ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
FINAL SCOPING REPORT

PROPOSED ELLIOT WIND ENERGY FACILITY, EASTERN CAPE PROVINCE

(DEA Ref No: 12/12/20/2282)

FINAL SCOPING REPORT

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PROJECT DETAILS

DEA Reference No.	**:**	**12/12/20/2282**
Title	**:**	Environmental Impact Assessment Process Final Scoping Report for the Proposed Elliot Wind Energy Facility, Eastern Cape
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Applicant	**:**	DNA Wind Farm (Pty) Ltd
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EXECUTIVE SUMMARY

DNA Wind Farm (Pty) Ltd is proposing to establish a commercial wind energy facility and associated infrastructure on a site located within Sakhisizwe Local Municipality in the Eastern Cape Province. The proposed wind energy facility is to be developed by DNA Wind Farm (Pty) Ltd, an infrastructure and wind farm developer. The proposed site is situated approximately 3 km west of Elliot (refer to Figure 1). Infrastructure associated with the wind energy facility is proposed to include:

- Up to 60 Wind Turbines with a total generating capacity of up to 180 MW (each turbine will be comprised of a tower, nacelle and a rotor with its associated blades).
- Foundations to support the turbine towers (up to 20m x 20m);
- Underground cables between turbines (excavated to a depth of ~1m deep);
- A small on-site substation (size to be determined in EIA phase);
- Overhead distribution power line which will link to the existing Eskom power line which traverses the site;
- Internal access roads (~ 8m wide) to each wind turbine; and
- Workshop / administration building.

The nature and extent of this facility, as well as potential environmental impacts associated with the construction of a facility of this nature is explored in more detail in this Scoping Report.

The Scoping Study for the proposed wind energy facility and associated infrastructure has been undertaken in accordance with the EIA Regulations published in Government Notice 33306 of GN R543, R544, R545 and R546 (18 June 2010), in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

This Scoping Report aims to identify potential issues associated with the proposed project, and define the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project involving specialists with expertise relevant to the nature of the project and the study area, the project proponent, as well as a consultation process with key stakeholders that includes both relevant government authorities and interested and affected parties (I&APs).

A comprehensive public participation process is being undertaken in accordance with Regulation 54 of Government Notice No R543 of 2010 during the Scoping phase of this EIA process.

This public participation process comprises the following:

» **Notification of the EIA Process** in printed media and on site, as well as through written notification to identified stakeholders and affected landowners.
» **Identification and registration** of I&APs and key stakeholders.
» Compilation and distribution of a **Background Information Document** (BID) to all identified I&APs and key stakeholders.
» **On-going consultation** with identified I&APs and stakeholders, including Telephonic communication, Focus Group Meetings and one-one-one meetings.
» Compilation and maintenance of a **database** containing the names and addresses of all identified I&APs and key stakeholders.
» Preparation of a **Comments and Response Report** detailing key issues raised by I&APs as part of the EIA Process.

The overarching objective for the wind farm planning process is to maximise electricity production through **exposure to the wind resource**, while minimising infrastructure, operational and maintenance costs, as well as **social and environmental impacts**. Local level environmental and planning issues will now be considered within **site-specific studies** to be undertaken as part of the EIA for the project. The assessments through the EIA process will assist in delineating areas of environmental sensitivity within the broader site and ultimately inform the placement of the wind turbines and associated infrastructure on the site in order to minimise impacts on the environment.

Issues identified through this scoping study as being potentially associated with the proposed Elliot Wind Energy Facility are summarised as follows:

Potential **positive** impacts related to the **construction phase** of the wind energy facility include, *inter alia:*
» Social Impacts
  * Skills development
  * Job and direct and indirect business opportunities
  * Improvement in opportunities for local and regional SMMEs

Potential **negative** impacts related to the **construction phase** of the wind energy facility include, *inter alia*:

» Visual impacts associated with the construction of the facility and associated infrastructure
» Loss of agricultural land and land use impacts
» Impacts on ecology and wetlands:
  * Impacts on bats due to construction activities in close proximity to habitat during construction
  * Impacts on threatened animals due to loss or transformation of habitat
  * Impacts on threatened plants due to loss or transformation of habitat

    * Impacts on protected tree species due to clearance of vegetation required for construction of infrastructure.
    * Direct loss of vegetation during construction leading to increased vulnerability, general reduction in biodiversity and increased fragmentation
    * Potential impacts on wetlands and drainage lines leading to localised loss of habitat with potential impacts on ecological and hydrological functioning
    * Spread of alien vegetation
- Impacts on avifauna
    * Disturbance to ground-nesting and/or terrestrial species and raptors especially along the ridge line, wetlands and dams.
    * Habitat loss: habitat destruction to small endemics.
- Impacts on heritage resources
- Impacts on paleontological resources (fossil material)
- Impacts on noise sensitive receptors
    * Noise impacts due to movement of construction machinery and vehicles
    * Noise impacts due to blasting (if required)
    * Noise impacts resulting from additional construction traffic onto feeder roads
- Social impacts
    * Impacts on land use and farming operations
    * Loss of sense of place
    * Impacts on property prices
    * Increased traffic
    * Increase crime in the study area

Potential **positive** impacts related to the **operational phase** of the wind energy facility include, *inter alia:*

- Provision of a clean, renewable energy source for the national grid
- Social Impacts:
    * Creation of opportunities to local business during the operational phase, including but not limited to, provision of security, staff transport, and other services
    * Potential up and down-stream economic opportunities for the local, regional and national economy
    * Assistance towards provision of secure power supply in South Africa

Potential **negative** impacts related to the **operational phase** of the wind energy facility include, *inter alia*:

- Visual impacts
    * Visual exposure of wind turbines and associated infrastructure on observers from roads, built-up areas, homesteads and farmsteads
    * Shadow flicker

    * Visual impact on sensitive topographic features and sense of place in particular in the southern parts of the Main Drakensburg Escarpment
- Impacts on ecology and wetlands:
    * Change in runoff and drainage patterns
    * Establishment of alien plant species
- Impacts on avifauna
    * Increased mortality of birds/bats due to collision with turbine blades and barotrauma (bats)
    * Increased mortality of birds due to collision with or electrocution on associated power line
    * Habitat loss and disturbance due to operation of the wind energy facility
- Noise impacts associated with operation of a wind energy facility
- Heritage Impacts:
    * Loss of cultural landscape and sense of place
- Social impacts:
    * Potential positive impacts on existing tourism potential due to visitors from other areas wanting to view the facility
    * Potential positive impacts on local farmers due to upgrade of roads and other infrastructure thereby improving efficiencies
    * Potential localised negative impacts on farming activities and land use
    * visual and sense of place impacts on existing receptors, including nearby rural and urban residences

The majority of potential impacts identified to be associated with the construction and operation of the proposed wind farm are anticipated to be localised and restricted to the proposed site. No environmental fatal flaws were identified to be associated with the site. However, areas of potential sensitivity were identified through the scoping phase as illustrated in Figure 2 below.

The sensitivity map is a rough scale estimate of sensitivity on the site, and these areas will be subject to survey and ground-truthing during the EIA phase of the project. These potentially sensitive areas will, therefore, be further investigated and assessed through detailed specialist studies (including field surveys) during the EIA phase.

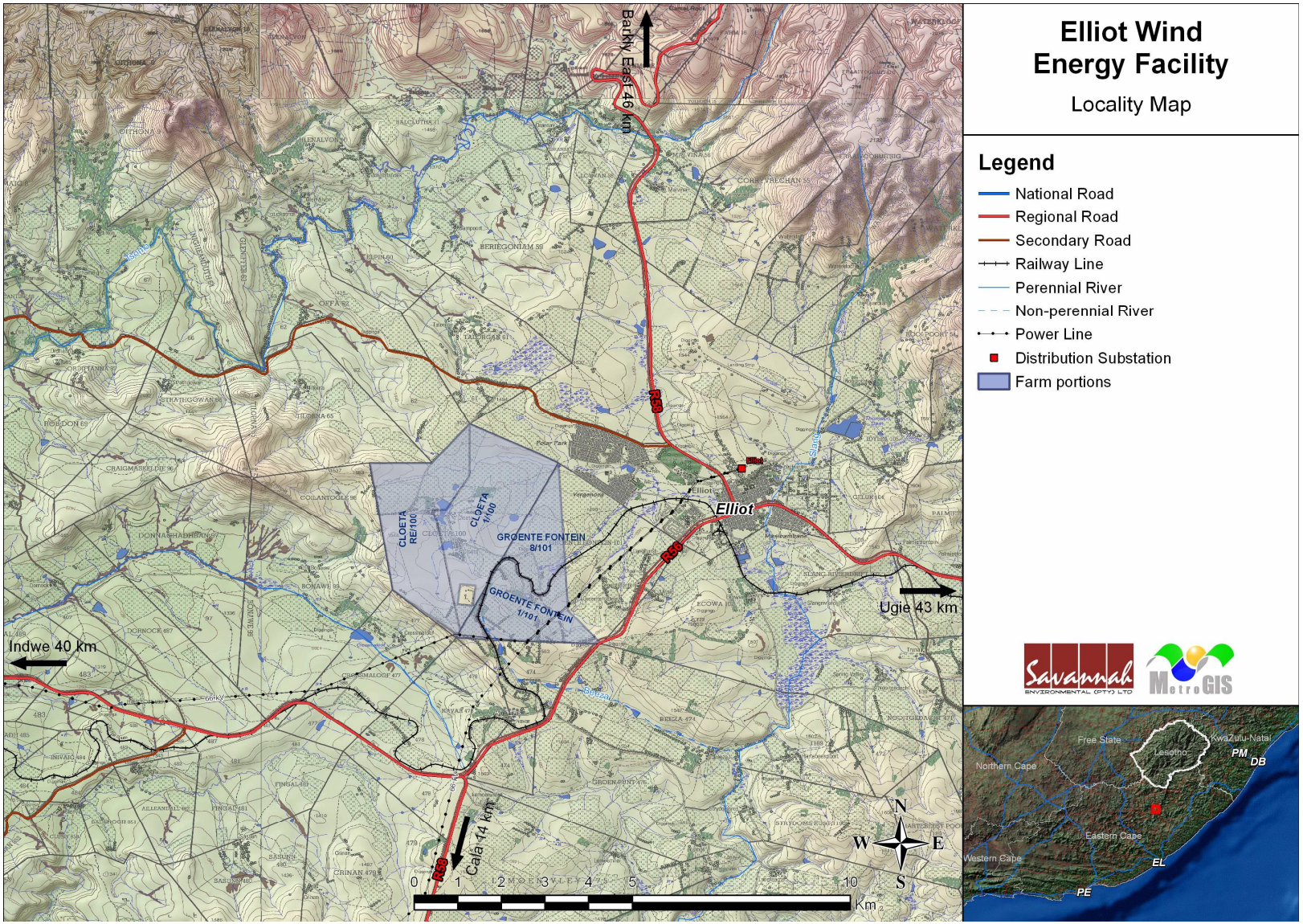

Figure 1: Locality map showing the proposed area for the establishment of the proposed Elliot Wind Energy Facility

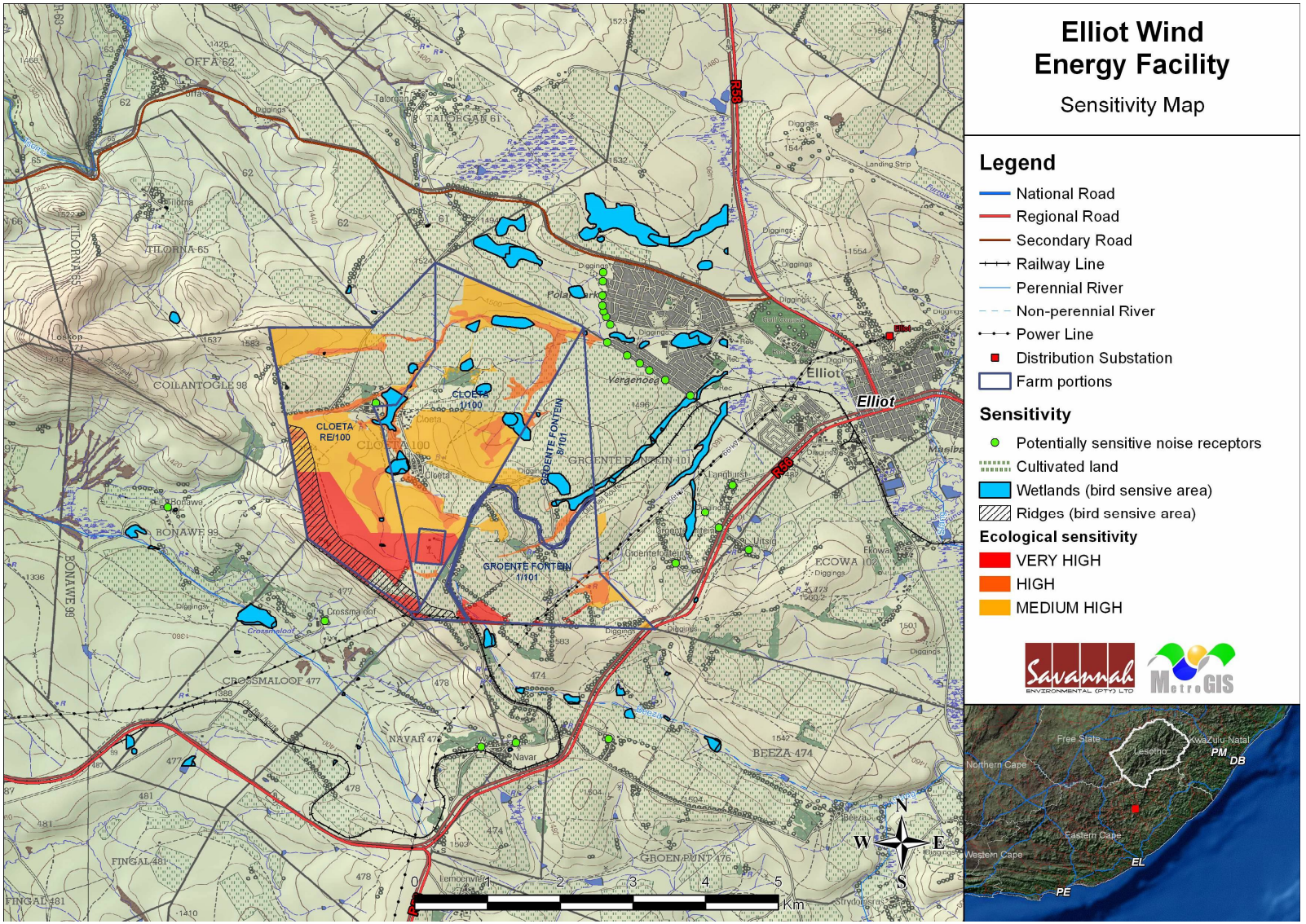

Figure 2: Potential environmental sensitivity based on overlay of sensitivities identified at Scoping

TABLE OF CONTENTS

APPENDICES

Appendix A: EIA Project Consulting Team CVs
Appendix B: Correspondence with Authorities
Appendix C: Stakeholder Database
Appendix D: Site Notice & Adverts
Appendix E: Public Participation Information
Appendix E1: Stakeholder Letter
Appendix E2: BID & Reply Form
Appendix E3: Stakeholder Consultation
Appendix E4: Minutes of the meetings
Appendix E5: Comments and responses report
Appendix F: Ecology Scoping Study
Appendix G: Avifauna Scoping Study
Appendix H: Soil & Agricultural Potential Scoping Study
Appendix I: Visual Scoping Study
Appendix J: Heritage Scoping Study
Appendix K: Noise Scoping Study
Appendix L: Social Scoping Study

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.

Ambient sound level: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

Betz Limit: 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

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 of time and can include both direct and indirect impacts.

Cut-in speed: The minimum wind speed at which the wind turbine will generate usable power.

Cut-out speed: The wind speed at which shut down occurs.

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

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'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.

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 (EIA), 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 plan: 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.

Generator: The generator is what converts the turning motion of a wind turbine's blades into electricity

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

Indirect impacts: Indirect or induced changes that may occur as a result 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 as a result 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 general public.

Nacelle: The nacelle contains the generator, control equipment, gearbox and anemometer for monitoring the wind speed and direction.

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).

Regional Methodology: The Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) have developed a guideline document entitled *Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape - Towards a Regional Methodology for Wind Energy Site Selection* (Western Cape Provincial Government, May 2006). The methodology proposed within this guideline document is intended to be a regional level planning tool to guide planners and decision-makers with regards to appropriate areas for wind energy development (on the basis of planning, environmental, infrastructural and landscape parameters).

Rotor: The portion of the wind turbine that collects energy from the wind is called the rotor. The rotor converts the energy in the wind into rotational energy to turn the generator. The rotor has three blades that rotate at a constant speed of about 15 to 28 revolutions per minute (rpm).

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.

Tower: The tower, which supports the rotor, is constructed from tubular steel. It is approximately 80 m tall. The nacelle and the rotor are attached to the top of the tower. 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. Larger wind turbines are usually mounted on towers ranging from 40 to 80 m tall. 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.

Wind power: A measure of the energy available in the wind.

Wind rose: The term given to the diagrammatic representation of joint wind speed and direction distribution at a particular location. The length of time that the wind comes from a particular sector is shown by the length of the spoke, and the speed is shown by the thickness of the spoke.

Wind speed: The rate at which air flows past a point above the earth's surface.

ABBREVIATIONS AND ACRONYMS

BID	Background Information Document
CBOs	Community Based Organisations
CDM	Clean Development Mechanism
CSIR	Council for Scientific and Industrial Research
CO_2	Carbon dioxide
D	Diameter of the rotor blades
DAFF	Department of Forestry and Fishery
DEA	National Department of Environmental Affairs
DME	Department of Minerals and Energy
DOT	Department of Transport
DWA	Department of Water Affairs
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
GWh	Giga Watt Hour
Ha	Hectare
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEP	Integrated Energy Planning
km^2	Square kilometres
km/hr	Kilometres per hour
kV	Kilovolt
m^2	Square meters
m/s	Meters per second
MW	Mega Watt
NEMA	National Environmental Management Act (Act No 107 of 1998)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NGOs	Non-Governmental Organisations
NIRP	National Integrated Resource Planning
NWA	National Water Act (Act No 36 of 1998)
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SDF	Spatial Development Framework
WC DEA&DP	Western Cape Department of Environmental Affairs and Development Planning

INTRODUCTION *CHAPTER 1*

DNA Wind Farm (Pty) Ltd is proposing to establish a commercial wind energy facility and associated infrastructure on a site located within Sakhisizwe Local Municipality in the Eastern Cape Province. The proposed wind energy facility is to be developed by DNA Wind Farm (Pty) Ltd, an infrastructure and wind farm developer. The proposed site is situated approximately 3 km west of Elliot. Based on an extensive pre-feasibility analysis and site identification process undertaken by DNA Wind Farm, as well as an analysis of the wind resource in the area, a favourable area has been identified for consideration and evaluation as per the requirements of an Environmental Impact Assessment (EIA). A cluster of up to 60 wind turbines with a total generating capacity of up to 180 MW, collectively referred to as a wind energy facility, is planned to be constructed over an area of approximately 1 600 ha in extent. These will be appropriately spaced to optimise the energy generating potential of the wind resource.

The nature and extent of this facility, as well as potential environmental impacts associated with the construction and operation of a facility of this nature is explored in more detail in this Final Scoping Report. The purpose of this report is to identify and evaluate potential environmental issues associated with the proposed project and to recommend further studies which may be required to determine the significance of the environmental impacts within the EIA phase of the process. This Scoping Report consists of the following sections:

» **Chapter 1** provides background to the proposed project and the environmental impact assessment.
» **Chapter 2** describes the activities associated with the project (project scope). This chapter also describes wind energy as a power generation option and provides insight of the available technologies for wind turbines.
» **Chapter 3** outlines the process which was followed during the Scoping Phase of the EIA process, including the consultation programme that was undertaken and input received from interested and affected parties.
» **Chapter 4** describes the existing biophysical and socio-economic environment.
» **Chapter 5** provides an identification and evaluation of the potential issues associated with the proposed project.
» **Chapter 6** presents the conclusions of the scoping evaluation.
» **Chapter 7** describes the Plan of Study for EIA.
» **Chapter 8** provides references used to compile the Scoping Report.

1.1. Project Overview

The proposed site is situated approximately 3 km west of Elliot. Based on an extensive pre-feasibility analysis and site identification process undertaken by DNA Wind Farm, as well as an analysis of the wind resource in the area, a favourable area has been identified for consideration and assessment within an Environmental Impact Assessment (EIA). The site being considered for the proposed wind energy facility covers an area of approximately 1 600 ha which has primarily been used for agricultural activities, being predominantly maize farming and livestock grazing. The site for the establishment of the wind energy facility comprises of the following farm portions (refer to Figure 1.1):

» Remainder of Portion 1 of the farm Cloeta,
» Remainder of the farm Cloeta No. 100,
» Portion 8 of the farm Groentefontein, and
» Remainder of Portion 1 of the farm Groentefontein.

The facility will install up to 60 turbines with a generating capacity of up to 3MW each, with a hub height of up to 100m and a rotor diameter of up to 120m. The entire facility would have a generating capacity of up to 180 MW. The optimal position for each turbine and layout of associated infrastructure will be determined using specialist software.

Infrastructure associated with the wind energy facility is proposed to include:

» Up to 60 Wind Turbines with a total generating capacity of up to 180 MW (each turbine will be comprised of a tower, nacelle and a rotor with its associated blades).
» Foundations to support the turbine towers (up to 20m x 20m);
» Underground cables between turbines (excavated to a depth of ~1m deep) and limited overhead cabling;
» A small on-site substation (size to be determined in EIA phase);
» Overhead distribution power line which will link to the existing Eskom power line which traverses the site;
» Internal access roads (~ 6m wide) to each wind turbine; and
» Workshop / administration building.

The above proposed infrastructure is anticipated to extend over a footprint of between 0.5km^2 to 0.8km^2 (or 50ha to 80ha) of the affected 1600ha study area, which is up to 5% of the total area included in this assessment. A more accurate understanding of the final footprint will be determined during the EIA Phase with the availability of the final layout plan.

Environmental issues and constraints are considered within **site-specific specialist studies** and assessments through the EIA process in order to delineate

areas of sensitivity within the broader area which should ideally be avoided in planning the proposed facility. A preliminary layout of the components of the wind energy facility will be developed for assessment during the EIA phase of the project. The layout of the wind turbines and associated infrastructure can be appropriately planned upon:

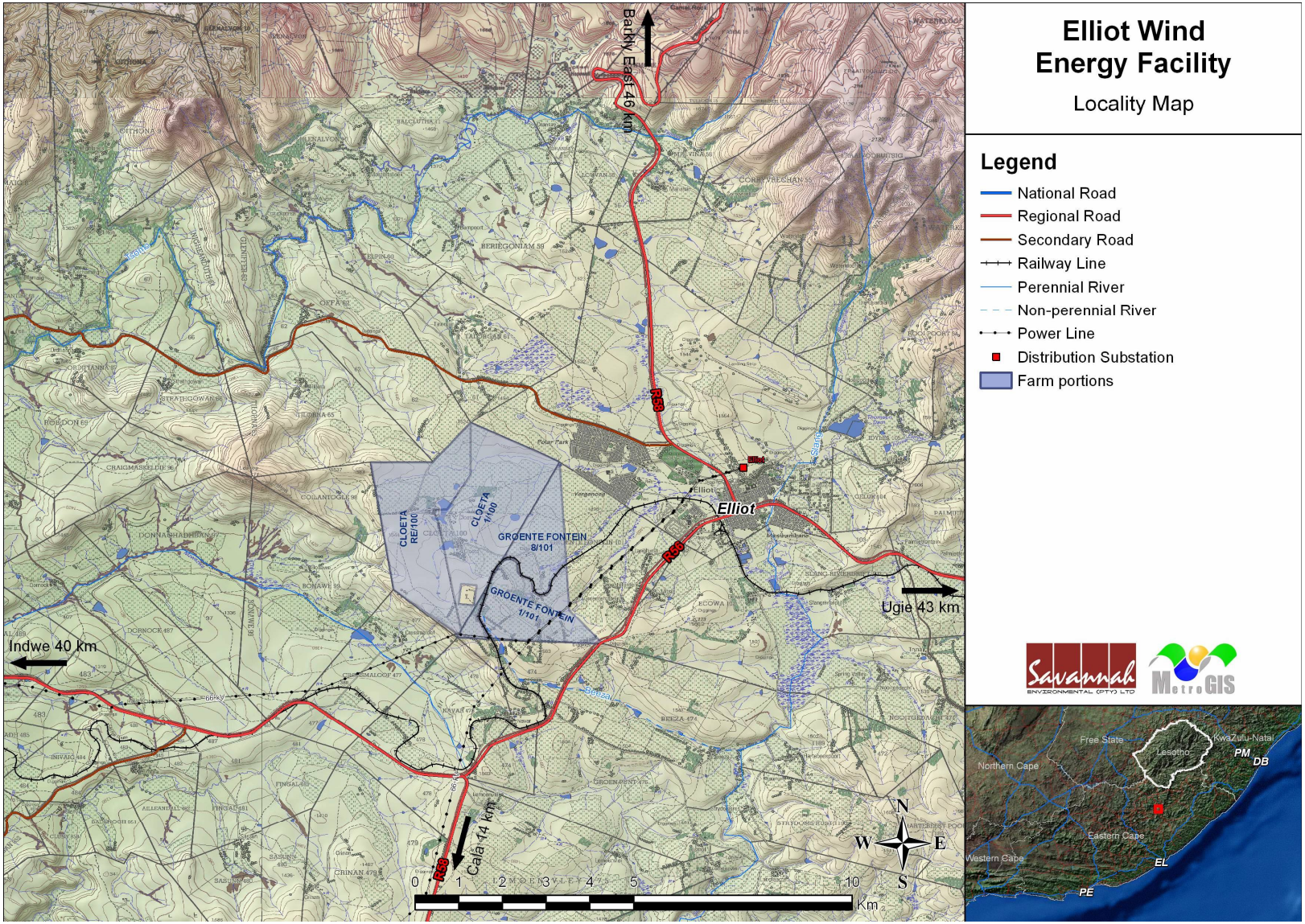

Figure 1.1: Locality map showing the proposed area for the establishment of the proposed Elliot Wind Energy Facility

» Identification of environmental constraints
» Site-specific wind data is available from the wind monitoring on site for an extended period (ideally 12 - 18 months), and
» The wind turbine manufacturer has been selected through a tendering process.

1.2. The Need and Desirability for the Proposed Project

Globally there is increasing pressure on countries to increase their share of renewable energy generation due to concerns such as climate change and the need to reduce the dependence upon fossil fuels, such as oil and coal, for energy and thus reduce the volume of greenhouse gasses emitted into the atmosphere. Grid connected renewable energy is currently the fastest growing sector in the global energy market.

Targets for the promotion of renewable energy now exist in more than 58 countries, of which 13 are developing countries. The South African Government has recognised the country's high level of renewable energy potential and presently has in place targets of 10 000 GWh of renewable energy by 2013.

The need to expand electricity generation capacity in South Africa is based on national policy and is informed by on-going strategic planning undertaken by the Department of Energy (DoE). In response to the National Energy Policy's objective relating to affordable energy services, the DoE commissioned a National Integrated Resource Plan (IRP) in order to provide a long-term, cost-effective resource plan for meeting electricity demand, which is consistent with reliable electricity supply and environmental, social, and economic policies. The planning horizon for the study was from 2010 to 2030. The objective of the IRP is to determine the least-cost supply option for the country, provide information on the opportunities for investment into new power generating projects, and evaluate the security of supply. The long-term electricity planning goal is to ensure sustainable development considering technical constraints, economic constraints, social constraints, and externalities.

In order to meet the long-term goal of a sustainable renewable energy industry and to diversify the energy-generation mix in South Africa, a goal of 17,8GW of renewables by 2030 has been set by the Department of Energy (DoE) within the Integrated Resource Plan (IRP) 2010. This energy will be produced mainly from wind, solar, biomass, and small-scale hydro (with wind and solar comprising the bulk of the power generation capacity). This amounts to ~42% of all new power generation being derived from renewable energy forms by 2030.

In responding to the growing electricity demand within South Africa, as well as the country's targets for renewable energy, DNA Wind Farm (Pty) Limited proposes the

establishment of the Elliot Wind Farm to add new capacity to the national electricity grid.

1.3. Requirement for an Environmental Impact Assessment Process

The construction and operation of the proposed Elliot Wind Energy Facility project is subject to the requirements of the Environmental Impact Assessment Regulations (EIA Regulations) published in terms of Section 24(5) of the National Environmental Management Act (NEMA, No 107 of 1998). This section provides a brief overview of EIA Regulations and their application to this project.

NEMA is 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) mandated by NEMA with the granting of the relevant environmental authorisation. The National Department of Environmental Affairs (DEA) is the competent authority for this project. An application for authorisation has been accepted by the DEA (under Application Reference number **12/12/20/2282**). Throughout the decision-making process, the DEA will be supported by the Eastern Cape Department of Economic Development and Environmental Affairs (Eastern Cape DEDEA).

The need to comply with the requirements of the EIA Regulations ensures that decision-makers are provided the opportunity to consider the potential environmental impacts of a project early in the project development process, and assess if 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. DNA Wind Farm appointed Savannah Environmental (Pty) Ltd to conduct the independent Environmental Impact Assessment (EIA) process for the proposed project.

An EIA is also an effective planning and decision-making tool for the project proponent. It allows the environmental consequences resulting from a technical facility during its establishment and its operation to be identified and appropriately managed. It provides the opportunity for the developer to be forewarned of potential environmental issues, and allows for resolution of the issue(s) reported on in the Scoping and EIA reports while facilitating dialogue between affected parties.

In terms of sections 24 and 24D of NEMA, as read with the EIA Regulations of GN R543 (Regulations 26-35), R544, R545 and R546, a Scoping Study and EIA are required to be undertaken for this proposed project as it includes the following

activities listed in terms of GN R545, R544 and R 546 (as corrected in December 2010):

Relevant Notice	Activity No	Description of listed activity	Applicability to the project
Government Notice R544, 18 June 2010	10	The construction 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 275kV;or (ii) inside urban areas or industrial complexes with a capacity of 275kV or more.	A new overhead power line will be constructed on the site
Government Notice R544, 18 June 2010	11	The construction of: (iii) bridges; (xi) infrastructure or structures covering 50 square metres or more Where such construction occurs within a watercourse or within 32 metres of a watercourse, measures from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	Potential construction of roads, power lines or infrastructure within 32 metres of a watercourse
GN 544, 18 June 2010	18(i)	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from: i. a watercourse;	The development of the facility may require the excavation, removal or moving of soil from a watercourse or drainage line for road construction.
GN 544, 18 June 2010	13	The construction 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 but not exceeding 500 cubic metres.	For the temporary on-site storage of diesel and fuel in containers for construction machinery and vehicles.
Government Notice R544, 18 June 2010	22	The construction of a road, outside urban areas, (i) With a reserve wider than 13,5 metres, or (ii) Where no road reserve exists where the road is wider than 8 metres	External and internal access roads between turbines need to be constructed. The roads may exceed 8m in width in some instances.

Relevant Notice	Activity No	Description of listed activity	Applicability to the project
Government Notice R544, 18 June 2010	26	Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).	The site may / may not have sensitive / conservation worthy vegetation, protected under the NEM:BA, this is to be confirmed during the EIA .
	47	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- (i) where the existing road reserve is wider than 13.5 metres; or (ii) where no reserve exists, where the existing road is wider than 8 metres – excluding widening or lengthening occurring inside urban areas.	Existing farm (gravel) access roads may be widened, (to be confirmed in the EIA phase, based on the design of the facility)
Government Notice R545, 18 June 2010	1	The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.	Establishment of a wind farm with a generating capacity of up to 180 MW.
Government Notice R545, 18 June 2010	15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for (i) Linear development activities or (ii) Agriculture or afforestation where activity 16 in this schedule will apply.	The facility is proposed to be established within an area of more than 20 ha in extent.
Government Notice 546, 18 June 2010	4(a)	The construction of a road wider than 4 metres with a reserve less than 13,5 metres	Access roads are required to be constructed for access to the turbines. In places these may be wider than 4m.
Government Notice 546, 18 June 2010	10(a)(ii)	The construction 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	This may be triggered during construction by the fuels etc (e.g. diesel) temporarily stored on site.
Government Notice 546, 18 June 2010	13(a)	The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation	The construction of the facility will require the clearance of >1 hectare of vegetation. The

Relevant Notice	Activity No	Description of listed activity	Applicability to the project
			relevance of this activity will be determined in the EIA phase.
Government Notice 546, 18 June 2010	16(iii)& (iv) (a)	The construction of: iii. Buildings with a footprint exceeding 10 square metres in size or iv. Infrastructure covering 10 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	The facility may entail construction close to existing watercourses / drainage lines on site. The relevance of this activity will be determined in the EIA phase.

This report documents the scoping evaluation of the potential environmental impacts associated with the construction and operation of the proposed wind energy facility. This scoping study forms part of the EIA process and was conducted in accordance with the requirements of the EIA Regulations in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

1.4. Objectives of the Scoping Phase

The Scoping Phase of the EIA process refers to the process of identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA Phase. This is achieved through:

» An evaluation of the proposed project within the broader study area,
» Involving the project proponent/applicant and communication of environmental risk,
» Involving specialists with experience in the study area and in EIAs for similar projects, and
» Conducting a public consultation process with key stakeholders, government authorities and interested and affected parties (I&APs).

In accordance with the EIA Regulations, the main purpose of the Scoping Phase is to focus the environmental assessment in order to ensure that only potentially significant issues and reasonable and feasible alternatives are assessed in detail in the EIA Phase. Review of the Draft Scoping Report provides the public with an opportunity to verify that all potential issues associated with the proposed project have been identified through this scoping study, and provides an opportunity for additional key issues requiring consideration to be raised. The Final Scoping Report

incorporates all issues and responses raised during the public review of the Draft Scoping Report prior to submission to DEA.

1.5. Details of Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA

Savannah Environmental was contracted by DNA Wind Farm as an independent consultant to undertake an Environmental Impact Assessment (EIA) for the proposed project, as required in terms of Regulation 17 of the NEMA EIA Regulations. Neither Savannah Environmental, nor any its specialist sub-consultants on this project are subsidiaries of or affiliated to DNA Wind Farm. 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 environmental impact 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.

The EAPs from Savannah Environmental who are responsible for this project are:

» *Karen Jodas* - a registered Professional Natural Scientist and holds a Master of Science degree. She has 16 years of experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. She is currently responsible for the project management of EIAs for several renewable energy projects across the country.

» *Steven Ingle* - Steven Ingle is currently employed as a senior environmental consultant and holds a degree in Environmental Management with over 7 years of experience in the environmental field. His competencies lie in environmental impact assessments for large scale infrastructure, property and mining projects, environmental due diligence and risk assessment, environmental

compliance monitoring, waste management licensing and strategic environmental assessment.

In order to adequately identify and assess potential environmental impacts associated with the proposed project, Savannah Environmental has appointed several specialist consultants to conduct the specialist scoping studies, as required.

The curricula vitae for the EIA project team are included in Appendix A.

SCOPE OF THE PROPOSED PROJECT CHAPTER 2

This chapter of the scoping report provides background to the proposed wind energy facility. The following information is presented:

» Wind energy as a power generation technology.
» Details regarding the scope of the proposed project. The scope of project includes construction, operation and decommissioning activities.
» Alternatives with regard to the proposed wind energy facility development, including the "do nothing" option.

2.1. Turning Wind into Electricity

Wind power is the conversion of wind energy into a useful form, such as electricity, using wind turbines. The use of wind for electricity generation is a non-consumptive use of a natural resource, and produces an insignificant quantity of greenhouse gases in its lifecycle. Wind power consumes no fuel for continuing operation, and has no emissions directly related to electricity production. Operation does not produce any type of air pollution, as would be associated with fossil fuel power sources. Wind energy is one of the fastest growing electricity generation technologies, and features in energy plans worldwide.

As part of the feasibility phase of a proposed wind energy project, a wind resource measurement and analysis programme must be conducted for the site proposed for development, as only measured data from the proposed development site will provide a robust prediction of the facility's expected energy production over its lifetime. As such, DNA Wind Farm are currently conducting wind measurement monitoring on the proposed development site to measure the wind potential (wind energy) in the area. The aim of this wind measurement monitoring is to obtain reliable information about the speed, strength, direction, and frequency of the wind resource.

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. Wind turbines can start generating at wind speeds of between 10 km/hr to 15 km/hr (~3 m/s to 4 m/s), with nominal wind speeds required for full power operation varying between ~45 km/hr and 60 km/hr (~12.5 m/s to 17 m/s). Wind speed can be highly variable and is also affected by a number of factors, including surface roughness of the terrain. Typical annual wind speeds range from 15 km/hr to 25 km/hr (4 m/s to 7 m/s) around South Africa's southern, eastern and western coastlines. This relates to an expected annual

energy utilisation factor of between 15% and 30%, the value depending on the specific site selected.

Turbines are able to operate at varying wind speeds. The amount of energy a turbine can harness depends on both the wind velocity and the length of the rotor blades. Wind turbines can start generating at wind speeds of between 10 km/hr to 15 km/hr (~3 m/s to 4 m/s), with nominal wind speeds required for full power operation varying between ~45 km/hr and 60 km/hr (12.5 m/s and 17 m/s).

Wind power (strength and frequency) is a measure of the energy available in the wind and the ability to convert the wind energy into electricity using wind turbines.

Wind direction at a site is important to understand, but it is not critical in site selection as wind turbine blades automatically turn to face into the predominant wind direction at any point in time.

Although modern wind turbines are able to yaw to the direction of the wind, the design of a wind energy facility is sensitive to the predominant wind directions and wind speeds for the site, as well as to topographical features or relief affecting the flow of the wind (e.g. causing shading effects and turbulence of air flow), and the effect of adjacent turbines on wind flow and speed (specific spacing is required between turbines in order to reduce the effects of wake turbulence).

As the performance of the turbines is determined by disturbances to the wind resource, they must be appropriately spaced within the facility. Turbines would, therefore, be positioned within the study area of approximately 1 600 ha. Wind turbines typically need to be spaced approximately 2 to 3xD apart, and 5 to 7xD where a turbine is behind another (D = the diameter of the rotor blades). This is required to minimise the induced wake effect the turbines might have on each other. Considering a typical 2 MW capacity turbine whose rotors are approximately 90 m in diameter, each turbine would be separated by approximately 180 m to 300 m. The erection of turbines in parallel rows one behind another would require a distance between rows of 500 m to 700 m.

The overall aim of the design and layout of the facility is to maximise electricity production through exposure to the wind resource, while minimising infrastructure, operation and maintenance costs, as well as social and environmental impacts. 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 micro-siting of the turbines on the site will be determined using industry standard software systems, which will automatically consider the spacing requirements.

2.2.1. Main Components of a Wind Turbine

Generally a wind turbine consists of a **rotor (with three blades)** and a **nacelle** mounted at the top of a tapered **tower** (refer to Figure 2.1). The mechanical power generated by the rotation of the blades is transmitted to the generator within the nacelle via a gearbox and drive train.

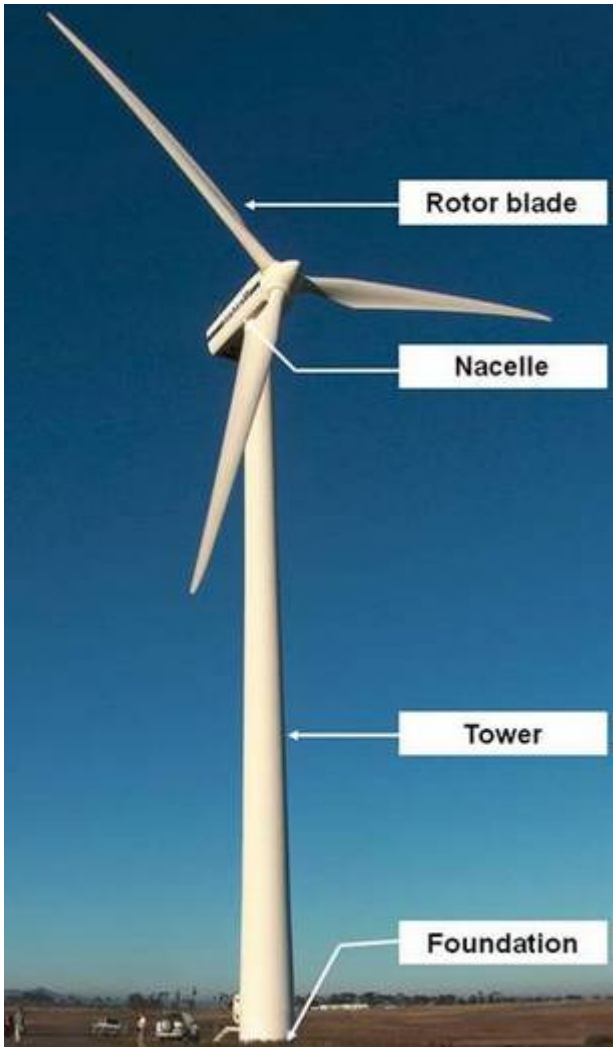

Figure 2.1: Illustration of the main components of a wind turbine

The turbines being considered for use at the proposed Elliot Wind Energy Facility will each be up to **3 MW** in capacity. The turbines will have a maximum **hub height** of up to **100m and a rotor diameter of up to 120m**.

Other infrastructure associated with the facility includes:

» Foundations to support the turbine towers;
» Underground cables between turbines;
» A substation

» Overhead distribution power line to connect to the existing Eskom power line which traverses the site;
» Internal access roads to each wind turbine; and
» Workshop / administration building.

The Rotor

The portion of the wind turbine that collects energy from the wind is called the rotor. The rotor converts the energy in the wind into rotational energy to turn the generator. The rotor generally has three blades that rotate at a constant speed up to 24 revolutions per minute (rpm). The speed of rotation of the blades is controlled by the nacelle, which can turn, so that the blades face into the wind ('yaw control'), and change the angle of the blades ('pitch control') to make the most use of the available wind.

The nacelle

The nacelle refers to the structure that houses all the generator components, i.e. control equipment, gearbox and anemometer for monitoring the wind speed and direction (as shown in Figure 2.2). The rotor is attached to the nacelle.

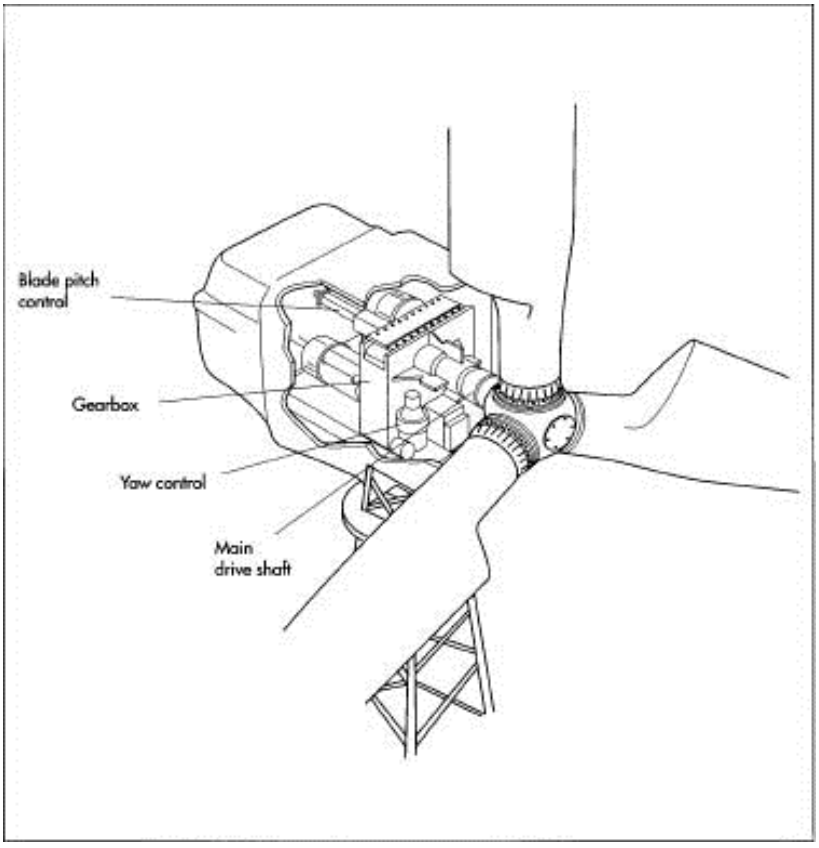

Figure 2.2: Detailed structure of a typical nacelle of a wind turbine

The tower

The tower, which supports the rotor, is constructed from tubular steel or concrete. The tower will be up to 100 m in height, depending on the turbine type selected for the wind energy facility. The nacelle is attached to the top of the tower.

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.

Foundation

A concrete **foundation** is laid into the ground at the base of the turbine to provide stability and support to the turbine. The dimensions of these foundations are generally 20 m x 20 m wide and up to 3 m deep on average depending on the geotechnical properties at the footprint for the individual turbine.

2.2.2. Operating Characteristics of a Wind Turbine

With the exception of downtime for preventative maintenance and/or malfunctions, the turbines will operate 365 days a year and 24 hours a day. A turbine is designed to operate continuously, unattended and with low maintenance for 20 - 30 years. The turbines will generate electricity only during times of sufficient wind.

Once operating, a wind energy facility can be monitored and controlled remotely, with a mobile team for maintenance, when required. Downtime for preventive maintenance and/or malfunctions may reduce the operating hours.

The **cut-in speed** is the minimum wind speed at which the wind turbine will generate usable power. This wind speed is typically between 10 and 15 km/hr (~3 m/s and 4 m/s).

At very high wind speeds, typically over 90 km/hr (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.

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 built close together to form a **wind energy facility** (also commonly referred to as a wind farm).

2.2. Project Site Selection

2.2.1. Identification of the Proposed Site as Suitable for Wind Energy Development

In determining a potentially suitable site for the establishment of a wind energy facility, a number of sites were considered by DNA Wind Farm. These sites were evaluated against specific criteria, which included grid connectivity, land availability, the wind resource and environmental risks. The proposed development site was identified as being potentially feasible in terms of these criteria. DNA Wind Farm further considers the proposed development site as an ideal location for a wind farm due to the favourable wind resource in the area. Wind resource data is currently being collected from existing wind monitoring masts installed on the site, which indicate a suitable wind resource for operation of a wind energy facility on the proposed site.

2.3. Site-specific or Layout Design Alternatives

As local level issues were not assessed prior to this scoping report, these issues are now being considered within the site-specific studies and assessments through the EIA in order to delineate areas of sensitivity within the broader development area. DNA Wind Farm has not selected the final turbine model or models that will be installed on the site. The capacity of the actual turbines to be used for the project is not certain at this point, but the units are expected to be up to 3 MW in capacity. The turbines will have a hub height of up to 100 m, and a rotor blade length of up to 60 m.

The site under consideration is approximately 16 km^2 in extent. Less than 20% of this area will be permanently transformed as a result of the proposed wind energy facility. As such, the placement of the wind turbines and associated infrastructure within the site can be undertaken taking cognisance of the identified environmental sensitivities. In order to identify potential sensitivities associated with a proposed layout, a preliminary layout of the components of the wind energy will be developed for assessment at the EIA phase of the project. Once environmental constraining factors have been determined through the EIA process, and site-specific wind data is available from the wind monitoring on site, the layout of the wind turbines and associated infrastructure can be appropriately planned. The final layout will result in a carefully achieved balance of energy production and environmental protection.

Initial studies on network integration have shown the project to be viable, but a more detailed study will be required. Network integration studies, planning and design for the distribution of the power generated by the wind energy facility are being finalised. The ability of the distribution network to absorb the generated power is one of a number of constraints on the size of the wind farm. This will be

informed through understanding the local power requirements and the capacity/stability of the local electricity network

2.4. The 'do-nothing' Alternative

The 'do-nothing' alternative is the option of DNA Wind Farm not constructing the Elliot Wind Energy Facility. This would result in no impacts on the environment as a result of a wind energy facility in this area.

Within a policy framework, the development of renewable energy in South Africa is supported by the White Paper on Renewable Energy (November 2003), which has set a target of 10,000 GWh renewable energy contribution to final energy consumption by 2013. The target is to be achieved primarily through the development of wind, biomass, solar and small-scale hydro. DoE's macroeconomic study of renewable energy, developed under the now completed Capacity Building in Energy Efficiency and Renewable Energy (CaBEERE) project, has established that the achievement of this target would provide a number of economic benefits, including increased government revenue amounting to R299 million, increased GDP of up to R1 billion per year and the creation of an estimated 20,500 new jobs. In addition, the development of renewable energy beyond the 10,000 GWh target holds further employment benefits and would maximise the number of jobs created per TWh.

The electricity demand in South Africa is placing increasing pressure on the country's existing power generation capacity. There is therefore a need for additional electricity generation options to be developed throughout the country. The option to do nothing in terms of implementing renewable energy projects therefore effectively means the choice to build another form of power generation plant in another location. This would most likely be a coal-fired thermal plant as this is the preferred source in South Africa. The development of a renewable energy source, as promoted by the South African Government would therefore not be realised, and reliance on fossil fuel energy sources would not be reduced.

In response to the above, the purpose of the proposed wind energy facility is to add new capacity for generation of renewable energy to the national electricity mix and to aid in achieving the goal of a 43% share of all new power generation being derived from independent power producers (IPPs), as targeted by the Department of Energy (DoE). The do-nothing alternative would result in this additional power from renewable energy not being added to the electricity grid. Although only a small contribution to the overall power requirements and renewable energy goals, the implementation of the proposed project (or any similar projects) is considered to provide possible environmental and socio-economic benefit at a local, regional and national level, and is in line with government policy. Therefore, the do-nothing alternative is not considered a preferred alternative as economic and environmental

benefits associated with development of a renewable energy source outweigh the short-term and long-term impacts of project construction and operation.

This option will be further assessed within the EIA phase of the process.

2.5. Description of the Project Construction Phase

The construction phase of the wind energy facility is dependent on the number of turbines to be erected. A facility of this size would take up to two years to construct. The construction of the proposed facility will mainly require the expertise of skilled staff, with limited opportunities for unskilled labour. In order to construct the proposed wind energy facility and associated infrastructure, a series of activities will need to be undertaken. The following construction activities have been considered to form part of the project scope.

2.5.1. Conduct Surveys

Prior to initiating construction, a number of surveys will be required including, but not limited to, geotechnical survey, site survey and confirmation of the turbine micro-siting footprint, survey of the substation site and survey of the power line servitude to determine tower locations. Much of this survey work occurs during the environmental feasibility process undertaken within the Environmental Impact Assessment (EIA) process. This is required in order to inform the preliminary layout of the facility which is assessed in the EIA.

2.5.2. Establishment of Access Roads to the Site

The eastern section of the site is accessible from the R58 Regional Road where the road passes the site at a location ~4 km south of Elliot. However, a preferred access point to the site will be specified during the EIA phase. Access/haul roads to the site as well as internal access roads within the site are required to be established. As far as possible, existing access roads would be utilised, and upgraded where required. Within the site itself, access will be required between the turbines for construction purposes (and later limited access for maintenance). Special haul roads may need to be constructed to and within the site to accommodate abnormally loaded vehicle access and circulation. The internal service road alignment will be informed by the final micro-siting/positioning of the wind turbines.

These access roads will have to be constructed in advance of any components being delivered to site, and will remain in place after completion for future access and possibly access for replacement of parts if necessary.

2.5.3. Undertake Site Preparation

Site preparation activities will include clearance of vegetation at the footprint of each turbine, levelling and clearance of laydown areas at each turbine position, the establishment of internal access roads and excavations for foundations. These activities will require the stripping of topsoil, which will need to be stockpiled, backfilled and/or spread on site.

2.5.4. Construct Foundation

Concrete foundations will be constructed at each turbine location. Foundation holes will be mechanically excavated to a depth of approximately 2 m to 3 m (or more depending to the sandy nature of the soil. A geotechnical investigation will give an indication of the depth of the foundation hole). A batching plant will be required to be erected close to the site for the construction of foundations. The dimensions of the reinforced concrete foundations are generally a maximum of 20 m x 20 m x 3 m. The foundation will be poured and will support a mounting ring. The foundation will then be allowed to cure.

2.5.5. Transport of Components and Equipment to Site

The wind turbine, including the tower, will be brought on site by the turbine supplier or a designated hauler in sections on flatbed trucks. Turbine units which must be transported to site consist of: the tower (in segments), nacelle and three rotor blades. The individual components are defined as abnormal loads in terms of Road Traffic Act (Act No 29 of 1989)[1] by virtue of the dimensional limitations (abnormal length of the blades) and load limitations (i.e. the nacelle). In addition, components of various specialised construction and lifting equipment are required on site to erect the wind turbines and need to be transported to site. In addition to the specialised lifting equipment/cranes, the normal civil engineering construction equipment would need to be brought to the site for the civil works (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.).

The components required for the establishment of the substation/s (including transformers) as well as the power lines (including towers and cabling) will also be transported to site as required.

The dimensional requirements of the load during the construction phase (length/height) may require alterations to the existing road infrastructure (e.g. widening on corners), accommodation of street furniture (e.g. street lighting, traffic signals, telephone lines etc) and protection of road-related structures (i.e. bridges, culverts, portal culverts, retaining walls etc) as a result of abnormal loading.

[1] A permit will be required for the transportation of these loads on public roads.

The equipment will be transported to the site using appropriate National and Provincial roads, and the dedicated access/haul road to the site itself.

2.5.6. Establishment of Laydown Areas on Site

Laydown areas will need to be established at each turbine position for the storage of wind turbine components. The laydown area will need to accommodate the cranes required in tower/turbine assembly. Laydown and storage areas will be established for the normal civil engineering construction equipment which will be required on site.

A laydown area, incorporated into the turbine component laydown area, will be required at each position where the main lifting crane will be required to erect the turbine. This area would be required to be compacted and levelled to accommodate the above-mentioned necessary equipment.

2.5.7. Construct Turbine

A lifting crane will be brought on site. It will lift the tower sections into place. The nacelle, which contains the gearbox, generator and yawing mechanism, will then be placed onto the top of the assembled tower. The next step will be to assemble or partially assemble the rotor (i.e. the blades of the turbine) on the ground. It will then be lifted to the nacelle and bolted in place. A small crane will likely be needed for the assembly of the rotor while a large crane will be needed to put it in place. It will take approximately 2 days to erect a single turbine.

2.5.8. Construct Substation

A substation will be constructed within the site development footprint. The turbines will be connected to the substation via trenched cabling. The local switchgear and transformers for each turbine may be installed in the base of the tower, or on a small concrete plinth (approx. 5m x 5m) adjacent to the tower.

Once micro-siting/positioning of the turbines has been finalised, the position of the main substation will be chosen to optimise cable lengths and associated losses. The construction of the substation would require a survey of the site (approximately 200 m x 200 m); site clearing and levelling and construction of an access road to substation site (where required); construction of substation terrace and foundations; substation building, assembly, erection and installation of equipment (including transformers); connection of conductors to equipment; and rehabilitation of any disturbed areas and protection of erosion sensitive areas.

2.5.9. Establishment of Ancillary Infrastructure

A workshop and administrative centre as well as a contractor's equipment camp may also be required to be constructed. The establishment of these facilities/buildings will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction. A laydown area for building materials and equipment associated with these buildings will also be required.

2.5.10. Connection of Wind Turbines to the Substation

Each wind turbine will be connected to an optimally positioned substation by underground electrical cables (33 kV). The installation of these cables will require the excavation of trenches, approximately 1 m in depth within which these cables can then be laid. The underground cables will be planned to follow the internal access roads, where possible.

2.5.11. Connect Substation to Power Grid

A distribution power line is proposed to connect the substation to existing Eskom power line (i.e. the Cala - Elliot 66kV power line) which traverses the site proposed for the wind energy facility. The overhead power line will connect the facility's substation to the Eskom distribution network via a turn-in and –out configuration.

A route for this power line will be assessed, surveyed and pegged prior to construction.

2.5.12. Undertake Site Rehabilitation

As construction is completed in an area, and as all construction equipment is removed from the site, the site rehabilitated where practical and reasonable will begin. On full commissioning of the facility, any access points to the site which are not required during the operation phase will be closed and prepared for rehabilitation.

2.6. Project Operation Phase

The lifespan of the facility is approximated at 20 to 30 years. It is unknown at this stage how many employees would be required for the monitoring and maintenance of the facility.

Each turbine within the wind energy facility will be operational except under circumstances of mechanical breakdown, extreme weather conditions or maintenance activities.

The operations staff would be responsible for routine maintenance, long-term maintenance, and emergency work on the turbines. Routine maintenance for the turbines will include testing of lubricants for contaminants, changing of lubricants, calibrating and testing electronic systems, and tightening of bolts and components. Routine maintenance is generally completed on a scheduled basis by climbing the tower using the internal ladder and doing the work with normal hand tools and electrical testing equipment.

Long-term maintenance may include replacement/rebuilding and cleaning of larger components such as generators and gearboxes, testing of electrical components, and refurbishing blades.

Emergency work also may be required as the result of a system or component failure. Certain unplanned work such as blade repairs or repairs to other large components may require the use of a crane to complete the work.

2.7. Project Decommissioning Phase

The turbine infrastructure which will be utilised for the proposed Elliot Wind Energy Facility is expected to have a lifespan of approximately 20 - 30 years (with maintenance). Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the facility discussed in this EIA would comprise the disassembly and replacement of the turbines with more appropriate technology/infrastructure available at that time.

The following decommissioning activities have been considered to form part of the project scope.

2.7.1. Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate required equipment and lifting cranes, preparation of the site (e.g. lay down areas, construction platform) and the mobilisation of construction equipment.

2.7.2. Disassemble and Replace Existing Turbine

A large crane will be brought on site. It will be used to disassemble the turbine and tower sections. These components will be reused, recycled or disposed of in accordance with regulatory requirements. All parts of the turbine would be considered reusable or recyclable except for the blades.

It is most likely that decommissioning would involve the disassembly and replacement of the turbines with more appropriate technology/infrastructure available at that time.

APPROACH TO UNDERTAKING THE SCOPING PHASE CHAPTER 3

An Environmental Impact Assessment (EIA) process refers to that process (dictated by the EIA Regulations) which involves the identification of and assessment of direct, indirect and cumulative environmental impacts associated with a proposed project. The EIA process comprises two phases: i.e. **Scoping Phase** and **EIA Phase**. The EIA process culminates in the submission of an EIA Report (including an environmental management plan (EMP)) to the competent authority for decision-making. The EIA process is illustrated below:

The Scoping Phase for the proposed Elliot Wind Energy Facility has been undertaken in accordance with the EIA Regulations published in Government Notice 33306 of 18 June 2010, as amended in December 2010, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998). This scoping process is aimed at identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project involving specialists with expertise relevant to the nature of the project and the study area, the project proponent, as well as a consultation process with key stakeholders (including relevant government authorities) and interested and affected parties (I&APs). This chapter serves to outline the process which was followed during the Scoping Phase of the EIA process.

3.1 Objectives of the Scoping Phase

This Scoping Phase aimed to:

» Identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including design, construction, operation and decommissioning) within the broader study area through a desk-top review of existing baseline data and specialist studies.
» Define the scope of studies to be undertaken within the EIA process.

» Identify potentially interested and affected parties and stakeholders and involve them within the EIA process.
» Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA process, as well as regarding the scope and extent of specialist studies that will be required to be undertaken as part of the EIA Phase of the process.

Within this context, the objectives of this Scoping Phase are to:

» Clarify the scope and nature of the proposed activities.
» Clarify the reasonable and feasible project-specific alternatives to be considered through the EIA process, including the "do nothing" option.
» Identify and evaluate key environmental issues/impacts associated with the proposed project, and through desk-top specialist studies identify those issues to be addressed in more detail in the Impact Assessment Phase of the EIA process.
» Conduct an open, participatory and transparent public involvement process and facilitate the inclusion of stakeholders' concerns regarding the proposed project into the decision-making process.

3.2. Overview of the Scoping Phase

The Scoping Phase has been undertaken in accordance with the EIA Regulations published in Government Notice 33306 of 18 June 2010, in terms of NEMA. Key tasks undertaken within the scoping phase included:

» Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
» Submission of a completed application form for authorisation in terms of Regulation 12 and 26 of Government Notice No R543 of 2010 to the competent authority (DEA).
» Undertaking a public involvement process throughout the Scoping process in accordance with Chapter 6 of Government Notice No R543 of 2010 in order to identify issues and concerns associated with the proposed project.
» Preparation of an Comments and Response Report detailing key issues raised by I&APs as part of the EIA Process (in accordance with Regulation 57 of Government Notice No R543 of 2010).
» Undertaking of independent specialist studies in accordance with Regulation 32 of Government Notice No R543 of 2010.

These tasks are discussed in detail below.

3.2.1. Authority Consultation and Application for Authorisation in terms of GN No R543 of 2010

As this is an electricity generation project the National Department of Environmental Affairs (DEA) is the competent authority for this application. As the project falls within the Eastern Cape Province, the Eastern Cape Department of Economic Development and Environmental Affairs (Eastern Cape DEDEA) act as a commenting authority for the project. Consultation with the Regulating authorities has been undertaken throughout the Scoping process. This consultation has included the following:

» Consultation with DEA regarding the proposed project and the EIA process to be undertaken.
» Submission of an application for authorisation to DEA. This application was accepted and the reference number **12/12/20/2282** allocated to the project. Authorisation was therefore granted to continue with the Scoping Phase of the project.

A record of all authority consultation undertaken prior to and within the Scoping Phase is included within Appendix B.

3.2.2. I&AP Identification, Registration and the Creation of a Project Database

The first step in the public involvement process was to identify relevant stakeholders and interested and affected parties (I&APs). This process was undertaken through existing contacts and databases, recording responses to site notices and newspaper advertisements, as well as through the process of networking. Stakeholder groups identified include:

» National, provincial and local government departments (including DEA, Eastern Cape DEDEA, South African Heritage Resources Agency (SAHRA), Department of Water Affairs (DWA), Civil Aviation Authority (CAA), Department of Agriculture, etc)
» Government Structures (including the Provincial Roads Authority, municipal planning departments, etc)
» Sakhisizwe Local Municipality and Chris Hani District Municipality
» Potentially affected and neighbouring landowners and tenants
» Conservation authorities
» Industry and business; and
» CBOs and other NGOs.

All relevant stakeholder and I&AP information has been recorded within a database of affected parties (refer to Appendix C for a listing of recorded parties). While I&APs have been encouraged to register their interest in the project from the start of the process, the identification and registration of I&APs will be on-going for the duration of the EIA process. The project database will be updated on an on-going basis throughout the project process, and will act as a record of the parties involved in the public involvement process.

3.2.3. Notification of the EIA Process

In order to notify and inform the public of the proposed project and invite members of the public to register as interested and affected parties (I&APs), the project and EIA process was advertised in the Barkley East Reporter.

In addition, site advertisements were placed on site in accordance with the requirements of the EIA Regulations.

In addition to the above advertisements and notices, key stakeholders and identified I&APs were notified in writing of the commencement of the EIA process. These parties included, inter alia:

- Relevant parties from Municipalities potentially affected (directly or indirectly) by the proposed project
- Communities and potentially affected landowners
- Organs of State having jurisdiction in respect of any aspect of the activity, including:
  - Department of Water Affairs (DWA)
  - Department of Mineral Resources (DMR)
  - Department of Agriculture – Land Care
  - Department of Transport and Public Works and various District Roads Departments
  - South African National Roads Agency
  - Department of Rural Development and Land Reform
  - Civil Aviation Authority
  - Chris Hani District Municipality
  - Sakhisizwe Local Municipality
  - SA Heritage Resources Agency (SAHRA)

Copies of all the advertisements placed and notices distributed are contained in Appendix D of this report. Copies of these letters distributed to the above mentioned organs of state/ key stakeholders are included in Appendix E of this report.

3.2.4. Public Involvement and Consultation

The aim of the public participation process throughout the EIA process is primarily to ensure that:

» All potential stakeholders and I&APs are identified and consulted with.
» Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs.
» Participation by potential I&APs is facilitated in such a manner that all potential stakeholders and I&APs are provided with a reasonable opportunity to comment on the application.
» Comment received from stakeholders and I&APs is recorded.

In order to provide information regarding the proposed project and the EIA process, a background information document (BID) for the project was compiled at the outset of the process (refer to Appendix E). The BID will be distributed to identified stakeholders and I&APs, and additional copies are to be made available at public venues within the broader study area.

Through consultation with key stakeholders and I&APs, issues for inclusion within the issues-based scoping study are identified and confirmed. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and concerns regarding the project, various opportunities have been and will continue to be provided for I&APs to have their issues noted, as follows:

» **Notification** of the proposed project in printed media and on site
» **Public meeting** in the study area (open meeting to be advertised in the local press)
» **Focus group meetings** (pre-arranged and stakeholders invited to attend)
» One-on-one **consultation meetings** (for example with directly affected or surrounding landowners)
» **Telephonic consultation** sessions (consultation with various parties from the EIA project team, including the project participation consultant, lead EIA consultant as well as specialist consultants)
» Written, faxed or e-mail **correspondence.**

Public consultation meetings regarding this proposed project will be undertaken during the public review period of the Draft Scoping Report. Networking with I&APs will continue throughout the duration of the EIA process. Issues and concerns raised by I&APs will be consolidated into a Comments and Response Report, which will form part of the Final Scoping Report.

3.2.5. Evaluation of Issues Identified through the Scoping Process

Issues (both direct and indirect environmental impacts) associated with the proposed project identified within the scoping process have been evaluated through desk-top studies. In evaluating potential impacts, Savannah Environmental has been assisted by the following specialist consultants:

Specialist	Area of Expertise	Refer Appendix
David Hoare of David Hoare Consulting cc	Ecology and Wetlands	Appendix F
Jon Smallie of WildSkies Ecological Services	Avifauna	Appendix G
Johan van der Waals of the Terrasoils	Agricultural potential & Soils	Appendix H
Lourens du Plessis of MetroGIS	Visual Impact	Appendix I
Celeste Booth of Albany Museum	Heritage	Appendix J
Morne de Jager of MENCO (M2 Environmental Connections cc)	Noise Impact	Appendix K
Tony Barbour (Environmental Consultant and Researcher)	Social Impact	Appendix L

In order to evaluate issues and assign an order of priority, the following methodology was used to identify the characteristics of each potential issue/impact for each of the proposed phases:

» Identify the **nature** of the potential impact, which includes a description of what causes the effect, what will be affected and how it will be affected
» Identify the **extent** of the potential impact, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development) or regional
» Identify **sensitive receptors** that may be impacted on by the proposed facility and the **types of impacts** that are most likely to occur.
» Evaluate the **significance** of potential impacts in terms of the requirements of the EIA Regulations.
» Identify the potential impacts that will be **considered further** in the EIA Phase.

The evaluation of the issues resulted in a statement regarding the potential significance of the identified issues, as well as recommendations regarding further studies required within an EIA.

3.2.6. Public Review of Draft Scoping Report and Feedback Meeting

The Draft Scoping Report was made available for public review from **26 April 2013 – 25 May 2013** at the following locations:

» www.savannahSA.com
» Elliot Public Library
» Sakhisizwe Municipal Offices (Elliot office)

In order to facilitate comments on the Draft Scoping Report, a public meeting was held during the review period for the Draft Scoping Report as follows:

» **Date:** 16 May 2013
» **Time:** 17h00
» **Venue:** Elliot Town Hall

The public review process and details of the public meeting were advertised in regional newspapers. In addition, all registered I&APs were notified of the availability of the report and public meeting by stakeholder letter (refer to Appendix E).

3.2.7. Summary of Public Involvement Process undertaken to date (Scoping Phase)

Activity	Date
Placement of Site notices on site & in public places	12 April 2013
Distribution of background information document to authorities, stakeholder groups, neighbouring landowners & community	24 April 2013
Placement of newspaper advert in local newspaper (Barkly East Reporter) informing of commencement of EIA process as well as the availability of Draft Scoping Report & Public meeting date.	26 April 2013
Distribution of Draft Scoping Report for comment	26 April – 25 May 2013
Public Meeting & focus group meeting with Sakhisizwe Local Municipality (Elliot office)	16 May 2013
Notification to registered I&APs of submission of Final Scoping Report to DEA & if any comments on the document	July 2013

3.2.8. Final Scoping Report

This final stage in the Scoping Phase entailed the capturing of responses from I&APs on the Draft Scoping Report in order to refine the report. It is this Final Scoping Report upon which the decision-making environmental authorities provide comment, recommendations and acceptance to undertake the EIA Phase of the process.

3.3. Regulatory and Legal Context

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 development is a multi-sectoral issue (encompassing economic, spatial, biophysical, and cultural dimensions) various statutory bodies are likely to be involved in the approval process for wind energy facility project and the related statutory environmental assessment process.

3.3.1. Regulatory Hierarchy

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

» *Department of Energy*: This department is responsible for policy relating to all energy forms, including renewable energy, and are responsible for forming and approving the IRP (Integrated Resource Plan for Electricity). It is the controlling authority in terms of the Electricity Regulation Act (Act No 4 of 2006).
» *National Energy Regulator of South Africa (NERSA):* This body is responsible for regulating all aspects of the electricity sector, and will ultimately issue licenses for wind energy developments to generate electricity.
» *Department of Environmental Affairs (DEA):* This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations. The DEA is the competent authority for this project, and charged with granting the relevant environmental authorisation.
» *The South African Heritage Resources Agency (SAHRA):* The National Heritage Resources Act (Act No 25 of 1999) and the associated provincial regulations provides legislative protection for listed or proclaimed sites, such as urban conservation areas, nature reserves and proclaimed scenic routes.
» *Department of Transport - Civil Aviation Authority (CAA):* This department is responsible for aircraft movements and radar, which are aspects that influence wind energy development location and planning.
» *South African National Roads Agency Limited (SANRAL):* This department is responsible for all National road routes.
» *Department of Water Affairs (DWA):* The DWA is mandated to manage South Africa's water resources by ensuring the security and quality thereof.
» *The Department of Agriculture, Forestry and Fisheries (DAFF)* is responsible for the promotion of the sustainable management of the country's forest and fishing resources for the benefit of the country.

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

» *Provincial Government of the Eastern Cape – Department of Economic Development and Environmental Affairs (DEDEA).* This department is the commenting authority for this project.
» *Department of Transport and Public Works - Eastern Cape.* This department is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads on public roads.
» *Eastern Cape Department of Agriculture and Rural Development* – This is the provincial authority responsible for the management of agricultural areas.

At **Local Level** the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Eastern Cape, both Municipalities i.e. *Sakhisizwe Local Municipality* and District Municipalities i.e. *Chris Hani District Municipality* play a role.

» In terms of the Municipal Systems Act (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.
» Bioregional planning involves the identification of priority areas for conservation and their placement within a planning framework of core, buffer and transition areas. These could include reference to visual and scenic resources and the identification of areas of special significance, together with visual guidelines for the area covered by these plans.
» By-laws and policies have been formulated by local authorities to protect visual and aesthetic resources relating to urban edge lines, scenic drives, special areas, signage, communication masts, etc.

There are also numerous non-statutory bodies such as Wind Energy Associations and environmental lobby groups that play a role in various aspects of planning and the environment that will influence wind energy development.

3.3.2. Legislation and Guidelines that have informed the preparation of this Scoping Report

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

» National Environmental Management Act (Act No 107 of 1998)
» EIA Regulations, published under Chapter 5 of the NEMA (GNR R543 in Government Gazette 33306 of 18 June 2010)
» Guidelines published in terms of the NEMA EIA Regulations, in particular:
  * Companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010 (Final Guideline; DEA, 2010)

* Public Participation in the EIA Process (DEA, 2010)
* Equator principals and IFC Standards

Several other Acts, standards or guidelines have also informed the project process and the scope of issues evaluated in the scoping report, and to be addressed in the EIA. A listing of relevant legislation identified at this stage of the process is provided in Table 3.1. A more detailed review of legislative requirements applicable to the proposed project will be included in the EIA phase.

Table 3.1: Initial review of relevant policies, legislation, guidelines and standards applicable to the proposed Elliot Wind Energy Facility Project EIA

Legislation	Applicable Sections
National Legislation	
Constitution of the Republic of South Africa (Act No 108 of 1996)	» Bill of Rights (S2) » Environmental Rights (S24) – i.e. the right to an environment which is not harmful to health and well-being » Rights to freedom of movement and residence (S22) » Property rights (S25) » Access to information (S32) » Right to just administrative action (S33)
National Environmental Management Act (Act No 107 of 1998)	» National environmental principles (S2), providing strategic environmental management goals and objectives of the government applicable throughout the Republic to the actions of all organs of state that may significantly affect the environment » NEMA EIA Regulations (GNR R543 of June 2010 as corrected December 2010) published in terms of Chapter 5 of the NEMA » The requirement for potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority (S24 – Environmental Authorisations) » Duty of Care (S28) requiring that reasonable measures are taken to prevent pollution or degradation from occurring, continuing or recurring, or, where this is not possible, to minimise & rectify pollution or degradation of the environment » Procedures to be followed in the event of an emergency incident which may impact on the environment (S30)
Environment Conservation Act (Act No 73 of 1989)	» National Noise Control Regulations (GN R154 dated 10 January 1992)

Legislation	Applicable Sections
National Heritage Resources Act (Act No 25 of 1999)	» Stipulates assessment criteria and categories of heritage resources according to their significance (S7) » Provides for the protection of all archaeological and paleontological sites, and meteorites (S35) » Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36) » Lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development (S38) » 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 (S44)
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	» Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) - none have as yet been published » A list of threatened & protected species has been published in terms of S 56(1) - Government Gazette 29657. » Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations). » Provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), 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 summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GoN 1002), 9 December 2011).

Legislation	Applicable Sections
	» This Act also regulates alien and invader species. » Under this Act, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species.
Minerals and Petroleum Resources Development Act	» Regulates mining activities » Requirements for Environmental Management Programme for mining applications, including borrow pits
National Environmental Management: Air Quality Act (Act No 39 of 2004)	» The Draft National Dust Control Regulations prescribe measures for the control of dust in all areas including residential and light commercial areas.
Conservation of Agricultural Resources Act (Act No 43 of 1983)	» Prohibition of the spreading of weeds (S5) » Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) & restrictions in terms of where these species may occur » Requirement & methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048)
National Water Act (Act No 36 of 1998)	» National Government is the public trustee of the Nation's water resources (S3) » Entitlement to use water (S4) – entitles a person to use water in or from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, fire fighting and recreational use, as set out in Schedule 1 » Duty of Care to prevent and remedy the effects of pollution to water resources (S19) » Procedures to be followed in the event of an emergency incident which may impact on a water resource (S20) » Definition of water use (S21) » Requirements for registration of water use (S26 and S34) » Definition of offences in terms of the Act (S151)
Aviation Act (Act No 74 of 1962)	» 13th amendment of the Civil Aviation Regulations (CARs) 1997 » The Minister of Transport has under section 22(1) of the Aviation Act, 1962 made the regulations in the Schedule hereto. » Obstacle limitations and marking outside aerodrome or heliport - CAR Part 139.01.33

Legislation	Applicable Sections
National Environmental Management: Waste Act (Act No 59 of 2008)	» The purpose of this Act is to reform the law regulating waste management in order to protect health and the environment by providing for the licensing and control of waste management activities. » The Act provides listed activities requiring a waste license. » S20 defines waste disposal practices.
National Veld and Forest Fire Act (Act No 101 of 1998)	» Formation of fire protection associations (S3) » Registration of fire protection associations (S4) » Duty to prepare and maintain firebreaks (S12) » Requirements for firebreaks (S13) » Readiness for fire fighting (S17) » Penalties (S24) and Offences (S25)
National Forests Act (Act No 84 of 1998)	» Protected trees (S12) » Forests (S19 – 21)
Guideline Documents	
South African National Standard (SANS) 10328, Methods for environmental noise impact assessments in terms of NEMA No. 107 of 1998	» Prediction of impact that noise emanating from a proposed development would have on occupants of surrounding land by determining the rating level. » Noise limits are based on the acceptable rating levels of ambient noise contained in SANS 10103
Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape (Report 1) - Towards a Regional Methodology for Wind Energy Site Selection	» Regional methodology for the siting of wind energy facilities within the Western Cape (Report 5) » Project level methodology for assessing wind energy facilities within the Western Cape (Report 6)
Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads	» Outlines 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
Relevant Municipal Planning Documents and Guidelines (IDPs, SDFs etc)	» Planning and sustainability objectives for Local and District municipalities
Birdlife South Africa / Endangered Wildlife Trust Best Practice Guidelines For Avian Monitoring And Impact Mitigation At Proposed Wind Energy Development Sites In Southern Africa	» Stipulates an integrated programme of pre- and post-construction monitoring for wind farm projects in order to: * develop our understanding of the effects of wind energy facilities on southern African birds. * To develop the most effective means to mitigate the impacts on birds.
Guidelines to minimise the impact	» Provision of a guideline and approach to

Legislation	Applicable Sections
on birds of Solar Facilities and Associated Infrastructure in South Africa	conducting avifaunal specialist studies at the desktop, EIA and post-construction monitoring stages.
South African Good Practice Guidelines for Surveying Bats in Wind Farm Developments (2011)	» Stipulates an integrated programme of pre- and post-construction monitoring for wind farm projects in order to: * develop our understanding of the effects of wind energy facilities on bats. » To develop the most effective means to mitigate the impacts on bats.
	»
Policies and White Papers	
The White Paper on the Energy Policy of the Republic of South Africa (December 1998)	» Investment in renewable energy initiatives, such as the proposed wind energy facility, is supported by this white Paper.
The White Paper on Renewable Energy (November 2003)	» This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.

DESCRIPTION OF THE AFFECTED ENVIRONMENT CHAPTER 4

This section of the Final Scoping Report provides a description of the environment that may be affected by the proposed Elliot Wind Energy Facility, proposed to be located west of Elliot in the Eastern Cape Province. This information is provided in order to assist the reader in understanding the possible effects of the proposed project on the environment. 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, and aims to provide the context within which this EIA is being conducted. A more detailed description of each aspect of the affected environment is included within the specialist scoping reports contained within Appendices F - L.

4.1. Regional Setting

The study area is within an area which ranges in elevation from 980 m above sea level (masl) to the south of the study area to about 2 450 masl within the mountains to the north of the study area. These mountains represent the southern section of the Main Drakensberg Escarpment. The site itself lies at an elevation of about 1 540 m above sea level and is situated below the escarpment. The topography comprises undulating plains and hills in the central study area, with mountains and tall hills to the north and south east.

A number of rivers are present within the broader area. These include the Slang River to the east and the Tsomo River (including its tributary, the Mzwazwa River) to the north and west. The Xuka River is found in the far east of the study area. In addition to these rivers, a large number of small dams, marshes and wetlands occur throughout the broader study area, but especially to the north and south of the town of Elliot, along the Slang River.

With its temperate climate, the broader study area receives between 574 mm and 875 mm of rainfall per year.

Economic activities in the area are primarily agricultural, and land cover consists of a mosaic of thicket and bushland, grassland, dryland agriculture, irrigated agriculture and degraded land. Built up areas within the study area include the town of Elliot and a number of smaller settlements in the south west. These include the settlements of Sunnyside, Glenhope, and KuZikonkwane. Other than these settlements, several homesteads are in the area surrounding the site. The average population density within the Sakhisizwe Local Municipality is ~23 people per km^2.

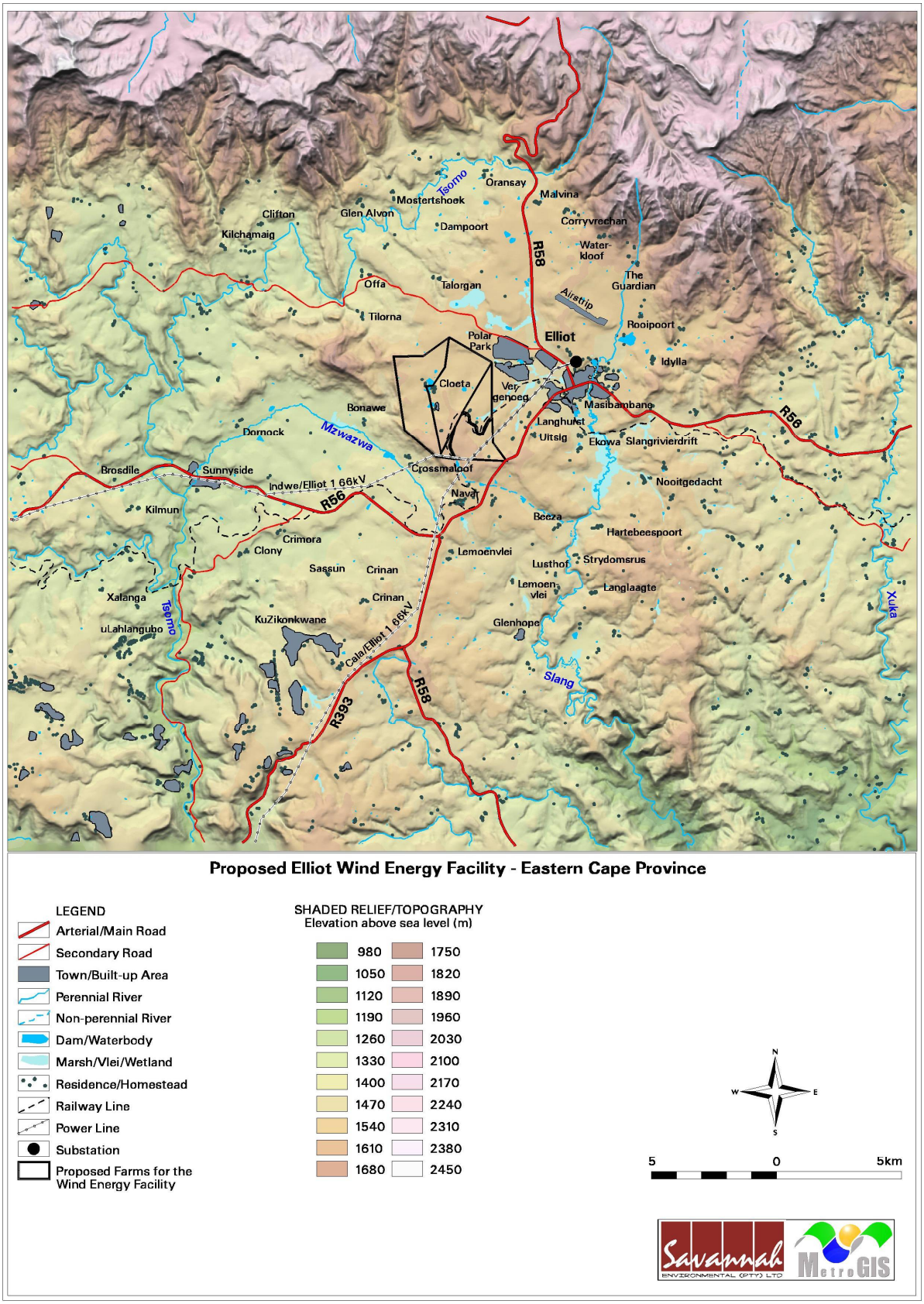

Figure 4.1: Shaded relief map (indicating the location of the proposed wind energy facility and the topography and elevation above sea level) of the broader study area.

This area is not known as a tourist destination, but the roads traversing the area are used by 4x4 enthusiasts to access the mountains in the north, and by tourists seeking alternative routes between KwaZulu Natal and the Western Cape. The greater environment, with its scenic landscapes, mountains and rivers, has a high visual quality and the roads passing through the area offer scenic drives to tourists passing through.

4.2. Location of the Site

The proposed site for the development of the wind energy facility comprises of the following farm portions:

» Remainder of Portion 1 of the farm Cloeta,
» Remainder of the farm Cloeta No. 100,
» Portion 8 of the farm Groentefontein and
» Remainder of Portion 1 of the farm Groentefontein.

These farms are located within the Eastern Cape Province approximately 3 km west of the town of Elliot. The site being considered for the proposed wind energy facility covers an area of approximately 16 km^2 which has primarily been used for cultivation activities and livestock grazing.

A number of arterial roads traverse the study area. These include the R58 running to the north and south east, the R56 running to the east and west, and the R393 running to the south west. The shortest route between KwaZulu Natal and the Western Cape runs through Elliot, along the R56 and R393.

Industrial-type infrastructure is limited to the Cala / Elliot 1 66kV power line (which crosses over the south eastern corner of the site), the Elliot Substation to the east of the proposed site, and a small airstrip just north east of Elliot.

There are no formally protected or conservation areas present within the study area, but the greater environment has a rural and undeveloped character, consisting of green fields and rolling hills. Settlements, where these occur, are limited in extent and domestic in scale.

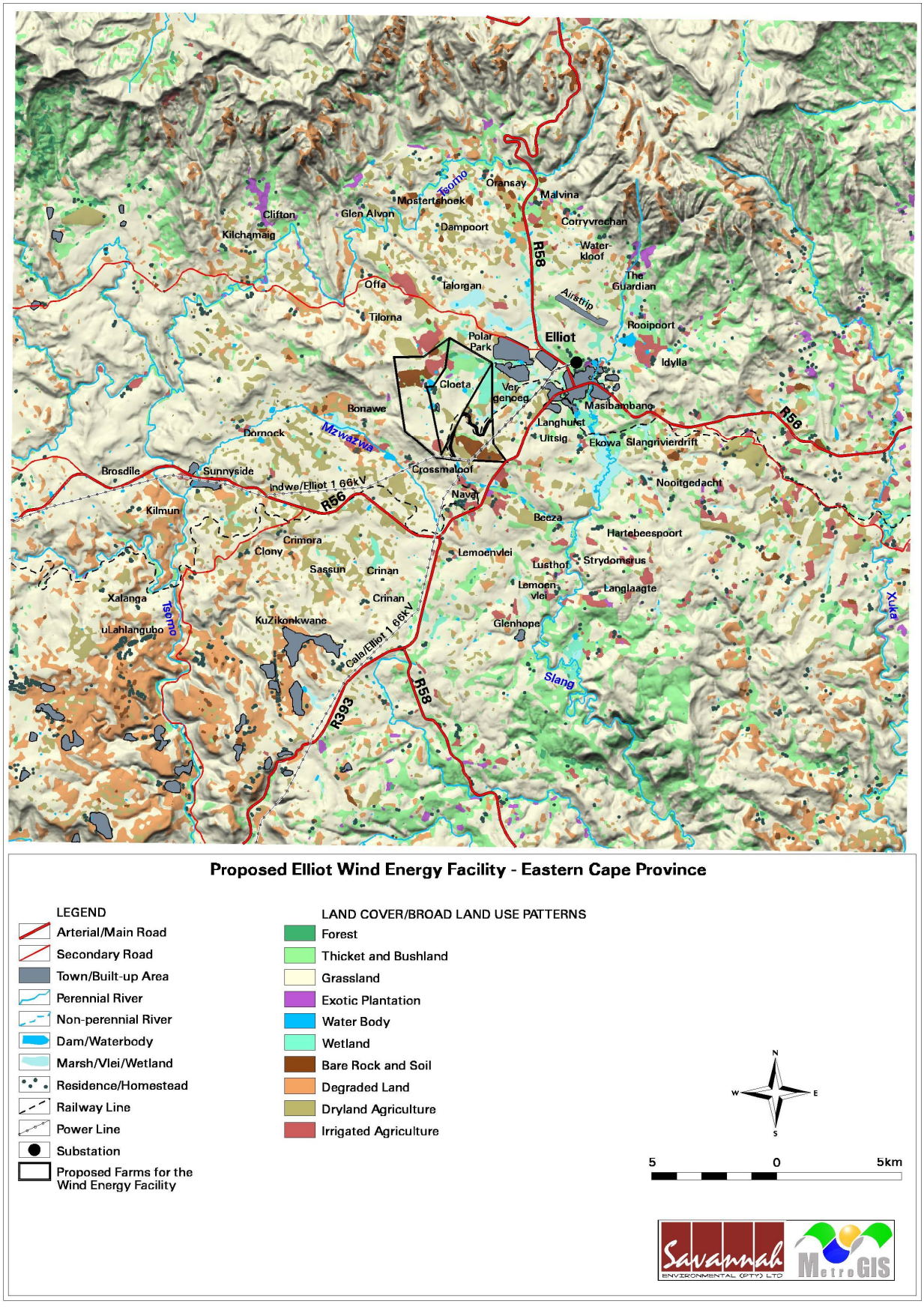

Figure 4.2: Land cover/land use map of the study area

4.3. Conservation Areas in the Region

There are no formally protected or conservation areas present within the study area. However, the site falls into Critical Biodiversity Areas (CBAs) for the Province. The Eastern Cape Biodiversity Conservation Plan (ECBCP) identifies Critical Biodiversity Areas (CBAs), which are terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning (Berliner & Desmet 2007). The ECBCP identifies CBAs at different levels with decreasing biodiversity importance, as follows:

1. PA: Protected areas.
2. CBA 1: CR vegetation types and irreplaceable biodiversity areas (areas definitely required to meet conservation targets).
3. CBA 2: EN vegetation types, ecological corridors, forest patches that do not fall into CBA 1, 1 km coastal buffer, irreplaceable biodiversity areas that do not fall into CBA 1.
4. CBA 3: VU vegetation types.

Within and around the site, the ECBCP identifies CBAs at two levels (Figure 4.3).

a. The CBA 1 areas that fall within the study site are areas identified as "Irreplaceable" for meeting conservation targets as well as being within important ecological corridors. The CBA 1 area is a band across the southern portion of the site.
b. The CBA 2 areas are important corridor areas. The corridor areas are important for a number of reasons, including the maintenance of ecological processes.

Despite the site falling into these CBAs the vegetation on site is significantly transformed due to cultivation. The condition of the vegetation will be confirmed during field surveys in the EIA Phase.

Land cover data for the site (Fairbanks et al. 2000) indicates that an approximate quarter of the site has been cultivated and remaining areas are natural, consisting of grassland (Fairbanks et al. 2000). The Surveyor-General's 1:50 000 topocadastral map and mapping from aerial imagery indicates that cultivation is far more extensive than indicated on landcover maps. A map of the land cover of the site, as derived from these two sources, is provided in Figure 4.4.

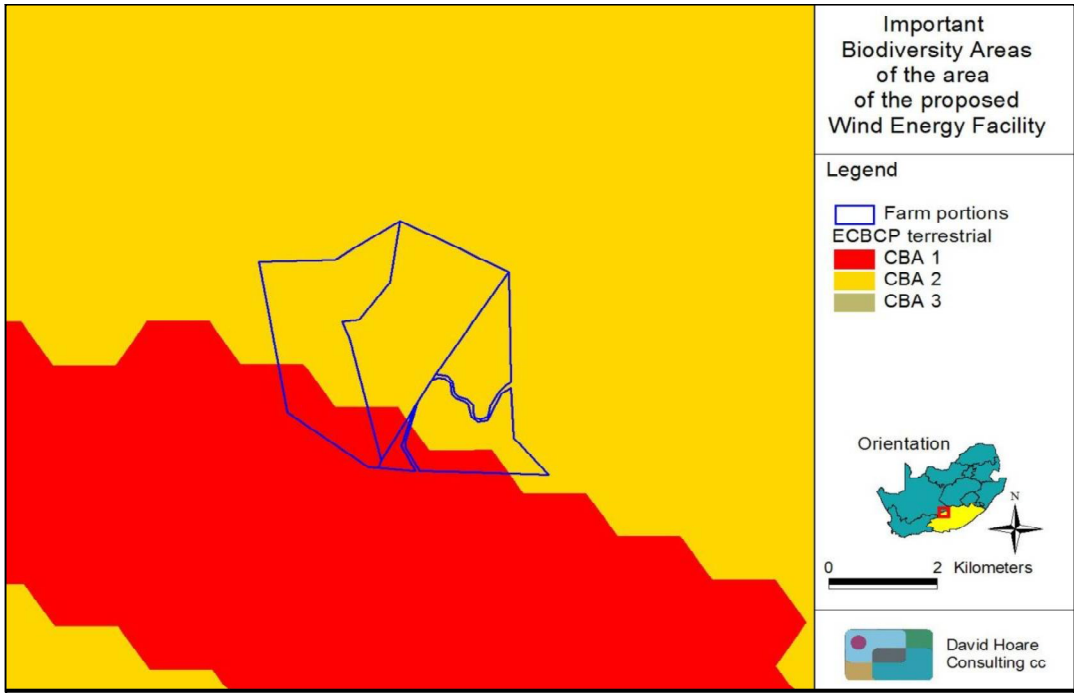

Figure 4.3 Important biodiversity areas of the study area

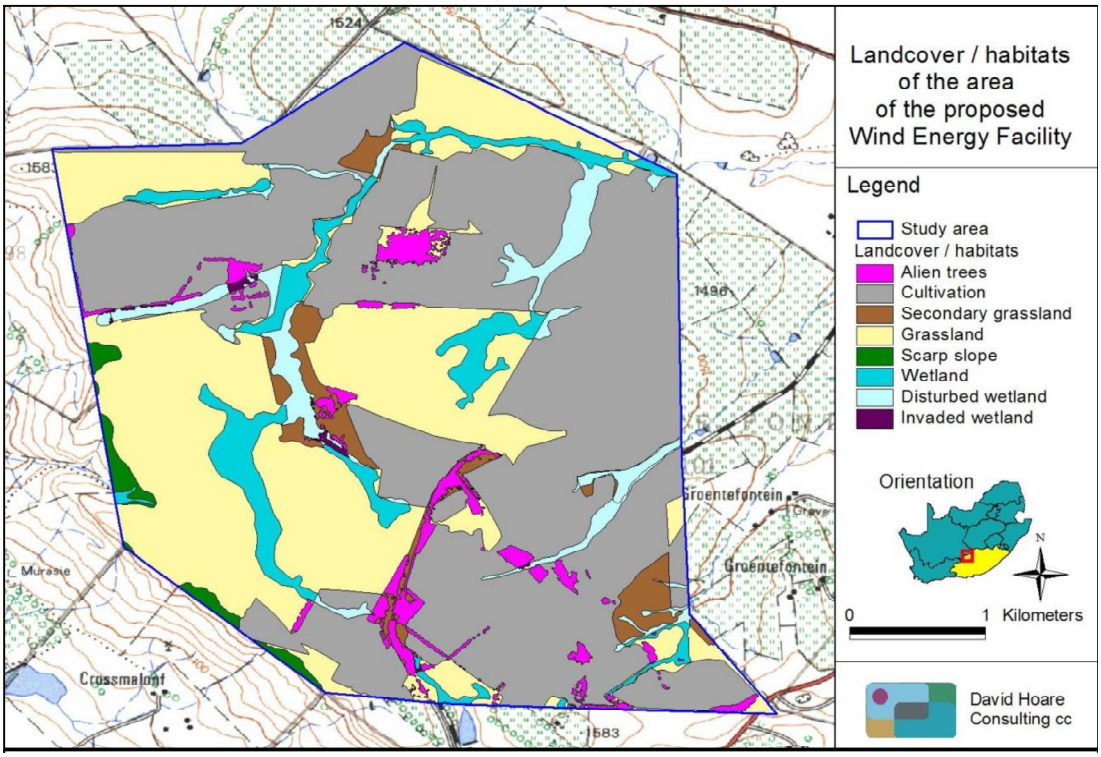

Figure 4.4: Land cover and habitats on site

4.4. Ecological Profile of the Study Area

4.4.1. Vegetation

According to the most recent vegetation map of the country (Mucina et al., 2005) the study area falls entirely within one regional vegetation type, i.e. Drakensberg Foothill Moist Grassland, which fall within the Grassland Biome. There are also small areas of two other vegetation types nearby, namely Tsomo Grassland to the south-west of the site and a small area of Eastern Temperate Freshwater Wetlands to the north-east of the site, but neither of these regional vegetation types are indicated as occurring on the site (Figure 4.5).

Drakensberg Foothill Moist Grassland is a forb-rich grassland dominated by bunch grasses occurring on the moderately rolling and mountainous areas of the Drakensberg piedmonts in KwaZulu-Natal and the Eastern Cape (Mucina et al. 2006). Due to the considerable concentration of local endemics within this vegetation type, it is being considered to include it within the Drakensberg Alpine Centre of Plant Endemism.

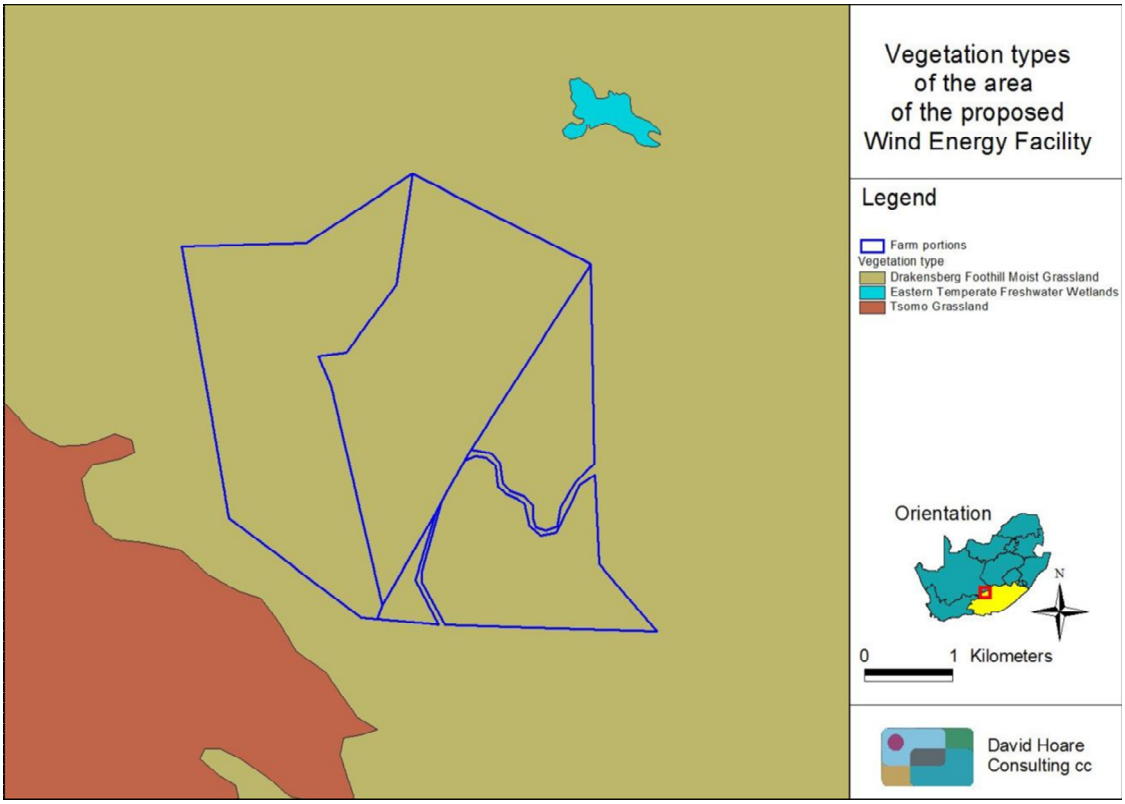

Figure 4.5: Vegetation map of the site

The study area falls within the Maputaland-Pondoland Region, very close to the boundary of the Drakensberg Alpine Centre of Plant Endemism (van Wyk & Smith 2001).

The Maputaland-Pondoland Region (MPR) is very diverse and complex and endemic plants are not always concentrated in particular regions. The MPR includes subtropical/tropical elements in the lower-lying areas and temperate Afromontane elements in the higher-lying regions. The site occurs within the Afromontane component of the Maputaland-Pondoland Region. Sub-centres of endemism in the MPR include some of the mountain peaks below the Drakensberg, e.g. Ingeli Mountain, and consist primarily of Afromontane vegetation.

The Drakensberg Alpine Centre of Plant Endemism (DACPE) occupies the central high-lying portion of the Drakensberg Mountain range and is defined as the areas above 1800 m in elevation (van Wyk & Smith 2001). The DACPE can be divided into the alpine and subalpine belts, of which the subalpine belt (closer to the site) consists of grasslands dominated by *Bromus speciosus*, Cymbopogon *validus*, *Festuca caprina*, *Hyparrhenia dregeana*, *Pentaschistis tysonii*, *Rendlia altera* or *Themeda triandra*.

The study site falls within an area defined as the Maputaland-Pondoland-Albany (MPA) Hotspot. The Maputaland-Pondoland-Albany region lies along the east coast of southern Africa below the Great Escarpment. Based on species numbers, the Maputaland-Pondoland-Albany region is the second richest floristic region in southern Africa (after the Cape Floristic Region). One of the more remarkable characteristics of the MPA hotspot is its succulent flora.

Permanent and complete transformation of habitat has affected 19% of the Maputaland-Pondoland-Albany hotspot. A further 30% of the natural vegetation has been severely damaged and permanently degraded. Less than 25% of the total area covered by the Maputaland-Pondoland-Albany hotspot can be considered close to the pristine state. The proposed development site is on the margin of this hotspot area and, although the hotspot contains a wide variety of vegetation types, the site is not typical of the areas of concern within the hotspot.

4.4.2 Terrestrial Fauna

All Red List vertebrates (mammals, reptiles, amphibians, fish) that could occur in the study area are listed in Appendix 2 of the Ecology Scoping Study (Appendix F). Those vertebrate species with a geographical distribution that includes the study area and habitat preference that includes habitats available in the study area are discussed further.

There are three bat species of conservation concern that have a geographical distribution that includes the site and that may occur there. These are the Lesser Long-fingered Bat, the Natal Long-fingered Bat and Geoffroy's Horseshoe Bat, all three of which are listed as Near Threatened in South Africa and Least Concern globally. All three species are cave-dependent for roosting. Any individuals found

on site would therefore either be foraging or migrating as no caves occur on the site.

Other than bats, there are four mammal species of conservation concern that have a distribution that coincides with the study area and have a possibility of occurring on site as a result of habitats available, i.e. the Serval, the Spotted-necked Otter, the Honey Badger and the White-tailed Rat. The first three of these species are listed as Near Threatened in South Africa, and the White-tailed Rat is listed as Endangered.

The White-tailed Rat (EN) occurs in Highveld and montane grassland, but requires sandy soils with good cover. Land type information indicates that soils on site are likely to be clay, although more sandy soils could occur on site in places. The species is endemic to South Africa and occurs at low density throughout its range. It lives in holes in the ground. The species has not been previously recorded in the grid in which the site occurs. The White-tailed Rat is therefore assessed as having a moderate to low probability of occurring on site and the site is not considered to be important for conservation of the species.

The Serval (NT) is found in moist savannah and tall grassland. The grassland on site is likely to be short due to grazing by domestic livestock and is therefore not considered to be ideal habitat for this species. Nevertheless, it is considered possible that it could occur.

The Honey Badger (NT) is a mobile animal that is found in a wide variety of habitats, although probably only in natural habitats. It is considered possible that it occurs in the study area.

The Spotted-necked Otter is found in permanent, unsilted, unpolluted rivers, streams and freshwater lakes where sufficient numbers of its prey occur. Habitat includes water-storage areas, ponds, permanent rivers, streams, creeks, wetlands. It eats fish, crabs and frogs. Suitable habitat occurs on site and suitable prey probably occurs. It is therefore considered probable that it occurs in the study area.

There are no reptiles and no amphibian species of conservation concern that have a distribution that includes the study area and which could occur on site.

4.4.3 Avifauna

This site is situated in the foothills of the southern tip of the Drakensberg. The land is currently used for livestock and crop farming. Although large parts of the site are transformed for cropping, the combination of arable land and remaining grassland and wetland are highly favourable for the Grey Crowned Crane, and to a

slightly lesser extent the Blue Crane. The site's proximity to large expanses of undisturbed grassland towards the berg make it likely that raptors such as Verreaux's Eagle, Cape Vulture and even Bearded Vulture could occasionally (or frequently in the case of Verreaux's Eagle) pass over the site. A host of small terrestrial species can also be expected to reside in the grassland portions of the site. The proximity of the site to the Elliot township to the east, however, means that the grassland nesting birds are expected to be at risk of predation by stray dogs, thereby reducing the importance of the site for these species.

The bird micro-habitats on site will need to be identified during the field work in the EIA phase. At this stage, desktop examination of aerial photography has revealed grassland, wetland, arable land, ridge and dams as present on the site. The most sensitive of these for avifauna are the wetlands, dams and the ridge to the south-west of the site.

4.5. Agricultural Potential

Land type data for the site was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC). The site falls into the Ab184 and Db247 land types (Land Type Survey Staff, 1972 - 2006) (refer to Figure 4.6 for the land type map of the area).

Land Type Ab184

Soils: Mainly variable depth to deep red sandy loam soils with bleached sandy soils in seepage areas. Soils with shallow and rocky profiles occur throughout. Drainage depressions are characterised by soils with poor drainage and wetlands occur throughout.

Land capability and land use: Land use ranges from grazing through dryland agriculture to irrigated agriculture. The main crop is maize.

Agricultural potential: The agricultural potential is linked to the soil depth and large areas are of high to very high potential (dryland and irrigated land uses). The areas with shallower soils and wetland areas are utilised for grazing purposes. Dryland agriculture potential and grazing capacity are high due to adequate rainfall (between 700 and 800 mm per year).

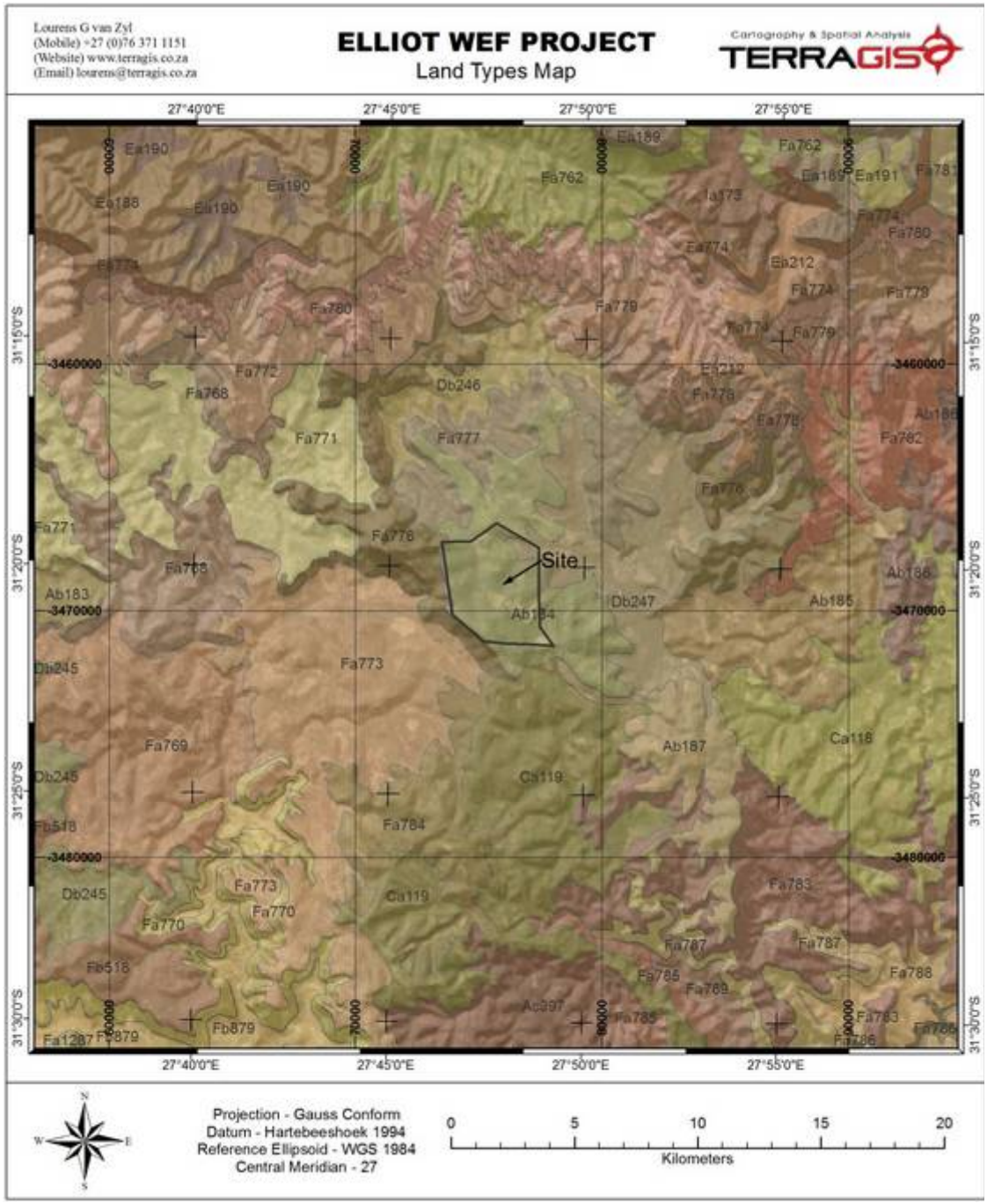

Figure 4.6: Land types of the study area

Land Type Db274

Soils: Mainly variable depth duplex soils sandy soils that are bleached with regular occurrences of duplex soils with prismatic structure. Soils with signs of incipient soil formation occur throughout the landscape.

Land capability and land use: A mixture of low intensity crop production, grazing and forestry. Land uses that lead to rapid vegetation material removal have serious erosion consequences.

Agricultural potential: The agricultural potential varies from low to high depending on the soil types. Duplex soils generally are of lower potential than soils with more homogenous profiles.

The dryland agricultural potential of the site varies from low to high, depending on the soils. The deeper and more homogenous soils are considered to be of high potential for irrigated agriculture. From the satellite image interpretation it appears that the arable areas make up almost 50% of the site. Grazing areas make up the balance and in these areas wetlands are expected to occur. Due to the moderately high rainfall in the area, the site is considered to be of high potential for both dryland agriculture and grazing.

4.6. Heritage Profile

Several archaeological sites have been recorded in the area surrounding the proposed Elliot Wind Energy Facility site, although no sites have been recorded within the immediate area proposed for development. The Albany Museum database holds limited information of archaeological sites for the north-eastern Cape, however, records are held at several institutions including the University of the Transkei (now Walter Sisulu University), the University of Fort Hare, and the Rock Art Research Institute at the University of the Witwatersrand. Rock art research, mainly conducted by researchers from the Rock Art Research Institute, University of the Witwatersrand, have been conducted around the Barkly East, Ugie, Maclear, Dordrecht and other areas in the Southern Drakensberg escarpment of the north-eastern Cape. Middle Stone Age and Later Stone Age sites have also been excavated and researched during the 1970's. In addition, recent cultural assessments (Anderson 2007; Smith 2010; Van Schalkwyk 2003 and; Van Schalkwyk & Wahl 2007) conducted mainly within the areas surrounding the proposed area for development provides information on predicted archaeological findings.

The literature consulted shows evidence of an archaeological heritage that spans from the Early Stone Age, Middle Stone Age to the Later Stone, as well as evidence of pastoralism and Iron Age farmers. Rock paintings are prolific throughout Southern Drakensberg Mountains. The region is also significant historically as a frontier between hunter-gatherers, pastoralists, Nguni-speaking farming communities and European settlers.

No archaeological heritage remains, features, or sites have been recorded within the area proposed for Elliot Wind Energy Facility. However, the surrounding area and region has previously and is currently being well researched. Surface scatters of Early Stone Age hand-axes and Middle Stone Age stone artefacts have been recorded near Indwe west of the proposed site. Middle Stone Age rock shelter sites

containing blade stone artefacts and wooden artefacts as well as preserved bedding have been recorded near to Maclear. Several Later Stone Age sites have been excavated and researched within the surrounding area and wider region, the closest site situated 3km west of the proposed area proposed for development. Several rock art sites within the surrounding area and wider have also been recorded, the closest site situated on the adjacent neighbouring farm of the proposed area for development. Although very little Iron Age sites have been researched within the area, there may be a possibility that these may be encountered. Graves, both formal (identifiable on the landscape) and informal (identifiable when exposed below the surface if no surface identification is present) may also be encountered during the survey.

4.7 Social Characteristics of the Study Area and Surrounds

Statistical information at a community level essentially dates back to Census 2001. In addition, ward-level information (Census 2001) is currently no longer available from the Municipal Demarcation Board. Recent Census statistics contained in the various Local and District municipality IDPs are essentially limited to population projections and access to various municipal services. The objective of this section is to provide a general overview of the regional demographic context. The demographic profiles of the communities in the local municipality will be investigated in greater detail during the EIA phase, i.e. by means of sourcing information from local officials.

The Sakhizwe Local Municipality is a rural municipality where just over 39% of its households are located in the urban centres and peri-urban areas of Cala and Elliot. The total population of the Sakhizwe Local Municipality is estimated at 66 097 (2008), accounting for ~6.7% of the greater Chris Hani District Municipality's population. The local municipality population live in 16 756 households which when divided by the local municipality populations translates into an average of 4 people per household. Between 2001 and 2010, the average population growth was estimated at 1.02 per annum (Sakhizwe Local Municipality IDP 2010/11). According to the LM IDP (2011/12) the population density of the LM is estimated at 29.9 people per km^2. The population density is higher that the District average of 22 people per km^2 and lower that the Provincial average of 39 people per km^2. The majority of the population are Black African (87.6%) followed by Coloureds (7.5%) and Whites (4.7%), with less than 1% Indian/Asian. The gender composition shows that in 2008, 49% were males and 51% were females. Approximately 53% of the population are 19 years of age or younger with 39.6 being 15 years of age or below.

The Sakhisizwe Local Municipality IDP (2011/12) indicates that 56% of the population within the LM are functionally illiterate. Approximately 14% have no schooling and only 5% have a matriculation certificate (in 2008).

In 2008 the Sakhisizwe Local Municipality unemployment rate was estimated at 36%. While this is significantly lower than the District average of ~55% unemployment it is still above the provincial and national averages of 32% (2004) and 24% (2011) respectively. It is important to note that according to the 2001 Census, unemployment in the Sakhizwe Local Municipality was estimated at 24% which means that employment has grown rapidly between 2001 and 2008.

Construction activities for wind energy projects typically include:

» land clearing for site preparation and access routes;
» transportation of supply materials and fuels;
» construction of foundations involving excavations and placement of concrete;
» construction of a substation, underground and above ground power lines;
» operating cranes for unloading and installation of wind turbines;
» commissioning of new installation; and
» waste removal and rehabilitation of disturbed sites.

Operational activities include regular maintenance of the wind turbines and associated site infrastructure.

Decommissioning activities may include removal of project infrastructure and site rehabilitation.

Environmental issues associated with **construction** and **decommissioning** activities may include, among others, noise impacts, soil erosion, and threats to biodiversity and ecological processes, including habitat alteration and impacts to fauna.

Environmental issues specific to the **operation** of a wind energy facility could include visual impacts; noise produced by the spinning of rotor blades; avian/bat mortality resulting from collisions with blades; mortality, injury and disturbance to other faunal species; and light and illumination issues.

The significance of impacts associated with a particular wind energy facility is dependant on site-specific factors, and therefore impacts can be expected to vary significantly from site to site.

The environmental issues associated with the proposed wind energy facility have been identified through a scoping evaluation undertaken in accordance with the requirements of the EIA Regulations.

This chapter serves to describe and evaluate the identified potential environmental impacts associated with the wind energy facility, and to make recommendations for further studies required to be undertaken in the EIA phase, and/or recommendations for the management of these impacts through inclusion in the Environmental Management Programme (EMPr).

Table 5.1 and Table 5.2 provide a summary of the findings of the scoping study undertaken for the construction and operation phases of the proposed project respectively. Impacts associated with decommissioning are expected to be similar to those associated with construction. Potential direct and indirect impacts of the proposed wind energy facility are evaluated, and recommendations are made regarding further studies required within the EIA phase of the process. Specialist scoping reports are included within Appendix F to L.

In identifying and evaluating impacts associated with the proposed project, it has been assumed that although during the **operational phase** the area affected will be limited and comprise the wind turbines, access roads and a substation footprint, during **construction** a larger area within the approximately 1 600 ha area being considered for the wind energy facility footprint could suffer some level of disturbance as a result of the required activities on site. However, once construction is complete, only a small portion of this area (typically less than 5%) will be permanently impacted by infrastructure associated with the wind energy facility.

The **cumulative impacts** associated with the proposed wind energy facility are expected to be associated with the scale of the project (i.e. that up to 60 wind turbines and associated infrastructure will be located on the proposed site). The presence of other wind energy facilities in the region contributing to potential cumulative impacts in the broader area is not addressed in this Scoping Report however will be addressed in the EIA Report. The potential direct cumulative impacts associated with the project are expected to be associated predominantly with the potential visual impact, potential noise impacts, potential vegetation impact, potential heritage impact and potential impacts on avifauna. Cumulative effects can only be adequately assessed once a preliminary layout is available, and will be considered in the detailed specialist studies to be undertaken in the EIA phase of the process.

Table 5.1: Evaluation of potential impacts associated with the **construction phase** of the proposed Elliot Wind Energy Facility Project:

Potential Visual Impacts:

Potential visual impacts during the construction phase are expected to be of a short duration and limited to the site itself.

Issue	Nature of Impact	Extent of Impact	'No go' areas
Potential visual impacts associated with the construction phase	Construction of the wind energy facility.	Local	None.
The potential visual impact of the construction of ancillary infrastructure (i.e. the substation, associated power line, access road to the site and internal access roads within the site) on observers residing in close proximity of the facility.	Construction of associated infrastructure of the wind energy facility.	Local	None.

Gaps in knowledge & recommendations for further study:

It is recommended that:

» The significance of the potential visual impact be assessed in further detail in the EIA phase.

» Additional spatial analyses must be undertaken in order to create a visual impact index that will further aid in determining potential visual impact.

Specific spatial criteria need to be applied to the visual exposure of the proposed facility in order to successfully determine visual impact and ultimately the significance of the visual impact.

Potential impacts on Ecology:

The preliminary ecological sensitivity assessment identifies at a high (regional) level those parts of the study area that have high conservation value or that may be sensitive to disturbance. Areas containing untransformed natural vegetation, high diversity or habitat complexity, Red List organisms or systems vital to sustaining ecological functions are considered sensitive. In contrast, any transformed area that has no importance for the functioning of ecosystems is considered to have low sensitivity. A preliminary sensitivity map was compiled of remaining natural habitats and areas important for maintaining ecological processes in the study area. Broad scale mapping was used to provide information on the location of sensitive features. There are a number of features that need to be taken into account in order to evaluate sensitivity in the study area. These include the following:

» Vegetation of conservation importance: this is based primarily on the ECBCP assessment, the Draft Ecosystem List and the fact that the site falls within the Cape Floristic Region;

» Perennial and non-perennial rivers and streams and wetlands: this represents a number of ecological processes including groundwater dynamics,

hydrological processes, nutrient cycling and wildlife dispersal;

» Potential occurrence of populations of Red List organisms, including flora and fauna that have been evaluated as having a high chance of occurring within remaining natural habitats within the study area.

» Estuaries and estuarine habitats that occur off-site, but which may be affected by activities on site.

These factors have all been taken into account in mapping potentially sensitive areas within the study area. These are mapped in Figure 5.1. This map shows the remaining natural vegetation on site and wetlands and drainage lines to have high sensitivity and conservation value. The area of vegetation in the southern part of the site is classified as having very high sensitivity and conservation value (no-go areas). The area in the centre of the site is dominated by woodlands, the majority of which are most probably alien trees. The identity of this area will be determined in the field during the EIA phase of the process, but it must be taken into consideration that parts of these areas are natural and therefore sensitive.

Parts of the site are still in a natural condition or considered to be natural vegetation; while a large proportion of the site appears from aerial imagery to be transformed due to agriculture. The condition of the vegetation will be determined during detailed field surveys to be undertaken during the EIA phase of the project. Any degraded areas on site are classified as having low sensitivity and conservation value. Most natural areas of grassland have been classified in the preliminary sensitivity map as having medium-high sensitivity and conservation value, with the exception of areas close to the scarp slopes, which have been classified as having very high sensitivity and conservation value. All intact wetlands have been classified as having high sensitivity and conservation value.

Direct loss of vegetation associated with the construction phase of the proposed development is likely to have a Low – Medium impact on a regional scale, depending on the final extent and position of the actual infrastructure footprints and the management of the land. The alternative facility layouts will be assessed in the EIA Phase and appropriate mitigation measures outlined, with details stipulated in the EMP. Indirect (mainly operational phase) impacts (disruption of ecological processes, etc.) are likely to be fairly insignificant due to the nature of the facility.

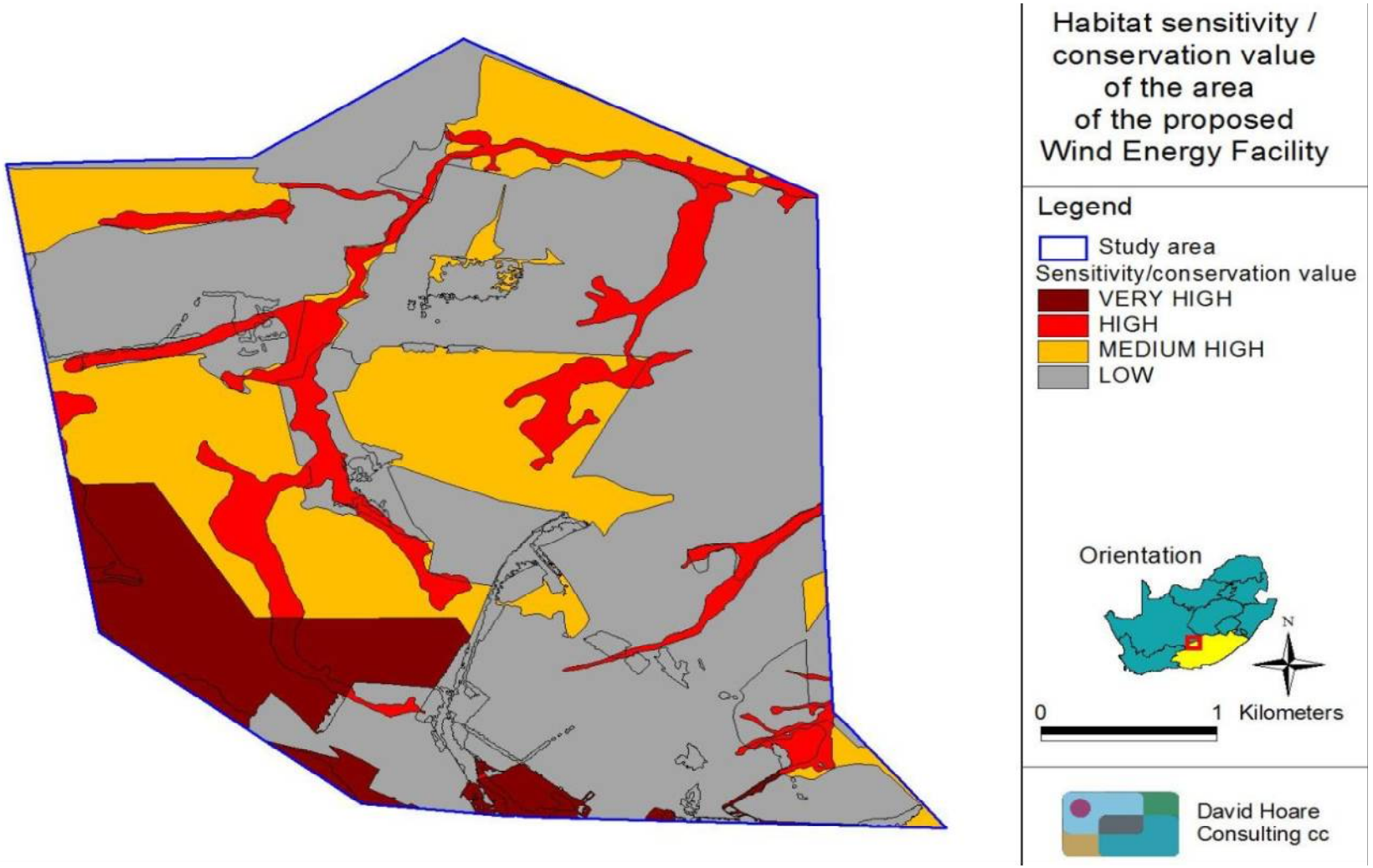

Figure 5.1 Preliminary Ecological Sensitivity Map of the site

Issue	Nature of Impact	Extent of Impact	'No go' areas
Impacts on bats	It has been evaluated that there are three Near Threatened bat species that could occur site or in the surrounding areas (the Lesser Long-fingered Bat, the Natal Long-fingered Bat and Geoffroy's Horseshoe Bat).	Local - Regional	None identified at this stage.
Impacts on other threatened animals	Threatened animal species are affected primarily by the overall loss of habitat, since direct construction impacts can often be avoided due to movement of individuals from the path of construction	Local - Regional	None identified at this stage.
Impacts on threatened plants	Plant species are especially vulnerable to infrastructure development due to the fact that they cannot move out of the path of the construction activities, and are also affected by overall loss of habitat.	Local – International	Preliminary high sensitivity areas identified (refer to Figure 5.1)
Impacts on protected tree species	Protected tree species are could potentially occur along the steep scarp slopes along the western boundary.	Local	Preliminary high sensitivity areas identified comprising potential scarp slope vegetation which could include protected tree species (refer to Figure 5.1)
Impacts on indigenous natural vegetation (terrestrial)	Construction of infrastructure may lead to direct loss of vegetation. This will lead to localised or more extensive reduction in the overall extent of grassland vegetation. Where this vegetation has already been stressed due to degradation and transformation at a regional level, the loss may lead to increased vulnerability of the habitat.	Local - Regional	The proportion of the site containing vegetation in a moderate to good condition needs to be established before this impact can be properly assessed. If indigenous natural vegetation is significantly adversely affected, the potential significance of this impact could potentially be of high significance.
Impacts on wetlands	Construction may lead to some direct or indirect loss of or damage to seasonal	Local	Preliminary high sensitivity areas identified (refer to Figure 5.1)

	marsh wetlands or drainage lines or impacts that affect the catchment of these wetlands. This will lead to localised loss of wetland habitat and may lead to downstream impacts that affect a greater extent of wetlands or impact on wetland function. Where these habitats are already stressed due to degradation and transformation, the loss may lead to increased vulnerability of the habitat.		
Establishment and spread of declared weeds and alien invader plants	There is a moderate likelihood that alien species will spread on site in the absence of control measures.	Local - Regional	None identified.

Gaps in knowledge & recommendations for further study:

The following assessments will be done during the EIA phase in order to properly assess potential impacts on the ecological receiving environment by the proposed facility:

» The presence and distribution of wetlands and drainage lines on site will be confirmed. This will be done primarily using aerial photograph interpretation, and will be confirmed in the field using topographic and floristic indicators.

» The draft sensitivity map will be verified in the field.

» Searches will be undertaken in the scarp slope areas to determine whether any protected trees occur on site or not.

» The presence of species of concern will be evaluated during the EIA phase. This will be done by assessing habitat suitability for those species that have been assessed as potentially occurring in the area. The lists provided in the appendices contained in the specialist scoping report will form the basis for those assessments and surveys. Particular attention will be paid to those species classified as threatened (VU, EN or CR) or Critically Rare, including one plant species (*Encephalartus friderici-guilielmi*)which has a probability of occurring in the study area. There are also a number of plant and animal species classified as Near Threatened, Rare or Declining that could occur on site, including the plants, *Nerine bowdenii, Pelargonium sidoides* and *Eucomis autumnalis*, and the animals, the Serval, the Spotted-necked Otter, the Honey Badger, the Lesser Long-fingered Bat, the Natal Long-fingered Bat and Geoffroy's Horseshoe Bat.

Potential Impacts on Avifauna (birds):

The scoping phase has identified potential avifaunal issues associated with the construction of the proposed wind energy facility and its associated infrastructure including disturbance, habitat destruction and displacement.

The list of 'target species' for this study is as follows: Cape Vulture; Black Harrier; Blue Crane; Secretarybird; African Marsh Harrier; Denham's Bustard; Grey Crowned Crane; Verreaux's Eagle; Lanner Falcon; Blue Korhaan; Jackal Buzzard; Yellow-breasted Pipit; White Stork; Black Kite; Amur Falcon; Steppe Buzzard; Drakensberg Rockjumper; Grey-winged Francolin; and Black-shouldered Kite. Of these the most important is the Grey Crowned Crane. This list will be refined as more work at this site is conducted.

The portions of this study area that have been identified as being of high sensitivity for avifauna are the ridge line in the south-west, the wetlands, and the dams. The ridge line is judged to be of high risk since raptors and vultures are anticipated to use the favourable air currents along this ridge frequently, thereby placing them at risk of collision with infrastructure placed here. The wetlands are sensitive as breeding, roosting and foraging habitat for the Grey Crowned Cranes and several other species. Dams provide roosting areas for cranes and as such are also high risk areas as the birds enter and leave the roost in the late evening and early morning when visibility is low and collision risk high. Based on field work, suitable buffers for these features will be determined, likely in the range of 300 to 500m. Ideally no construction of turbines or associated infrastructure should be undertaken in these areas, as they have been noted as areas of high sensitivity.

Figure 5.2 Avifaunal sensitivity map. Blue areas indicate expected wetlands and dams based on the desktop study, and the green area indicates the ridge.

Issue	Nature of Impact	Extent of Impact	'No go' areas
Disturbance to Ground-nesting and/or terrestrial species and raptors.	Construction & maintenance	Local	Refer to Figure 5.2
Habitat loss: habitat destruction to small endemics.	Construction footprint	Local	Refer to Figure 5.2

Gaps in knowledge & recommendations for further study:

The EIA Phase will include the following activities:

» The micro habitats on site will be assessed for their suitability for the key species.
» The sensitivity zones and suitable buffer zones will be identified and mapped.
» The impacts identified in this scoping phase study will be assessed formally according to the supplied criteria.
» A framework for an avifaunal pre-construction monitoring programme will be prepared.

Potential Impacts on Soils and Agricultural Potential:

The site is characterised by extensive crop production and wetland areas. The proposed development of a wind energy facility near Elliot on the site will have moderate to high impacts due to the high potential agricultural land on the site as well as the possible presence of numerous wetlands. The current land use is a mixture of dryland and irrigated crop production as well as extensive grazing.

Issue	Nature of Impact	Extent of Impact	'No go' areas
Physical soil disturbance due to construction activities	Removal of soil due to excavations for foundations, underground services and access roads and erosion. Alteration of soil texture, density, structure and chemistry due to soil loosening, mixing, wetting, stockpiling and compaction	Local (construction areas only)	To be confirmed during the detailed soil survey.
Impacts on current land use due to construction activities	Direct impacts are associated with the constructed roads as well as the turbine construction sites. Indirect impacts could arise in the form of land use changes due to soil erosion and degradation if stormwater management is not planned and managed properly	Local	To be confirmed during the detailed soil survey.

	as it is generated on the roads and construction sites. Cumulative impacts are considered to be highly probable and problematic due to the high agricultural potential of the site as well as the presence of numerous wetlands.		
Impacts on agricultural potential due to construction activities	Direct impacts are considered to be high due to the high agricultural potential over portions of the site.	Local	To be confirmed during the detailed soil survey.

Gaps in knowledge & recommendations for further study:

The extent of the portions of the site under crop production as well as the wetland areas will be confirmed during the detailed soil survey and site visit. The field work will be conducted as part of the EIA level investigation which will consider the following parameters:

» Soil distribution (classification) on the site;
» Extent of degradation due to current land use (such as overgrazing);
» Erosion status and erodibility of the soils on the site; and
» Mitigation measures to arrest current impacts and manage future impacts associated with the development.

A conclusion can therefore be drawn as to the suitability of the site for the development of a wind energy facility.

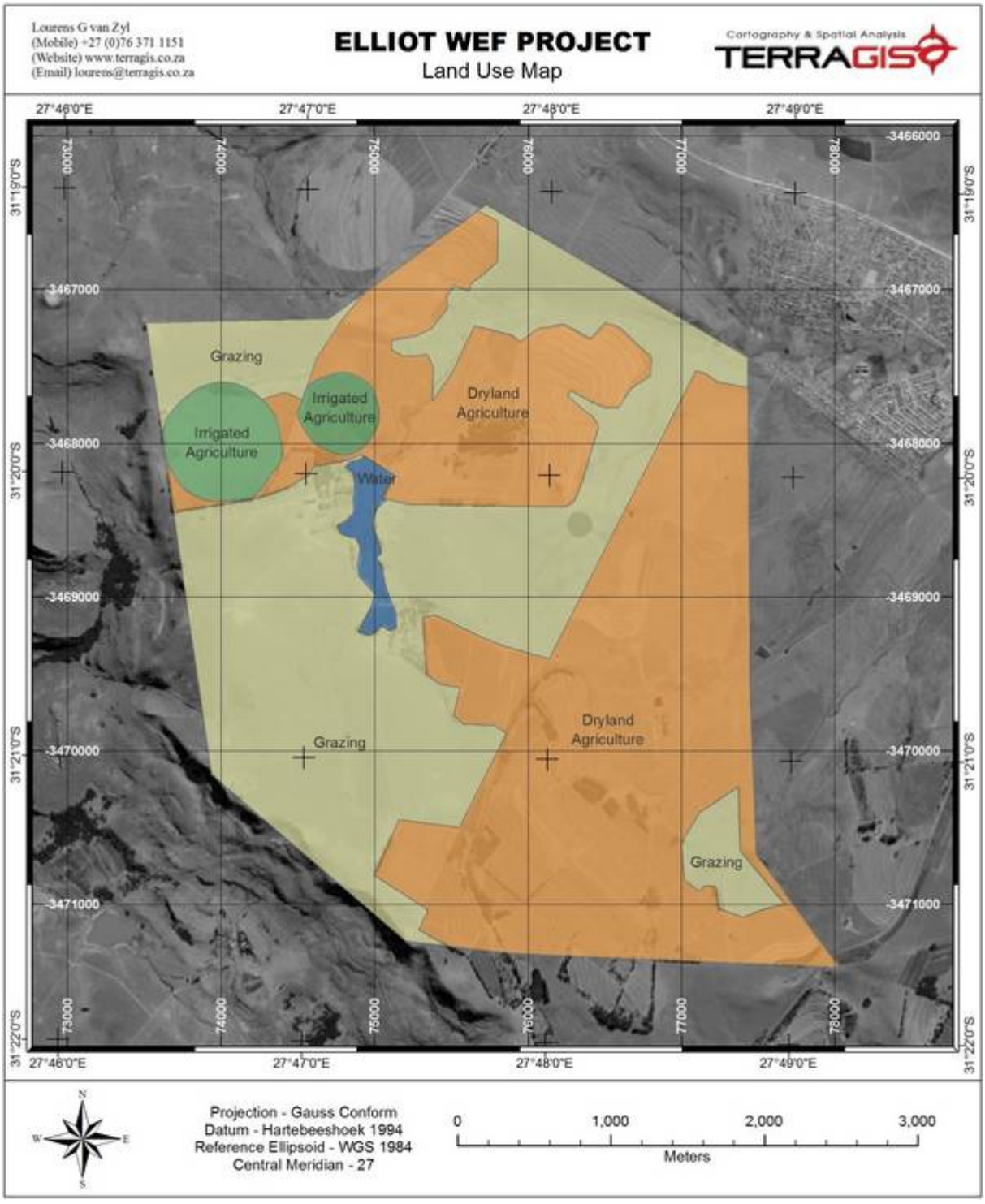

Figure 5.3: Land Use Map

Potential impacts on Heritage Resources:

Several archaeological sites have been recorded in the area surrounding the site proposed for the Elliot Wind Energy Facility although no sites have been recorded within the immediate area proposed for development. The archaeological heritage spans an occupation period from the Early Stone Age, Middle Stone Age to the Later Stone, as well as evidence of pastoralism and Iron Age farmers. Rock paintings are prolific throughout Southern Drakensberg Mountains.

Issue	Nature of Impact	Extent of Impact	'No go' areas
Potential impacts on heritage resources	Construction of facility and associated infrastructure impacting on potential in situ heritage resources	Local	No 'no- go' areas have not been identified at this stage.

Gaps in knowledge & recommendations for further study:

It is recommended that a full phase 1 archaeological impact assessment be conducted to establish the range and importance of the exposed and in situ archaeological heritage materials and features, the potential impact of the development and to make recommendations to minimise possible damage to these sites.

Potential noise impacts:

23 potential noise-sensitive developments were identified in the noise specialist scoping study, one of which is located on site and the majority of which are residential sites located to the east of the proposed WEF. Potential sources of noise from construction activities which could impact on the noise-sensitive developments include:

» Construction equipment e.g. excavator/grader, bulldozer, dump trucks, vibratory roller, bucket loader, rock breaker, (potentially) drill rig, flat bed trucks, concrete truck(s), cranes, fork lift and various 4WD and service vehicles
» Concrete batching plants and use of Borrow Pits (if required)
» Blasting (if required)
» Construction traffic.

Issue	Nature of Impact	Extent of Impact	'No go' areas
Noise impacts due to construction equipment	» Noise from (potential) borrow pit activities » Noise from concrete batching/delivery » Noise from foundation preparation » Noise from the digging of trenches	Local	Cannot be determined at this stage.

Noise impacts due to construction traffic	Increased traffic noise due to: » deliveries » movement onsite	Local	Cannot be determined at this stage.

Gaps in knowledge & recommendations for further study:

» There is no information available regarding the existing soundscape of the area.
» Projected impacts from the construction phase can only be modelled once more information regarding the duration of construction and equipment used are known.

It is recommended that the potential noise impact be investigated in more detail in the EIA Phase. The following information is considered critical:

» The prevailing night-time background ambient noise levels,
» The available meteorological data,
» The exact locations of the various wind turbine generators within the wind farm development footprint,
» The confirmation of the noise-sensitive developments, and;
» An overview of the equipment, processes and schedules for the construction phase.

The following work is planned for the EIA Phase:

» A site visit to obtain information regarding background noise levels, the prevailing meteorological conditions during this background noise level survey, as well as confirming and identifying Noise-sensitive developments,
» Currently identified (potential) Noise Sensitive Developments (NSDs) will be investigated during the EIA phase, and any additional NSDs will be identified. Their relative sensitivity to noise impacts will be determined. This will be based on the SANS 10103 guideline, as well as current land uses on the properties (residential vs business/industrial).
» Using the data (proposed processes, noise characteristics of the selected equipment, locations of the WTG) as provided by the project developer, the predicted impact of the Wind Energy Facility (WEF) on NSDs will be predicted using the CONCAWE method as recommended by SANS 10357:2004 for both the construction and operational phases, as well as the ISO 9613-2 model for the operational phase.
» Using the calculated noise levels at the identified NSDs, the projected significance of WEF (whether construction or operational) will be determined using the criteria as proposed (subject to possible changes after any stakeholder input). Further recommendations on the most suitable buffer zone can be made after more information is available for the proposed WEF.

Potential impacts on the social environment:

The potential positive social impacts during the construction phase are largely linked to the creation of employment and skills development opportunities. The potential negative impacts are linked to the impact on local road surfaces associated with the transport of heavy components and the impact on local communities and current farming activities associated with the presence of construction workers on the site. A number of key social issues are potentially associated with the construction of the wind energy facility as noted in the table below.

Issue	Nature of Impact	Extent of Impact	'No go' areas
Impact on rural sense of place	Impact on sense of place closely linked to the visual impacts.	Local and Regional	N/A
Impact on farming activities	Safety and security impacts, stock losses, damage to farm infrastructure and damage to farm roads.	Local	N/A
Influx of job seekers into the area during the construction phase	The influx of job seekers may result in an increase in sexually transmitted diseases, including HIV/AIDS; increase in prostitution; increase in alcohol and drug related incidents; increase in crime; and creation of tension and conflict in the community.	Local and Regional	N/A
Creation of employment and business opportunities during the construction phase	Positive impact associated with indirect business opportunities created as a result of the proposed project.	Local	N/A
Creation of potential training and skills development opportunities for local communities and businesses	Positive impact associated with potential for skills development and business opportunities.	Local and Regional	N/A
Potential up and down-stream economic opportunities for the local, regional and national economy	Maximising opportunities to local and regional SMMEs and other businesses to provide a range of services, which may include, but not limited to, catering, laundry, transport (limited positive impact)	Local, Regional and National	N/A

Gaps in knowledge & recommendations for further study:

» Census, or sources based projections on the Census 2001 data. The writing of this report coincides with Census 2011 – the first comprehensive community level count undertaken since 2001. An interim Community Survey was undertaken by StatsSA in 2007 (Local Municipal level). However, Census 2001 remains the most recent community/ ward level, actual count data currently available. Final data from Census 2011 will be available in early 2013. Therefore, it should be noted that the 2001 Census data is dated. Where possible this data has been up-dated by projections, derived from Census 2001.

Methodology to be undertaken for the EIA phase:

» Review of existing project information, including the Planning and Scoping Documents;
» Collection and review of reports and baseline socio-economic data on the area (IDPs, Spatial Development Frameworks etc);
» Site visit and interviews with key stakeholders in the area including local land owners and authorities, local community leaders and councillors, local resident associations and residents, local businesses, community workers etc;
» Identification and assessment of the key social issues and opportunities;
» Preparation of Draft Social Impact Assessment (SIA) Report, including identification of mitigation/optimisation and management measures to be implemented.

The following typical, generic project information is required in order to inform the Social Impact Assessment (Including all related infrastructure such as transmission lines, access roads, office and warehouse components):

» Comments received from I&APs during the public participation process, including comments reflected in the Final Scoping Report;
» A plan of the proposed lay-out(s) of the wind turbines (including an indication of the phasing sequence on the site), supporting structures and infrastructure;
» Duration of the construction phase (months);
» Number of people employed during the construction phase;
» Breakdown of number of people employed in terms of skills categories (low skilled, semi-skilled and skilled);
» Estimate of the total wage bill for the construction phase and breakdown in % as per skills categories;
» Estimate of total capital expenditure for the construction phase;
» Indication of where construction workers will be housed (on site or in nearest town?);
» Opportunities for on-site skills development and training;
» Description of the typical activities associated with the construction phase, specifically on-site construction activities. This includes a description of how the components associated with a WEF will be transported to and assembled on site;
» The size of the vehicles needed to transport the components and the routes that will be used to transport the large components to the site, and an estimate of the number of vehicle trips required; and

» Information on the nature of the agreements with the affected landowners and or communities, specifically with regard to compensation for damage to land, infrastructure etc.

Table 5.2: Evaluation of potential impacts associated with the **operation phase** of the proposed Elliot Wind Energy Facility

Potential Visual Impacts:

The construction and operation of the proposed Elliot Wind Energy Facility will have a visual impact on a number of potentially sensitive visual receptors especially within (but not restricted to) a 10km radius of the proposed project development site. Such visual receptors include people travelling along roads and those residing in Elliot and within the smaller settlements, farms and homesteads.

There are no formally protected or conservation areas present within the study area, but the greater environment has a rural and undeveloped character, consisting of green fields and rolling hills. Settlements, where these occur, are limited in extent and domestic in scale. This area is not known as a tourist destination, but the greater environment, with its scenic landscapes, mountains and rivers, has a high visual quality and the roads passing through the area will offer scenic drives to tourists passing through.

Figure 5.3 indicates areas from which any number of turbines (with a minimum of one turbine) could potentially be visible as well as proximity radii from the proposed development area. The proposed facility will have a large core area of potential visual exposure on the facility site itself, and within a 5km offset.

Issue	Nature of Impact	Extent of Impact	'No go' areas
The visibility of the facility to, and potential visual impact on observers travelling along the national and arterial roads (i.e. the R56, R58 and R393) as well as secondary roads within the study area.	Visual exposure to wind turbines and associated infrastructure.	Local and/ or regional	Cannot be determined at this stage.
The potential visual impact on built up areas and populated places in close proximity to the proposed facility and within the region. These include the town of Elliot and the settlements of Sunnyside, Glenhope and KuZikonkwane.	Visual exposure to wind turbines and associated infrastructure.	Local and/ or regional	Cannot be determined at this stage.
The visibility of the facility to, and visual impact on farmsteads and homesteads within the study area.	Visual exposure to wind turbines and associated infrastructure.	Local and/ or regional	Cannot be determined at this stage.
The potential visual impact of ancillary infrastructure (i.e. the substation, overhead power line, and internal access roads) on observers in close proximity to the proposed	Visual exposure to wind turbines and associated infrastructure.	Regional	Cannot be determined at this stage.

facility.			
The potential visual impact of shadow flicker on observers residing on or in close proximity to the proposed facility.	This is the flicker of shadow as the rotor blades pass between the receptor and the sun. It occurs when the sky is clear, and when the rotor blades are between the sun and the receptor (i.e. when the sun is low).	Local	Cannot be determined at this stage.
The potential visual impact of the proposed facility on sensitive topographic features such as the rivers and mountains, and in particular the southern parts of the Main Drakensberg Escarpment in the north of the study area.	Visual exposure to associated infrastructure.	Local	Cannot be determined at this stage.
The potential visual impact of the proposed facility on the visual quality of the landscape and sense of place region.	Visual exposure to associated infrastructure.	Local and/ or regional	Cannot be determined at this stage.
The potential visual impact of operational, safety and security lighting of the facility at night on observers in close proximity to the facility.	Visual impact associated with lighting	Local	Cannot be determined at this stage.
The potential cumulative visual impact of the proposed wind energy facility in relation to other proposed wind energy facilities (e.g. Indwe WEF located approximately 30km away) and associated infrastructure in relation to other built forms.	Cumulative visual impacts	Regional	Cannot be determined at this stage.

Gaps in knowledge & recommendations for further study:

The potential visual impacts need to be assessed in greater detail during the EIA phase of the project. It is recommended that:

» Additional spatial analyses be undertaken in order to create a visual impact index that will further aid in determining potential areas of visual impact. This exercise should be undertaken for the core wind energy facility as well as the ancillary infrastructure.

» The site-specific issues and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact.

» Determination of Viewer Incidence/Viewer Perception, Visual Absorption Capacity of the landscape, Visual Impact Index and Visual Distance/Observer

Proximity to the facility as proposed in the Visual Assessment.

» Consideration of cumulative visual impacts from other WEF within the region

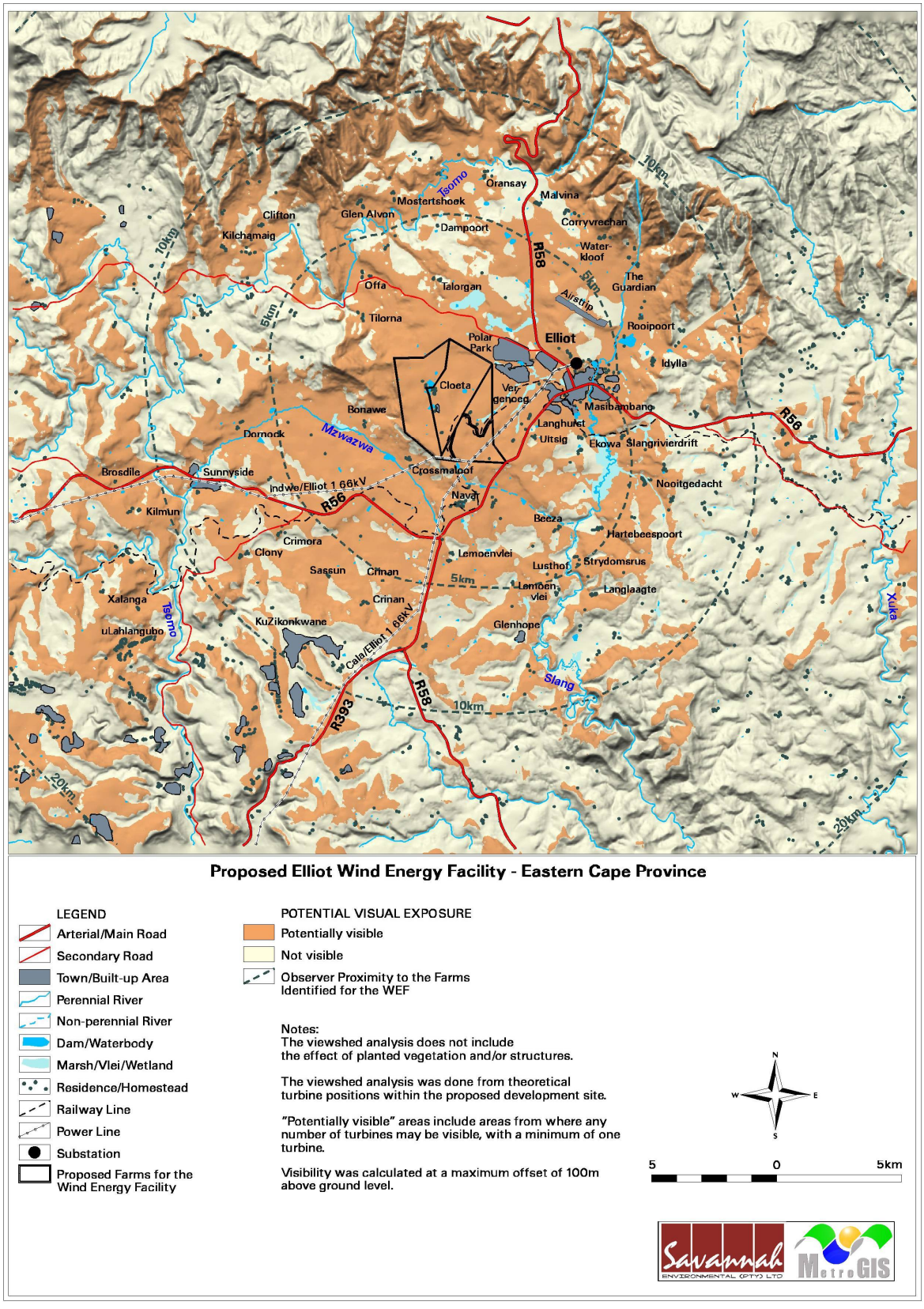

Figure 5.4: Map indicating the potential visual exposure of the proposed wind energy facility (Note: the *visible area* indicates areas from which any number of wind turbines (with a minimum of one turbine) *may be visible*).

Impacts on Ecology:

The most important potential negative ecological impacts of the operation of a wind energy facility are related to bat mortality and loss of habitat.

Bats have been found to be particularly vulnerable to being killed by wind turbines. A primary cause for mortality is a combination of direct strikes and barotrauma (bats are killed when suddenly passing through a low air pressure region surrounding the turbine blade tips causing low pressure damage to the bat's lungs, Baerwald et al. 2008). The relative importance of this impact on bat populations depends on which species are likely to be affected, the importance of the site for those species and whether the site is within a migration corridor for particular bat species.

Issue	Nature of Impact	Extent of Impact	'No go' areas
Impacts on bats	It has been evaluated that there are three Near Threatened bat species that could occur site or in the surrounding areas.	Local - Regional	None identified at this stage.
Establishment and spread of declared weeds and alien invader plants	There is a moderate likelihood that alien species will spread on site in the absence of control measures.	Local - Regional	None.

Gaps in knowledge & recommendations for further study:

The following assessments will be done during the EIA phase in order to properly assess potential impacts on the ecological receiving environment by the proposed WEF:

» The presence and distribution of wetlands and drainage lines on site will be confirmed. This will be done primarily using aerial photograph interpretation, but will be confirmed in the field using topographic and floristic indicators.
» The draft sensitivity map will be verified in the field.
» Searches will be undertaken in the scarp slope areas to determine whether any protected trees occur on site or not.
» The presence of species of concern will be evaluated during the EIA phase. This will be done by assessing habitat suitability for those species that have been assessed as potentially occurring in the area. Particular attention will be paid to those species classified as threatened, Critically Rare, Near Threatened, Rare or Declining that could occur on site. These include the Lesser Long-fingered Bat, the Natal Long-fingered Bat and Geoffroy's Horseshoe Bat.

Impacts on Avifauna:

The list of 'target species' for this study is as follows: Cape Vulture; Black Harrier; Blue Crane; Secretarybird; African Marsh Harrier; Denham's Bustard; Grey Crowned Crane; Verreaux's Eagle; Lanner Falcon; Blue Korhaan; Jackal Buzzard; Yellow-breasted Pipit; White Stork; Black Kite; Amur Falcon; Steppe

Buzzard; Drakensberg Rockjumper; Grey-winged Francolin; and Black-shouldered Kite. Of these the most important is the Grey Crowned Crane. This list will be refined as more work at this site is conducted.

The impact of most concern for these species is that of collision with turbines, based on the fact that this study area is already relatively disturbed by other activities rendering habitat destruction and disturbance of lower significance. Although this area is known to be a stronghold for the Grey Crowned Crane, and flocks of up to several hundred of these bird move throughout the area, the proportion of flight time spent at turbine height (and hence at risk of collision) is not known (nor is it known for the other target species).

Issue	Nature of Impact	Extent of Impact	'No go' areas
Disturbance to nesting or foraging large terrestrial species, foraging or nesting raptors and smaller endemics.	Operation noise and movement leading to disturbance.	Local	Refer to Figure 5.2
Habitat loss: displacement to nesting or foraging large terrestrial species, foraging or nesting raptors, commuting wetland species and smaller endemics	Operation noise and movement leading to habitat loss.	Local	Refer to Figure 5.2.
Mortality	Electrocution on associated infrastructure (especially raptors and storks) and collision with turbine blades and associated power lines (commuting large terrestrial species, raptors, wetland birds, ibises and some endemic passerines)	Local	Refer to Figure 5.2

Gaps in knowledge & recommendations for further study:

It is not possible at this stage to determine with confidence the relative significance of these various potential impacts, mainly because too little information is available on the relative abundance and movements of local populations of the implicated species. The significance of impacts will be investigated in more detail during the EIA phase after spending some field time at the site.

The EIA Phase will conduct the following activities:

» The micro habitats on site will be assessed for their suitability for the key species.
» The sensitivity zones and suitable buffer zones will be identified and mapped.
» The impacts identified in this scoping phase study will be assessed formally according to the supplied criteria.

» A framework for a pre-construction bird monitoring programme will be prepared.

Potential noise impacts:

23 potential noise-sensitive developments were identified in the noise specialist scoping study, one of which is located on site and the majority of which are residential sites located to the east of the proposed WEF. Commonly the most significant noise occurs during the operational phase of a wind energy facility. The sources of noise include:

» Aerodynamic noise is emitted by a wind turbine blade (sound of the wind turbine "cutting" wind – low frequency noise)
» Mechanical noise (from the gear-box / generator)
» Transformer noises (substations)
» Transmission Line noise (Corona noise)
» Low frequency noise
» Amplitude modulation of the sound emissions from the wind turbines

During this evaluation, more focus was placed on the impacts on the surrounding noise environment during times when a quiet environment is highly desirable. Noise limits should therefore be appropriate for the most noise-sensitive activity. Noise-sensitive activities such as sleeping, or areas used for relaxation or other activities (places of worship, school, etc) should determine appropriate Zone Sound Levels.

Based on the total area that could be influenced by the operation of the wind energy facility, there are potential receptors (to be confirmed during EIA phase) that could be affected by the facility.

Issue	Nature of Impact	Extent of Impact	'No go' areas
Noise impacts associated with the operation of the wind energy facility	Based on the preliminary impact estimations (as detailed in the noise specialist report contained within Appendix M), potential sensitive receptors closer than 1,000 meters could be impacted. This, however, needs to be confirmed through detailed modelling of the preliminary layout in the EIA phase of the process.	Regional (i.e. beyond the site boundaries). The noise could impact on receptors up to 1,000 meters from the boundary of the facility (worst case scenario – wind blowing from wind energy facility towards receptor).	An appropriate buffer around identified sensitive receptors - to be confirmed in the EIA phase

Gaps in knowledge & recommendations for further study:

No preliminary layout was available for evaluation at this stage in the process. Conceptual scenarios were therefore modelled to illustrate the potential spatial extent of noise impacts that wind turbines may have on a potential receptor.

The following work is planned for the Environmental Impact Assessment phase:

» A site visit to obtain information regarding background noise levels, the prevailing meteorological conditions during this background noise level survey, as well as confirming and identifying Noise-sensitive developments,
» Currently identified (potential) noise receptors will be investigated during the EIA phase, and any additional sensitive developments will be identified. Their relative sensitivity to noise impacts will be determined. This will be based on the SANS 10103 guideline, as well as current land uses on the properties (residential vs. business/industrial).
» Using the data (proposed processes, noise characteristics of the selected equipment, locations of the turbines) as provided by the project developer, the predicted impact of the facility on noise sensitive developments will be predicted using the CONCAWE method as recommended by SANS 10357:2004 for both the construction and operational phases.
» Using the calculated noise levels at the identified noise sensitive developments, the projected significance of noise impact (whether construction or operational) will be determined using the criteria as proposed (subject to possible changes after any stakeholder input).

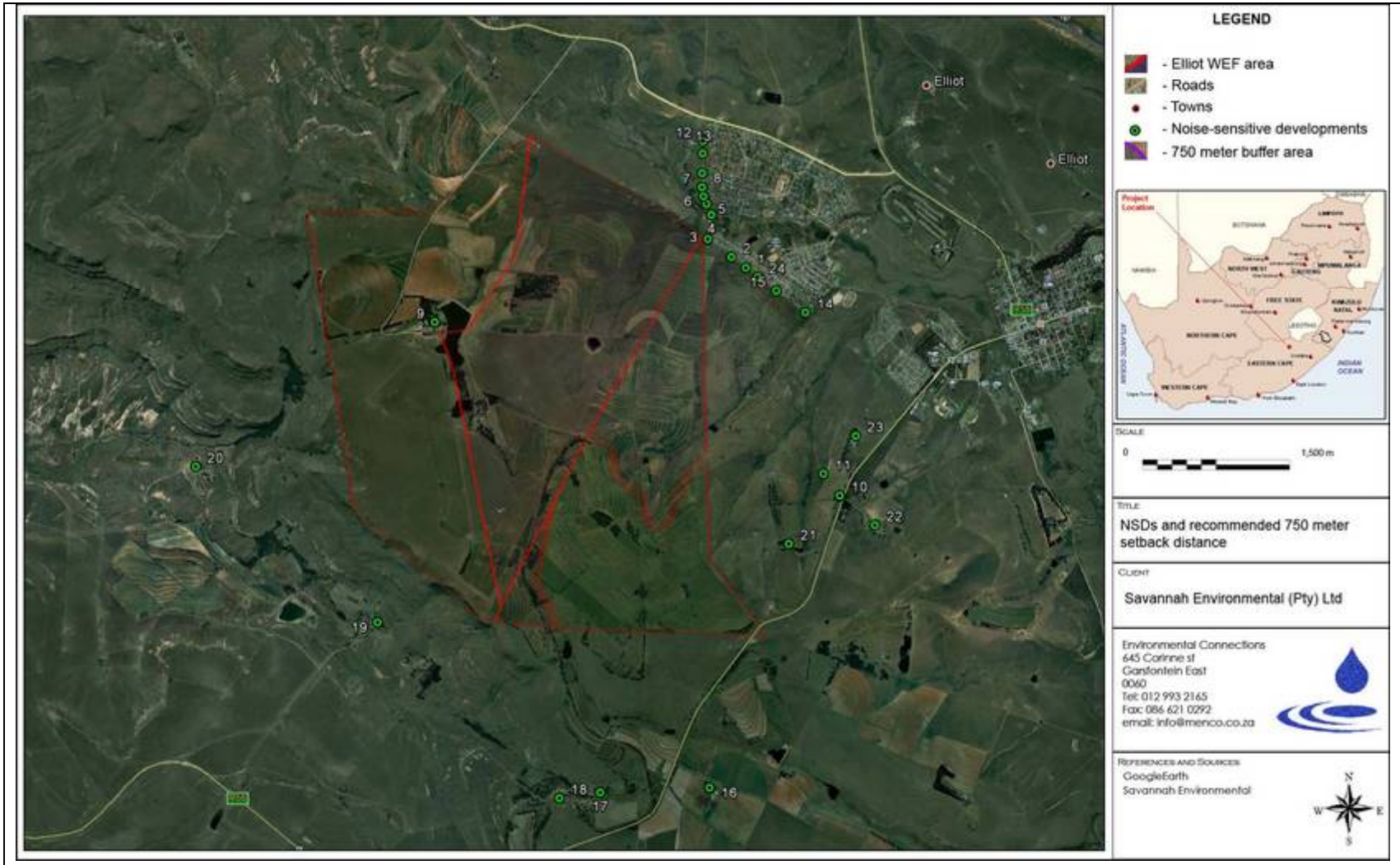

Figure 5.5: Map indicating the potential noise sensitive developments (green dots)

Potential Social Impacts:

Potential positive impacts associated with the operational phase are linked to the benefits that will accrue to the local landowners and community in terms of the agreements entered into with DNA Wind Farm. The development will also create employment and skills development opportunities. The establishment of a renewable energy source will also represent a positive social impact. The potential negative impacts are linked to the visual impact on the areas rural sense of place, and, to a lesser extent, the potential impact on the productivity of local farms through the loss of productive land. In addition, a power line linking the site to the Eskom electricity grid may potentially have negative impacts on land uses and the areas sense of place.

Issue	Nature of Impact	Extent of Impact	'No go' areas
Impacts on tourism	Visual impacts on tourists visiting the area	Local-Regional (limited due to limited number of tourists)	N/A
Impacts on property prices	Potential impact on property values	Local	N/A
Creation of opportunities to local business during the operational phase, including but not limited to, provision of security, staff transport, and other services	Limited opportunities available (Positive impact)	Local, Regional and National	N/A
Potential up and down-stream economic opportunities for the local, regional and national economy	(Positive impact)	Local, Regional and National	N/A
Provision of a clean, renewable energy source for the national grid	(Positive impact)	Local, Regional and National	N/A

Gaps in knowledge & recommendations for further study:

The potential impacts on rural sense of place and tourism have the potential to be exacerbated by the cumulative impacts associated with other facilities proposed for the area. This issue will need to be addressed as part of the Social Impact Assessment. A detailed consultation process will be undertaken during the EIA phase of the project. The consultation process for the SIA will be separate to the consultation process for the EIA.

The most important issues that are likely to be raised and will need to be assessed during the EIA include:

- Provision of clean, renewable energy source for the national grid.
- Creation of employment and business creation opportunities during the operational phase.
- Impact on rural sense of place. The impact on sense of place is also linked to the associated power lines.

- Impact on tourism, both locally and regionally.
- Impact on farming activities.

In terms of potential impacts on local farmers in the area the following issues will need to be assessed:

- Potential threat to farm safety due to increased number of people in the area and construction workers.
- Potential stock losses.
- Potential damage to water and other farm infrastructure.
- Potential damage to roads by heavy equipment and increased traffic volumes.
- Potential impact on farming operations and loss of productive land.

CONCLUSIONS CHAPTER 6

DNA Wind Farm (Pty) Ltd, an infrastructure and wind farm developer, is proposing to establish a commercial wind energy facility and associated infrastructure on a site located within Sakhisizwe Local Municipality in the Eastern Cape Province. The proposed site is situated approximately **3 km west of Elliot**. Based on an extensive pre-feasibility analysis and site identification processes undertaken by DNA Wind Farm, a favourable area has been identified for consideration and evaluation as per the requirements of an Environmental Impact Assessment (EIA). A cluster of up to **60 wind turbines** with a total generating capacity of up to 180 MW, collectively referred to as a wind energy facility, is planned to be constructed over an area of approximately 1 600 ha in extent. These will be appropriately spaced to make optimal use of the wind resource on the site.

Infrastructure associated with the facility will include:

» Up to 60 Wind Turbines with a total generating capacity of up to 180 MW (each turbine will be comprised of a tower, nacelle and a rotor with its associated blades).
» Foundations to support the turbine towers (up to 20m x 20m);
» Underground cables between turbines (excavated to a depth of ~1m deep) and limited overhead cabling;
» A small on-site substation (size to be determined in EIA phase);
» Overhead distribution power line which will link to the existing Eskom power line (Elliot to Cala 66 kV line) which traverses the site;
» Internal access roads (~ 6m wide) to each wind turbine; and
» Workshop / administration building.

The above proposed infrastructure is anticipated to extend over a footprint of between 0.5km² to 0.8 km² (or 50ha to 80ha) of the affected 1600ha study area, which is up to 5% of the total area included in this assessment. A more accurate understanding of the final footprint will be determined during the EIA Phase with the availability of the final layout plan.

This Final Scoping Report aimed at detailing the nature and extent of this facility, identifying potential issues associated with the proposed project, and defining the scope of the studies required within the EIA. This was achieved through an evaluation of the proposed project, involving the project proponent, specialist consultants, and a consultation process with key stakeholders that included both relevant government authorities and interested and affected parties (I&APs). In accordance with the requirements of the EIA Regulations, feasible project-specific

alternatives (including the "do nothing" option) have been identified for consideration within the EIA process.

The conclusions and recommendations of this Final Scoping Report are the result of on-site inspections, desk-top evaluations of impacts identified by specialists, and the parallel process of public participation. A summary of the conclusions of the evaluation of the potential impacts identified to be associated with the proposed wind energy facility is provided below. Recommendations regarding investigations required to be undertaken within the EIA are provided within the Plan of Study for EIA, contained within Chapter 7 of this report.

6.1. Conclusions drawn from the Evaluation of the Proposed Site for Development of the Wind Energy Facility

The identified site (as assessed in this scoping report) for the establishment of the proposed Elliot Wind Energy Facility is situated within the Eastern Cape Province approximately 3 km west of Elliot.

The wind energy facility is proposed to accommodate up to 60 wind turbines appropriately spaced to make use of the wind resource on the site. In identifying and evaluating impacts associated with the proposed wind energy facility, it has been assumed that although during operation, the area affected will comprise wind turbines, access roads and a substation, during construction some level of disturbance outside of the infrastructure footprint can be expected. However, once construction is complete, only a small portion of this area will be permanently impacted by infrastructure associated with the wind energy facility.

Potential issues identified through this scoping study associated with the proposed wind energy facility are summarised in Tables 6.1 and 6.2 below.

Table 6.1 Potential impacts associated with the construction phase

Potential Positive Impacts	» Social Impacts * Skills development * Job and direct and indirect business opportunities * Improvement in opportunities for local and regional SMMEs
Potential Negative Impacts	» Visual impacts associated with the construction of the facility and associated infrastructure » Loss of agricultural land and land use impacts » Impacts on ecology and wetlands: * Impacts on bats due to construction activities in close proximity to habitat during construction * Impacts on threatened animals due to loss or transformation of habitat * Impacts on threatened plants due to loss or

	transformation of habitat * Impacts on protected tree species due to clearance of vegetation required for construction of infrastructure. * Direct loss of vegetation during construction leading to increased vulnerability, general reduction in biodiversity and increased fragmentation * Potential impacts on wetlands and drainage lines leading to localised loss of habitat with potential impacts on ecological and hydrological functioning * Spread of alien vegetation » Impacts on avifauna * Disturbance to ground-nesting and/or terrestrial species and raptors especially along the ridge line, wetlands and dams. * Habitat loss: habitat destruction to small endemics. » Impacts on heritage resources » Impacts on paleontological resources (fossil material) » Impacts on noise sensitive receptors * Noise impacts due to movement of construction machinery and vehicles * Noise impacts due to blasting (if required) * Noise impacts resulting from additional construction traffic onto feeder roads » Social impacts * Impacts on land use and farming operations * Loss of sense of place * Impacts on property prices * Increased traffic * Increase crime in the study area

Table 6.2 Potential impacts associated with the operation phase

Potential Positive Impacts	» Provision of a clean, renewable energy source for the national grid » Social Impacts: * Creation of opportunities to local business during the operational phase, including but not limited to, provision of security, staff transport, and other services * Potential up and down-stream economic opportunities for the local, regional and national economy » Assistance towards provision of secure power supply in South Africa
Potential Negative Impacts	» Visual impacts * Visual exposure of wind turbines and associated infrastructure on observers from roads, built-up areas, homesteads and farmsteads

	* Shadow flicker * Visual impact on sensitive topographic features and sense of place in particular in the southern parts of the Main Drakensburg Escarpment » Impacts on ecology and wetlands: * Change in runoff and drainage patterns * Establishment of alien plant species » Impacts on avifauna * Increased mortality of birds/bats due to collision with turbine blades * Increased mortality of birds due to collision with or electrocution on associated power line * Habitat loss and disturbance due to operation of the wind energy facility » Noise impacts associated with operation of a wind energy facility » Heritage Impacts: * Loss of cultural landscape and sense of place » Social impacts: * Potential positive impacts on existing tourism potential due to visitors from other areas wanting to view the facility * Potential positive impacts on local farmers due to upgrade of roads and other infrastructure thereby improving efficiencies * Potential localised negative impacts on farming activities and land use * visual and sense of place impacts on existing receptors, including nearby rural and urban residences

The majority of potential impacts identified to be associated with the construction and operation of the proposed wind energy facility are anticipated to be localised and restricted to the proposed site. The negative cumulative impacts associated with the proposed wind energy facility are not considered to be significant as the nearest wind energy facility which is proposed in the region, is located west of Indwe approximately 30 – 35km from the proposed site. No environmental fatal flaws were identified to be associated with the site at this stage in the process. However, areas of potential high sensitivity were identified at a desk-top level through the scoping phase. These areas of sensitivity are illustrated in the sensitivity map included as Figure 6.1.

The potentially sensitive areas/environmental features that have been identified include:

» Areas of high ecological sensitivity.
» Areas of avifaunal sensitivity.

» Potential noise sensitive developments.
» Areas of agricultural sensitivity – irrigated agriculture

The sensitivity map shown below is a rough scale estimate of sensitivity on the site, and these areas will be subject to survey and ground-truthing during the EIA phase of the project. These potentially sensitive areas will, therefore, be further investigated and assessed through detailed specialist studies (including field surveys) during the EIA phase in order to identify exclusion or no-go areas. In order to assess potential impacts within sensitive areas, a preliminary layout for the wind energy facility is required to be compiled by DNA Wind Farm.

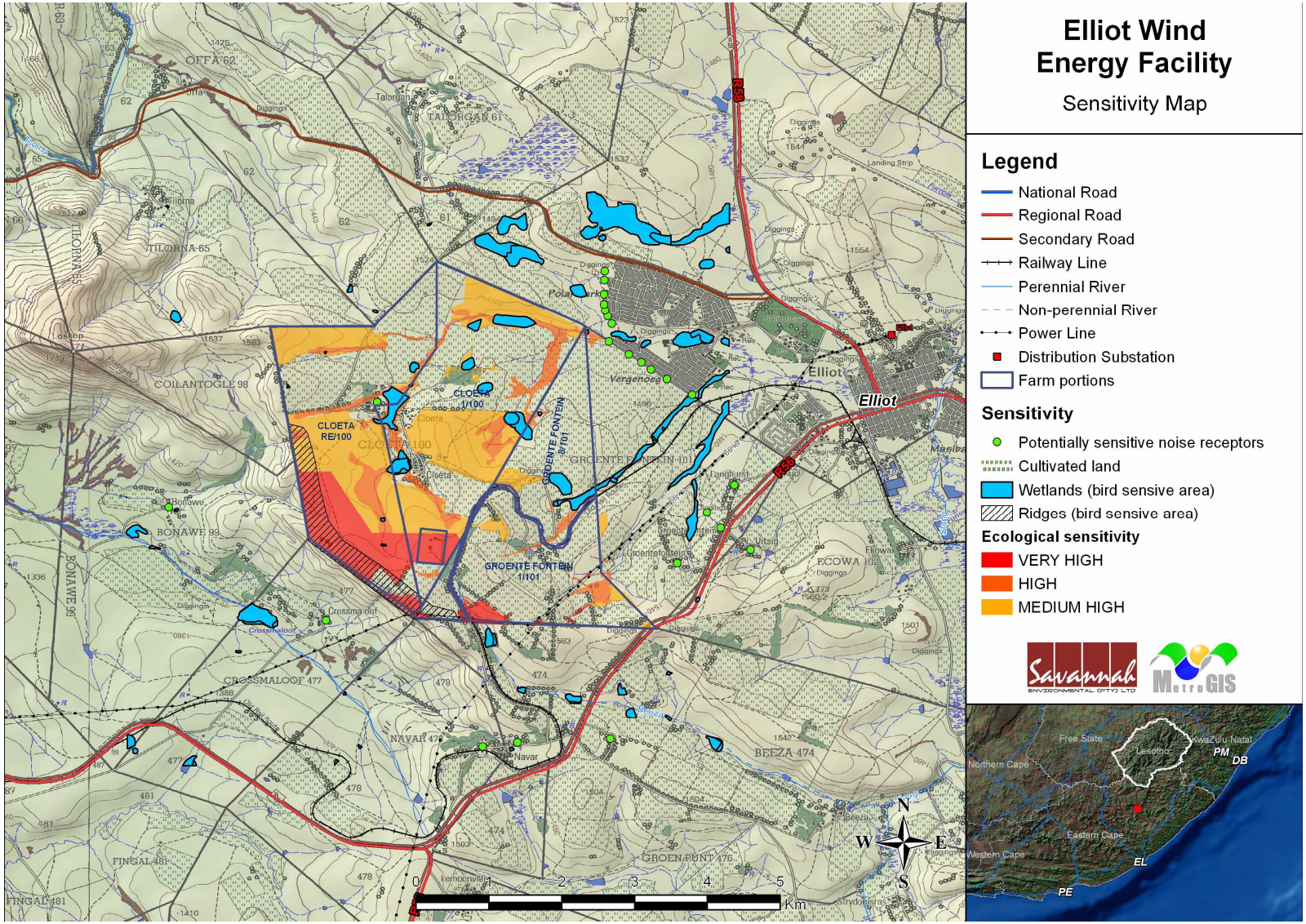

Figure 6.1: Potential environmental sensitivity based on overlay of sensitivities identified at Scoping

6.2. Evaluation of the Potential Issues associated with the power line

In order to connect the wind energy facility to the power grid, an overhead power line will be required to be constructed from the on-site substation to the point of connection point to the electricity grid. It is proposed that a loop-in and loop-out power line configuration will connect the substation to the existing Eskom Elliot – Cala 66 kV line power line which traverses the site. This avoids the need for long lengths of power line over adjacent properties. A route for the power line will be assessed, surveyed and pegged prior to construction. Potential issues identified to be associated with the proposed overhead power line include impacts on flora, fauna and ecological processes, impacts on avifauna as a result of habitat disturbance, collisions and electrocutions, potential impacts on heritage sites and visual impacts.

The potential impacts associated with the power line will be considered in detail within the EIA phase. Recommendations regarding a preferred alignment and appropriate mitigation measures (if required) will be made.

6.3. Potential Benefits of the Proposed Wind Energy Facility

At present, South Africa is some way off from 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.

Within a policy framework, the development of renewable energy in South Africa is supported by the White Paper on Renewable Energy (November 2003), which has set a target of 10 000 GWh renewable energy contribution to final energy consumption by 2013. The target is to be achieved primarily through the development of wind, biomass, solar and small-scale hydro. The Department of Energy's macroeconomic study of renewable energy, developed under the now completed Capacity Building in Energy Efficiency and Renewable Energy (CaBEERE) project, has established that the achievement of this target would provide a number of economic benefits, including increased government revenue amounting to R299 million, increased GDP of up to R1 billion per year and the creation of an estimated 20 500 new jobs. In addition, the development of renewable energy beyond the 10 000 GWh target holds further employment benefits and would maximise the number of jobs created per TWh produced.

DNA Wind Farm initiated a wind monitoring programme to determine the viability of a wind energy facility and subsequently determined that up to 60 turbines can be established as part of the Elliot Wind Energy Facility due to the viability of the wind

resource. This proposed project would have benefits at a local, regional and national level.

Benefits associated with the establishment of a wind energy facility include:

» **Increased energy security:** The current electricity crisis in South Africa highlights the significant role that renewable energy can play in terms of supplementing the power available. In addition, given that renewables can often be deployed in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality, while reducing expensive transmission and distribution losses.
» **Resource saving:** Conventional coal-fired power plants are major consumers of water during cooling processes and power generation process. 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, when compared with wet-cooled conventional coal-fired power stations. This translates into a revenue saving of ~R26.6 million. As South Africa is already a water-stressed nation, it is critical that the country collectively engages in a variety of water conservation measures, particularly as the detrimental effects of climate change on water availability are expected to be experienced in the future.
» **Exploitation of our significant renewable energy resource:** At present, valuable national resources (including biomass by-products, solar insolation and wind) remain largely unexploited within South Africa. The use of these energy flows into the national grid will strengthen energy security within the country through the development of a diverse energy portfolio.
» **Pollution reduction:** The release of by-products from fossil fuel burning for electricity generation has a particularly hazardous impact on human health through impacts on air quality, and contributes to ecosystem degradation. Renewable energy generation is not associated with such emissions to air.
» **Climate friendly development:** The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner, contributing to the mitigation of climate change through the reduction of greenhouse gas (GHG) emissions. South Africa as a nation is estimated to be responsible for 1% of global GHG emissions and is currently ranked 9th worldwide in terms of per capita CO_2 emissions.
» **Support for international agreements and enhanced status within the international community:** 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 for cementing its status as a leading player within the international community.
» **Employment creation:** The sale, development, installation, maintenance and management of renewable energy facilities have potential for job creation in South Africa.

- **Acceptability to society:** Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health and climate friendly development.
- **Support to a new industry sector:** The development of renewable energy offers an opportunity to establish a new industry within the South African economy.
- **Protecting the natural foundations of life for future generations:** Actions to reduce South Africa's disproportionate carbon footprint can play an important part in ensuring the country's role in preventing dangerous anthropogenic climate change; thereby securing the natural foundations of life for generations to come.

These potential benefits will be assessed in further detail in the EIA phase of the process.

PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT CHAPTER 7

A detailed description of the nature and extent of the proposed Elliot Wind Energy Facility and associated infrastructure, details regarding the Scoping Phase followed, as well as the issues identified and evaluated through the Scoping phase (to date) have been included in this Final Scoping Report. This section of the report provides the context for a Plan of Study for Environmental Impact Assessment (EIA).

The Plan of Study describes how the EIA Phase for the proposed wind energy facility project will proceed. The EIA Phase of the study includes detailed specialist studies for those impacts recorded to be of potential significance, as well as on-going public consultation. The key findings of the Scoping Phase (which includes inputs from authorities, Organs of State, the public, the proponent and the EIA specialist team) are used to inform the Plan of Study for EIA, together with the requirements of the NEMA EIA Regulations and applicable guidelines.

7.1. Aims of the EIA Phase

The EIA Phase will aim to achieve the following:

» Provide an overall assessment of the social and biophysical environments affected by the proposed project.
» Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with the proposed wind energy facility and associated infrastructure.
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.
» Undertake a fully inclusive public involvement process to ensure that I&AP are afforded the opportunity to participate, and that their issues and concerns are recorded.

The EIA will address potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with all phases of the project including design, construction, operation and decommissioning, and will aim to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project. All feasible alternatives (including the 'do nothing' alternative) will be assessed.

7.2. Authority Consultation

Consultation with the regulating authorities (i.e. DEA and Eastern Cape DEDEA) will continue throughout the EIA process. On-going consultation will include the following:

» Submission of a Draft Scoping Report to Eastern Cape DEDEA for review and comment.
» Submission of a Draft Scoping Report to National DEA for review.
» Submission of a Final Scoping Report to DEA following a 30-day review period.
» Submission of a Draft EIA Report to Eastern Cape DEDEA for review and comment.
» Submission of a Draft EIA Report to National DEA for review.
» Submission of a Final EIA Report following a 30-day public review period.
» An opportunity to visit and inspect the site.

7.3. Consideration of Alternatives

The following project alternatives will be investigated in the EIA:

» **The 'do nothing' alternative:** DNA Wind Farm do not establish the Elliot Wind Energy Facility (maintain status quo).
» **Site-specific alternatives:** in terms of the siting or positioning of the turbines and associated infrastructure on the site in response the identified environmental sensitivities.
» **Site alternatives:** DNA Wind Farm has determined the quality of the wind resource over the farm portions included in this report. No site alternatives are currently proposed however further consideration of site alternatives west of Elliot will be given during the EIA phase.

7.4. Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

A summary of the issues which require further investigation within the EIA phase, as well as the proposed activities to be undertaken in order to assess the significance of these potential impacts is provided within Table 7.1. The specialists involved in the EIA Phase are also reflected in Table 7.1. These specialist studies will consider the site proposed for the development of the wind energy facility and all associated infrastructure (including layout alternatives, as well as the alternative alignments of the proposed overhead power line and access road/s.

Table 7.1: Summary of the issues which require further investigation within the EIA phase and activities to be undertaken in order to assess the significance of these potential impacts

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Impacts on Ecology and Wetlands	A risk assessment was undertaken which identified seven main potential impacts on the ecological receiving environment. The significance of these impacts will be assessed during the EIA phase after collection of relevant field data. The identified potential negative impacts are the following (with potential worst-case significance without mitigation measures given in brackets): 1. Impacts on bats (high). 2. Impacts on threatened animals (medium). 3. Impacts on threatened plants (high). 4. Impacts on protected tree species (medium). 5. Impacts on indigenous natural vegetation (high). 6. Impacts on wetlands (high). 7. Establishment and spread of declared weeds and alien invader plants (high). The following assessments will be done during the EIA phase in order to properly assess potential impacts on the ecological receiving environment by the proposed facility: » The presence and distribution of wetlands and drainage lines on site will be confirmed. This will be undertaken primarily using aerial photograph interpretation, but will be confirmed in the field using topographic and floristic indicators. » The draft sensitivity map will be verified in the field. » Searches will be undertaken in the scarp slope areas to determine whether any protected trees occur on site or not. » The presence of species of concern will be evaluated during the EIA phase. This will be done by assessing habitat suitability for those species that have been assessed as potentially occurring in the area. The lists provided in this Scoping Report will form the basis for those assessments and surveys. Particular attention will be paid to those species classified as threatened or Critically Rare.	David Hoare of David Hoare Consulting
Impacts on Avifauna	The following activities will be undertaken during the EIA Phase: » The micro-habitats on site will be assessed for their suitability for the key species. » The sensitivity zones and suitable buffer zones will be identified and mapped.	Jon Smallie of WildSkies Ecological Services

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» The impacts identified in this scoping phase study will be assessed formally according to the supplied criteria. » A framework for a preconstruction bird monitoring programme will be prepared and DEA's requirements for concurrent monitoring will be considered.	
Impacts on bats	An EIA site visit will be conducted by a bat specialist to more accurately determine bat presence, and to provide more guidance regarding the appropriate positioning of the turbines as well as the associated infrastructure. Species of concern include the Lesser Long-fingered Bat, the Natal Long-fingered Bat and Geoffroy's Horseshoe Bat. Information for the EIA phase would include the following fieldwork techniques: » Species presence estimates determined through the use of a bat detector system operated whilst driving transect lines across the farm » Surveys to assess and identify potential key areas for roosting such as (but not limited to) buildings, underground sites and trees » Roost investigation will be conducted if any areas adjacent to the site are identified and having a high chance of having suitable roost sites » Roost surveys will be conducted during day-light hours as well as at dusk and dawn at all infrastructure currently present on the farm » A framework for a preconstruction bat monitoring programme will be prepared and DEA's requirements for concurrent monitoring will be considered.	
Impacts on Soils and Agricultural Potential	A detailed site visit will have to be conducted as part of the EIA level investigation and the following parameters should be investigated: » Soil distribution (classification) on the site; » Extent of degradation due to current land use (such as overgrazing); » Erosion status and erodibility of the soils on the site; and » Mitigation measures to arrest current impacts and manage future impacts associated with the development.	Johan van der Waals of Terrasoils
Noise Impacts	The following information is considered critical in the assessment of the potential noise impact	Morné de Jager of

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	through the EIA Phase study: » The prevailing night-time background ambient noise levels; » The available meteorological data; » The exact locations of the various turbines in the facility; » The full specifications of the wind turbines being considered for use in the facility; » The confirmation of the location of noise-sensitive developments, and; » An overview of the equipment, processes and schedules for the construction phase. The following work will be undertaken during the Environmental Impact Assessment phase: » A site visit to obtain information regarding background noise levels, the prevailing meteorological conditions during this background noise level survey, as well as confirming and identifying noise-sensitive developments, » Currently identified (potential) noise-sensitive developments will be investigated during the EIA phase, and any additional noise-sensitive developments will be identified. Their relative sensitivity to noise impacts will be determined. This will be based on the SANS 10103 guideline, as well as current land uses on the properties (residential vs business/industrial). » Using the data (proposed processes, noise characteristics of the selected equipment, locations of the turbines) as provided by the project developer, the predicted impact of the facility on noise-sensitive developments will be predicted using the CONCAWE method as recommended by SANS 10357:2004 for both the construction and operational phases. » Using the calculated noise levels at the identified noise-sensitive developments, the projected significance of wind energy facility (whether construction or operational) will be determined using the criteria as proposed (subject to possible changes after any stakeholder input).	Menco
Impacts on Heritage Resources	A full phase 1 archaeological impact assessment be conducted to establish the range and importance of the exposed and in situ archaeological and heritage materials and features, the potential impact of the development and to make recommendations to minimize possible damage to these sites. Areas where infrastructure is proposed will be surveyed and recorded in detail. All sites will be evaluated in terms of: » Type of site - e.g. shell midden, shell scatter, stone feature etc.	Celeste Booth of the Albany Museum, Grahamstown

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Location and environmental surrounds - e.g. dune, grassland, etc. » Site category - e.g. Later Stone Age, Middle Stone Age etc. » Context and condition - e.g. disturbed, primary or secondary, etc. » Estimated size and depth of deposits » Cultural affinities - e.g. hunter-gatherer, pastoralist, etc. » Record site content - e.g. food waste, cultural material, etc. » Record basic information of finds -e.g. types of bone, shellfish species, raw material used for stone tools, type of stone tools, ceramics, describe stone features etc. » Estimate relative age of sites from cultural material and other information. » Record and describe any graves or burial sites. » Make statement on the importance/significance of site, feature etc. » Rate sites - e.g. national, provincial, local etc. A report will be compiled with recommendations for mitigation. It will include an assessment of the potential impact of development on the sites and proposals for mitigation and/or protection - towards a Phase 2 and possible Phase 3 investigation. A desktop palaeontological study will also be undertaken during the EIA phase.	
Visual Impacts	The specialist study to be undertaken in the EIA phase will include: » Additional spatial analyses to be undertaken in order to create a visual impact index that will further aid in determining potential areas of visual impact. This exercise should be undertaken for the core wind energy facility as well as the ancillary infrastructure, as these structures (e.g. the substation and power line) are envisaged to have varying levels of visual impact at a more localised scale. Importantly, a preliminary layout of the proposed facility would be required in order to determine these potential areas of visual impact. » Specific spatial criteria need to be applied to the visual exposure of the proposed facility in order to successfully determine the issues related to the visual impact and ultimately the significance of the visual impact. » Photo simulations of critical viewpoints need to be undertaken where required, in order to aid in the visualisation of the envisaged visual impact. » The site-specific issues (as mentioned in the Visual impact assessment – Appendix J) and	Lourens du Plessis of MetroGIS

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact, as well as suggested mitigation measures.	
Social Impact Assessment	Based on review of information relating to wind energy facilities and experience with SIA's undertaken for other wind energy facilities, the most important issues that are likely to be raised and will need to be assessed during the EIA include: » Impact on rural sense of place (this will be closely linked to the visual impacts). » Impact on tourism, both locally and regionally; » Impact on land use and farming activities and potential loss of productivity as a result of the proposed development; » Impact on property prices; » Influx of job seekers into the area during the construction phase. The influx of job seekers may result in an increase in sexually transmitted diseases, including HIV/AIDS; increase in prostitution; increase in alcohol and drug related incidents; increase in crime; and creation of tension and conflict in the community; » Creation of employment and business opportunities during the construction phase; » Creation of employment and business creation opportunities during the operational phase; » Creation of potential training and skills development opportunities for local communities and businesses; » Potential up and down-stream economic opportunities for the local, regional and national economy; and » Provision of clean, renewable energy source for the national grid. In terms of potential impacts on local farmers in the area the following issues will need to be assessed: » Potential threat to farm safety due to increased number of people in the area and construction workers; » Potential stock losses (during the construction and operational phase); » Potential damage to water and other farm infrastructure (during the construction and operational phase); » Potential damage to roads by heavy equipment and increased traffic volumes (during the	Tony Barbour (Environmental Consultant and Researcher)

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	construction and operational phase); and » Potential impact on farming operations and loss of productive land (during the construction and operational phase), and overall impact on sustainability of farming practices as a result of the proposed development.	

7.5. Methodology for the Assessment of Potential Impacts

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified will be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
  - local extending only as far as the development site area – assigned a score of 1;
  - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
  - will have an impact on the region – assigned a score of 3;
  - will have an impact on a national scale – assigned a score of 4; or
  - will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where 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); and
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, 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); and
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

» the **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
» the **status**, which will be described as either positive, negative or neutral.
» the degree to which the impact can be reversed.
» the degree to which the impact may cause irreplaceable loss of resources.
» the *degree* to which the impact can be *mitigated.*

The **significance** is 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).

As DNA Wind Farm has the responsibility to avoid or minimise impacts, and plan for their management (in terms of the EIA Regulations), the mitigation of significant impacts will be discussed and appropriate recommendations made. Assessment of impacts with mitigation will be made in order to demonstrate the effectiveness of the proposed mitigation measures.

The results of the specialist studies and other available information will be integrated and synthesised by the Savannah Environmental project team. An EIA report will be compiled, and will include:

» **detailed description** of the proposed activity
» a description of the property(ies) on which the activity is to be undertaken and the location of the activity on the property(ies)
» a description of the **environment that may be affected by the activity** and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity
» details of the **public participation process** conducted, including:

  - steps undertaken in accordance with the plan of study for EIA;
  - a list of persons, organisations and organs of state that were registered as interested and affected parties;
  - a summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response to those comments; and
  - copies of any representations, objections and comments received from registered interested and affected parties
- a description of the **need and desirability** of the proposed project and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity
- an indication of the methodology used in determining the **significance** of potential environmental impacts
- a description and comparative **assessment of all alternatives** identified during the environmental impact assessment process
- a summary of the findings and recommendations of **specialist reports**
- a description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures
- an assessment of each identified potentially significant impact
- An assessment of cumulative impacts
- a description of any assumptions, uncertainties and gaps in knowledge
- an environmental **impact statement** which contains:
  - a summary of the key findings of the environmental impact assessment; and
  - a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives
- a draft **environmental management programme (EMPr)**
- copies of specialist reports undertaken for the EIA.

The draft EIA Report will be released for a 30-day public review period. The comments received from I&APs will be captured within a Comments and Response Report, which will be included within the final EIA Report, for submission to the authorities for decision-making.

7.6. Public Participation Process

A public participation process will be undertaken by Savannah Environmental in accordance with the requirements of the EIA Regulations. Consultation with key stakeholders and I&APs will be on-going throughout the EIA process. Through this consultation process, stakeholders and I&APs will be encouraged to provide input to the project, and to comment on the findings of the EIA process.

In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their inputs regarding the project, various opportunities will be provided for stakeholders and I&APs to be involved in the EIA phase of the process, as follows:

» Public meeting (advertised meeting for members of the general public).
» Community meeting (pre-arranged and community leaders and members invited to attend).
» Focus group meetings (pre-arranged and stakeholders invited to attend).
» One-on-one consultation meetings (for example on request by stakeholders or I&APs).
» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the project participation consultant, lead EIA consultant as well as specialist consultants).
» Written, faxed or e-mail correspondence.

The draft EIA report will be made available for public review for a 30-day period prior to finalisation and submission to the DEA for review and decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, meetings suitable to accommodating the needs of the I&APs and stakeholders as described above will be held during this public review period.

7.7. Key Milestones of the programme for the EIA

The envisaged key milestones of the programme for the EIA phase of the project are outlined in Table 7.2.

Table 7.2: Envisaged key milestones of the programme for the EIA phase of the project

Key Milestone Activities	Proposed completion date[2]
Authority acceptance of the Scoping Report and Plan of Study to undertake the EIA	30-days after receiving the Final EIA report
Public review period of draft EIA Report	September 2014[3]
Finalisation of EIA Report	October 2014
Make draft EIA Report and draft EMP available to the public, stakeholders and authorities	30-day public review period
Final EIA Report to DEA for review and decision-making, and issue of an Environmental Authorisation	Within 105 days after receiving the Final EIA report.

[2] Indicative dates only

[3] Makes provision for pre-construction bird and bat monitoring to be undertaken over 12 month period

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