

» As sensitive ecological features have been avoided by all projects proposed in the area, cumulative impact on important local biodiversity features would be low. The contribution of the Aberdeen Wind Facility 2 to cumulative impacts in the area would also be low. There will therefore be no unacceptable loss or impact on ecological aspects (vegetation types, species and ecological processes) due to the development of the Aberdeen Wind Facility 2 and other wind farms within the surrounding area, provided recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.
» The layouts of the existing and proposed wind energy facilities in the area indicated limited impacts on their aquatic environments as the proposed structures for the most part, have either avoided the delineated watercourses and drainage areas with the exception of unavoidable watercourse crossings

by the proposed access roads. There will therefore be no significant loss of sensitive and significant freshwater resources, provided recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.

» The cumulative contribution of the Aberdeen Wind Facility 2 to the total number of turbines in the area, and by implication the impacts associated with the turbines, is moderate. There will be no unacceptable risk to avifauna with the development of the Aberdeen Wind Facility 2 and other wind farms within the surrounding area, provided recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.
» Based on the opportunity for reduction of the impacts through appropriate mitigation measures, there will be no unacceptable risk to bats in terms of mortality with the development of the Aberdeen Wind Facility 2 and other wind farms within the surrounding area. The cumulative impact is therefore acceptable.
» Due to the limited agricultural potential of soils in the area, it was concluded that there will be no unacceptable loss of agricultural land due to the development of the Aberdeen Wind Facility 2 and other wind farms within the surrounding areas, provided recommended mitigation measures are implemented. The cumulative impact is therefore acceptable.
» The establishment of Aberdeen Wind Facility 2 in conjunction with the establishment of other Wind Energy Facilities, Aberdeen Wind Facility 2 and Eskom Aberdeen Wind Energy Facilities are proposed in the area with the potential for a high cumulative visual impact. Change to the sense of place and character of the area is therefore expected with the development of wind energy facilities. However, the change is not considered to be a fatal flaw.
» Provided that sensitive heritage sites and landscape features, and their associated buffers are avoided, there will be no unacceptable loss of heritage resources associated with the development of the Aberdeen Wind Facility 2 and other wind farms within the surrounding areas. The cumulative impact is therefore acceptable.
» Both positive and negative cumulative impacts are expected to occur with the establishment of a Aberdeen Wind Facility 2. No unacceptable socio-economic impacts are expected to occur. The cumulative impact is therefore acceptable.
» No unacceptable increase in ambient noise levels are expected to occur with the development of the Aberdeen Wind Facility 2 and other wind farms within the surrounding areas. The cumulative impact is therefore acceptable.
» No unacceptable impacts to the traffic network are expected to occur with the development of the Aberdeen Wind Facility 2 and other wind farms within the surrounding areas. The cumulative impact is therefore acceptable.
» No significant impacts are expected with the development of Aberdeen Wind Facility 2 in terms of wake loss impact to planned adjacent facilities. The cumulative impact is therefore acceptable.

Positive cumulative impacts are expected to occur from a socio-economic perspective. These impacts will range from a medium to high significance depending on the impact being considered.

Most cumulative impacts associated with the Aberdeen Wind Facility 2 will be of a medium or low significance, with impacts of a high significance associated with positive socio-economic cumulative impacts, with one negative socio-economic impact considered to be of a high significance and visual impacts. A summary of the cumulative impacts is included in **Table 11.3** below.

Table 11.3: Summary of the cumulative impact significance for the Aberdeen Wind Facility 2 within the project site

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Ecology	Low	Low
Aquatics	Low	Medium
Avifauna	Medium	Medium
Bats	Medium	High
Agriculture	Low	Medium
Heritage (archaeology, palaeontology and cultural landscape)	Medium	High
Noise	Low	Low
Visual	Medium	High
Social Impact Assessment	Low (Negative) Medium (Positive)	Medium(Negative) High (Positive)
Traffic	Low	Medium

The location of the Aberdeen Wind Facility 2 project site and the surrounding wind farms being considered as part of this cumulative impact assessment within a REDZ is considered to assist with the concentration of the negative impacts within an area, as well as the focussing of positive impacts and benefits. The REDZ are considered to be areas within which significant negative impacts on the natural environment are limited and socio-economic benefits are enhanced. Therefore, the development of wind farms within a REDZ reduces the negative impacts in areas located outside of the REDZ and concentrates the positive impacts within the REDZ thereby creating a positive contribution to the communities present. This supports and contributes the need and desirability of the Aberdeen Wind Facility 2 within the project site.

Based on the specialist cumulative assessment and findings, the development of the Aberdeen Wind Facility 2 and its contribution to the overall impact of all wind energy facilities to be developed within a 30km radius, it can be concluded that the Aberdeen Wind Facility 2 cumulative impacts will be of a medium to low significance, with impacts of a high significance mainly relating to positive socio-economic impacts, bats and visual impacts on the landscape. Therefore, the development of the Aberdeen Wind Facility 2 will not result in unacceptable, cumulative impacts and will not result in a whole-scale change of the environment.

CHAPTER 12: CONCLUSIONS AND RECOMMENDATIONS

Aberdeen Wind Facility 2 (Pty) Ltd, proposes 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 greater Sarah Baartman District Municipality. The project site consists of four (4) affected properties:

» Remainder of the Farm Doorn Poort 93
» Portion 1 of Farm Doorn Poort 93
» Farm Kraanvogel Kuil 155
» Portion 4 of Farm Sambokdoorns 92.

A main access road up to 5.7km in length and up to 10m in width will provide access to the facility, and ultimately to all three planned wind farm sites (that is, a shared access route). The access to the facility/ies will be via an existing (unnamed) gravel road off the R61 between Beaufort West and Aberdeen. The gravel road is well established (~10m wide excluding road reserve), however it's likely portions of this road will require upgrading to accommodate the movement of heavy vehicles. This road traverses Portion 4 of Farm Sambokdoorns 92.

The project site has an extent of ~15 800ha, which is considered sufficient in extent (allowing sufficient space to avoid any major environmental sensitivities) and suitable from a technical perspective for the development of up to 41 wind turbines with a contracted capacity of up to 240MW. A development area[26] of approximately 6 475ha has been identified within the project site and assessed as part of the BA process. The much smaller development footprint[27] will be sited within the development area, with an estimated disturbance area of less than 1.9% (up to 120ha) of the development area. The infrastructure associated with the 240MW Aberdeen Wind Facility will include:

» Up to 41 wind turbines with a maximum hub height of up to 200m. The tip height of the turbines will be up to 300m.
» Concrete turbine foundations and turbine hardstands.
» 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.
» Upgrade to a main access road of approximately 5.7km in length and up to 10m in width.
» Medium-voltage (MV) power lines internal to the wind farm trenched and located adjacent to internal access roads, where feasible.

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[26] The development area is that identified area where the 240MW wind farm is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints. The development area is 6 475ha in extent.
[27] The development footprint is the defined area (located within the development area) where the wind farm and other associated infrastructure for the facility is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

» Substation, BESS and O&M buildings hub, including:
  - On-site facility substation (132kV)
  - Battery Energy Storage System (BESS)
  - Operation and Maintenance buildings, including control centre.
» Warehouse, laydown area and site camp hub, including:
  - Construction laydown areas
  - Site camp
  - Warehousing and buildings (including offices, gatehouse, warehouses, workshop, canteen, visitors centre, staff lockers, etc.):

Aberdeen Wind Facility 2 (Pty) Ltd has confirmed that the project site is particularly suitable for wind energy development from a technical perspective due to the strength of the prevailing wind resources, access to the electricity grid, compatibility with the current land use and land availability (refer to Chapter 2 for further details).

A summary of the recommendations and conclusions for the proposed project is provided in this Chapter.

12.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the Basic Assessment report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	A summary of the findings of the specialist studies undertaken for the Aberdeen Wind Facility 2 has been included in section 12.2.
3(l) an environmental impact statement which contains (i) a summary of the key findings of the environmental impact assessment, (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	An environmental impact statement containing the key findings of the environmental impacts of the Aberdeen Wind Facility 2 has been included as section 12.5. An Environmental Sensitivity and Layout map of the Aberdeen Wind Facility 2 has been included as **Figure 12.1** which overlays the development footprint (as assessed within the Basic Assessment) of the wind energy facility with the environmental sensitive features located within the project site. This is an optimised layout which adheres to the avoidance measures based on the sensitivity analysis (Chapter 9). A summary of the positive and negative impacts associated with the Aberdeen Wind Facility 2 has been included in section 12.2.
3(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	All conditions required to be included in the Environmental Authorisation of the Aberdeen Wind Facility 2 has been included in section 12.6.
3(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	A reasoned opinion as to whether the Aberdeen Wind Facility 2 should be authorised has been included in section 12.5.

12.2 Evaluation of the Aberdeen Wind Facility 2

The development footprint assessed within this Basic Assessment Report was designed by the project developer in order to respond to and avoid the sensitive environmental and social features located within the project site. This approach ensured the application of the mitigation hierarchy (i.e., avoid, minimise, mitigate and offset) to the Aberdeen Wind Facility 2 project, which ultimately ensures that the development is appropriate from an environmental perspective and is suitable for development within the development envelope (located within the project site). The application of the mitigation hierarchy was undertaken by the developer prior to the commencement of the Basic Assessment process for Environmental Authorisation, as detailed in Chapter 3, and further considered based on specialist study findings, as concluded in this chapter.

The preceding chapters of this report together with the specialist studies contained within **Appendices D-M** provide a detailed assessment of the potential impacts that may result from the development of the Aberdeen Wind Facility 2. This chapter concludes the environmental assessment of the wind energy facility by providing a summary of the results and conclusions of the assessment of both the project site and development footprint for the Aberdeen Wind Facility 2. In so doing, it draws on the information gathered as part of the Basic Assessment process, the knowledge gained by the environmental specialists and the EAP, and presents a combined and informed opinion of the environmental impacts associated with the project.

No environmental fatal flaws or unacceptable impacts were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures are implemented. These measures include, amongst others, the avoidance of sensitive features within the development area during construction and operation, and the undertaking of construction and operation phase bird monitoring, as specified by the specialists.

The potential environmental impacts associated with Aberdeen Wind Facility 2 identified and assessed through the Basic Assessment process include:

» Impacts on ecology, flora and fauna.
» Impacts on aquatic resources.
» Impacts on avifauna.
» Impacts on bats.
» Impacts on land use, soils and agricultural potential.
» Impacts on heritage resources, including archaeology, palaeontology and the cultural landscape.
» Noise impacts due to the construction and operation of the wind energy facility.
» Visual impacts on the area imposed by the components of the facility.
» Positive and negative socio- economic impacts.
» Traffic impacts, including increased pressure on the existing road network.

The environmental sensitivities identified by the relevant specialists for the project site, overlain with the relevant environmental sensitivities, are illustrated in **Figure 12.1**.

12.2.1 Impacts on Terrestrial Ecology

The Aberdeen Wind Facility 2 project site falls entirely within the Eastern Lower Karoo vegetation type. Although there is some variation in vegetation composition within the site depending on soil depth, underlying geology and rockiness, these differences represent different communities rather than different vegetation types. There are no CBAs within the Aberdeen Wind Facility 2 site and only a small extent of Ecological Support Area 2 buffer along the Gannaleegte River. This corridor is over 4km wide and is presumably designed to act as a movement corridor for fauna through the area. The whole of the Aberdeen Wind Facility 2 site falls within a FEPA Priority Subcatchment, which is over 50 000ha in size.

Sensitive Species 1212 was observed at the site in rocky areas and low hills, and it is considered unlikely that any other plant Species of Conservation Concern (SCC) would be present within the site. The site is therefore considered high sensitivity for the plant species theme.

Mountain Reedbuck and Black-footed Cat were considered unlikely to be present on site due to the lack of suitable habitat on site. No other mammals of concern were observed at the site/likely to be present. The Karoo Dwarf Tortoise was not observed on site and it was concluded that there is little to no suitable habitat for this species within the site. It is therefore considered absent from the site. No other reptile species of concern are likely to be present within the site. No amphibian species of concern are known from the area with the result that the site is considered low sensitivity for amphibians. Only drainage features would be considered to be of significance for amphibians. The Aberdeen Wind Facility 2 development was considered to be of low sensitivity for the animal species theme.

The Ecological Impact Assessment has identified impacts of medium significance to be associated with the development of Aberdeen Wind Facility 2. No impacts of high significance were identified, and no fatal flaws are associated with the Aberdeen Wind Facility 2 from a terrestrial ecology perspective. There are no impacts associated with the Aberdeen Wind Facility 2 that cannot be mitigated to a low and acceptable level. With the application of relatively simple mitigation and avoidance measures, the impact of the Aberdeen Wind Facility 2 on the local environment can be reduced to a low and acceptable magnitude.

12.2.2 Impacts on Aquatic Resources

All wind turbines and facility infrastructure are located outside of the delineated aquatic features and recommended no-go buffer areas. Where road infrastructure intersects with high sensitivity freshwater features, existing road crossings are acceptable to be used/upgraded.

Impacts of a medium to high significance on aquatic resources have been identified to be associated with the development of the Aberdeen Wind Facility 2 prior to the implementation of appropriate mitigation measures. With the implementation of the mitigation measures all impacts would be reduced to a low significance which is considered to be acceptable.

No impacts of a high significance or fatal flaws are expected to occur after implementation of the recommended mitigation measures. The specialist indicates that with the implementation of the recommended mitigation measures, impacts on these aquatic features can be effectively minimised without negatively affecting/changing the rivers current conditions, and that the development can be authorised.

12.2.3 Impacts on Avifauna

The avifauna described to be associated with development area and the impacts identified and assessed are based on the results of the four seasons of pre-construction monitoring which was conducted from October 2021 to October 2022 in accordance with the best practice guidelines.

Key avifaunal sensitivities have been identified within and within the surrounding area of the project site. Avian habitats on the site range from the open stony grassy plains where larks and bustards are found. These areas also support the small karoo population of Blue Cranes, that tend to concentrate around farm dams and flooded areas following good rains.

Abundant rains, that are known to promote high avian species richness and abundance in Nama Karoo areas, bring influxes of insect-eating kestrels and other falcons onto the plains, and a roost of Lesser Kestrels is known in the town of Aberdeen, 20 km east of the development area.

The development area is not expected to be of particularly high sensitivity for birds. It does not fall within any Important Bird Areas and the closest protected area is the Camdeboo National Park 80 km north-east of the development area. The area is generally overgrazed reducing its productivity and its capacity to support high species richness.

Collision Risk Modelling (CRM) was undertaken to identify areas where priority collision-prone species are at risk of being impacted by turbines. Based on the outcomes of the CRM, the following areas (and associated risk profiles) were identified:

- Areas where priority collision-prone species are most at risk (high risk) - these areas must be avoided;
- Areas where the level of risk is deemed acceptable subject to mitigation (medium risk)
- Areas where level of risk is deemed low to negligible (low risk) - development is acceptable within these areas and mitigation might be required subject to operational monitoring fatality thresholds.

The results of the Collision Risk Modelling indicated that the highest risk areas (class 5.5 and above) were clumped in the northern sections of the development area. These areas were classified as too risky for development and allocated as No-Go areas and no turbines are allowed to be placed within these areas in order to mitigate the potential disturbance of breeding priority species.

The development footprint assessed for the Aberdeen Wind Facility 2 adheres to and avoids the no-go buffer areas which are not considered to be suitable for the placement of turbines.

The Avifauna Impact Assessment identified that all impacts associated with the development of the Aberdeen Wind Facility 2 development footprint will be of a medium to high significance. This can be mitigated to an acceptable medium to low level of impact. No impacts of a high significance or fatal flaws are expected to occur with the implementation of the recommended mitigation measures.

12.2.4 Impacts on Bats

Pre-construction bat monitoring was undertaken within the development area in accordance with the best practice guidelines. The monitoring was designed to monitor bat activity across the area for the projects. The baseline environment was investigated by using acoustic monitoring to document bat activity between September 2021 and October 2022 (382 sample nights).

Key habitat features have been identified for bats within the development area. These habitat features present specific uses and opportunities for bats including known and potential roosts, natural and artificial permanent, seasonal, and ephemeral surface water resources, geological layers, such as dolerite, which may be associated with karst formations, riparian and other woody vegetation and tree clumps, and local buildings are of great importance as these may serve as suitable sites for the roosting of bats and support of their foraging habits. Local resources impacting bats include the negative impact by disturbance of natural habitat from especially livestock overgrazing and possibly other agricultural activities, built infrastructure (such as roads), and light pollution from scattered dwellings and Aberdeen town. At the same time, developments such as certain buildings, dams, and reservoirs are positively benefitting bats by providing them with favourable roosting habitat and more permanent water supplies. Therefore, onsite anthropogenic disturbances currently do not appear to exert an appreciable negative impact on bats.

Buffers have been placed around important habitat for bats. These include bat roosts of Cape Serotines and possibly some Egyptian Free-tailed Bats) in the south-western corner of the development area, which have been buffered by 500m. All rivers and streams (traversing through the centre of the site of the development area), farm dams and reservoirs all of which have been buffered by 500m. Secondary drainage lines been buffered by 200m.

Based on the bat activity recorded at the Aberdeen Wind Facility 2 project site the significance ratings for the majority of the impacts to bats posed by the development are predicted to be medium or high depending on the impact being considered. After mitigation, bat impacts are predicted to be of a low to medium significance.

The specialist indicates that provided the mitigation measures are implemented, the development of the Aberdeen Wind Facility 2 will not result in unacceptable impacts to bats and can be authorised.

12.2.5 Impacts on Agriculture

The development area contained areas of medium and low sensitivity. 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. Only the southern and eastern central portion of the development area has a small area which could be considered to have a medium sensitivity. High sensitivity areas are not present within the Aberdeen Wind Facility 2.

The Low Sensitivity areas have shallow effective soil depth and soils with pedocutanic horizons, furthermore, the arid climate reduces the land capability of the area significantly. The area is mainly used for livestock grazing. 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.

It is considered by the specialist that the majority of the infrastructure is located in areas with low sensitivity only. The development footprint is therefore considered to be acceptable from a soils and agricultural perspective with no adjustments to the development footprint required.

Majority of the impacts of the Aberdeen Wind Energy Facility 1 from an agricultural perspective will be of medium to low sensitivity. With the implementation of the recommended mitigation measures, all impacts can be reduced to a low acceptable level.

No impacts of a high significance are expected to occur, and no fatal flaws are associated with the development from an agricultural perspective. The specialist indicates that the project will be acceptable, subject to the implementation of the recommended mitigation measures.

12.2.6 Impacts on Heritage Resources (archaeology, palaeontology and cultural landscape)

Specific heritage resources and recommended buffers which needs to be considered for the placement of turbines have been identified within the project site. Of these, the majority are low density Middle Stone Age or Later Stone Age artefact scatters that have been determined to have limited scientific value and have been determined to be not conservation-worthy.

Two of the archaeological resources identified within this area (Site were determined to be conservation-worthy, the first site consists of a sandstone walled old kraal graded IIIB. This site is located approximately 150m from an existing road and is located more than 600m from the nearest proposed turbine. It is recommended that a 500m no-development buffer be implemented around this site in order to retain a sense of place for the kraal. The second site is the Windermere farmhouse complex (Graded IIIC). As this site is located more than 900m from the nearest proposed turbines, no direct or indirect impact is anticipated.

The development site lies between the R61 and N9, both of which are considered to have scenic qualities with views towards the Camdeboo mountain backdrop to the north. A cultural landscape development setback of by at least 1km on either side of the R61 and N9 has been recommended.

All impacts identified on the heritage resources (including archaeology, palaeontology and cultural landscape) are of a medium to high significance prior to the implementation of mitigation measures. With the implementation of the mitigation measures the impact significance will be reduced to impacts of a medium to low significance.

With the opportunities presented for the reduction of impact through the implementation of the recommended mitigation measures, no unacceptable impacts of a high significance are expected to occur. No fatal flaws are therefore associated with the Aberdeen Wind Facility 2 from a heritage perspective.

The specialist indicates that the Aberdeen Wind Facility 2 can proceed, subject to the implementation of the recommended mitigation measures.

12.2.7 Noise Impacts

Noise sensitive developments (NSDs) were identified within and within the area surrounding the development area, and ambient noise levels were measured in the location. Based on the results of the Noise Impact Assessment no adjustments to the proposed development footprint is required.

From the noise impacts assessed there will be a low significance for daytime construction activities, a low significance for night-time construction activities and a low significance for night-time facility operation activities and an impact to ambient sound levels at noise-sensitive receptors due to air-borne noise from the wind turbines. No impacts of a high significance or fatal flaws were identified.

The specialist indicates that subject to the condition that the applicant will select appropriate measures to ensure that the potential medium significance noise impact is eliminated, it is recommended that the proposed Aberdeen Wind Facility 2 (and associated infrastructure) be authorized.

12.2.8 Visual Impacts

A visibility analysis was undertaken for the project. The result of the viewshed analysis displays the potential areas of visual exposure, as well as the potential frequency of exposure, and potential visual sensitive receptors. Negative impacts on visual receptors will occur during the undertaking of construction activities and the operation of the Aberdeen Wind Facility 2.

During the construction phase of the Aberdeen Wind Facility 2 a noticeable increase in heavy vehicles utilising the roads to the project site may occur. This will result in a visual nuisance to other road users and landowners within the surrounding area. Construction activities may potentially result in a high temporary visual impact, that may be mitigated to moderate.

Construction activities may potentially result in a high temporary visual impact, that may be mitigated to moderate. The operation of the Aberdeen Wind Facility 2 will have a high to very high visual impact on observers/visitors residing at homesteads and travelling along the roads within a 5km radius of the proposed wind turbine structures.

The operation of the Aberdeen Wind Facility 2 will have a very high visual impact (which can be mitigated to high) on observers/visitors residing at homesteads within a 5km radius of the proposed wind turbine structures, a high impact on observers travelling along the roads within a 5km radius of the wind turbines and on residents of (or visitors to) homesteads within a 5 - 10km radius of the wind turbine structures. No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice.

The Aberdeen Wind Facility 2 could have a moderate visual impact on residents of (or visitors to) homesteads within a 10-20km radius of the wind turbine structures.

Shadow flicker is an impact relevant to the operation of the turbines. Shadow flicker only occurs when the sky is clear, and when the turbine rotor blades are between the sun and the receptor (i.e. when the sun is low). Most shadow impact is associated with 3-4 times the height of the object. Based on this, a 1.2km buffer along the edge of the outer most turbines were identified as the zone within which there is a risk of shadow flicker occurring. The potential for shadow flicker is anticipated to be of medium significance.

In terms of lighting impacts, the area immediately surrounding the proposed facility has a relatively low incidence of receptors and light sources. The anticipated lighting impact during operation is likely to be of high significance, and may be mitigated to moderate, especially within a 5km to 10km radius of the wind turbine structures.

In terms of ancillary infrastructure, the range of visual exposure will fall within that of the turbines. The anticipated visual impact resulting from this infrastructure is likely to be of low significance both before and after mitigation.

The significance of the visual impacts on the sense of place within the region (i.e. beyond a 20km radius of the development and within the greater region) is expected to be of low significance. Structures will be visible regardless of mitigation but general mitigation and management measures are recommended as best practice.

The visual impact is expected to be of high significance. However, this is not considered to be a fatal flaw.

12.2.9 Social Impacts

Impacts are expected to occur with the development of the Aberdeen Wind Facility 2 during the construction, operation and decommissioning phases. Both positive and negative impacts are identified and assessed.

Positive impacts during construction includes:
» Creation of employment and business opportunities, and the opportunity for skills development and on-site training.

Negative impacts during construction includes:
» Impacts associated with the presence of construction workers on local communities.
» Impacts related to the potential influx of jobseekers.
» Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site.
» Increased risk of grass fires associated with construction related activities.
» Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
» Impact on productive farmland.

Positive impacts during operation includes:
» The establishment of infrastructure to improve energy security and support renewable sector.
» Creation of employment opportunities.
» Benefits for local landowners.
» Benefits associated with socio-economic contributions to community development.

Negative impacts during operation includes:
» Noise impacts associated with the operation of the plant.
» Visual impacts and associated impacts on sense of place.
» Potential impact on property values.
» Potential impact on tourism.
» Wake loss effect impacts on the nearby renewable energy facilities.

The positive effects and impacts of Aberdeen Wind Facility 2 would outweigh the negative effects. This is largely due to the fact that the project is expected to have a positive net impact on economic development, employment, household earnings, skills development and most importantly in the local community that experiences a high unemployment rate as well as a small economic base. Negative impacts are expected to be of a medium significance with the implementation of mitigations measures reducing this to a low impact. Positive impacts are expected to be of a medium significance with the implementation of enhancements.

Considering the above, the development of the Aberdeen Wind Facility 2 is acceptable from a social perspective.

12.2.10 Impacts on Traffic

Traffic impacts have been identified for the construction, operation and decommissioning phases, with the most significant impact expected to occur during the construction phase.

The traffic generated during the construction phase, although significant, will be temporary and impacts are considered to be negative and of medium significance before and of low significance after mitigation. During the operation phase impact would be minimal. The traffic generated during the decommissioning phase will be similar but less than the construction phase traffic and the impact on the surrounding road network will also be considered negative and of medium significance before and of low significance after mitigation.

No impacts of high significance were identified, and no fatal flaws are associated with the Aberdeen Wind Facility 2 from a traffic perspective.

12.2.11 Assessment of Cumulative Impacts

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of several renewable energy facilities in South Africa. The degree of significance of these cumulative impacts is difficult to predict without detailed studies based on more comprehensive data/information on each of the receptors and the site-specific developments. The alignment of renewable energy developments with South Africa's National Energy Response Plan and the global drive to move away from the use of non-renewable energy resources and to reduce greenhouse gas emissions is undoubtedly positive. The economic benefits of renewable energy developments at a local, regional and national level have the potential to be significant.

The Aberdeen Wind Facility 2 falls within the Beaufort West REDZs which has been identified by the DFFE as an area highly suitable for wind energy facilities given a range of factors considered. Therefore, DFFE envisages dealing with multiple applications and cumulative issues within a REDZ area. The REDZ are of strategic importance for large scale wind and solar photovoltaic development, in terms of Strategic Integrated Project (SIP) 8. These zones are considered to be areas where significant negative impacts on the environment are limited and socio-economic benefits to the country can be enhanced. One project within the immediate area surrounding the has been approved. Aberdeen Wind Facility 2 will contribute to the cumulative impact experienced within the area. The cumulative impacts associated with the Aberdeen Wind Facility 2 have been assessed to be acceptable, with no unacceptable loss or risk expected (refer to **Table 12.1** and Chapter 11).

Table 12.1: Summary of the cumulative impact significance for the Aberdeen Wind Facility 2 within the project site

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Ecology	Low	Low
Aquatics	Medium	Low
Avifauna	Medium	Medium
Bats	Medium	High

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Agriculture	Low	Medium
Heritage (archaeology, palaeontology and cultural landscape)	Medium	High
Noise	Low	Low
Visual	Medium	High
Socio-Economic	Low (Negative) Medium (Positive)	Medium (Negative) High (Positive)
Traffic	Low	Medium

Based on the specialist cumulative assessment and findings, the development of the Aberdeen Wind Facility 2 and its contribution to the overall impact of all wind energy facilities to be developed within a 30km radius, it can be concluded that the Aberdeen Wind Facility 2 cumulative impacts will be of a medium to low significance, with impacts of a high significance mainly relating to positive socio-economic impacts, bats and visual impacts on the landscape. Therefore, the development of the Aberdeen Wind Facility 2 will not result in unacceptable, cumulative impacts and will not result in a whole-scale change of the environment.

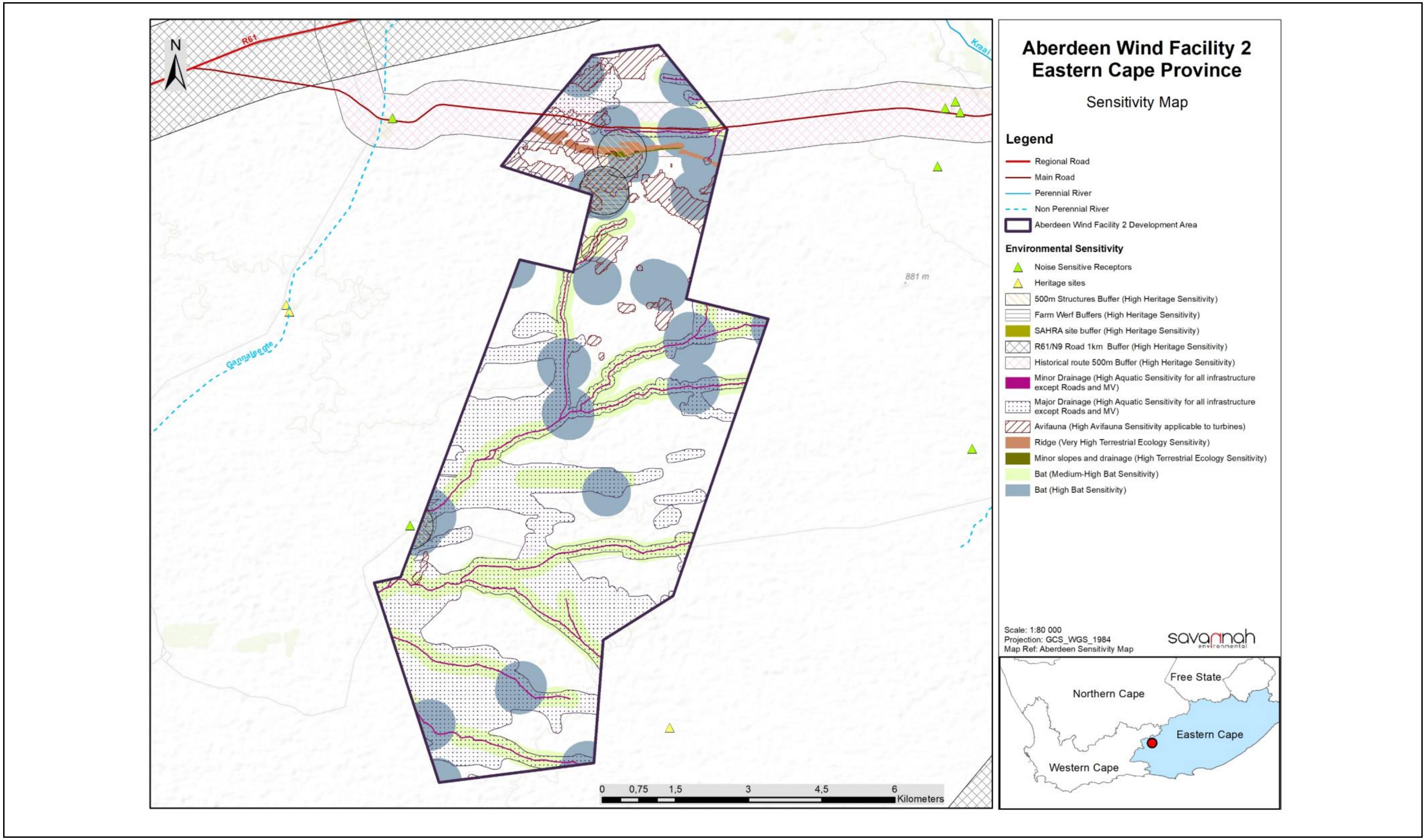

Figure 12.1: Environmental sensitivities associated with the Aberdeen Wind Facility 2, as identified by the various specialists.

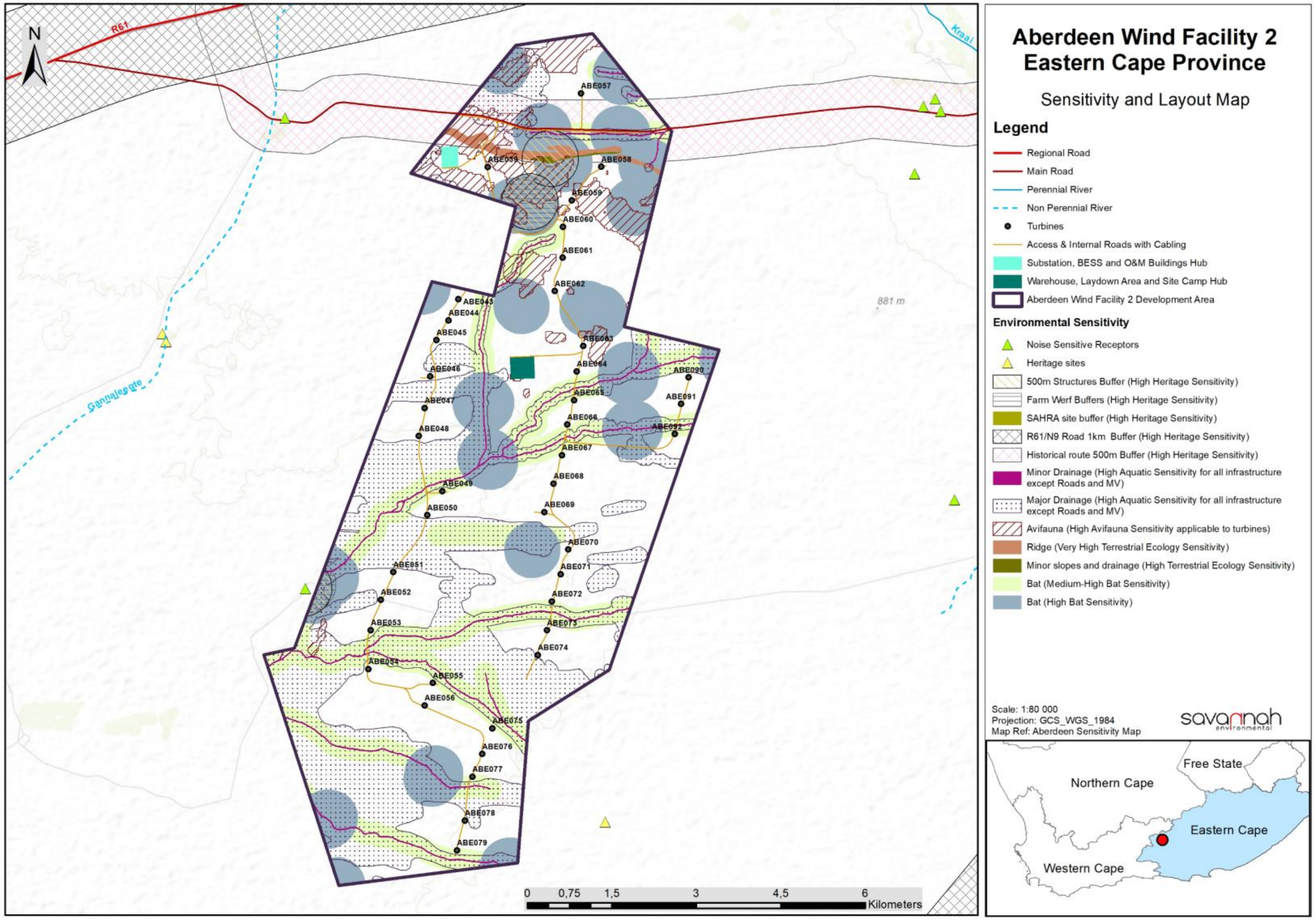

Figure 12.2: The development footprint of the Aberdeen Wind Facility 2 overlaid with the final facility layout and environmental sensitivities associated with the project site, as identified by the various specialists.

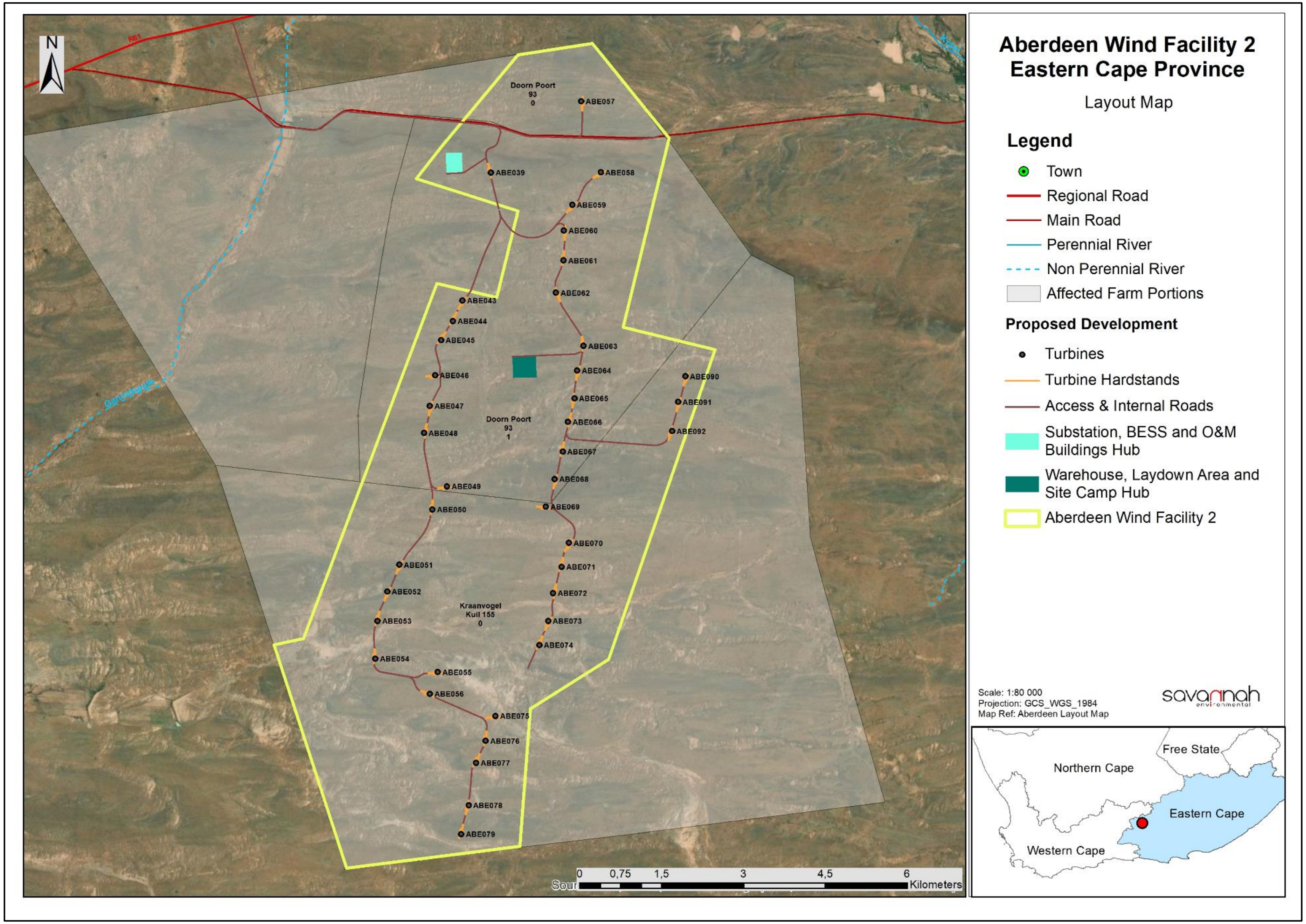

Figure 12.3: Final development footprint for the Aberdeen Wind Facility 2 (A3 map included in **Appendix O**)

12.3. Environmental Costs of the Wind Energy Facility versus Benefits of the Wind Energy Facility

Environmental costs (including those to the natural environment, economic and social environment) can be anticipated at a local and site-specific level, and are considered acceptable provided the mitigation measures as outlined in the Basic Assessment report and the EMPr are implemented and adhered to. No fatal flaws have been identified. These environmental costs could include:

- *A loss of biodiversity, flora and fauna due to the clearing of land for the construction and utilisation of land for the wind energy facility* - The cost of loss of biodiversity has been minimised/avoided through the limited placement of project components and infrastructure within the sensitive habitat communities considered to be of very high and high sensitivity.
- *Impacts on freshwater resources* - the impacts on freshwater resources have been minimised through the avoidance of the sensitive features by project infrastructure.
- *An increase in traffic* – The Aberdeen Wind Facility 2 construction will create an increase in traffic. This impact will however be short-term in extent and is not considered to be significant.
- *Visual impacts associated with the wind energy facility* - The Aberdeen Wind Facility 2 will be visible and mainly of a high significance. No mitigation of this impact is possible (i.e. the structures will be visible in the landscape), but general mitigation and management are required as best practise to minimise secondary visual impacts which may arise from mismanagement of the site.
- *Loss of land for agriculture* – The development will remove areas available for agricultural activities, however based on the current conditions of the project site and the small development footprint of the wind energy facility, this will be limited and not significant.
- *Impacts on birds and bats* – loss of birds and bats species due to collision. The impact is however considered to be acceptable without any impact of high significance.
- *Socio-economic impact s* – impacts relating to the influx of workers and safety, amongst others. The impact is however considered to be acceptable without any impact of high significance.

Benefits of the Aberdeen Wind Facility 2 include the following:

- The project will result in important economic benefits at the local and regional scale through job creation, income and other associated downstream economic development. These will persist during the preconstruction, construction, operation and decommissioning phases of the project.
- The project provides an opportunity for a new land use on the affected property which is considered as a more efficient use of the land and provides an opportunity for alternative generation of income from the property which would support the agricultural activities undertaken within the project site.
- The project contributes towards the Provincial and Local goals for the development of renewable energy as outlined in the respective IDPs.
- The project serves to diversify the economy and electricity generation mix of South Africa through the addition of wind energy.
- The water requirement for a wind farm is negligible compared to the levels of water used by coal-based technologies. This generation technology is therefore supported in dry climatic areas.
- South Africa's per capita greenhouse gas emissions are amongst the highest in the world due to the reliance on fossil fuels. The Aberdeen Wind Facility 2 will contribute to achieving goals for implementation of renewable energy and sustaining a 'green' economy within South Africa.

The benefits of the Aberdeen Wind Facility 2 are expected to occur at a national, regional and local level. As the costs to the environment at a site-specific level have been largely limited through the appropriate placement of infrastructure on the project site within lower sensitive areas through the avoidance of features and areas considered to be sensitive, the benefits of the project are expected to partially offset the localised environmental costs of the wind energy facility.

12.4. Overall Conclusion (Impact Statement)

The preferred activity was determined by the developer to be the development of a renewable energy facility on site using wind as the preferred technology, due to the availability of a suitable wind resource. Independent specialists appointed to undertake the assessment of potential impacts associated with the project assessed a larger area in order to inform the best location for the Aberdeen Wind Facility 2 infrastructure. The specialists considered desktop data, field work, existing literature and the National Web-based Environmental Screening Tool to inform the identification of sensitivities. A proposed layout was designed after provision of sensitivity data by the specialists with the aim of avoiding sensitive areas identified.

Based on the specialist investigations of the larger area, a technically viable development footprint was proposed by the developer and assessed as part of the BA process. The findings of the assessment of the development footprint undertaken by independent specialists have informed the results of this BA report. The specialist findings have indicated that there are no identified fatal flaws associated with the implementation of the project within the project site.

From a review of the relevant policy and planning framework, it was concluded that the project is well aligned with the policy framework, and a clear need for the project is seen from a policy perspective at a local, provincial, and National level.

When considering biodiversity and socio-economic benefits and impacts on the affected and surrounding areas, the following is concluded from the specialist studies undertaken within this BA process.

The proposed facility layout (**Figure 12.3**) ensures that all sensitivities identified through the BA process (as supported by the pre-construction monitoring) are avoided and recommended buffer areas (including all avifauna precautionary buffers) are honoured. This approach is in line with the application of the mitigation hierarchy, where all the sensitive areas which could be impacted by the development have been avoided (i.e., tier 1 of the mitigation hierarchy). Where impacts could not be avoided, appropriate mitigation has been proposed to minimise impacts. It follows, therefore, that the project does not adversely impact on the ecological integrity of the area. In addition, the social assessment has identified 10 short-term (construction related) impact indicators and 10 operation related socio-economic impact indicators. Over both phases of the proposed development seven impacts are forecasted to be negative before and after mitigation, while 13 are anticipated to be positive, before and after mitigation.

The benefits of the Aberdeen Wind Facility 2 are expected to occur at a national, regional and local level. As the costs to the environment at a site-specific level have been largely limited through the appropriate placement of infrastructure on the project site within lower sensitive areas through the avoidance of features and areas considered to be sensitive, which has been further considered through the proposed facility layout (**Figure 12.3**), the benefits of the project are expected to partially offset the localised environmental costs of the Aberdeen Wind Facility 2. From an economic perspective, both positive and negative impacts are expected.

Based on the conclusions of the specialist studies and the facility layout which prioritised the avoidance of environmental sensitivities, it can be concluded that the development of the Aberdeen Wind Facility 2 will not result in unacceptable environmental impacts (subject to the implementation of the recommended mitigation measures). Impacts can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures. This is however not relevant for the visual impact of the wind farm as the turbines will be visible regardless of the mitigation applied. This high significance rating is, however, not considered as a fatal flaw by the specialist. <u>The facility layout and EMPr presented within this BAR should therefore be authorised for implementation.</u>

12.5. Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, the development footprint proposed by the developer within the development envelope, the avoidance of the sensitive environmental features within the project site through the optimised development footprint, as well as the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the EAP that the Aberdeen Wind Facility 2 is acceptable within the landscape and can reasonably be authorised (**Figure 12.3**).

The Aberdeen Wind Facility 2 with a contracted capacity of up to 240MW, located within a development area consisting of four (4) affected properties:

» Remainder of the Farm Doorn Poort 93
» Portion 1 of Farm Doorn Poort 93
» Farm Kraanvogel Kuil 155
» Portion 4 of Farm Sambokdoorns 92.

A main access road up to 5.7km in length and up to 10m in width will provide access to the facility, and ultimately to all three planned wind farm sites (that is, a shared access route). The access to the facility/ies will be via an existing (unnamed) gravel road off the R61 between Beaufort West and Aberdeen. The gravel road is well established (~10m wide excluding road reserve), however it's likely portions of this road will require upgrading to accommodate the movement of heavy vehicles. This road traverses Portion 4 of Farm Sambokdoorns 92.

The following infrastructure would be included within an authorisation issued for the project:

» Up to 41 wind turbines with a maximum hub height of up to 200m. The tip height of the turbines will be up to 300m.
» Concrete turbine foundations and turbine hardstands.
» An internal road network between project components inclusive of stormwater infrastructure.
» Medium-voltage (MV) power lines internal to the wind farm trenched and located adjacent to internal access roads, where feasible.
» Substation, Battery Energy Storage System (BESS) and O&M buildings hub, including:
    o On-site facility substation (132kV).
    o Battery Energy Storage System (BESS).
    o Operation and Maintenance buildings, including control centre.

» Warehouse, laydown area and site camp hub, including:
  - Construction laydown areas
  - Site camp
  - Warehousing and buildings
» Upgrade to a main access road of approximately 5.7km in length and up to 10m in width.

The following key conditions would be required to be included within an authorisation issued for the Aberdeen Wind Facility 2:

» The facility layout as presented in **Figure 12.3** should be authorised for implementation.
» All mitigation measures detailed within this Basic Assessment report, as well as the specialist reports contained within **Appendices D to M**, are to be implemented.
» The EMPr as contained within **Appendix N** of this Basic Assessment report should form part of the contract with the Contractors appointed to construct and maintain the wind energy facility in order to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the Aberdeen Wind Facility 2 is considered key in achieving the appropriate environmental management standards as detailed for this project.
» Following the final design of the Aberdeen Wind Facility 2, a final layout must be submitted to DFFE for review and approval prior to commencing with construction.
» No development is permitted within the identified no-go areas as detailed in **Figure 12.1.**
» A pre-construction walk-through of the final layout, including roads and underground cables, should be undertaken before construction commences and adjusted where required to ensure avoidance of development on sensitive habitats and associated species of concern.
» Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan.
» Implement a chance finds procedure for the rescuing of any fossils or heritage resources discovered during construction.
» If any archaeological material or human burials are uncovered during construction activities, work in the immediate area should be halted, the find reported to the heritage authorities and inspected by an archaeologist. Such heritage is the property of the State and may require excavation and curation in an approved institution.
» Maintain vegetation cover (i.e. either natural or cultivated) immediately adjacent to the actual development footprint, both during construction and operation of the proposed facility.
» Monitor all rehabilitated areas for one year following decommissioning, and implement remedial actions as and when required.

A validity period of 15 years of the Environmental Authorisation is requested, should the project obtain approval from DFFE.

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251166	Palaeontological Specialist Reports	John E Almond	31/12/2014	PALAEONTOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED ABERDEEN 200 MW WIND FARM, CAMDEBOO LOCAL MUNICIPALITY, EASTERN CAPE.
354680	HIA Phase 1	Lita Webley, David Halkett	30/11/2015	Heritage Impact Assessment: Proposed Uranium Mining and Associated infrastructure on portions of the farm Quaggasfontein and Ryst Kuil near Beaufort West in the Western Cape and De Pannen near Aberdeen in the Eastern Cape
354681	AIA Phase 1	Lita Webley	30/11/2015	Archaeological Impact Assessment: Proposed uranium mining and associated infrastructure on portions of the farms Quaggasfontein and Ryst Kuil near Beaufort West in the Western Cape and De Pannen near Aberdeen in the Eastern Cape
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