ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED ST HELENA COMMUNITY WIND FARM DEVELOPMENT, WESTERN CAPE PROVINCE

DRAFT ENVIRONMENTAL SCOPING REPORT FOR PUBLIC REVIEW

VOLUME 1

DEA Reference Number: 12/12/20/2157

April 2011
J30212
## PROJECT INFORMATION

<table>
<thead>
<tr>
<th>Title:</th>
<th>Draft Environmental Scoping Report for the Proposed St Helena Community Wind Farm Development, Western Cape Province</th>
</tr>
</thead>
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<tr>
<td>Environmental Authority:</td>
<td>Department of Environmental Affairs</td>
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<tr>
<td>DEAT Reference No.:</td>
<td>12/12/20/2157</td>
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<tr>
<td>Applicant:</td>
<td>Just Energy</td>
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<tr>
<td>Environmental Consultants:</td>
<td>Arcus GIBB (Pty) Ltd</td>
</tr>
<tr>
<td>Date:</td>
<td>April 2011</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

Introduction

Just Energy is proposing to establish a community wind farm in association with the Seeland Development Trust and associated infrastructure on Langeklip Farm (Erf 47) near St Helena Bay in the Saldanha Bay Municipality, Western Cape Province. The proposed St Helena Community Wind Farm Development is expected to generate approximately 30 MW and will comprise of between 10 to 35 wind turbines. Associated infrastructure will include on-site transformers and control equipment buildings, access roads to the various turbines and on site during construction and electrical cables connecting the turbines to a new substation site where the connecting cables will link into the electricity grid through a possible overhead powerline.

This proposed project will be registered with the United Nation’s Framework Convention for Climate Change (UNFCCC) as part of the Clean Development Mechanisms (CDM) Programme. Just Energy acknowledges this project as a ‘green’ initiative and have decided to, where possible, commit to making environmentally favourable decisions in respect of the project as a whole.

In terms of the Environmental Impact Assessment (EIA) Regulations, an application of this nature has to undergo both Scoping and Environmental Impact Assessment. Arcus GIBB (Pty) Ltd (GIBB) has been commissioned by Just Energy, who is the project developers, to undertake the EIA process, in the capacity of independent Environmental Assessment Practitioners (EAPs).

This EIA will consider the potential positive and negative environmental and social impacts associated with the establishment of the proposed wind farm and will propose measures to mitigate the negative impacts of the proposed project on the receiving environment and community.

Location

The proposed project is situated within the Saldanha Bay Municipality, Western Cape Province. A study area of approximately 744 hectares, approximately 5 km east of St Helena Bay and 3 km west of Laingville, is being considered within which the proposed wind farm and associated infrastructure will be established.

The land proposed to be utilised for the project will be Langeklip Farm (Erf 47) which is owned by the Seeland Development Trust. The farm is currently zoned as agricultural land and is comprised mainly of cultivated land. It is proposed that only ploughed areas within the farm will be considered for the placement of the turbines, so as not to affect any natural vegetation as far as possible.

A map indicating the farm and the location of the proposed site is provided in Figure 1 below.
Figure 1: Locality map for the proposed St Helena Community Wind Farm Development within Saldanha Bay Municipality
Project Description

- **Wind Farm**
The wind farm is proposed to have a generating capacity of approximately 30 MW and will comprise of between 10 and 35 wind turbines, which will vary between 0.85 MW and 3 MW in generating capacity. The hub height may range between 50 m and 100 m with the turbine blade length ranging between 25 m and 45 m. The wind farm can operate continuously for approximately 20 years.

- **Access Roads**
Access roads will be required for the delivery of the turbines to their assembly positions during construction, as well as for access during the operational phase. Separate to the wind farm access routes, will be an access road to a temporary laydown area where vehicles and materials will be stored during the construction phase.

- **Powerlines**
The turbines and wind farm will be connected to the existing 66 kV power lines through a low voltage feeder powerline, which will be constructed below ground, and according to the recommendations from the Environmental Impact Assessment. Eskom have indicated they may upgrade the 66 kV powerline to a 132 kV powerline. This upgrade of the powerline will be subject to a separate EIA process.

- **Proposed New Substation**
Where the lines connect to the existing 66 kV powerline a substation will be built within the proposed area as required, and in accordance to the NERSA Grid Code Standards, to feed electricity into the national grid.

- **Temporary Construction Laydown Area**
A temporary laydown area will be utilised during the construction phase of the project. This area will be used to store machinery and equipment as well as consist of facilities such as diesel storage facilities, toilets, showers and eating facilities.

- **Staff Housing**
Staff will be accommodated on the farm in its various buildings, no additional construction of staff housing will take place.

- **Wind Farm Control Room**
A monitoring & control room will be constructed on the proposed property.

- **Transport**
It is proposed that turbine components and some of the construction materials will be delivered to the site by road from either Cape Town or Saldanha harbour. The turbines will be delivered directly to their point of assembly on site. Where possible, existing farm roads will be upgraded for transport within the proposed site, to the future benefit of the farm owners.

**Benefits of a wind farm**
Renewable energy, produced from sustainable natural sources such as wind, provides incremental energy security and financial resources to stimulate sustainable development within the area where established. Furthermore, it will contribute towards South Africa meeting its international commitments, made in respect of limiting greenhouse gas emissions, as well as government’s objectives, set out in the 2002 White Paper on Renewable Energy, and President Jacob Zuma’s commitments during the Copenhagen Conference on Climate Change to the United Nations.

Wind energy is plentiful, renewable, clean, and reduces greenhouse gas emissions, when it replaces fossil-fuel derived electricity. It is thus attractive to governments, industry, and communities. As most of the sources are indigenous and naturally available, wind energy is more secure in that it is not subject to disruption by international crises or limited supplies, nor fluctuations in the cost of raw materials, as
experienced during the 2008 spike in oil costs, being naturally available. The location of the proposed wind farm in the Western Cape will also mean a reduction in line losses, associated with up to 70% of the Western Cape’s energy “imports” from Mpumalanga, as the wind farm will be located close to the customer load demand.

Typical benefits associated with wind farms are:

- Wind energy is renewable, clean and non-polluting, and does not produce by-products (atmospheric contaminants, Nuclear Waste or thermal pollution) that could be harmful to humans and the environment;
- Wind farms are well suited to rural areas and therefore have a reduced impact on agriculture compared to other electricity generating options. Wind turbines can also contribute to economic growth in these regions;
- Wind turbines make use of well proven & reliable technology in terms of design and construction;
- Wind energy is competitively priced compared to other renewable energy sources, and does not require additional “input” materials such as Coal and Water;
- Localized production of energy reduces transmission line losses associated with transmitting electricity over long distances;
- The use of wind turbines displaces the use of coal and other fossil fuels with their associated emissions of Green House Gases; and
- Wind Farms improve energy security for South Africa and the Western Cape, reducing dependency on imported fossil fuels.
- Wind Energy does not use water in the production of Energy, whereas fossil-fuel based production uses 1.19L / KwH.

Environmental Study Requirements

In terms of the EIA Regulations published in Government Notice R543 of 02 August 2010 in terms of Section 24 (5) of the National Environmental Management Act (Act No. 107 of 1998), certain listed activities as set out in Government Notices R544 (activities that trigger Basic Assessments), R545 (activities triggering Scoping and Environmental Impact Assessment processes or full EIAs) and R546 (location specific activities triggering Basic Assessments) require environmental authorisation before they can proceed.

The following activities have been identified as part of the proposed project:

<table>
<thead>
<tr>
<th>Number and date of the relevant notice:</th>
<th>Activity No (s):</th>
<th>Description of each listed activity as per project description:</th>
</tr>
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<tbody>
<tr>
<td>544, 18 June 2010</td>
<td>1</td>
<td>The proposed construction of a wind farm near St Helena Bay with a generation capacity of 30 MW.</td>
</tr>
<tr>
<td>544, 18 June 2010</td>
<td>10</td>
<td>The proposed construction of powerlines which will connect the wind farm to electrical grid. The powerlines will be between 33 and 275 kilovolts.</td>
</tr>
<tr>
<td>544, 18 June 2010</td>
<td>56</td>
<td>Phased activities for all activities listed in this Schedule, which commenced on or after the effective date of this Schedule, where anyone phase of the activity may be below a threshold but where a combination of the phases, including expansions or extensions, will exceed a</td>
</tr>
</tbody>
</table>

1 Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description.
<table>
<thead>
<tr>
<th>Date</th>
<th>No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>545, 18 June</td>
<td>1</td>
<td>The proposed construction of a wind farm near St Helena Bay with a generation capacity of 30 MW.</td>
</tr>
<tr>
<td>545, 18 June</td>
<td>3</td>
<td>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 more than 500 cubic metres.</td>
</tr>
<tr>
<td>545, 18 June</td>
<td>15</td>
<td>Construction of a wind farm on Langeklip Farm (Erf 47) which is 744 ha in size. The actual footprint of the wind farm will be smaller than the footprint of the property but is not confirmed at this stage. There will thus be a physical alteration of undeveloped land for industrial use.</td>
</tr>
<tr>
<td>546, 18 June</td>
<td>4</td>
<td>The construction of a road wider than 4 metres with a reserve less than 13.5 metres.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>In Western Cape:</strong></td>
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<tr>
<td></td>
<td></td>
<td>ii. All areas outside urban areas;</td>
</tr>
<tr>
<td>546, 18 June</td>
<td>10</td>
<td>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.</td>
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<tr>
<td></td>
<td></td>
<td><strong>In Western Cape:</strong></td>
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<tr>
<td></td>
<td></td>
<td>ii. All areas outside urban areas;</td>
</tr>
<tr>
<td>546, 18 June</td>
<td>19</td>
<td>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</td>
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<td></td>
<td></td>
<td><strong>In Western Cape:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>i. All areas outside urban areas;</td>
</tr>
<tr>
<td>546, 18 June</td>
<td>26</td>
<td>Potential phased activities for all activities listed in this Schedule and as it applies to a specific geographical area, which commenced on or after the effective date of this Schedule, where any phase of the activity may be below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.</td>
</tr>
</tbody>
</table>
It is anticipated that the activities associated with the project described above may have, both positive and negative, potential impacts on the study area, and these will be assessed within this EIA and through the following specialist studies:

- Flora Impact Assessment
- Fauna Impact Assessment
- Avifauna Impact Assessment
- Baseline Geotechnical Study
- Social Impact Assessment
- Heritage Impact Assessment
- Noise Impact Assessment
- Visual Impact Assessment

**Role Players**

**Applicant**

Just Energy (www.just-energy.org) is an organisation focused on working with low income communities to establish socially responsible clean energy enterprises, with the aim that these enterprises will generate social and economic benefits for the local community through new revenue streams generated by the projects. Just Energy is a not-for-profit business based in South Africa that is currently funded by the international development organisation, Oxfam and by a number of other like-minded organisations that share similar social objectives. Just Energy is assisting the Seeland Development Trust in the planning and development of a community wind farm. Just Energy are partnered with a number of industry leading legal, financial and technical companies who ensure the delivery, financing and operation of the wind farm to the highest international standards.

**Environmental Assessment Practitioner**

Arcus GIBB (Pty) Ltd. (Arcus GIBB) is an integrated group of highly trained scientists, project managers and engineers providing cost-effective solutions and specialist services in a wide range of disciplines, including environmental services.

**Competent/Relevant Authority**

The Department of Environmental Affairs (DEA) will act as the competent authority and the Western Cape Department of Environmental Affairs and Development Planning (WC DEA&DP) as the commenting authority for this application. The mandate and core business of the DEA is underpinned by the Constitution and all other relevant legislation and policies applicable to the government of the Republic of South Africa.

**Detailed Project Description: Technical Details**

**How exactly does wind energy work**

Wind power is the conversion of wind energy into a useful form of energy, such as electricity, using wind turbines. Wind power is non-dispatchable, meaning that for economic operation, all of the available output must be taken when it is available. The wind turbine consists of the following major components, as shown in Figure 2 below:
• The rotor / blades;
• The nacelle / generator;
• The tower; and
• The foundation unit.

![Components of a Typical Wind Turbine](image)

**Figure 2: Components of a Typical Wind Turbine**

**Infrastructure Requirements**
The proposal is for the construction, operation, and decommissioning of a wind farm comprising the following components:

• Between 10 and 35 wind turbines (including tower foundations).
• Internal access roads from the R399 and Velddrift Road to the operations area.
• Electrical cables to carry electricity from the turbines to the existing overhead transmission lines.
• Substation at the connection point to the existing 66 kV transmission lines.
• Control center compound on the property.

**Construction phase**
The wind farm is expected to be constructed over a period of approximately 6 months and is anticipated to produce electricity for approximately 20 years or more. It is proposed that in 2012, the roads, substation, transmission lines, and turbine foundations would be constructed, followed by the erection of the turbines.
The following activities are expected to undertaken during the construction phase of the project:

• Transportation of components
• Temporary works and laydown area
• Construction of substation and ancillary infrastructure
• Access roads to the temporary works and wind farm
• Temporary on-site road for the self propelled crane
• Turbine assembly
• Turbine foundations
Operation phase
It is anticipated that the proposed wind farm will begin generating electricity in 2012 following installation and testing of the turbines. Operational efficiency will be monitored 24 hours per day in the control center which will be based on the property. In general, there will be no daily traffic to and from the site.

It is anticipated that technicians will visit each turbine on at least a quarterly basis for routine inspection and maintenance. In addition, turbines will require other periodic maintenance as prescribed by the equipment manufacturer, including changes of lubricating oils. Routine road maintenance will include blading and smoothing as necessary to maintain the road surface, as well as inspecting and repairing stormwater controls as necessary to ensure their proper functioning to control erosion.

When operating, there will be some noise from each of the turbines. Noise will be generated by the gearbox and generator in the nacelle, and by the rotors passing through the air. The former will be largely contained by insulation, and reduced further at ground level. Rotor noise will depend on the turbine used and the speed of the wind and rotors.

In general, land disturbance will be confined to areas on and around where various site components were constructed, with no additional disturbance of otherwise undisturbed lands.

Decommissioning phase
At present, it is not possible to describe the activities at the end of the operational life of the wind farm. It is possible that the Seeland Development Trust will replace turbines, extend the period of the lease, and continue to generate electricity, in which case decommissioning may be postponed for years or decades. When electricity generation finally ends, the proponent may wish to leave at least some of the roads and/or transmission lines. Regardless, activities will be in compliance with national and local government requirements.

Project Alternatives
In terms of the EIA Regulations published in Government Notice R543 of 02 August 2010 in terms of Section 24 (5) of the National Environmental Management Act (Act No. 107 of 1998), feasible and reasonable alternatives have to be considered within the environmental scoping phase. All identified, feasible and reasonable alternatives are required to be identified in terms of social, biophysical, economic and technical factors.

The ‘do-nothing’ or ‘no-go’ alternative
The ‘do-nothing’ or ‘no-go’ alternative is the option of not establishing a community wind farm in St Helena in the Western Cape Province.

The electricity demand in South Africa surpassed existing power generation capacity in 2008, causing nation-wide black-outs and load shedding. The crisis has temporarily been averted through the forced reduction of use to the mining industry by 10%, causing vast job-losses in its wake. South Africa requires additional capacity if it is to meet the growing demand for electricity. The ‘do nothing’ option will, therefore,
contribute to these electricity demands not being met. Not meeting the growing electricity demand will have major adverse impacts on economic activity and economic growth in South Africa, which in turn will have an adverse impact on socio-economic development in South Africa. Additional electricity generation options will contribute to meeting this energy demand. The recent increase in oil prices, the exhaustibility of fossil fuels and the urgent need for stable, reliable, non-polluting sources of electrical energy that are indispensable to a modern industrial economy focuses attention on alternative energy, such as renewable energy sources.

The construction of the proposed wind farm will also aid South Africa in meeting its commitments to reduce greenhouse gas emissions, made in terms of the United Nations Framework Convention on Climate Change (1997) and the Kyoto Protocol (2002) The “do-nothing” alternative will not assist the country in meeting these renewable energy targets or aid in reducing the Western Cape Province’s dependence on imported electricity.

The “do-nothing” alternative is therefore not considered to be the preferred alternative. The “do-nothing” alternative however will be represented by the status quo, against which the proposed project will be compared in detail during the impact assessment phase of the project.

Layout and design alternatives

• Arrangement of the wind turbines
  The arrangement of the wind turbines will be determined by leading international wind experts. **Size / Generating Capacity of wind turbines**
  Turbines ranging between 0.85 and 3 MW will be investigated during the detailed impact assessment phase of the project. **Transmission power lines**
  Due to the need for power to be connected from the turbines to the substation, and then to the national transmission system, it is necessary to identify potential alignments for the electrical cables and low voltage feeder powerline. Network integration, planning and design studies for the integration of the powerline into the national network is still being finalised. This will be informed by the understanding the local power requirements.

• Access roads
  Access roads will be required in order to ensure access from the main road to the wind farm and to connect the turbines within the proposed site. The access road routes will ultimately depend on the layout of the turbines, as well as the size of the turbines, which will in turn determine where the roads will be required to go and how many roads will be required. These access road alignments will therefore have to be further investigated in the impact assessment phase once the layout and design alternatives have been selected.

Planning and Legislative Context

The legislative framework applicable to this project is potentially diverse, and consisting of a number of Acts, Regulations and Treaties which must be considered. A list of some of the key legislation is provided hereunder.

• The Constitution (Act No. 108 of 1996)
• National Energy Act (Act No. 34 of 2008)
• The Promotion of Administrative Justice Act (Act No. 3 of 2000)
• The Promotion of Access to Information Act (Act No. 2 of 2000)
• The National Environmental Management Act (Act No. 107 of 1998)
• Environmental Conservation Act (Act No. 73 of 1989)
• National Heritage Resources Act (Act No. 25 of 1999)
• World Heritage Convention Act (Act No. 49 of 1999)
• National Water Act (Act No. 36 of 1998)
• Water Services Act (Act No. 108 of 1997)
• Aviation Act (Act No. 74 of 1962)
• Waste Act (Act No. 59 of 2008)
• Atmospheric Pollution Prevention Act (Act No. 45 of 1965)
• National Environmental Management: Air Quality Act (Act No. 39 of 2004)
• National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
• National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
• National Forests Act (Act No. 84 of 1998)
• Conservation of Agricultural Resources Act (Act No. 43 of 1983)
• Occupational Health and Safety Act (Act No. 85 of 1993)
• The Land Use Planning Ordinance 15 of 1985 (“LUPO”)

Policy and Planning Context

• White Paper on the Energy Policy of the Republic of South Africa
• National Spatial Biodiversity Assessment (“NSBA”)
• Draft National Strategy for Sustainable Development
• Western Cape Guideline Series for EIA (2005)
• Department of Environmental Affairs and Tourism Integrated Environmental Management Guideline Series (2006)
• The Western Cape Provincial Spatial Development Framework (“WCPSDF”)
• Integrated Development Plans (IDP)

A comprehensive discussion of legislation and guidelines considered in the preparation of this Scoping Report is included in Chapter 5

EIA Process and Methodology

An EIA is a legislative tool that is used to ensure that potential impacts that may occur due to the proposed development are avoided or mitigated (minimised). In South African legislation the environment includes social, economic and bio-physical aspects and the EIA must assess these equitably.

The EIA procedures are based on the principles of Integrated Environmental Management (IEM) which, in short, comprise pro-active planning, informed decision making, a transparent and participatory approach to development, a broad understanding of the environment, and accountability for decisions and the information on which they are based.

The EIA process can be divided into 4 distinct components:
• **Application and initial notification**
  - Submit an EIA application to the DEA
  - DEA acknowledgement of the EIA application (within 14 days),
  - Notify the public of the proposed development through *inter alia*, newspaper adverts, notification letters, BIDs and notice boards.

• **Scoping phase**
  - Investigate and gather information on the proposed study area in order to establish an understanding of the area;
  - Establish how the proposed project will potentially impact on the surrounding environment;
  - Identify Interested and Affected Parties (I&APs) and relevant authorities by conducting a Public Participation Process (PPP);
  - Identify potential environmental impacts through investigation and PPP; and
  - Describe and investigate the alternatives that may be considered.

• **Impact Assessment phase**
  - Detailed specialist assessment of all issues and proposed alternatives identified in the Scoping phase;
  - Identify mitigation measures and recommendations to reduce the significance of potential impacts;
  - Compile an Environmental Management Plan (EMP) which will prescribe environmental specifications to be adhered to during the construction and operational phases of the project; and
  - As with the Scoping phase, the PPP is an integral and important part of the Impact Assessment phase.

• **Environmental Authorisation**
  - Environmental Authorisation (EA) issued to Just Energy once DEA has made a decision regarding the proposed project; and
  - Decision may be positive or negative based on *inter alia*, information received in the Scoping and Impact Assessment phases.

The full EIA Process and timeframes are discussed in further detail in Chapter 6.

A comprehensive Public Participation Process (PPP) will be implemented as part of the Scoping Phase of the EIA. The PPP aims to:

• Ensure all relevant Key stakeholders and Interested and Affected Parties (I&APs) have been identified and invited to engage in the scoping phase;
• Raise awareness, educate and increase understanding of stakeholders about the proposed project, the affected environment and the environmental process being undertaken;
• Create open channels of communication between Key stakeholders and I&APS and the project team;
• Provide opportunities for Key stakeholders and I&APS to identify issues or concerns and suggestions for enhancing potential benefits and to prevent or mitigate impacts;
• Accurately document all opinions, concerns and queries raised regarding the project; and
• Ensure the identification of the significant alternatives and issues related to the project.

The Environmental Impact Assessment (EIA) process for the proposed St Helena Community Wind Farm Development is comprised of two main phases, namely the Scoping phase and Impact Assessment phase. To date, tasks that have been completed include the:

• Identification of stakeholders or I&APs;
• Notification of I&APs of the proposed development by distribution of a Background Information Document (BID); and
• Advertisements concerning the proposed development, the availability of the Draft Scoping Report for review and notification of public meetings.

Tasks which are currently underway include:

• Compilation of a comments and responses report relating to the information supplied in the Background Information Document; and
• Ongoing consultation and engagement.

The Draft Scoping Report is released for public review and comment from **5 April 2011 to 19 May 2011**. During the review period a public participation process (PPP) will be undertaken, allowing Interested and Affected Parties (I&APs) and Key Stakeholders from government and the private sector to engage with the project proponents and independent environmental consultants. The PPP will consist of key stakeholder workshops, focus group meetings, public open days and one-on-one interactions. Issues raised by I&APs and key stakeholders during the public participation process will be documented and included in the Final Scoping Report.

The relevant authorities required to review the proposed project and provide an Environmental Authorisation were consulted from the outset of this study, and have been engaged throughout the project process. These supervisory authorities include the National Department of Environmental Affairs (DEA), who are the lead authority for this project. The Western Cape Department of Environmental Affairs and Development Planning (WC DEA&DP) is noted as a key commenting authority. In addition, a number of other authorities have been consulted. For a comprehensive list see **Chapter 6**.

The scoping phase serves to define the scope of the detailed assessment of the potential impacts of a proposed project. Scoping has been undertaken in accordance with the requirements of Government Notices R543 of 2010, and the IEM Information Series (DEA, 2002). The objectives of the scoping phase are to:

• Ensure that the process is open and transparent and involves the authorities, proponent and stakeholders;
• Identify the important characteristics of the affected environment;
• Ensure that feasible and reasonable alternatives are identified and selected for further assessment; and
• Determine possible impacts of the project on the environment.
Description of the Baseline Environment

The description of the baseline environment details the various biophysical and socio-economic factors as described by the various specialists involved in the project. The biophysical aspects include: geology and spoils, topography, groundwater, agricultural potential, the climate of the study area, regional vegetation, ecological corridors, land cover, faunal species of conservation importance and bird habitat in the study area. The socio-economic aspects include: baseline demographic processes, economic growth potential, heritage resources and noise climate. More information regarding these factors can be located in Chapter 7.

Potential Issues and Impacts

Specialist studies were undertaken to identify potential impacts that may occur as a result of the proposed project. The studies undertaken are listed in Table 1.

Table 1: Specialist studies undertaken within the Scoping Phase of the Project

<table>
<thead>
<tr>
<th>Specialist Study</th>
<th>Name of Specialist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flora Impact Assessment</td>
<td>David Hoare of David Hoare Consulting CC</td>
</tr>
<tr>
<td>Fauna Impact Assessment</td>
<td>David Hoare of David Hoare Consulting CC</td>
</tr>
<tr>
<td>Avifauna Impact Assessment</td>
<td>Chris van Rooyen of Chris van Rooyen Consulting</td>
</tr>
<tr>
<td>Geotechnical Study</td>
<td>Jon McStay of WSP</td>
</tr>
<tr>
<td>Social Impact Assessment</td>
<td>Tony Barbour of Tony Barbour Environmental</td>
</tr>
<tr>
<td>Heritage Impact Assessment</td>
<td>Dr. Lita Webley/ Tim Hart of UCT</td>
</tr>
<tr>
<td>Noise Impact Assessment</td>
<td>Demos Dracoulides of DDA Environmental Engineers</td>
</tr>
<tr>
<td>Visual Impact Assessment</td>
<td>Reuben Heydenrych of Arcus GIBB</td>
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</tbody>
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Fauna and Flora

The study site is located within the Cape Floristic Region (CFR), which is recognized as one of the principal centres of diversity and endemism in Africa. Fynbos and Renosterveld are considered to be the main vegetation types in the CFR. Fynbos is very species rich, but has been transformed or degraded to a high degree and is therefore considered to be of high conservation concern.

The site occurs within one main vegetation type: Saldanha Granite Strandveld, classified as Endangered (Mucina et al. 2005, Mucina & Rutherford 2006). There is also a small area of Saldanha Flats Strandveld along the eastern boundary, classified as Endangered (Mucina et al. 2005, Mucina & Rutherford 2006). The Endangered vegetation types are protected under the Draft National List of Threatened Ecosystems (GN1477 of 2009), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004). Any remaining patches of natural vegetation on site therefore have a very high conservation value.

Large parts of the study area appear to be in a transformed state and consists primarily of agricultural lands. There are, however, significant areas of remaining natural vegetation. The vegetation-type descriptions provide an indication that remaining natural vegetation on site consists primarily of strandveld. There are, however, also strips of thicket along drainage lines in the areas of steeper topography and wetland vegetation within the remaining drainage lines.
Drainage lines (wetlands) represent particularly vital natural corridors as they function both as wildlife habitat, providing resources needed for survival, reproduction and movement, and as biological corridors, providing for movement between habitat patches. Both functions are potentially critical to conservation of biological diversity as the landscape becomes increasingly fragmented into smaller, more isolated patches (Rosenberg et al., 1997).

Despite high levels of transformation on site, there are a number of different habitat types that may provide suitable habitat for a variety of flora and fauna species. There are a number of plant and animal species of conservation concern that may occur in habitats within the study area. There are 52 Red List plant species that have a geographic distribution that includes the site and which have a chance of occurring in the study area. This includes three species listed as Critically Endangered, sixteen as Endangered, sixteen as Vulnerable and seventeen as Near Threatened. This is an exceptionally high number of threatened species, even by Fynbos biome standards. There is therefore a very high likelihood of more than one threatened plant species occurring on site or being dependant on natural habitats on site remaining in a natural state.

There are nine animal species of conservation concern that may occur in habitats within the study area or that may be affected by the proposed wind farm. This includes one species classified as Endangered (EN), three as Vulnerable (VU) and five as Near Threatened, including the White-tailed Rat (EN), the Cape Caco (VU), the Cape Sand Snake (VU), the Armadillo Girdled Lizard (VU), the Namaqua Plated Lizard (NT), Gronovi’s Dwarf Burrowing Skink (NT), Lesueur’s Wing-gland bat (NT), Natal long-fingered bat (NT) and the Cape horseshoe bat (NT).

Bat deaths are one of the most controversial biological issues related to wind turbines. Bats have been found to be particularly vulnerable to being killed by wind turbines. It has long been a mystery why they should be so badly affected since bat echo-location allows them to detect moving objects very well. A recent study in America has found that the 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 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.

Steep slopes can be problematic in constructing infrastructure due to the fact that any impact can have an effect downslope from that point. Depending on the steepness and the length of the slope, particular areas may be more sensitive to disturbance than others. Any steep slopes are therefore considered to have elevated sensitivity. Potential issues that may arise from development of these areas includes erosion of substrates downslope and the impacts of stormwater runoff.

Other than protected ecosystems and threatened plant and animal species, forests and wetlands are both protected under national legislation (National Forests Act and National Wetlands Act respectively). Any impacts on these areas would require a permit from the relevant National Department. There is one tree species that is protected under the National Forests Act that has a geographic distribution that includes this area (Sideroxylon inerme subsp. inermes), which has a moderate likelihood of occurring on site. Any impacts on individuals of this species requires a permit from the National Department.
A risk assessment was undertaken which identified nine main potential negative impacts on fauna, flora and ecology of the site. The significance of these impacts will be assessed during the EIA phase after collection of relevant field data. An initial assessment indicates that these impacts are likely to be significant. The identified potential impacts are the following (likely significance of impacts in brackets):

1. Impacts on habitats of threatened fauna (Medium)
2. Impacts due to collision of bats with infrastructure (Medium to High)
3. Impacts on threatened plants (High).
4. Impacts on protected tree species (Medium to High).
5. Impacts on indigenous natural vegetation (High).
6. Impacts on wetlands (High).
7. Change in runoff and drainage patterns (Medium to High).
8. Establishment and spread of declared weeds and alien invader plants (Medium to High).
9. Increased risk of veld fires (Medium).

The majority of these impacts would only be significant if remaining areas of natural vegetation are developed. If infrastructure is restricted to previously transformed areas (primarily cultivated lands), the significance of impacts would be LOW for most of these impacts.

**Avifauna**

The principal areas of concern with regard to effects on birds are listed below. Each of these potential effects can interact with each other, either increasing the overall impact on birds or, in some cases, reducing a particular impact (for example where habitat loss or displacement causes a reduction in birds using an area which might then reduce the risk of collision):

- Collision mortality on the wind turbines
- Collision with the proposed power line
- Displacement due to disturbance
- Displacement caused by habitat transformation.

It is important to note that the detailed assessment will be made on the status quo as it is currently on site. The possible change in land use in the area where the wind farm is situated will not be taken into account because the extent and nature of future developments are unknown at this stage. It is however highly unlikely that the land use will change in the foreseeable future.

The economic activity at the Langeklip farm consists mostly of sheep farming. At some stage in the past, several sand quarries were also active on the farm. There are no cereal crops at this stage, but a substantial part of the farm consists of old cereal lands which are now use for grazing sheep. Based on observations during the field visit and using satellite imagery, the bird habitat on the Langeklip Farm is classified as follows:

- Natural strandveld vegetation (app. 45%)
- Old lands (app. 42%)
- Old sand quarries (app. 9%)
- Other e.g. roads, dwellings (4%)
Priority species that could be affected by the wind facility include Blue Cranes and several species of raptors and waterbirds.

**Geotechnical Study**

There are no predictable geological or geotechnical impacts associated with the construction or operations of the wind turbines that cannot be adequately addressed by simple engineering measures.

Ground conditions are stable, there are no severe slope stability problems that require unusual or special construction measures to be used.

Geotechnical constraints relate to the presence of shallow rock over much of the area. In terms of foundation conditions this results in highly variable excavation depth to hard rock and difficulty in establishing a large flat foundation base for casting the large concrete plinth required for the masts. Rock blasting is a highly likely over most of the preferred turbine locations.

The shallow rock condition will increase the costs and timeframes associated with excavation for turbines and cable trenches.

The hard domes of granite and small outcrops are clearly visible. These areas can be avoided during the specific location of individual masts to reduce impacts due to rock blasting.

The soils are highly conductive and will require cathodic protection for the underground powerlines. Similarly the local soil conditions are not ideal in terms of their thermal resistivity, both issues can be mitigated in the selection of an imported quartz sand for pipe bedding.

The soils are dispersive and have a moderate to high susceptibility to erosion. Rehabilitation of re-vegetation of disturbed areas after the completion of construction will be necessary to mitigate against erosion and loss of topsoil.

The overall geotechnical assessment is that the site is favourable for the operation of a wind farm and that detailed geotechnical investigations are not required for the assessment of environmental impacts but should be undertaken to provide detailed information for engineering design once final locations and routes are confirmed.

**Social**

The key conclusions of the Scoping level study are the following:

- The establishment of wind energy facilities are supported at national, provincial and local levels;
- The proposed St Helena Bay WEF site conflicts with a number of principles relating to site selection contained in the Western Cape Regional Methodology for Wind Energy Site Selection (2006), PSDF (2009) and Guideline for development on Mountains, Hills and Ridges (2003);
- Key potential construction phase issues for further investigation during the EIA phase relate to the recruitment and on-site management of construction labour and the management of impacts on local roads;
- Key potential operational phase issues relate to the potential negative impacts on the scenic integrity (visual) of the landscape. In this regard the potential for negative cumulative impacts on the visual character of the area exists. This issue
is likely to represent one of the key issues in terms of the assessment of the proposed St Helena Bay WEF.

**Heritage Resources**

It is anticipated that the impact on the Palaeontological heritage of the Study Area is likely to be minimal. However, a palaeontologist may request monitoring of the turbine trenches during construction.

Indications are that the proposed activity may impact on the archaeological (pre-colonial and colonial) heritage and built environment of the Study Area. However, it is expected that impacts may be mitigated through avoidance of sensitive areas which will be identified during the fieldwork phase of the project. The impacts are likely to be limited and controllable. If impacts cannot be avoided, then second phase archaeological work may be required.

A Phase 2 Archaeological Impact Assessment includes the recording and sampling of the archaeological site (with a permit issued by Heritage Western Cape), before its destruction is permitted. The costs of the test excavations are for the developer.

In terms of the natural cultural landscape qualities of the site, the impacts are expected to be more significant especially since the proposed activity is situated on a prominent landscape feature and in a scenic area. The degree and nature of the impact is going to depend on how the wind turbines are arranged on the landscape, and the ability of the topography to absorb their presence which is an issue which will require close attention during the course of the EIA.

It is anticipated that the landscape impacts of the proposal will receive close scrutiny from Heritage Western Cape.

Follow up heritage work such as monitoring of excavations by a palaeontologist or archaeological sampling is likely to be a requirement of the Environmental Management Plan.

**Noise**

The wind farm project will introduce noise sources into the local rural noise environment. The project’s main noise sources and activities include:

- The construction equipment and activities during the construction phase.
- The wind turbines during the operational phase.

Noise associated with construction activities is generally of local extent and short duration. The construction operations are not expected to have any significant impact on the nearest local dwellings or residential communities. The noise impact, therefore, is expected to be of low significance and will be quantified in detail in the EIA phase.

The introduction of the wind turbines could have a noise impact, as a result of the increase of the noise levels within and around the wind farm site due to their operation. The noise emission information under various wind speeds will be utilised in 3-dimensional noise propagation modelling, in order to determine the resulting operational sound pressure levels and assess the cumulative noise impact. From past experience and noise emission data from various turbine manufacturers, it is anticipated that the overall spectrum of wind turbines will be broad band, with no prominent third octave bands. Therefore, under normal operation, the wind turbines are not expected to generate any clearly audible tones or impulses that may cause
community responses at lower noise levels. This, however, will be verified once the sound power spectrum data is available from the manufacturer and/or by direct measurements, if deemed necessary. The duration of the noise impact is expected to be long-term, i.e. for the duration of the operational life of the project. The impact is expected to be of low to medium significance, and together with its extent will be assessed in detail in the EIA phase of the project.

Visual
The proposed St. Helena wind farm will be located on one of the highest points in the Vredenburg-Saldanha region, at a height of some 232m above sea level. The topography is gently rolling and does offer screening between the proposed wind farm site and the settlements around the northern side of the peninsula, from Laingville west to Stompneus Bay and possibly as far as Paternoster.

The sense of place in the region varies greatly. The West Coast National Park, which is centred on the Langebaan Lagoon, has a wilderness atmosphere and is focused on tourism. The town of Langebaan similarly has a tourism focus. However, the town of Saldanha, the iron ore export terminal in Saldanha Bay, the Saldanha Steel plant and the Namakwa Sands smelting plant result in an industrial atmosphere around the northern rim of Saldanha Bay and the areas inland of this. The settlements that hug the coastline to the north of the proposed site are tourist towns, which derive their visual amenity from north-facing sea views. Velddrif is also tourism-focused, and is orientated towards the Berg River lagoon.

There is little doubt that there will be direct line of sight to the proposed wind turbines from the east, south and west. However, the area to the south has an industrial character, and it is doubtful that the turbines would be visible from Langebaan and the West Coast National Park, due to the long distance to the site. The views from Vredenburg and Velddrif are important, as they are from the closer distance. It is essential to provide simulations of the appearance of the turbines from these viewpoints.

Based on the above factors, it is considered that the risk that the project may not be authorised on the basis of visual impacts is not significant. In spite of the wind turbine site being situated in one of the highest points in the study area, the impacts is expected to be moderate due to the screening from a number of tourist towns north of the site, as well as the long distance over which the wind farm will be viewed. However, this needs to be confirmed through visual simulations. The recommendation by Heritage Western Cape will also be key to determining the viability of the project. Although Heritage Western Cape is not the decision-making body from an EIA perspective, their decision will be regarded as important by the national Department of Environmental Affairs, which will be the competent authority in this instance.

According to the DEA&DP guideline document for VIAs, the proposed development can be expected to result in high visual impacts, and accordingly a Level 4 assessment is required for this project, should it proceed to the EIA phase. The VIA must be based on computer modelling to make the assessment and comparison of various scenarios possible.
Conclusions

Based on the specialist studies no environmental fatal flaws have been identified to date. However, a number of potentially significant environmental impacts, both positive and negative have been identified as requiring further in-depth study. Therefore, a detailed Environmental Impact Assessment is required to be undertaken in order to provide an assessment of these potential impacts and recommend appropriate mitigation measures, where required.

The terms of references for the detailed specialist studies required in the Impact Assessment phase of the project are included in the Plan of Study for EIA (Chapter 10).

Through the Scoping phase it has become evident, during the scoping studies, that detailed geotechnical investigations are not required for the assessment of environmental impacts, but should be undertaken to provide detailed information for engineering design once final locations and routes are confirmed.
# ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED ST HELENA COMMUNITY WIND FARM DEVELOPMENT, WESTERN CAPE PROVINCE

## ENVIRONMENTAL IMPACT ASSESSMENT

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1 INTRODUCTION

Just Energy is proposing to establish a community wind farm in association with the Seeland Development Trust and associated infrastructure on Langeklip Farm (Erf 47) near St Helena Bay in the Saldanha Bay Municipality, Western Cape Province. The proposed St Helena Community Wind Farm Development is expected to generate approximately 30 MW and will comprise of between 10 to 35 wind turbines. Associated infrastructure will include on-site transformers and control equipment buildings, access roads to the various turbines and on site during construction and electrical cables connecting the turbines to a new substation site where the connecting cables will link into the electricity grid through a possible overhead powerline.

This proposed project will be registered with the United Nation’s Framework Convention for Climate Change (UNFCCC) as part of the Clean Development Mechanisms (CDM) Programme. Just Energy acknowledges this project as a ‘green’ initiative and have decided to, where possible, commit to making environmentally favourable decisions in respect of the project as a whole.

In terms of the Environmental Impact Assessment (EIA) Regulations, an application of this nature has to undergo both Scoping and Environmental Impact Assessment. Arcus GIBB (Pty) Ltd (GIBB) has been commissioned by Just Energy, who is the project developers, to undertake the EIA process, in the capacity of independent Environmental Assessment Practitioners (EAPs).

This EIA will consider the potential positive and negative environmental and social impacts associated with the establishment of the proposed wind farm and will propose measures to mitigate the negative impacts of the proposed project on the receiving environment and community.

1.1 Project Location

The proposed project is situated within the Saldanha Bay Municipality, Western Cape Province. A study area of approximately 744 hectares, approximately 5 km east of St Helena Bay and 3 km west of Laingville, is being considered within which the proposed wind farm and associated infrastructure will be established.

The land proposed to be utilised for the project will be Langeklip Farm (Erf 47) which is owned by the Seeland Development Trust. The farm is currently zoned as agricultural land and is comprised mainly of cultivated land. It is proposed that only ploughed areas within the farm will be considered for the placement of the turbines, so as not to affect any natural vegetation as far as possible.

A map indicating the farm and the location of the proposed site is provided in Figure 1.1 below.
Figure 1.1: Locality map for the proposed St Helena Community Wind Farm Development within Saldanha Bay Municipality
1.2 Project Description

This section provides an overall description of the proposed community wind farm. Further technical details relating to the project is provided in Chapter 3 of this report.

Wind Farm
The wind farm is proposed to have a generating capacity of approximately 30 MW and will comprise of between 10 and 35 wind turbines, which will vary between 0.85 MW and 3 MW in generating capacity. The hub height may range between 50 m and 100 m with the turbine blade length ranging between 25 m and 45 m. The wind farm can operate continuously for approximately 20 years. A typical wind turbine, illustrating the hub height and blade length, is depicted in Figure 1.2 below.

![Typical wind turbine structure](image)

**Figure 1.2:** Typical wind turbine structure

Wind modelling and micro-siting expertise will be utilised to determine the exact layout of the wind turbines, according to the optimum wind speeds and directions identified. The turbine layout will further be guided by the specialist studies undertaken during the EIA process. This exact positioning will be determined during the Impact Assessment Phase of the project once the modelled results are received and the detailed specialist studies have been undertaken.

Access Roads
Access roads will be required for the delivery of the turbines to their assembly positions during construction, as well as for access during the operational phase. Separate to the wind farm access routes, will be an access road to a temporary
laydown area where vehicles and materials will be stored during the construction phase.

**Powerlines**
The turbines and wind farm will be connected to the existing 66 kV power lines through a low voltage feeder powerline, which will be constructed below ground, and according to the recommendations from the Environmental Impact Assessment. Eskom have indicated they may upgrade the 66 kV powerline to a 132 kV powerline. This upgrade of the powerline will be subject to a separate EIA process.

**Proposed New Substation**
Where the lines connect to the existing 66 kV powerline a substation will be built within the proposed area as required, and in accordance to the NERSA Grid Code Standards, to feed electricity into the national grid.

**Temporary Construction Laydown Area**
A temporary laydown area will be utilised during the construction phase of the project. This area will be used to store machinery and equipment as well as consist of facilities such as diesel storage facilities, toilets, showers and eating facilities.

**Staff Housing**
Staff will be accommodated on the farm in its various buildings, no additional construction of staff housing will take place.

**Wind Farm Control Room**
A monitoring & control room will be constructed on the proposed property.

**Transport**
It is proposed that turbine components and some of the construction materials will be delivered to the site by road from either Cape Town or Saldanha harbour. The turbines will be delivered directly to their point of assembly on site. Where possible, existing farm roads will be upgraded for transport within the proposed site, to the future benefit of the farm owners.

It is anticipated that the activities associated with the project described above may have, both positive and negative, potential impacts on the study area, and these will be assessed within this EIA and through the following specialist studies:

- Flora Impact Assessment
- Fauna Impact Assessment
- Avifauna Impact Assessment
- Baseline Geotechnical Study
- Social Impact Assessment
- Heritage Impact Assessment
- Noise Impact Assessment
- Visual Impact Assessment
1.3 Need and Justification for the Project

1.3.1 Legal Framework for Renewable Energy in South Africa

Electricity generation and provision is a strategic sector of the South African economy underpinning growth and developmental objectives set out by the Government. Over the next few years, the country is expected to experience continued growth in electricity demand, driven by growth in the industrial, mining, commercial and domestic consumer sectors.

Several key policies, departments and institutions are responsible for energy planning in South Africa. In terms of energy planning, the South African Energy Policy (December 1998) published by the Department of Energy (DoE)*, firstly identifies five key objectives:

- Increasing access to affordable energy services;
- Improving energy sector governance;
- Stimulating economic development;
- Managing energy-related environmental impacts;
- Securing supply through diversity; and
- International Climate Change Commitments under the UNFCCC

In order to meet these objectives as well as the developmental and socio-economic objectives in South Africa, the country needs to make optimal use of available energy resources. The DoE secondly performs Integrated Energy Planning to identify future energy demand and supply requirements. Thirdly, the National Energy Regulator of South Africa (NERSA) performs National Integrated Resource Planning to identify the future electricity demand and supply requirements.

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. This has now been promulgated in the form of the Integrated Resource Plan 1 (IRP1, dated 31 December 2009). 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.

“South Africa is well endowed with renewable energy resources that can be sustainable alternatives to fossil fuels. Thus far, these have remained largely untapped. Government’s long-term goal is the establishment of a renewable energy industry producing modern energy carriers that will offer, in future years a

* Previously the Department of Minerals and Energy (DME)
sustainable, fully non-subsidised alternative to fossil fuels. To get started on a deliberate path towards this goal, the Government’s medium-term (10-year) target is:

10 000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41539 MW).” (White Paper on Renewable Energy (2004))

The 1667 MW projected renewable energy demand for 2013 would be base load energy at 100% availability, and in terms of wind energy is equivalent to approximately 4000 MW installed wind plants at +/- 25 – 30 % availability.

Furthermore, wind energy is highly desirable in terms of minimising the impact on the environment and offers a number of socio-economic benefits. These impacts are detailed in the South Africa Renewable Energy Feed-in Tariff (REFIT) Regulatory Guideline published by NERSA (26 March 2009) and 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, particularly the role of cogeneration technologies in providing additional base load or peak load support. 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, whilst reducing expensive transmission and distribution losses. Grid connected renewable energy can also provide an important source of backup power to critical installations such as emergency services, traffic lights and security apparatus in the event of a centralised power failure. Support in this regard includes the continued operation of key facilities such as social service centres, schools, clinics, telecommunications, and small businesses and other such facilities vital for poverty alleviation and socio-economic development.

- **Resource saving**: Conventional coal fired plants are a major consumer of water during their requisite cooling processes. 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, where compared with wet cooled conventional power stations. This translates into a revenue saving of R26.6 million. As an already water stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly as the detrimental effects of climate change on water availability are experienced in the future.

- **Exploitation of our significant renewable energy resource**: At present, valuable national resources, ranging from biomass by-products, solar insulation and wind energy through to tidal currents remain largely unexploited. The use of these energy flows will not only strength energy security through the development of a diverse energy portfolio, but reduce price shocks associated with conventional fuels.

- **Pollution reduction**: The release of oxides of nitrogen, sulphur and carbon is a major byproduct of fossil fuel burning for electricity generation. NOx, SOx, CO and CO\textsubscript{2} have a particularly hazardous impact on human health, contributing to the formation of smog and exacerbating the spread of respiratory illness, as well as contributing to the development of acid rain and ecosystem degradation.
- **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 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 CO2 emissions. The development of proper incentives to promote renewable energy is a key component in taking ambitious actions to mitigate climate change, an objective put forward by the South African delegation to the Bali Conference of the Parties in December 2007.

- **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 subsequent Copenhagen Agreement, 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 has significant potential for job creation in South Africa, particularly given that many of these technologies are labour intensive in comparison to their conventional counterparts. It is estimated that the achievement of the targets within the Renewable Energy White Paper will result in an additional 20,500 jobs being created, both directly and indirectly, in comparison to the development of conventional coal based technologies. 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.

- **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. Increasing awareness amongst national leaders and general populations alike of the importance of playing at least some part in combating climate change, highlights the role of renewable energy in supporting energy futures that are considered socially acceptable and just to future generations.

- **Support to a new industry sector**: The development of renewable energy offers the opportunity to establish a new industry within the South African economy. The development of this industry also makes available a variety of export and service led commercial opportunities, not simply in South Africa but within Sub-Saharan Africa also.

- **Protecting the natural foundations of life for future generations**: Actions to reduce our disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change; thereby securing the natural foundations of life for generations to come.

According to REFIT (2009), 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. Currently, a significant contribution of renewable energy to primary energy supply occurs though the use of traditional biomass (resulting in large-scale indoor air pollution and often occurring through unsustainable deforestation practices).
South Africa has high levels of renewable energy potential, including an abundant wind resource which is particularly strong along coastal areas. The Darling Wind Farm, the first Independent Power Producer (IPP) in South Africa, has also recently signed a Power Purchase Agreement (PPA) to supply green electricity to the City of Cape Town, with the facility supplying 5.2 MW of power in its first phase (REFIT 2009).

1.3.2 International Commitments

Emissions of greenhouse gases, such as carbon dioxide, from the use of fossil fuels has led to increasing concerns worldwide, about global climate change. These concerns were articulated at the Johannesburg World Summit on Sustainable Development in 2002 and a corresponding commitment to promote renewable energy in all the participating nations was made in the Johannesburg Declaration. Correspondingly, it is the intention of the South African Government to make South Africa’s due contribution to the global effort to mitigate greenhouse gas emissions.

By ratifying the UNFCCC (1997) and the Kyoto Protocol (2002), South Africa has made international commitments to reduce greenhouse gases emissions so as to prevent dangerous anthropogenic interference with the climate system.

1.3.3 Benefits of a Wind Farm

Renewable energy that is produced from sustainable natural sources will provide incremental financial resources to stimulate sustainable development. Further, it will contribute towards the country meeting its international commitments made in respect of greenhouse gas emissions (Copenhagen Accord), as well as government’s objectives set out in the White Paper on Renewable Energy.

Wind energy is plentiful, renewable, widely distributed, clean, and reduces greenhouse gas emissions when it displaces fossil-fuel derived electricity. It is thus attractive to many governments, organizations, and individuals. As most of the sources are indigenous and naturally available, Wind energy is more secure in that it is not subject to disruption by international crises or limited supplies, being naturally available. The location of the proposed wind farm in the Western Cape will also mean a reduction in line losses as the wind farm will be located close to the customer load demand.

Typical benefits associated with wind farms are:

- Wind energy is renewable, clean and non-polluting, and does not produce by-products (atmospheric contaminants or thermal pollution) that could be harmful to the environment;
- Wind farms are well suited to rural areas and therefore have a reduced impact on agriculture compared to other electricity generating options. Wind turbines can also contribute to economic growth in these regions;
- Wind turbines make use of relatively simple technology in terms of design and construction;
- Wind energy is competitively priced compared to other renewable energy sources;
- Localized production of energy reduces transmission line losses associated with transmitting electricity over long distances;
- The use of wind turbines displaces the use of coal and other fossil fuels with their
associated emissions of greenhouse gases; and

- Wind Farms improve energy security for South Africa and the Western Cape, reducing dependency on imported fossil fuels.
- Access to international funding for energy projects.
- Access to technology for creation of manufacturing industry within the renewable energy technology sector.

1.4 Environmental Study Requirements

In terms of the EIA Regulations published in Government Notice R543 of 02 August 2010 in terms of Section 24 (5) of the National Environmental Management Act (Act No. 107 of 1998), certain listed activities as set out in Government Notices R544 (activities that trigger Basic Assessments), R545 (activities triggering Scoping and Environmental Impact Assessment processes or full EIAs) and R546 (location specific activities triggering Basic Assessments) require environmental authorisation before they can proceed.

This proposed wind farm development comprises several activities listed in terms of the EIA Regulations (2010), which should be covered in a single application for authorisation. Table 1.1 below lists all proposed relevant listed activities

These listed activities are:

Table 1.1: Listed activities in terms of section 24 and 24(d) of the NEMA as per GN R544, R545 and R546

<table>
<thead>
<tr>
<th>Number and date of the relevant notice:</th>
<th>Activity No (s):</th>
<th>Description of each listed activity as per project description†:</th>
</tr>
</thead>
<tbody>
<tr>
<td>544, 18 June 2010</td>
<td>1</td>
<td>The proposed construction of a wind farm near St Helena Bay with a generation capacity of 30 MW.</td>
</tr>
<tr>
<td>544, 18 June 2010</td>
<td>10</td>
<td>The proposed construction of powerlines which will connect the wind farm to electrical grid. The powerlines will be between 33 and 275 kilovolts.</td>
</tr>
<tr>
<td>544, 18 June 2010</td>
<td>56</td>
<td>Phased activities for all activities listed in this Schedule, which commenced on or after the effective date of this Schedule, where anyone phase of the activity may be below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.</td>
</tr>
<tr>
<td>545, 18 June 2010</td>
<td>1</td>
<td>The proposed construction of a wind farm near St Helena Bay with a generation capacity of 30 MW.</td>
</tr>
<tr>
<td>545, 18 June 2010</td>
<td>3</td>
<td>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 more than 500 cubic metres.</td>
</tr>
<tr>
<td>545, 18 June 2010</td>
<td>15</td>
<td>Construction of a wind farm on Langeklip Farm (Erf 47) which is 744 ha in size. The actual footprint of the wind farm will be smaller than the footprint of the property but is not confirmed at this stage. There will thus be a physical alteration of undeveloped land for industrial use.</td>
</tr>
<tr>
<td>546, 18 June 2010</td>
<td>4</td>
<td>The construction of a road wider than 4 metres with a reserve less than 13.5 metres. <strong>In Western Cape:</strong> ii. All areas outside urban areas;</td>
</tr>
<tr>
<td>546, 18 June 2010</td>
<td>10</td>
<td>The construction of facilities or infrastructure for the</td>
</tr>
</tbody>
</table>

† Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description
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.  
In Western Cape:  
ii. All areas outside urban areas;

<table>
<thead>
<tr>
<th>Date</th>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>546, 18 June 2010</td>
<td>19</td>
<td>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</td>
</tr>
<tr>
<td>546, 18 June 2010</td>
<td>26</td>
<td>Potential Phased activities for all activities listed in this Schedule and as it applies to a specific geographical area, which commenced on or after the effective date of this Schedule, where any phase of the activity may be below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.</td>
</tr>
</tbody>
</table>

Just Energy and the Seeland Development Trust requires authorisation from the National Department of Environmental Affairs (DEA) in consultation with the Western Cape Department of Environmental Affairs and Development Planning (WC DEA&DP) for undertaking the proposed Project. In order to obtain authorisation for this project, comprehensive, independent environmental studies must be undertaken in accordance with the EIA Regulations.

An Application Form was submitted to the DEA on 17 January 2011. The application was subsequently acknowledged by the DEA in a letter dated 28 February 2011 (Appendix A). The application has been assigned the DEA reference number 12/12/20/2157.

Just Energy has appointed GIBB as independent Environmental Assessment Practitioner (EAP) to manage the application and to undertake environmental studies together with a team of specialists. Through this process GIBB and the relevant specialists will identify and assess all potential environmental impacts associated with the proposed Project.

The environmental studies will follow a two-phased approach in accordance with the EIA Regulations published in Government Notice R543 of 02 August 2010 in terms of Section 24 (5) of the National Environmental Management Act (NEMA) (Act No. 107 of 1998) i.e.:

- Phase 1: Environmental Scoping Study
- Phase 2: Environmental Impact Assessment (EIA)

This Environmental Scoping Study identifies and describes potential environmental impacts associated with all aspects of the proposed Project. In terms of the EIA Regulations, feasible and reasonable alternatives have been discussed within the Scoping Study (Chapter 4). Recommendations regarding the detailed studies required within the Impact Assessment phase of the project have been made in Chapter 10.

### 1.5 Summary of the EIA Process

#### 1.5.1 EIA Process

An EIA is a legislative tool that is used to ensure that potential impacts that may occur due to the proposed development are avoided or mitigated (minimised). In South
African legislation the environment includes social, economic and bio-physical aspects and the EIA must assess these equitably.

The EIA procedures are based on the principles of Integrated Environmental Management (IEM) which, in short, comprise pro-active planning, informed decision making, a transparent and participatory approach to development, a broad understanding of the environment, and accountability for decisions and the information on which they are based.

The EIA process is controlled through Regulations published under the Government Notice No. R. 543 and associated guidelines promulgated in terms of Chapter 5 of the National Environmental Management Act (Act 107 of 1998).

The EIA process can be divided into 4 distinct components:

1. **Application and initial notification**
   - Submit an EIA application to the DEA
   - DEA acknowledgement of the EIA application (within 14 days),
   - Notify the public of the proposed development through *inter alia*, newspaper adverts, notification letters, Background Information Documents (BIDs) and notice boards.

2. **Scoping phase**
   - Investigate and gather information on the proposed study area in order to establish an understanding of the area;
   - Establish how the proposed project will potentially impact on the surrounding environment;
   - Identify Interested and Affected Parties (I&APs) and relevant authorities by conducting a Public Participation Process (PPP);
   - Identify potential environmental impacts through investigation and PPP; and
   - Describe and investigate the alternatives that may be considered.

3. **Impact assessment phase**
   - Detailed specialist assessment of all issues and proposed alternatives identified in the scoping phase
   - Identify mitigation measures and recommendations to reduce the significance of potential impacts.
   - Compile an Environmental Management Plan (EMP) which will prescribe environmental specifications to be adhered to during the construction and operational phases of the project
   - As with the Scoping phase, the PPP is an integral and important part of the Impact Assessment phase.

4. **Environmental authorisation**
   - Environmental Authorisation (EA) issued to Just Energy once the DEA has made a decision regarding the proposed project.
   - Decision may be positive or negative based on *inter alia*, information received in the Scoping and Impact Assessment phases.
The full EIA Process and timeframes are discussed in further detail in **Chapter 6**.

The EIA process and appeal process as legislated in terms of NEMA is shown diagrammatically in **Figure 1.3** below.
Figure 1.3: Environmental Impact Assessment (EIA) Process

- Submit application to authorities including declaration of interest, application fee and consent of landowner(s)
- Authority to acknowledge receipt within 14 days
- Conduct public participation process
- Notify relevant authorities and landowners
- Authority to reply in 30 days
  - Accept report
  - Reject report
  - Require amendments
- Prepare Draft Scoping Report and Plan of Study for EIA
- Solicit comments on Draft Scoping Report.
- Prepare Final Scoping Report and submit to authorities
- Authority to decide within 60 days to
  - Accept report
  - Refer for reviews
  - Request amendments
  - Reject report
- Prepare Draft Environmental Impact Report (EIR), draft EMP and Environmental Impact Statements (EIS)
- Solicit comments on the Draft EIR / EMP
- Prepare Final Environmental Impact Report. Submit to authorities
- Within 45 days of acceptance authority must grant authorisation or refuse
- PPP
  - Notice boards
  - Landowners
  - Ward Councilor
  - Municipality
  - Other authorities
  - Newspaper adverts
  - Gazette
- PPP
  - 40 day comments period
- PPP
  - 40 day comments period
- PPP
  - Advise I&APs of decision
- Decision
1.6 **Way Forward**

This Draft Scoping Report including the Plan of Study for EIA is distributed for public comment for a period of 40 calendar days, from **5 April until 19 May 2011**. All comments on the document will be considered and a response thereto provided within an Issues and Response Report (IRR) prior to submission of the Final Scoping Report (FSR) to the DEA and the WC DEA&DP for consideration.

It is anticipated that WC DEA&DP (among others) will provide comment to the DEA on the adequacy of the DSR, and the DEA will consider these comments prior to making a decision on the adequacy of the report. If the report is adequate then the DEA will instruct the EAP to continue on to the next phase of the EIA process.
2 DETAILS OF ROLEPLAYERS

2.1 Introduction

The following subsection of the Draft Scoping Report (DSR) provides the particulars, including contact details, of the applicant, the EIA consultant and the relevant authority. Details of the specialists appointed to undertake the relevant specialist studies are provided within the respective specialist study reports attached within Appendices H – N.

2.2 Details of Applicant

Just Energy is the applicant for the proposed St Helena Community Wind Farm Development. Just Energy (www.just-energy.org) is an organisation focused on working with low income communities to establish socially responsible clean energy enterprises, with the aim that these enterprises will generate social and economic benefits for the local community through new revenue streams generated by the projects. Just Energy is a not-for-profit business based in South Africa that is currently funded by the international development organisation, Oxfam and by a number of other like-minded organisations that share similar social objectives. Just Energy is assisting the Seeland Development Trust in the planning and development of a community wind farm. Just Energy are partnered with a number of industry leading legal, financial and technical companies who ensure the delivery, financing and operation of the wind farm to the highest international standards.

The details of the applicant are shown in the table below.

<table>
<thead>
<tr>
<th>Name of Applicant:</th>
<th>Just Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact person:</td>
<td>Mr. Neil Townsend</td>
</tr>
<tr>
<td>Postal Address:</td>
<td>2nd Floor, 27 Buitenkant Street, Cape Town.</td>
</tr>
<tr>
<td>Tel:</td>
<td>+27 (0) 21 469 4755</td>
</tr>
<tr>
<td>Fax:</td>
<td>+27 (0) 21 469 4751</td>
</tr>
<tr>
<td>E-mail:</td>
<td><a href="mailto:neil@just-energy.org">neil@just-energy.org</a></td>
</tr>
</tbody>
</table>

2.3 Details of Independent Environmental Assessment Practitioner (EAP)

Arcus GIBB (Pty) Ltd (GIBB) is an integrated group of highly trained scientists, project managers and engineers providing cost-effective solutions and specialist services in a wide range of disciplines. The multi-disciplinary consulting, management and design approach allows for the execution of projects in a holistic way, as this is believed to be the best approach to fully meet the needs of our clients.

Specific to environmental management, GIBB has a team of specialists comprising environmental scientists, environmental engineers, geologists and geo-hydrologists.
that form the national environmental team. These specialists have broad experience in terms of working on a range of environmental projects within the public and private sector. The environmental services division has a formidable track record and comprises highly qualified and experienced technical staff. The CVs of the Project Director and Project Leader as well as the environmental scientists and various specialists are available in Appendix B.

Table 2.2: Details of the independent Environmental Assessment Practitioner (EAP)

<table>
<thead>
<tr>
<th>Name of Consultant:</th>
<th>Arcus GIBB (Pty) Ltd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact person:</td>
<td>Ms. Jaana-Maria Ball / Ms. Rebecca Thomas</td>
</tr>
<tr>
<td>Postal Address:</td>
<td>P.O. Box 2700</td>
</tr>
<tr>
<td></td>
<td>Rivonia</td>
</tr>
<tr>
<td></td>
<td>2128</td>
</tr>
<tr>
<td>Tel:</td>
<td>+27 (0) 11 519 4600 / +27 (0) 21 469 9100</td>
</tr>
<tr>
<td>Fax:</td>
<td>+27 (0) 11 807 5670</td>
</tr>
<tr>
<td>E-mail:</td>
<td><a href="mailto:jball@gibb.co.za">jball@gibb.co.za</a> / <a href="mailto:rthomas@gibb.co.za">rthomas@gibb.co.za</a></td>
</tr>
<tr>
<td>Expertise to conduct this EIA:</td>
<td>Ms. Jaana-Maria Ball - MSc (Botany); MBA; PrSciNat; is a Professional Environmental Scientist, Ecologist and Botanist. She is a Director of Arcus GIBB with 14 years experience in the environmental field, having been the Project Manager or Director of many high profile projects in Southern Africa. Jaana is currently the Discipline Leader of Arcus GIBB's Environmental Services Discipline. She specialises in strategic and operational planning as well as the management of complex Strategic Environmental Assessments, Environmental Impact Assessments, Environmental Management Plans, co-ordination and execution of public involvement processes, Integrated Development Planning, environmental auditing and the management of large, multi-disciplinary project teams.</td>
</tr>
<tr>
<td></td>
<td>Ms Rebecca Thomas - Bachelors in Environmental Science (BSc) - is a Senior Environmental Scientist with 7 years experience in the environmental field. Rebecca specialises in Environmental Impact Assessments and Environmental Management Plans. Her key experience includes the assessment of environmental impacts associated with large industrial facilities specifically with regards to power generation and transmission.</td>
</tr>
</tbody>
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2.4 Details of Competent / Relevant Authority

The Department of Environmental Affairs (DEA) will act as the competent authority and the Western Cape Department of Environmental Affairs and Development Planning (WC DEA&DP) as the commenting authority for this application. The mandate and core business of the DEA is underpinned by the Constitution and all other relevant legislation and policies applicable to the government of the Republic of South Africa.
Table 2.3: Details of the relevant competent authority

<table>
<thead>
<tr>
<th>Name:</th>
<th>Department of Environmental Affairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact person:</td>
<td>Mr. Coenrad Agenbach</td>
</tr>
<tr>
<td>Case Officer:</td>
<td>Mr. Nyiko Ngoveni / Mr. Mmatlala Rabothata</td>
</tr>
<tr>
<td>Address:</td>
<td>Private Bag X447 Pretoria 0001</td>
</tr>
<tr>
<td>Tel:</td>
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<td><a href="mailto:nngoveni@environment.gov.za">nngoveni@environment.gov.za</a> / <a href="mailto:mrabothata@environment.gov.za">mrabothata@environment.gov.za</a></td>
</tr>
</tbody>
</table>
3 DETAILED PROJECT DESCRIPTION: TECHNICAL DETAILS

3.1 Introduction

Just Energy has secured approximately 744 hectares on Langeklip Farm (Erf 47) near St Helena Bay in the Western Cape Province, and proposes to construct and operate a wind farm and associated infrastructure to generate up to 30 MW of electricity for the national grid. This chapter describes the project in sufficient detail to allow an evaluation of the potential impacts that could result from project construction and operation, and to allow development of appropriate mitigation measures for such impacts. The potential impacts associated with the project have been evaluated within the environmental studies and are discussed in Chapter 8.

3.2 Wind Energy: How it Works

Wind power is the conversion of wind energy into a useful form of energy, such as using wind turbines to make electricity. Wind power is non-dispatchable, meaning that for economic operation, all of the available output must be taken when it is available.

Wind turbines, like windmills, are mounted on a tower to capture wind energy. The kinetic energy of the wind is used to turn the blades of the turbine to generate electricity. At 30 m or more above ground they can take advantage of the faster less turbulent wind. Usually, 2 - 3 blades are mounted on a shaft to form a rotor. The nacelle, which sits at the top of the hub, contains the generator, control equipment, gearbox and anemometer for monitoring the wind speed and direction. The mechanical power generated by the rotation of the blades is transmitted to the generator within the nacelle via a gearbox and drive train. The generator converts the turning motion of the blades into electricity.

The wind turbine consists of the following major components, as shown in Figure 3.1 below:

- The rotor / blades;
- The nacelle / generator;
- The tower; and
- The foundation unit.

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. It is anticipated that the turbines utilised for the St Helena Community Wind Farm Development will have a hub height of between 50 m and 100 m and a turbine blade length of between 25 m and 45 m, with a generating capacity of between 0.85 MW and 3 MW each. Wind turbines typically start generating electricity at wind speeds of between 10 km/hr to 15 km/hr. This is called the cut-in speed, the minimum wind speed at which the wind turbine will generate usable power. Nominal wind speeds required for full power operation vary between 45 km/hr and 60 km/hr. At very high speeds, typically over 100 km/hr, the wind turbine will cease power generation and shut down. The wind speed at which shut down occurs is called the cut-out speed.
This is a safety feature which protects the turbine from damage. Normal wind turbine operation usually resumes when the wind drops back to a safe level.

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

![Components of a Typical Wind Turbine](image)

**Figure 3.1:** Components of a Typical Wind Turbine

### 3.3 Infrastructure Requirements

Just Energy is in the process of finalising the type of turbine to be procured and the micro-siting / placement to determine the exact positioning of the turbines. Some specifications of the final project could be somewhat different than described here. However, differences are expected to be relatively minor and should not result in increased impacts.

The proposal is for the construction, operation, and decommissioning of a wind farm comprising the following components:

- Between 10 and 35 wind turbines (including tower foundations).
- Internal access roads from the R399 and Velddrift Road to the operations area.
- Electrical cables to carry electricity from the turbines to the existing overhead transmission lines.
- Substation at the connection point to the existing 66 kV transmission lines.
- Control center compound on the property.
Alternatives identified as part of the Environmental Impact Assessment process are discussed in Chapter 4 of this report.

3.4 Construction Phase

The wind farm is expected to be constructed over a period of approximately 6 months and is anticipated to produce electricity for approximately 20 years or more. It is proposed that in 2012, the roads, substation, transmission lines, and turbine foundations would be constructed, followed by the erection of the turbines. The following subsections provide a general idea regarding the transportation of workers, materials, and equipment to the site, the temporary works to be used during construction, and the construction of the various project components.

3.4.1 Transportation

The wind turbines will be transported in sections to the installation site. In addition, other materials needed for the foundations & grid-connection, will be transported separately.

3.4.2 Temporary Works

Temporary works used during the construction period will consist of a temporary compound and staging area located within the site (Farm Langeklip, Erf 47). The main compound will include a parking area, a generator with fuel storage, and temporary buildings to provide accommodation and support facilities for managers, secure storage, site offices, and welfare and first aid facilities.

3.4.3 Construction of Substation and Ancillary Infrastructure

An electrical substation will be constructed within the proposed site to connect the electrical cables from the turbines to the existing Eskom line that will convey the electricity to the national grid.

Other equipment will include excavation and other heavy construction equipment as well as passenger vehicles. All materials and equipment will be transported to the site in heavy trucks via the access road.

Aboveground tanks to store small quantities (500 – 1 000 liters) of diesel fuel, 1 000 liters of hydraulic oil, and 200 liters of lubricating oil will be placed in the laydown area.

3.4.4 Access Roads

Access roads will be required for the delivery of the turbines to their assembly positions during construction, as well as for access during the operational phase. Separate to the wind farm access routes, will be an access road to a temporary laydown area where vehicles and materials will be stored during the construction phase.

The total length of these roads will vary depending on the arrangement of the turbines. The access roads will be three to four meter wide two track roads, covered with gravel.
3.4.5 Temporary On-Site Road for Self Propelled Crane

A self-propelled crane will be used to erect the turbines. This crane will need to travel from one turbine location to the next. The crane will require a wider road, up to 10 meters wide.

The wider roads will be required during assembly of the turbines. Immediately after towers and turbines are erected and the crane is no longer needed, the width of these roads will be reduced to about three to four meter, two - track roads, with wider areas around bends and junctions. Where roads are made narrower, soil will be replaced from the stockpiles and indigenous vegetation will be re-established.

3.4.6 Turbines

During the construction phase, foundations for the turbines will be constructed. Figure 3. below shows the dimensions of the typical foundation. Foundations, above ground, will be approximately 36 - 49 meters square (dependant on final turbine size), with a somewhat larger area disturbed during construction. Chapter 7 provides a detailed description of the baseline environment in which the wind farm is proposed to be constructed. Turbines will be placed at least 150 meters apart, with distances ranging up to a kilometer or more depending on topography and their relative orientation to the prevailing wind direction. Optional layouts with regards to the placement of wind turbines will be determined from the micro-siting and the EIA process being undertaken. The findings of the environmental studies being undertaken will also provide a synopsis of opportunities and limitations for considerations in the determination of the most appropriate sites and layout options to be implemented. Project alternatives are discussed further in Chapter 4 of this document.

![Figure 3.2: Example of a Turbine Foundation](image-url)
3.4.7 Use of Services and Resources during Construction

The following services or resources will be required during construction:

Water
Water will be required for potable use and in the construction of the foundations for the turbines.

Sewage
A negligible sewage flow is anticipated for the duration of the construction period. On site treatment will be undertaken through the use of chemical toilets. The toilets will be serviced periodically by the supplier.

Roads
Existing informal roads will be used / upgraded as far as possible during construction. The use of the roads will be negotiated with the landowners. Access roads will be constructed separately as discussed in Section 3.4.4.

Stormwater
Stormwater will be required to be managed. Stormwater will be managed in accordance with the Environmental Management Plan (EMP) that will be compiled for the construction phase. A stormwater management plan will be drafted in consultation with the relevant specialists.

Solid Waste Disposal
All solid waste will be collected at a central location at each construction site and will be stored temporarily until removal to an appropriately permitted landfill site in the vicinity of the construction site.

Electricity
Diesel generators will be utilised for the provision of electricity during construction.

3.5 Operational Phase

It is anticipated that the proposed wind farm will begin generating electricity in 2012 following installation and testing of the turbines. Operational efficiency will be monitored 24 hours per day in the control center which will be based on the property. In general, there will be no daily traffic to and from the site.

It is anticipated that technicians will visit each turbine on at least a quarterly basis for routine inspection and maintenance. In addition, turbines will require other periodic maintenance as prescribed by the equipment manufacturer, including changes of lubricating oils. Routine road maintenance will include blading and smoothing as necessary to maintain the road surface, as well as inspecting and repairing stormwater controls as necessary to ensure their proper functioning to control erosion.

When operating, there will be some noise from each of the turbines. Noise will be generated by the gearbox and generator in the nacelle, and by the rotors passing through the air. The former will be largely contained by insulation, and reduced further at ground level. Rotor noise will depend on the turbine used and the speed of the wind and rotors.
In general, land disturbance will be confined to areas on and around where various site components were constructed, with no additional disturbance of otherwise undisturbed lands.

3.6 Decommissioning Phase

At present, it is not possible to describe the activities at the end of the operational life of the wind farm. It is possible that the Seeland Development Trust will replace turbines, extend the period of the lease, and continue to generate electricity, in which case decommissioning may be postponed for years or decades. When electricity generation finally ends, the proponent may wish to leave at least some of the roads and/or transmission lines. Regardless, activities will be in compliance with national and local government requirements.

When the site is ready to be decommissioned, the turbines will be dismantled. Steel and other useful materials will be recycled. Inert materials that cannot be re-used or recycled will be taken to a suitable landfill. Any contaminated material such as oil storage tanks will be taken to a suitable disposal site. On-site roads that will no longer be used will be reclaimed and vegetated with indigenous vegetation.

Foundations and other belowground inert structures will be buried and covered with soil. Land no longer being used will be revegetated with indigenous vegetation. All these reclaimed areas will be monitored and maintained until no further attention is required to ensure long-term survival of vegetation.

3.7 Conclusion

This chapter describes the various infrastructure and technology requirements for the proposed St Helena Community Wind Farm Development. The wind farm is proposed to generate up to approximately 30 MW. Between 10 and 35 wind turbines, varying between 0.85 MW and 3 MW in generating capacity, will be constructed within an area of approximately 744 ha. The arrangement of the wind turbines will depend on the topography and their relative orientation to the prevailing wind direction. The findings of the environmental studies being undertaken will also provide a synopsis of opportunities and limitations for considerations in the determination of the most appropriate sites and layout options to be implemented.
4 PROJECT ALTERNATIVES

In terms of the EIA Regulations published in Government Notice R543 of 02 August 2010 in terms of Section 24 (5) of the National Environmental Management Act (Act No. 107 of 1998), feasible and reasonable alternatives have to be considered within the environmental scoping phase. All identified, feasible and reasonable alternatives are required to be identified in terms of social, biophysical, economic and technical factors.

A key challenge of the EIA process is the consideration of alternatives. Most guidelines use terms such as ‘reasonable’, ‘practicable’, ‘feasible’ or ‘viable’ to define the range of alternatives that should be considered. Essentially there are two types of alternatives:

- incrementally different (modifications) alternatives to the Project; and
- fundamentally (totally) different alternatives to the Project.

Fundamentally different alternatives are usually assessed at a strategic level and EIA practitioners recognise the limitations of project-specific EIAs to address fundamentally different alternatives. Electricity generating alternatives have been addressed as part of the National Integrated Resource Plan (NIRP) published by the National Energy Regulator of South Africa (NERSA) and the Integrated Strategic Electricity Plan (ISEP) undertaken by Eskom. Environmental aspects are considered and integrated into the NIRP and ISEP using the strategic environmental assessment approach, focussing on environmental life-cycle assessments, water-related issues and climate change considerations. The environmental scoping phase, thus, only considered alternatives considered in terms of the proposed St Helena Community Wind Farm Development in the Western Cape Province, and did not evaluate any other power generation options.

4.1 The ‘Do Nothing’ Alternative

The ‘do-nothing’ or ‘no-go’ alternative is the option of not establishing a community wind farm in St Helena in the Western Cape Province.

The electricity demand in South Africa surpassed existing power generation capacity in 2008, causing nation-wide black-outs and load shedding. The crisis has temporarily been averted through the forced reduction of use to the mining industry by 10%, causing vast job-losses in its wake. South Africa requires additional capacity if it is to meet the growing demand for electricity. The ‘do nothing’ option will, therefore, contribute to these electricity demands not being met. Not meeting the growing electricity demand will have major adverse impacts on economic activity and economic growth in South Africa, which in turn will have an adverse impact on socio-economic development in South Africa. Additional electricity generation options will contribute to meeting this energy demand. The recent increase in oil prices, the exhaustibility of fossil fuels and the urgent need for stable, reliable, non-polluting sources of electrical energy that are indispensable to a modern industrial economy focuses attention on alternative energy, such as renewable energy sources.

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1 In terms of the EIA Regulations published in Government Notice R385 of 21 April 2006 in terms of Section 24 (5) of the National Environmental Management Act (Act No. 107 of 1998), the definition of “alternatives” in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity which may include: (a) the property on which or location where it is proposed to undertake the activity; (b) the type of activity to be undertaken; (c) the design or layout of the activity; (d) the technology to be used in the activity; and (e) the operational aspects of the activity.
The construction of the proposed wind farm will also aid South Africa in meeting its commitments to reduce greenhouse gas emissions, made in terms of the United Nations Framework Convention on Climate Change (1997) and the Kyoto Protocol (2002). The “do-nothing” alternative will not assist the country in meeting these renewable energy targets or aid in reducing the Western Cape Province’s dependence on imported electricity.

The “do-nothing” alternative is therefore not considered to be the preferred alternative. The “do-nothing” alternative however will be represented by the status quo, against which the proposed project will be compared in detail during the impact assessment phase of the project.

4.2 Layout and Design Alternatives

4.2.1 Arrangement of the Wind Turbines

The arrangement of the wind turbines will be determined by leading international wind experts. It is critical the end arrangement is in the right position (i.e., according to the wind), such that maximum capacity is produced by the wind farm. The positions determined through micro-siting will however have (limited) latitude to move within the identified optimal wind resource to mitigate for any particular environmental potential impacts identified within the layout region.

4.2.2 Size of Wind Turbines

Turbines ranging between 0.85 and 3 MW will be investigated during the detailed impact assessment phase of the project. The different turbine sizes will have different hub heights and different blade lengths, with these increasing from 50 m to 100 m for the hub height and 25 m to 45 m for the blade length as one moves from a 0.85 MW turbine to a 3 MW turbine. The number of turbines required, however, will decrease as the size increases (i.e., approximately 35 x 0.85 MW turbines to approximately 10 x 3 MW turbines). The various turbines will be considered by the specialists in the detailed impact assessment phase and the size used in the end will depend on which will result in the least environmental impact on the proposed study area.

4.2.3 Transmission Power Lines

Due to the need for power to be connected from the turbines to the substation, and then to the national transmission system, it is necessary to identify potential alignments for the electrical cables and low voltage feeder powerline. Network integration, planning and design studies for the integration of the powerline into the national network is still being finalised. This will be informed by the understanding the local power requirements.
4.3 Associated Infrastructure

4.3.1 Access Roads

Access roads will be required in order to ensure access from the main road to the wind farm and to connect the turbines within the proposed site. The access road routes will ultimately depend on the layout of the turbines, as well as the size of the turbines, which will in turn determine where the roads will be required to go and how many roads will be required. These access road alignments will therefore have to be further investigated in the impact assessment phase once the layout and design alternatives have been selected.

4.4 Conclusion

This chapter discusses the various project alternatives involved with the proposed St Helena community wind farm.
5 LEGAL AND POLICY CONTEXT

5.1 Introduction

This section of the Scoping Report details applicable legal provisions and the policy context for the EIA. It provides a review of relevant international legal instruments as well as national legislation, regulations and policy documents, which are applicable to (or have implications for) the proposed wind farm development in the Republic of South Africa.

One of the main foci of this section is on the provisions of the National Environmental Management Act (NEMA). NEMA is the primary South African legislation governing the requirements for environmental impact assessment. In the context of Just Energy’s initiative to build the required infrastructure for electricity generation, the provisions of NEMA and associated EIA Regulations (regarding scoping and EIA) are of fundamental relevance. This chapter also describes other legislation relevant to constitutional and administrative legal precepts in South African law, as well as environmental legislation of specific relevance *inter alia* to water resources; heritage; biodiversity and land use planning.

The activities associated with the project have the potential to trigger the South African requirements for EIA, and are likely to require a number of particular consents and authorisations. An analysis of the range of consents and authorisations required for the operation of the project will be the subject of a detailed legal (including environmental) analysis. This chapter does not provide such an analysis. Rather, this chapter provides a preliminary input at the Scoping phase of the EIA process by describing the environmental and other legislation that may be relevant during the undertaking of the project.

5.2 Legislative, Policy, Planning and Guideline Context

The legislative framework applicable to this project is diverse and consists of a number of Acts and Regulations which must be complied with. A summary of the key environmental legislation and relevant policies and/or guidelines is provided in the following sections:

5.2.1 The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)

NEMA\(^1\) is the most significant single piece of legislation dealing with environmental management in South Africa. The stated purpose of NEMA is, amongst other things, “to provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote

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\(^1\) NEMA applies throughout the territory of the Republic of South Africa which effectively means that it applies throughout the terrestrial area of the Republic and seaward beyond the low-water mark, to the outer extent of the territorial waters (which extend for 12 nautical miles from the low-water mark or specifically demarcated baselines – see the provisions of the Maritime Zones Act, 15 of 1994 in this regard).
co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state..."  

NEMA takes the form of “framework” legislation. It establishes a set of 18 principles which apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and -

“a) shall apply alongside all other appropriate and relevant considerations, including the State's responsibility to respect, protect, promote and fulfil the social and economic rights in Chapter 2 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination;
b) serve as the general framework within which environmental management and implementation plans must be formulated;
c) serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment;
d) serve as principles by reference to which a conciliator appointed under this Act must make recommendations; and
e) guide the interpretation, administration and implementation of this Act, and any other law concerned with the protection or management of the environment.”  

The following principles contained in section 2 of NEMA are of particular relevance in that they potentially impact on any decisions that may be taken by organs of state in relation to the authorisation of the construction of electricity transmission infrastructure in South Africa:

- “Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.”
- “Development must be socially, environmentally and economically sustainable.”
- “Sustainable development requires the consideration of all relevant factors including the following:
  
  (i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
  (ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
  (iii) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;

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2 Long title of NEMA. Section 239 of the Constitution defines an “organ of state” as:
(a) any department of state or administration in the national, provincial or local sphere of government; or
(b) any other functionary or institution-
(i) exercising a power or performing a function in terms of the Constitution or a provincial constitution; or
(ii) exercising a public power or performing a public function in terms of any legislation, but does not include a court or a judicial officer.

3 Section 2(1) of NEMA.
4 Section 2(2) of NEMA.
5 Section 2(3) of NEMA.
(iv) that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
(v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;
(vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;
(vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
(viii) that negative impacts on the environment and on people’s environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.6

- “The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.”7
- “The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.”8
- “There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.”9
- “Global and international responsibilities relating to the environment must be discharged in the national interest.”10

NEMA also contains provisions on the creation of environmental management plans and environmental implementation plans and stipulates the respective organs of state responsible for doing so, as well as what such management and implementation plans are to include.11

Chapter 5 of NEMA, entitled “Integrated Environmental Management” establishes the environmental impact assessment regime in South Africa. Since 3 July 2006, the procedural and substantive requirements for undertaking EIAs in South Africa have been regulated in terms of the provisions contained in section 24 of NEMA and the NEMA EIA Regulations.12 The NEMA EIA Regulations identify lists of activities which require either “basic assessment”13 or “scoping and environmental impact assessment”, and prescribe the procedural and substantive requirements for the undertaking of EIAs and the issue of environmental authorisations.

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6 Section 2(4)(a) of NEMA.
7 Section 2(4)(f) of NEMA.
8 Section 2(4)(i) of NEMA.
9 Section 2(4)(l) of NEMA.
10 Section 2(4)(n) of NEMA.
11 Chapter 3 of NEMA (Sections 11-16).
12 Published respectively in Government Notices R544, 545 and 546 in Government Gazette dated 2 August 2010, as amended.
14 GN R545 in Government Gazette dated 2 August 2010.
Activities identified in terms of section 24(2)(a) and (d) of NEMA, which may not commence without environmental authorisation from the competent authority and in respect of which the investigation, assessment and communication of potential impact of such activities must follow the procedure as described in regulations 22 to 26 of the NEMA EIA Regulations. If the activity is listed in GN R544, GN R 545 and GN 546, an applicant applies for authorisation either by undertaking a basic assessment or a scoping and EIA process, respectively.

The activities that apply to the St Helena Community Wind Farm Development Development project are set out in Table 5.1 below.

**Table 5.1: Activities requiring Environmental Authorisation**

<table>
<thead>
<tr>
<th>Indicate the number and date of the relevant notice:</th>
<th>Activity No (s) (in terms of the relevant notice):</th>
<th>Describe each listed activity as per project description</th>
</tr>
</thead>
<tbody>
<tr>
<td>544, 18 June 2010</td>
<td>1</td>
<td>The proposed construction of a wind farm near St Helena Bay with a generation capacity of 30 MW.</td>
</tr>
<tr>
<td>544, 18 June 2010</td>
<td>10</td>
<td>The proposed construction of powerlines which will connect the wind farm to electrical grid. The powerlines will be between 33 and 275 kilovolts.</td>
</tr>
<tr>
<td>544, 18 June 2010</td>
<td>56</td>
<td>Phased activities for all activities listed in this Schedule, which commenced on or after the effective date of this Schedule, where anyone phase of the activity may be below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.</td>
</tr>
<tr>
<td>545, 18 June 2010</td>
<td>1</td>
<td>The proposed construction of a wind farm near St Helena Bay with a generation capacity of 30 MW.</td>
</tr>
<tr>
<td>545, 18 June 2010</td>
<td>3</td>
<td>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 more than 500 cubic metres.</td>
</tr>
<tr>
<td>545, 18 June 2010</td>
<td>15</td>
<td>Construction of a wind farm on Langeklip Farm (Erf 47) which is 744 ha in size. The actual footprint of the wind farm will be smaller than the footprint of the property but is not confirmed at this stage. There will thus be a physical alteration of undeveloped land for industrial use.</td>
</tr>
<tr>
<td>546, 18 June 2010</td>
<td>4</td>
<td>The construction of a road wider than 4 metres with a reserve less than 13,5 metres. <strong>In Western Cape:</strong> ii. All areas outside urban areas;</td>
</tr>
<tr>
<td>546, 18 June 2010</td>
<td>10</td>
<td>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. <strong>In Western Cape:</strong> ii. All areas outside urban areas;</td>
</tr>
<tr>
<td>546, 18 June 2010</td>
<td>19</td>
<td>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. <strong>In Western Cape:</strong> i. All areas outside urban areas;</td>
</tr>
<tr>
<td>546, 18 June 2010</td>
<td>26</td>
<td>Potential Phased activities for all activities listed in this Schedule and as it applies to a specific geographical area, which commenced on or after the effective date of this Schedule, where any phase of the activity may be below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.</td>
</tr>
</tbody>
</table>

15 Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description.
5.2.2 Western Cape Guideline Series for EIA (2005)

The Western Cape DEADP has developed various guidelines relating to environmental assessment and management, and the EIA process. The guidelines aim to inform participants and increase the effectiveness of the environmental assessment and management processes. The series currently includes:

- Guideline for Determining the Scope of Specialist Involvement in EIA Processes;
- Guideline for the Review of Specialist Input into the EIA Process;
- Guideline for Involving Biodiversity Specialists in EIA Processes;
- Guideline for Involving Heritage Specialists in EIA Processes;
- Guideline for Involving Visual and Aesthetic Specialists in EIA Processes;
- Guideline for Involving Economists in EIA Processes;
- Guideline for Involving Hydrogeologists in EIA Processes;
- Guideline for Environmental Management Plans; and
- Guideline for Involving Social Assessment Specialists in EIA Processes.

Those specialists involved with the proposed St Helena Community Wind Farm Development project must be aware and make use of these guidelines as appropriate.

In addition, the following guidelines were finalised in 2010 after the amendments to NEMA and the EIA Regulations, and have now been promulgated:

- Guideline on Transitional Arrangements
- Guideline on Public Participation
- Guideline on Alternatives
- Guideline on Exemption Applications
- Guideline on Appeals

5.2.3 Department of Environmental Affairs and Tourism Integrated Environmental Management Guideline Series (2006)

The DEA has developed a series of guidelines to assist environmental assessment practitioners, potential applicants and interested and affected parties in understanding the roles, responsibilities and Regulations associates with the EIA process. The 2006 series currently includes:

- Guideline 3 : General guide to the EIA Regulations
- Guideline 4 : Public participation
- Guideline 5 : Assessment of alternatives and impacts
- Guideline 6 : Environmental management frameworks

5.2.4 Other Acts/Regulations/Policies/Guidelines relevant to the project

Several other Acts, Plans, Policies and Guidelines have also informed the project. Table 5.3 below provides a brief review of other relevant policies, legislation, guidelines and standards applicable to the St Helena Community Wind Farm Development EIA. A more detailed review of legislative requirements applicable to the proposed project will be included in the Impact Assessment phase.
Table 5.3: Brief review of other relevant policies, legislation, guidelines and standards applicable to the St Helena Community Wind Farm Development EIA

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Details/Applicable Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>National Legislation</strong></td>
<td></td>
</tr>
</tbody>
</table>
| The Constitution of the Republic of South Africa (Act 108 of 1996) | The Constitution of the Republic of South Africa is the supreme law of South Africa and is the statute against which all other law (both statutory instruments and the common law) must be measured. To the extent that other laws conflict with the Constitution, they are as a general rule invalid, subject to the provisions of the limitations clause contained in section 36.  
- The Bill of Rights forms the cornerstone upon which the constitutional dispensation in South Africa is built. It applies to all law, and binds the legislature, the executive, the judiciary and all organs of state. (Chapter 2, Section 7 – 39):  
  - Environmental Rights i.e. “Everyone has the right to an environment which is not harmful to their health or well-being; and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures (Section 24)  
  - Rights to Freedom of Movement and Residence (Section 22)  
  - Property rights (Section 25)  
  - The Right of Access to Information (Section 32)  
  - The Right to Just Administrative Action (Section 33)  
  - Enforcement of Rights (Section 38 of the Constitution).  
  - Limitations of Rights (Section 36)  
  - Provincial Competence (Section 44 and 104)  
  - Local Authority Competence (Section 44, 104, 154, 156 and Part B of Schedule 4 and Part B of Schedule 5) |
| National Energy Act (Act 34 of 2008) | The Act is aimed to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements and interactions amongst economic sectors.  
- The Act also provides for energy planning, increased generation and consumption of renewable energies, contingency energy supply, holding of strategic energy feedstocks and carriers, adequate investment in, appropriate upkeep and access to energy infrastructure. |
<table>
<thead>
<tr>
<th>The act also establishes an institution to be responsible for promotion of efficient generation and consumption of energy and energy research; and to provide for all matters connected therewith.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Promotion of Administrative Justice Act (Act 3 of 2000)</td>
</tr>
</tbody>
</table>
| Definitions (Section 1)  
Procedural Fairness (Section 3, 4 and 6)  
Right to Reasons for Decisions (Section 5)  
Judicial Review (Section 6 and 8) |
| Promotion of Access to Information Act (Act 2 of 2000) |
| The purpose of the Promotion of Access to Information Act (“PAIA”) is to give effect to the constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights, and to provide for matters connected therewith. |
| Environmental Conservation Act (Act 73 of 1989) |
| Waste disposal practices (Section 20)  
National Noise control Regulations (GN R154 dated 10 January 1999) |
| National Heritage Resources Act (Act No. 25 of 1999) |
| Stipulates assessment criteria and categories of heritage resources according to their significance (Section 7)  
Provides for the protection of all archaeological and Palaeontological sites, and meteorites (Section 35)  
Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (Section 36)  
List activities which require developers to notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development (Section 38)  
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 (Section 44) |
| National Environmental Management: Biodiversity Act (Act No. 10 of 2004) |
| Provides for the MEC or Minister to list ecosystems which are threatened and in need of protection (Section 52) (none published as yet)  
Provides for the MEC or Minister to identify any process or activity in such a listed ecosystem as a threatening process (Section 53) (none published as yet)  
A list of threatened and protected species has been published in terms of Section 56(1), Government Gazette 29657  
Three government notices have been published, i.e. GN R150 (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). |
<table>
<thead>
<tr>
<th>Act Name</th>
<th>Measures</th>
</tr>
</thead>
</table>
| Atmospheric Pollution Prevention Act (Act No. 45 of 1965)               | • Part IV: Dust Control  
• Part V: Air Pollution by fumes emitted by vehicle emissions                                                                 |
| National Environmental Management: Air Quality Act (Act No 39 of 2004)  | • Measures in respect of dust control (Section 32) (no regulations promulgated as yet)  
• Measures to control noise (Section 34) (no regulations promulgated as yet) |
| Conservation of Agricultural Resources Act (Act No. 43 of 1983)        | • Prohibition of the spreading of weeds (Section 5)  
• Classification of categories of weeds and invader plants (Regulation 15 of GN R1048) and restrictions in terms of where these species may occur  
• Requirement and 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 (Section 3)  
• Entitlement to use water (Section 4)  
• Duty of Care to prevent and remedy the effects of pollution to water resources (Section 19)  
• Procedures to be followed in the event of an emergency incident which may impact on a water resource (Section 20)  
• Definition of Water Use (Section 21)  
• Requirements for registration of water use (Section 26 and Section 34)  
• Definition of offences in terms of the Act (Section 151) |
| 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 |
| Waste Act (Act No 59 Of 2008)                                         | • Waste Management Measures  
• Regulations and schedules |
| National Forests Act (Act No. 84 of 1998)                             | • Protected Trees  
• Forests |

**Provincial Legislation**

<table>
<thead>
<tr>
<th>Ordinance</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Land Use Planning Ordinance 15 of 1985 (“LUPO”)</td>
<td>• The purpose of LUPO is to regulate land use planning and incidental matters in the Eastern, Northern and Western Cape.</td>
</tr>
</tbody>
</table>

**Municipal by-laws**

This chapter, which considers the potentially relevant national and provincial environmental legislative dimension of the project, does not include discussion on relevant municipal by-laws. However, it is possible that certain municipal by-laws will be relevant to the project and these will be discussed further during the impact assessment phase of the EIA.

**Policy and Planning Context**

White Paper on the Energy Policy of the... The Energy Policy governs development within the...
<table>
<thead>
<tr>
<th>Republic of South Africa</th>
<th>Energy sector in South Africa, and has five policy objectives:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Increased access to affordable energy services;</td>
</tr>
<tr>
<td></td>
<td>• Improved energy governance;</td>
</tr>
<tr>
<td></td>
<td>• Stimulating economic development;</td>
</tr>
<tr>
<td></td>
<td>• Managing energy related environmental and health impacts; and</td>
</tr>
<tr>
<td></td>
<td>• Securing supply through diversity.</td>
</tr>
<tr>
<td></td>
<td>It also identifies:</td>
</tr>
<tr>
<td></td>
<td>• The need to undertake an Integrated Energy Planning process, while also taking into account health, safety and environmental parameters.</td>
</tr>
<tr>
<td></td>
<td>• The need for the implementation of a National Integrated Resource Plan (NIRP).</td>
</tr>
<tr>
<td>Energy Security Master Plan – Electricity (2007-2025)</td>
<td>• Addresses all aspects of the electricity sector including generation, transmission and distribution as well as Demand Side Management and energy efficiency initiatives for the period 2007-2025.</td>
</tr>
<tr>
<td></td>
<td>• The Master Plan also considers standards for ensuring security of supply.</td>
</tr>
<tr>
<td>National Spatial Biodiversity Assessment (“NSBA”)</td>
<td>• The NSBA establishes protection and conservation priority status for terrestrial, inland water, estuarine and marine ecosystems at a 1:250,000 scale nationally and suggested implementation options for priority areas. It provides the national context for development of biodiversity plans at the sub-national and local scale.</td>
</tr>
<tr>
<td>Draft National Strategy for Sustainable Development</td>
<td>• The (draft) National Strategy notes that the nation’s biodiversity provides critical ecosystem services on which socio-economic systems depend. Although still in development, the final product is set to be used by government and stakeholders to enhance South Africa’s long term planning capacity. It would specifically influence national and provincial development strategies.</td>
</tr>
<tr>
<td>Integrated Development Plans (IDP)</td>
<td>• West Coast District Municipality IDP (IDP2010 - 2014)</td>
</tr>
<tr>
<td></td>
<td>• Saldanha Bay Local Municipality IDP (IDP 2006 – 2011)</td>
</tr>
<tr>
<td>The Western Cape Provincial Spatial Development Framework (“WCPSDF”)</td>
<td>The stated purpose of the WCPSDF is to:</td>
</tr>
<tr>
<td></td>
<td>• Be the spatial expression of the Provincial Growth and Development Strategy (PGDS);</td>
</tr>
<tr>
<td></td>
<td>• Guide municipal (district, local and metropolitan) Integrated Developments Plans (IDPs) and Spatial Development Frameworks (SDFs) and provincial and municipal Spatial Development Plans (SDPs);</td>
</tr>
<tr>
<td></td>
<td>• Help prioritise and align investments and</td>
</tr>
</tbody>
</table>
infrastructure plans of other provincial departments, as well as national departments and parastatals plans and programmes in the Province;

- Provide clear signals to the private sector about desired development directions;
- Increase predictability in the development environment, for example by establishing “no-go”, “maybe” and “go” areas for development; and
- Redress the spatial legacy of apartheid.

### Guideline Documents

<table>
<thead>
<tr>
<th>Guideline Document</th>
<th>Description</th>
</tr>
</thead>
</table>
| South African National Standards (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 – 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 the 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 |

### 5.3 Conclusion

This legal review has provided a preliminary overview of the key aspects of environmental policy and the key environmental legal framework relating to the project. It provides a preliminary identification and review of the most relevant international, national and provincial environmental legislation as well as relevant international standards and guidelines. It must be noted that this preliminary review does not include all potentially relevant laws, policies, standards and guidelines.
6 EIA PROCESS AND METHODOLOGY

6.1 Introduction

The EIA process for the St Helena Community Wind Farm Development project is comprised of two main phases, namely the scoping phase and impact assessment phase. This report documents the tasks which have been undertaken as part of the scoping phase of the EIA. These tasks include the public participation process and specialist studies.

The scoping phase serves to define the scope of the detailed assessment of the potential impacts of a proposed project. Scoping has been undertaken in accordance with the requirements of Government Notices R543 of 2010, and the IEM Information Series (DEA, 2002). The objectives of the scoping phase are to:

- Ensure that the process is open and transparent and involves the authorities, proponent and stakeholders;
- Identify the important characteristics of the affected environment;
- Ensure that feasible and reasonable alternatives are identified and selected for further assessment; and
- Determine possible impacts of the project on the environment.

6.2 Scoping Phase

6.2.1 Consultation with Authorities

The relevant authorities required to review the proposed project and provide an Environmental Authorisation were consulted from the outset of this study, and have been engaged throughout the project process. These competent authorities include the National Department of Environmental Affairs (DEA), who are the competent authority for this project. The Western Cape Department of Environmental Affairs and Development Planning (WC DEA&DP) is noted as a key commenting authority.

Authority consultation included the following activities:

- Pre-Application Meeting with DEA on Monday 29th November 2010;
- Submission of an application for authorisation in terms of NEMA (Act 107 of 1998) on 17 January 2011;
- Submission of a copy of the application for authorisation to WC DEA&DP on 18 January 2011.

Following the submission of the application for authorisation, the DEA acknowledged receipt thereof in the form of an Acknowledgement of Receipt letter from DEA dated 28 February 2011 (Appendix A) and issued EIA reference number 12/12/20/2157.

6.2.2 Consultation with other Relevant Authorities
Background information regarding the proposed project was provided to other relevant authorities, together with a registration and comment form formally requesting their input into the EIA process. These authorities include *inter alia*:

- Saldanha Bay Local Municipality
- West Coast District Municipality
- Department of Water Affairs (DWA),
- Department of Agriculture, Fisheries and Forestry (DAFF),
- Department of Energy (DoE),
- Department of Transport (DoT),
- South African Heritage Resources Agency (SAHRA),
- Heritage Western Cape (HWC),
- Civil Aviation Authority (CAA),
- South African National Parks (SANParks),

A full list of keystoneholders consulted during the environmental scoping phase is included in the I&AP database (*Appendix C*). Authority consultation will continue throughout the remainder of the EIA process.

### 6.2.3 Identification of Potentially Significant Environmental Impacts

Potential positive and negative direct and indirect environmental impacts associated with the proposed project were identified within the scoping phase and have been evaluated through desktop studies and a one day site visit. In evaluating the potential impacts, studies were provided by the following specialists:

<table>
<thead>
<tr>
<th>Specialist Study</th>
<th>Specialist Name</th>
<th>Appendix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecological Impact Assessment</td>
<td>David Hoare of David Hoare Consulting CC</td>
<td>Appendix H</td>
</tr>
<tr>
<td>Avifauna Impact Assessment</td>
<td>Chris van Rooyen of Chris van Rooyen Consulting</td>
<td>Appendix I</td>
</tr>
<tr>
<td>Geotechnical Study</td>
<td>Jon McStay of WSP</td>
<td>Appendix J</td>
</tr>
<tr>
<td>Social Impact Assessment</td>
<td>Tony Barbour of Tony Barbour Environmental</td>
<td>Appendix K</td>
</tr>
<tr>
<td>Heritage Impact Assessment</td>
<td>Dr. Lita Webley/ Tim Hart of UCT</td>
<td>Appendix L</td>
</tr>
<tr>
<td>Noise Impact Assessment</td>
<td>Demos Dracoulides of DDA Environmental Engineers</td>
<td>Appendix M</td>
</tr>
<tr>
<td>Visual Impact Assessment</td>
<td>Reuben Heydenrych of Arcus GIBB</td>
<td>Appendix N</td>
</tr>
</tbody>
</table>

### 6.2.4 Draft Scoping Report

This report represents the findings of the scoping phase of the proposed project and the purpose of the report is therefore to document these findings in the form of a Draft and Final Scoping Report (FSR). The report documents the issues identified through the site visit, the Public Participation Process (PPP) as well as through the professional input of the relevant specialists and the GIBB team.

All public comments on the DSR will be captured in an updated Issues and Response Report (IRR) (*Appendix D*), which will be submitted to DEA as an appendix to the FSR. Correspondence will be sent to all I&APs registered on the I&AP database, thereby informing them of the availability of the FSR submitted to DEA in order for the public to note how their comments were addressed.
6.2.5 Plan of Study for EIA

The Terms of Reference (ToR) for specialist studies are outlined in the Plan of Study (PoS) for EIA, presented in Chapter 10. The results of the specialist studies will form part of the Environmental Impact Report (EIR), which will be compiled during the detailed impact assessment phase of the EIA process.

6.3 Public Participation Process

A comprehensive Public Participation Process (PPP) has been implemented as part of the scoping phase of the EIA. The PPP aims to:

- Ensure all relevant Key stakeholders and Interested and Affected Parties (I&APs) have been identified and invited to engage in the scoping phase;
- Raise awareness, educate and increase understanding of stakeholders about the proposed project, the affected environment and the environmental process being undertaken;
- Create open channels of communication between Key stakeholders and I&APS and the project team;
- Provide opportunities for Key stakeholders and I&APS to identify issues or concerns and suggestions for enhancing potential benefits and to prevent or mitigate impacts;
- Accurately document all opinions, concerns and queries raised regarding the project; and
- Ensure the identification of the significant alternatives and issues related to the project.

6.3.1 Identification of Key stakeholders and I&APs

The identification and registration of I&APs will be an ongoing activity during the course of the project. Please note however that only registered I&APs are entitled to comment, in writing, on all written submissions made to the competent authority by the applicant or the EAP managing an application, and to bring to the attention of the competent authority any issues which that party believes may be of significance to the consideration of the application, provided that comments are submitted within the timeframes that have been approved or set by the competent authority or any extension of a timeframe agreed to by the application or EAP. GIBB will develop, maintain and constantly update an electronic I&AP database for the project (see Appendix C). The I&APs for the project have been identified using the following:

- Existing I&AP databases obtained from the client;
- Existing I&AP databases for other projects within the study area,
- Placement of newspaper advertisements in three newspapers,
- Placement of site notices at the proposed site locations;
- Placement of site notices in venues in the surrounding towns;
- Distribution of Background Information Documents (BIDs);
- Discussions with community leaders and relevant ward councillors; and
- Completed comments sheets.

6.3.2 Notification and Advertisements
In accordance with the requirements of the NEMA EIA Regulations, the project has been advertised in a number of newspapers and site notices. The purpose of the advertisement and site notice is to notify the public about the proposed project and to invite them to register as I&APs (see Appendix E). The relevant advertisement dates are listed in Table 6.2 below.

Table 6.2: List of newspapers and dates in which the adverts were published

<table>
<thead>
<tr>
<th>Newspaper</th>
<th>Publication Date</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Argus</td>
<td>5 April 2011</td>
<td>English</td>
</tr>
<tr>
<td>Die Burger</td>
<td>5 April 2011</td>
<td>Afrikaans</td>
</tr>
<tr>
<td>Weslander</td>
<td>7 April 2011</td>
<td>English and Afrikaans</td>
</tr>
</tbody>
</table>

The project and environmental assessment process have been widely announced with an invitation to the general public to register as I&APs and to actively participate in the PPP. This was achieved using:

- Print media advertisements in English and Afrikaans that were placed in regional and local newspapers for the Project;
- A letter of notification written in English and Afrikaans was sent to identified I&APs announcing the project and opportunities for participation;
- A Background Information Document (BID) and comment sheet were produced in English and Afrikaans detailing the proposed project and explaining the EIA process. The BID was mailed to I&APs on the database and delivered to identified strategic public venues;
- Copies of the BID were made available to I&APs as and when requested. Public documents were also made available in public libraries and other local public venues.

6.3.3 Background Information Document (BID)

The Background Information Document (BID) that briefly describes the proposed project was compiled in English and Afrikaans and distributed to all identified and registered I&APs. The BID introduces the proposed project and contains background information on the project, the proponent, consultants and proposed process to be followed. It also includes a locality map and a registration/comment sheet inviting I&APs to submit details of any issues, concerns or inputs they might have with regards to the proposed project. A copy of the BID is included in Appendix F.

6.3.4 Environmental Scoping Phase Meetings

There are various forms of public meetings. These include Key Stakeholder Workshops (KSWs), Focus Group Meetings (FGMs), Public Open Days with different public sectors, organisations and individuals, as well as one-on-one interactions. The purpose of these meetings is to present I&APs with information pertaining to the project and the process being followed, as well as to document and discuss any issues which the public wishes to raise.

A KSW to discuss the issues around the proposed St Helena Community Wind Farm Development will be held during the public review period of the DSR. Key stakeholders that will be invited to the workshop are representatives of relevant sectors.
Invitations to Public Open Days have been extended in letters and public notices. Table 6.4 provides a list of the dates and venues where the public meetings are to be held.

The purpose of the Public Open Days will be to provide an appropriate platform to enable I&APs to raise issues and have the opportunity to interact one-on-one with the applicant and the EIA Project Team, either in English or Afrikaans. Poster displays and one-on-one interactions will be given at the Public Open Days.

Table 6.3: Public Open Days

<table>
<thead>
<tr>
<th>No.</th>
<th>Province</th>
<th>Area</th>
<th>Venue</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Western Cape Province</td>
<td>Veldrif</td>
<td>Veldrif Town Hall</td>
<td>4 May 2011, 16h00 until 19h00</td>
</tr>
<tr>
<td>2</td>
<td>Laingville</td>
<td>Laingville</td>
<td>Laingville Community Centre</td>
<td>5 May 2011, 16h00 until 19h00</td>
</tr>
<tr>
<td>3</td>
<td>Vredenburg</td>
<td>Louwville</td>
<td>Louwville Community Hall</td>
<td>6 May 2011, 16h00 until 19h00</td>
</tr>
</tbody>
</table>

One-on-one interactions will be held with individuals and representatives of relevant sectors. These interactions will be particularly useful in identifying key issues and other relevant stakeholders.

For groups with significant common interest around a particular issue or geographic area, meetings will be held with these interest groups. Interaction with members of various Focus Groups will continue throughout the EIA process. Additional Key Stakeholder Workshops will also be held if required.

Minutes of all meetings held with I&APs will be taken and will be forwarded to the attendees for verification of their issues. The minutes of the consultation will be included within the FSR. The comments raised during the public participation process described above, will be recorded in the updated Issues and Response Report (IRR) to be included in the Final Scoping Report.

6.3.5 Ongoing Consultation and Engagement

In addition to the public documents distributed to I&APs, there will be ongoing communication between the applicant, the EIA team and I&APs. These interactions will include the following:

- In addition to the project announcement letters, a letter will be sent out to all registered I&APs providing them with an update of the project;
- Interactions with I&APs will take place in English and Afrikaans where required;
- Feedback to Key stakeholders, individually and collectively;
- Written responses (email, faxes and letters) will be provided to numerous I&APs acknowledging issues and providing information requested (dependent on availability);
- Special attention will be paid to consultation with affected and potentially affected landowners within the study area.

The consultation with all Key stakeholders and I&APs will continue into the Environmental Impact Assessment and EMP phase. Consultation will continue and will include:

- Distribution of all project information and findings to I&APs;
6.3.6 Public Review of the Draft Environmental Scoping Report

The draft Environmental Scoping Report has been made available for review from **5 April 2011 to 19 May 2011** and is available at the following public locations within the proposed study area:

- Velddrif Public Library
- Laingville Public Library
- Vredenburg Public Library

All registered I&APs have been notified of the availability of the report in writing. Comments received during the review period will be included in the FSR to be submitted to the authorities for decision-making.

6.3.7 Final Environmental Scoping Report

The final stage in the environmental scoping phase entails the capturing of responses and comments from I&APs on the Draft Scoping Report in order to refine the Environmental Scoping Report, and ensure that all issues of significance are addressed. The Final Environmental Scoping Report will be submitted to DEA for review and decision-making.

6.4 Conclusion

This chapter discusses the various tasks that have been undertaken as part of the scoping phase of the EIA process. Two of the main components, include the Public Participation Process and the identification of the impacts that will be assessed in the detailed specialist studies completed as part of the impact assessment phase. The Environmental Scoping phase has been undertaken in accordance with the requirements of the National Environmental Management Act (NEMA) (Act 108 of 1998), as read with Government Notices R 544, 545 and 546 of the NEMA and the IEM Information Series (DEA, 2002).
7 DESCRIPTION OF THE BASELINE ENVIRONMENT

7.1 Introduction

This section provides a description of the baseline environment in the study area, which may be affected by the proposed project. The receiving environment is described in terms of biophysical and socio-economic environmental factors, those which could potentially be directly or indirectly affected by the project, or which could themselves, affect the proposed project. This information was extracted from the various specialist studies undertaken during the Scoping phase for this EIA study as well as readily available information for the study area.

7.2 General Study Area

7.2.1 Administrative context

The proposed St Helena Community Wind Farm is located within the Saldanha Bay Local Municipality (SBLM) of the Western Cape Province, which is one of five constituent B-Municipalities that make up the West Coast District Municipality (WCDM). The administrative seat of the SBLM is in Vredenburg. The most significant settlements in the SBLM are Vredenburg, Saldanha, Langebaan, St Helena Bay and Hopefield (See Figure 7.1).

The SBLM consists of 12 wards. The proposed St Helena Community Wind Farm is located on the Langekilp 47 Farm, which is situated in Ward 11. This ward consists largely of rural land and a number of small coastal settlements. The closest towns to the site are St Helena Bay (7 km north west of the site), Vredenburg (12 km south of the site) and Saldanha Bay (22 km south of the site).

7.2.2 Socio-economic context

In 2004 the SBLM had the largest economy in the WCDM, accounting for 33.5% of the district's total regional gross domestic product (GDPR). The largest sectors were Manufacturing (29.5%), Transport & Communication (14.9%), Wholesale & Retail trade; Catering & Accommodation (14.7%), with a relatively smaller contribution from the Agriculture, Forestry & Fishing sector (11.9%). These sectors also represented about 70% of the SBLM's workforce in 2001.

The largest employer still remains Agriculture, Forestry and Fisheries which employ 23.6% of the workforce in the Saldanha area. Commercial agriculture also continues to be the dominant land use in the Saldanha Bay region, with the Koppiesveld and "Middel Swartland" (south-east of Hopefield) constituting the areas with the highest agricultural potential. Traditional cropping activities are dominated by wheat cultivation with sheep farming being the main livestock farmed, followed by beef and dairy cattle. However, due to low rainfall and limited water resources, the potential for intensive agricultural production is limited and the low carrying capacity of the natural veld also constitutes a limiting factor. Due to natural declines in fishing stocks and other factors, the importance of the fishing industry has also declined significantly.
over the past decade or so, with many of the processing factories running at significantly reduced capacity. For the above and other reasons, agriculture and coastal fisheries, which are traditionally the main drivers of the SBLM economy, are being replaced by manufacturing and tourism.

The manufacturing industry has seen extensive growth over the last decade, with large industrial sites having been located in the Saldanha area, many of which are in close proximity to the site. These sites house major facilities such as the Saldanha Steel Mill and Namakwa Sands Smelter, which are closely tied to the Saldanha harbour. During the 1970's, the harbour was expanded to accommodate the export of iron ore and manganese from the Northern Cape (Sishen). The harbour is linked to Sishen by means of a dedicated ore railway line, known as the Sishen-Saldanha line. The Saldanha harbour has been considerably expanded since then, and is currently the largest harbour on the west coast of the African continent. In addition, the harbour also handles the import of crude oil.

Tourism and the establishment of holiday homes are now also playing an increasingly important role in the local economies of the coastal towns in the area. According to the Draft SBLM Spatial Development Framework (SDF), 2010, the industry is well-established and is expected to grow by 50% over the next ten years. One of Saldanha Bay region’s key economic assets includes the region’s pristine coastline. Coastal settlements such as Langebaan, Saldanha, Jacobsbaai, Paternoster and St Helena Bay represent the key tourist destinations in the region and have also become important retirement and “lifestyle” resettlement destinations. The role of the tourism sector has also been enhanced by the region’s proximity to Cape Town and other large towns in the Boland region such as Stellenbosch, Paarl, and Wellington.

With regards to tourism flows in the region, it appears to enter and leave the Vredenburg Peninsula either via the MR 240 (for Paternoster), or via the MR 533 (for the St Helena Bay/Stompneus Bay area). The MR 533 is located approximately 500m to the north of the northern boundary of the site and intersects with the R 399 approximately 1.5 km to the east of the site. Although there are no designated scenic drives routed in the study area, the 2010 Draft SBLM SDF does recommend the establishment of a formal scenic drive network for the area.
Figure 7.1: Major roads and settlements within the Saldanha Bay Local Municipality
7.3 Biophysical Environment

7.3.1 Geology and soils

The area is underlain by granites of the Vredenburg pluton of the Cape Granite Suite which intrudes the basement rocks of the Precambrian age Malmesbury Group. The granites have ages estimated to be approximately 550 Ma.

On the proposed site, the granites form a distinctive topography of rolling hills with domes and pinnacles of granite outcroppings (Figure 7.2). Soils are also relatively thin particularly on the ridges where a coarse sandy hillwash layer overlies weathered rock. The thin soils and high sodicity can give rise to soil erosion problems particularly if over-grazed. There are examples of soil erosion and donga formation that can be observed along the access road to the site (Figure 7.3).

In general terms, the site is considered of very low sensitivity in terms of its geological environment. The ground is stable and there are no immediate or predictable geological hazards which may give rise to significant environmental impacts. There are also no geological features that have special scientific or historical significance.

Figure 7.2: Exposure of granite domes forming a low ridge

Figure 7.3: Extensive soil erosion in granite soils
7.3.2 Topography

The proposed site is situated on a coastal plain, which is a relatively flat region stretching from the sea to the inland mountains. The topography of this area is gently undulating, with no sharp or jagged landforms. The geology of the area from St. Helena in the north to Langebaan in the south is composed of Basement Granite, which gives the landscape its rolling topography. As stated in Section 7.3.1, there are numerous dome-shaped granite formations that form the tops of hills in the area. In some instances, granite domes form outcrops at the high points of these hills, while in other cases the granite remains buried. The granite geology is interspersed by more recent sand deposits, which generally give rise to a flatter landscape than the granite.

The highest point on the property is Stemmet’s Kop (240m above sea level), at which the test mast is located. There are few other high points in the region up to Langebaan. The highest point on the Postberg Peninsula west of the Langebaan Lagoon is 194 m above sea level, which makes Stemmet’s Kop the highest point in the study area.

7.3.3 Groundwater

The Cape Granites in the St Helena Bay area are best described as being poor quality regional aquifers. Groundwater yields are generally low and water quality can be moderately to highly saline with Total Dissolved Solids (TDS) of between 300-1000 mS/m. With a relatively low annual rainfall the groundwater resources of the study area are considered to be poor with limited opportunities for the drilling of successful abstraction wells.

7.3.4 Agricultural potential

The larger area in which the site is located has been farmed continuously for close to two centuries with wheat cultivation having traditionally been the dominant cropping activity. However, mixed farming operations are now typical in the study area, with sheep farming being the main livestock farmed, followed by beef and dairy cattle.

As stated in Section 7.2.2, commercial agriculture continues to be the dominant land use in the Saldanha Bay region but intensive agricultural production is limited due to low rainfall, limited water resources and the low carrying capacity of the natural veld. Dry-land cultivation is practised over the whole region whereas irrigation farming - table grapes and, to a lesser degree, deciduous fruit - is confined to the river valleys and the foothills of the mountains.

The soils in the area also tend to have a high sodium content which further limits its agricultural potential. They require extensive lime addition for growing crops and thus the bulk of the farms in this area are used for grazing sheep and cattle. The high percentage of old lands (lands left after the last harvest and not cultivated for some time) is also indicative of the economic instability of wheat farming. Because of thin soils and high sodicity the area it is also prone to soil erosion problems, particularly if over-grazed. This problem is also evident on the proposed site for the wind farm.

7.3.5 Vegetation and land cover

Vegetation may be described at various hierarchical levels from Biome, to broad Vegetation Type and down to Plant Community level associated with local habitat conditions.
The study area occurs within the Cape Floristic Region which is recognised as one of the principal centres of diversity and endemism in Africa (Figure 7.4). Moreover, it is one of the earth's 25 hotspots, i.e. geographical areas that contain the world’s greatest plant and animal diversity while also being subjected to high levels of pressure from development and/or degradation. The Cape Floristic Region is also the only hotspot that encompasses an entire Floristic Kingdom. This region has the greatest extratropical concentration of plant species in the world, with 9000 plant species, 6210 of which are endemics. Diversity and endemism are high at the generic and familial level as well, with five of South Africa’s 12 endemic plant families.

According to the most recent vegetation map produced of the country, the study area falls within one main vegetation type, Saldanha Granite Strandveld, which falls into the Fynbos Biome. Another vegetation type which also falls within the Biome, namely the Saldanha Flats Strandveld, occurs along the eastern boundary of the site. It is likely that the site could contain floristic elements derived from either of these vegetation types within remaining patches of natural vegetation.

Saldanha Granite Strandveld is found on granite domes on the West Coast from Vredenburg to St Helena Bay, in numerous patches along the coast. It has a restricted distribution and its original distribution was only 235 km². It is a low to medium height shrubland containing some succulent elements. This alternates with grassy and herb-rich spots that support a rich geophyte flora. This vegetation type constitutes most of the remaining natural areas within the site under assessment (Figure 7.5).

Saldanha Flats Strandveld occurs on the extensive coastal flats from St Helena Bay to Saldanha and Langebaan. It has a relatively restricted distribution and its original distribution was 760 km². It is a sclerophyllous shrubland consisting of a sparse emergent and moderately tall shrub layer with an open succulent shrub layer forming the undergrowth. The vegetation has conspicuous displays of geophytes and annual herbs in spring. This vegetation type occurs along the eastern boundary of the site (Figure 7.5) and there may be little remaining of it on site.

The vegetation types of South Africa have been categorised according to their conservation status which is, in turn, assessed according to the degree of transformation and rates of conservation. The status of a habitat or vegetation type is based on how much of its original area still remains intact relative to various thresholds. Both Saldanha Granite Strandveld and Saldanha Flats Strandveld is classified as Endangered, with only 10% and 11% conserved of a target of 24%.
A landcover map of the study area indicates that a significant proportion of the site consists of cultivation. An area in the centre of the site is indicated as natural (shrubland/low fynbos). The Surveyor General’s 1:50 000 topocadastral maps for the study area supports this observation and so does aerial imagery of the site. Based on these sources, it is probable that the study area has been impacted upon by cultivation and that any remaining vegetation is possibly not in pristine condition. There may, however, be areas that could potentially support unique populations of plants or animals, depending on their habitat requirements.
7.3.6 Faunal species of conservation importance

There are a number of species of conservation concern that are protected under the Western Cape Nature Conservation Laws Amendment Act of 2000 (Act 3 of 2000) and that have a geographical distribution that includes the study area. These species are listed in the tables below:

Table 7.1: Mammals of conservation importance within the broader study area

<table>
<thead>
<tr>
<th>Common name</th>
<th>Taxon</th>
<th>Status</th>
<th>Likelihood of occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant’s golden mole</td>
<td>Eremitalpa granti</td>
<td>VU</td>
<td>High, previously recorded in grid.</td>
</tr>
<tr>
<td>White-tailed rat</td>
<td>Mystromus albicaudatus</td>
<td>EN</td>
<td>Medium, previously recorded in nearby grid to the north, presence of suitable substrate unknown, but sandy soils probably present</td>
</tr>
<tr>
<td>Lesueur’s Wing-gland bat</td>
<td>Cistugo liiseuri</td>
<td>NT</td>
<td>Medium, not previously recorded in grid, but overall geographical distribution includes this area</td>
</tr>
<tr>
<td>Natal long-fingered bat</td>
<td>Miniopterus natalensis</td>
<td>NT</td>
<td>High, previously recorded in neighbouring grid</td>
</tr>
<tr>
<td>Cape horseshoe bat</td>
<td>Rhinolophus capensis</td>
<td>NT</td>
<td>High, previously recorded in neighbouring grid</td>
</tr>
</tbody>
</table>

Table 7.2: Amphibians of conservation importance within the broader study area

<table>
<thead>
<tr>
<th>Common name</th>
<th>Species</th>
<th>Status</th>
<th>Likelihood of occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cape Caco</td>
<td>Cacosternum capense</td>
<td>VU</td>
<td>High, previously recorded in grid and suitable habitat probably available on site.</td>
</tr>
</tbody>
</table>

Table 7.3: Reptiles of conservation importance within the broader study area

<table>
<thead>
<tr>
<th>Common name</th>
<th>Species</th>
<th>Status</th>
<th>Likelihood of occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cape sand snake</td>
<td>Psammophis leightoni leightoni</td>
<td>VU</td>
<td>High, within known distribution range, suitable habitat probably occurs on site.</td>
</tr>
<tr>
<td>Armadillo girdled lizard</td>
<td>Cordylus cataphractus</td>
<td>VU</td>
<td>Medium, on edge of known distribution range.</td>
</tr>
<tr>
<td>Namaqua plated lizard</td>
<td>Gerrhosaurus typicus</td>
<td>NT</td>
<td>High, overall geographical distribution includes this area; suitable habitat probably occurs on site</td>
</tr>
<tr>
<td>Southern speckled padloper</td>
<td>Homopus signatus cafer</td>
<td>NT</td>
<td>Low, just outside known distribution range. Small amount of suitable habitat may occur on site</td>
</tr>
<tr>
<td>Geometric tortoise</td>
<td>Psammobates geometricus</td>
<td>EN</td>
<td>Low, outside known distribution range.</td>
</tr>
<tr>
<td>Fisk’s house snake</td>
<td>Lamprophis fiskii</td>
<td>VU</td>
<td>Low, overall geographical distribution includes this area, but not recorded from area near site</td>
</tr>
<tr>
<td>Yellowbellied house snake</td>
<td>Lamprophis fuscus</td>
<td>NT</td>
<td>Low, not previously recorded in neighbouring grids, but within overall distribution range</td>
</tr>
<tr>
<td>Southern Adder</td>
<td>Bitis armata</td>
<td>Rare</td>
<td>High, site within distribution range</td>
</tr>
<tr>
<td>Gronovi’s dwarf burrowing skink</td>
<td>Scelotes gronovii</td>
<td>NT</td>
<td>High, within geographical distribution range, previously recorded nearby and suitable habitat may occur on site</td>
</tr>
<tr>
<td>Kasner’s dwarf burrowing skink</td>
<td>Scelotes kasneri</td>
<td>VU</td>
<td>Low, just outside geographical distribution range, suitable habitat unlikely to occur on site</td>
</tr>
</tbody>
</table>
Categories:

VU = Vulnerable
EN = Endangered
CR = Critically Endangered
NT = Near Threatened

Based on habitat requirements, there are a number of threatened or near threatened species that were considered to have a medium to high possibility of occurring on site or making use of habitats available on site. These are the following:

- White-tailed Rat (EN)
- Cape Caco (VU)
- Cape Sand Snake (VU)
- Armadillo Girdled Lizard (VU)
- Namaqua Plated Lizard (NT)
- Gronovi’s Dwarf Burrowing Skink (NT)

There were also a number of threatened or near threatened bat species that have a geographical distribution that includes the site and there is some possibility that they may be encountered on site, foraging, nesting or roosting. These include the following:

- Lesueur’s Wing-gland bat (NT)
- Natal long-fingered bat (NT)
- Cape horseshoe bat (NT)

The remaining species with a geographical range that includes the site were assessed as having a low chance of occurring in available habitats in the study area or the study site is at the margin of their distribution range.

7.3.7 Bird habitat in the study area

It is widely accepted that vegetation structure is more critical in determining bird habitat, than the actual plant species composition. The description of vegetation presented in this section therefore concentrates on factors relevant to the bird species present, and is not an exhaustive list of plant species present. The description of the natural vegetation types occurring in the study area makes extensive use of information presented by SABAP1. The criteria used by the SABAP1 authors to amalgamate botanically defined vegetation units, or to keep them separate were (1) the existence of clear differences in vegetation structure, likely to be relevant to birds, and (2) the results of published community studies on bird/vegetation associations.

From an avifaunal perspective, the natural strandveld vegetation in 3218CC is part of the Fynbos Biome. Fynbos has a very dense structure and is dominated by low shrubs. Despite having a high diversity of plant species, fynbos has a relatively low diversity of bird species. The only priority species that are closely associated with fynbos in the study area, is the Black Harrier *Circus maurus*. Other priority species that sometimes use this habitat are Secretarybirds *Sagittarius serpentarius* which are sometimes found in fynbos, while several raptor species e.g. Jackal Buzzard *Buteo rufofuscus*, Rock Kestrel *Falco tinnunculus* and Black Shouldered Kite *Elanus caeruleus* on occasion forage in this habitat.
Much of the fynbos in the Swartland has been transformed for agriculture. Whilst this obviously resulted in substantial natural habitat being destroyed, several species have in fact adapted well to this transformation. One such species, which is highly relevant to this study, is the Blue Crane *Anthropoides paradiseus*. This species has thrived on the grain lands and pastures in the southern and western Cape.

The following bird taxa that potentially might be affected by the proposed wind farm have been identified:

### Table 7.4: Priority species that could potentially occur on site

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Likelihood of occurrence</th>
<th>Habitat requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secretary bird</td>
<td><em>Sagittarius</em></td>
<td>NT, Ra</td>
<td>Confirmed</td>
<td>Grassland, old lands, open woodland. Most likely to be encountered in fynbos, pastures and old agricultural areas.</td>
</tr>
<tr>
<td>African Marsh-Harrier</td>
<td><em>Circus ranivorus</em></td>
<td>VU, Ra</td>
<td>Low</td>
<td>Large permanent wetlands with dense reed beds. Sometimes forages over smaller wetlands and grassland. Could be foraging at wetlands associated with dams in the study area.</td>
</tr>
<tr>
<td>Black Harrier</td>
<td><em>Circus maurus</em></td>
<td>NT, Ra</td>
<td>High</td>
<td>Highest expected densities in remnant patches of fynbos.</td>
</tr>
<tr>
<td>Peregrine Falcon</td>
<td><em>Falco peregrinus</em></td>
<td>NT, Ra</td>
<td>Medium</td>
<td>A wide range of habitats, but cliffs (or tall buildings) are a prerequisite for breeding. May hunt over old agricultural areas. Immature birds are most likely to be encountered foraging over farm land.</td>
</tr>
<tr>
<td>Lanner Falcon</td>
<td><em>Falco biarmicus</em></td>
<td>NT, Ra</td>
<td>High</td>
<td>Generally prefers open habitat, but exploits a wide range of habitats. May hunt over old agricultural areas.</td>
</tr>
<tr>
<td>Blue Crane</td>
<td><em>Anthropoides</em></td>
<td>VU, CS</td>
<td>Medium</td>
<td>Cereal crops, old lands, pastures, wetlands, dams and pans for roosting. Recorded in pastures, wheat fields and pans adjacent to the study area during the site visit.</td>
</tr>
<tr>
<td>Grey Heron</td>
<td><em>Ardea cinerea</em></td>
<td>AEWA</td>
<td>High</td>
<td>At the pan in the study site.</td>
</tr>
<tr>
<td>Black-headed Heron</td>
<td><em>Ardea melanocephala</em></td>
<td>AEWA</td>
<td>High</td>
<td>Generally prefers open habitat, but exploits a wide range of habitats. May hunt in old agricultural areas.</td>
</tr>
<tr>
<td>White Stork</td>
<td><em>Ciconia ciconia</em></td>
<td>AEWA</td>
<td>Low</td>
<td>Old agricultural lands and pans</td>
</tr>
<tr>
<td>African Sacred Ibis</td>
<td><em>Threskiornis</em></td>
<td>AEWA</td>
<td>Medium</td>
<td>Old agricultural lands and pans</td>
</tr>
<tr>
<td>African Spoonbill</td>
<td><em>Platalea alba</em></td>
<td>AEWA</td>
<td>Medium</td>
<td>At the pan in the study site.</td>
</tr>
<tr>
<td>Egyptian Goose</td>
<td><em>Alopochen aegyptiacus</em></td>
<td>AEWA</td>
<td>High</td>
<td>Old agricultural lands and pans</td>
</tr>
<tr>
<td>South African Shelduck</td>
<td><em>Tadorna cana</em></td>
<td>AEWA</td>
<td>Medium</td>
<td>At the pan in the study site.</td>
</tr>
<tr>
<td>Spur-winged Goose</td>
<td><em>Plectropterus</em></td>
<td>AEWA</td>
<td>Medium</td>
<td>Old agricultural lands and pans</td>
</tr>
<tr>
<td>Kittlitz's Plover</td>
<td><em>Charadrius</em></td>
<td>AEWA</td>
<td>Medium</td>
<td>Margins of water bodies.</td>
</tr>
<tr>
<td>Crowned Lapwing</td>
<td><em>Vanellus coronatus</em></td>
<td>AEWA</td>
<td>High</td>
<td>Bare lands and around homesteads</td>
</tr>
<tr>
<td>Three-banded Plover</td>
<td><em>Charadrius</em></td>
<td>AEWA</td>
<td>Medium</td>
<td>At the pan in the study site.</td>
</tr>
<tr>
<td>Species</td>
<td>Scientific Name</td>
<td>Conservation Status</td>
<td>Habitat</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------</td>
<td>---------------------</td>
<td>----------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Black Shouldered Kite</td>
<td><em>Elanus caeruleus</em></td>
<td>Ra, High</td>
<td>Fynbos and agricultural areas.</td>
<td></td>
</tr>
<tr>
<td>Booted Eagle</td>
<td><em>Aquila pennatus</em></td>
<td>Ra, Medium</td>
<td>Wide variety of habitats. Ridges important for slope soaring.</td>
<td></td>
</tr>
<tr>
<td>Steppe Buzzard</td>
<td><em>Buteo vulpinus</em></td>
<td>Ra, Confirmed</td>
<td>Agricultural areas and fynbos. Ridges important for slope soaring.</td>
<td></td>
</tr>
<tr>
<td>Jackal Buzzard</td>
<td><em>Buteo rufotuscus</em></td>
<td>Ra, Confirmed</td>
<td>Wide variety of habitats. Ridges important for slope soaring.</td>
<td></td>
</tr>
<tr>
<td>Black Sparrowhawk</td>
<td><em>Accipiter melanoleucus</em></td>
<td>Ra, Low</td>
<td>Alien plantations.</td>
<td></td>
</tr>
<tr>
<td>African Harrier-Hawk</td>
<td><em>Polyboroides typus</em></td>
<td>Ra, Low</td>
<td>Alien plantations and in natural vegetation along drainage lines.</td>
<td></td>
</tr>
<tr>
<td>Rock Kestrel</td>
<td><em>Falco rupicolus</em></td>
<td>Ra, Confirmed</td>
<td>Agricultural areas and fynbos. Ridges important for slope soaring.</td>
<td></td>
</tr>
<tr>
<td>Spotted Eagle-Owl</td>
<td><em>Bubo africanus</em></td>
<td>Ra, High</td>
<td>Wide range of habitats, but mostly in fynbos and in alien stands of trees.</td>
<td></td>
</tr>
<tr>
<td>Martial Eagle</td>
<td><em>Polemaetus bellicosus</em></td>
<td>Vu, Ra, Low</td>
<td>Agricultural areas and fynbos. Ridges important for slope soaring.</td>
<td></td>
</tr>
<tr>
<td>Yellow-billed Kite</td>
<td><em>Milvus aegyptius</em></td>
<td>Ra, Confirmed</td>
<td>Agricultural areas and fynbos. Ridges important for slope soaring.</td>
<td></td>
</tr>
<tr>
<td>Barn Owl</td>
<td><em>Tyto alba</em></td>
<td>Ra, Medium</td>
<td>Most likely to be encountered around homesteads and farm buildings.</td>
<td></td>
</tr>
</tbody>
</table>

The following abbreviations and acronyms are used to indicate conservation significance:

- **VU** = Nationally vulnerable (Barnes 2000)
- **NT** = Nationally near threatened (Barnes 2000)
- **AEWA** = Listed in Annexure 2 of the African-Eurasian Waterbird Agreement
- **Ra** = Raptor
- **SS** = Special regional significance
- **CS** = Cultural significance
7.4 Social and Cultural Environment

7.4.1 Baseline demographic processes

The data presented below is based on data from the last Census count (Census 2001). Census 2001 included the population of Laingville under that of St Helena Bay. St Helena Bay also includes Stompneusbaai village and other residential developments around Sandy Point harbour. Rural populations have been subsumed under urban place names. No disaggregated data is currently available.

Population

According to Census 2001 data, the total population of St Helena Bay (thus defined) was 7,881 and Vredenburg 27,085. More recent data could not be sourced, but it is assumed that the relevant populations would be somewhat higher at present (2010), as a result of, amongst others, growth of retirement/residential land uses in the area, as well as economically motivated in-migration (St Helena Bay and Vredenburg).

<table>
<thead>
<tr>
<th>Population Group</th>
<th>St Helena Bay</th>
<th>Vredenburg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>Black African</td>
<td>1,995</td>
<td>25</td>
</tr>
<tr>
<td>Coloured</td>
<td>5,250</td>
<td>67</td>
</tr>
<tr>
<td>Indian or Asian</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>White</td>
<td>633</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>7,881</td>
<td>100</td>
</tr>
</tbody>
</table>

As indicated in Table 7.5, the Coloured population group represent the dominant population group in the area. Of interest is the major presence of the Black group (25% in St Helena Bay; 17.5% in Vredenburg) in what is or was a traditionally Coloured and White region. The presence of the Black group is largely linked to economically-motivated in-migration, mainly since the 1990’s. In this regard the construction of the Saldanha Steel Mill in the early 1990’s resulted in a marked increase in in-migration of job seekers to the region.

The SBLM is one of a few local municipal areas in the WCDM where African in-migration rates were estimated to outstrip those of the Coloured group in 2006 (Provincial Treasury, 2006).

Education levels

As indicated in Table 7.6, approximately 23% and 22% of the population aged 20 and older for St Helena Bay and Vredenburg respectively, were estimated to be functionally illiterate/innumerate in 2001. Given the strong correlation between education and skills levels, it may be assumed that a significant portion of the study area’s working age population have only sufficient skills for elementary, low skilled jobs.
Table 7.6: Education levels for the study area (population 20 and older)

<table>
<thead>
<tr>
<th>Description</th>
<th>St Helena Bay %</th>
<th>Vredenburg %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No schooling</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Some primary</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>[% functional illiteracy/ innumeracy]</td>
<td>[23]</td>
<td>[22]</td>
</tr>
<tr>
<td>Complete primary</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Some secondary</td>
<td>43</td>
<td>40</td>
</tr>
<tr>
<td>Std 10/Grade 12</td>
<td>15</td>
<td>22</td>
</tr>
<tr>
<td>Higher</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

Employment levels

The employment statistics presented in Table 7.7 indicate that in 2001 67% of the population of St Helena Bay and 49% of Vredenburg were employed. Only Vredenburg had a significant unemployment rate, viz. 19%, which was 2% higher than the provincial average in 2001. As a result of the declining fortunes of the West Coast fishing industry, the current unemployment rates in St Helena Bay are likely to be significantly higher. With regard to St Helena Bay and Vredenburg, this may have been further compounded by continued economically motivated in-migration from other parts of the province and other provinces since the Census was conducted.

Table 7.7: Study area communities employment levels (15 – 64 age group)

<table>
<thead>
<tr>
<th>Description</th>
<th>St Helena Bay %</th>
<th>Vredenburg %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed¹</td>
<td>67</td>
<td>49</td>
</tr>
<tr>
<td>Unemployed</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Not Economically Active²</td>
<td>27</td>
<td>32</td>
</tr>
</tbody>
</table>

Household income

Census data for 2001 presented in Table 7.8 indicates that a significant portion of households in St Helena Bay (40%) and Vredenburg (40%) were living below the R1 600/month minimum subsistence level in 2001.

Table 7.8: Study area community’s income (by head of household)

<table>
<thead>
<tr>
<th>Income per month</th>
<th>St Helena Bay %</th>
<th>Vredenburg %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No formal income</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>R 1 – R 400</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>R 401 – R 800</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>R 801 – R 1 600</td>
<td>22</td>
<td>15</td>
</tr>
<tr>
<td>[% households below minimum subsistence level]</td>
<td>[40]</td>
<td>[40]</td>
</tr>
</tbody>
</table>

¹ In the South African context, having obtained a primary qualification (i.e. having successfully passed Grade 7) is generally held as the absolute minimum requirement for functional literacy/ numeracy. The National Department of Education’s ABET (Adult Basic Education and Training) programme provides education and training up to the equivalent of Grade 9. In this more onerous definition, Grade 9 is required as the minimum qualification for having obtained a basic education (www.abet.co.za).

² Census 2001 official definition of an unemployed person: ”A person between the ages of 15 and 65 with responses as follows: 'No, did not have work'; 'Could not find work'; 'Have taken active steps to find employment'; 'Could start within one week, if offered work'.” (www.statssa.gov.za).

³ The term "not economically active" refers to people of working age not actively participating in the economy, such as early retirees, students, the disabled and home-makers.
7.4.2 Heritage resources

The primary heritage resources that represent the issues that will need to receive detailed attention during the EIA phase are determined to be as follows:

- Pre-colonial archaeology (Stone Age as well as possible pre-colonial farming sites);
- Colonial period archaeology, including farm houses, historic roads, places, graveyards, tree lines;
- The cultural landscape – in particular the ability of the landscape to accommodate the wind turbines in terms of the heritage values and scenic qualities of the area.

Pre-colonial archaeology

The West Coast of South Africa has been settled for at least 100 000 years. There are shell middens dating to the Middle Stone Age (MSA) both north and south of the Vredenburg peninsula. Associated with these middens are MSA stone tools and a single clearly modern human tooth from Sea Harvest. All these sites are clearly older than 50 000 years. Hunter-gatherers living on the west coast of South Africa during the latter part of the Holocene made seasonal use of the coastal resources. Archaeological excavations at sites such as Duyker Eiland on the coast at Britannia Bay (Robertshaw 1979) confirm the importance of shellfish such as mussel and limpet. In addition, the excavations of numerous sites on the Vredenburg peninsula have shown that prehistoric groups also utilized resources such as seals, marine birds, crayfish and beached whales. We know this peninsula was particularly attractive to hunter-gatherer, and later pastoralist groups because of its wealth of marine and terrestrial resources. Archaeologists have postulated that the first pastoralist groups (with cattle, sheep and pottery) entered South Africa along the West Coast some 2000 years ago.

Colonial period heritage

No historical archaeological research has been conducted on the Vredenburg Peninsula and Phase 1 Archaeological Impact Assessments very rarely discuss historical remains relating to the colonial period or the built environment.

Early travellers reported that large numbers of cattle and sheep were being pastured around St Helena Bay on the Vredenburg peninsula by the 17th century. Historic accounts confirms a Khoekhoe group occupied the area around St Helena Bay during the 17th century, with the Cochoquas or Saldanhars further to the west around Saldanha Bay. The Saldanha Bay area was also the focus of intense competition between French and Dutch interests during the 17th and 18th centuries, with a number of military outposts established in the area to provide protection for fishing and sealing interests. One such post was established at St Helena Bay in 1734. There are no exact positions given for the post, but a post was established at Soldantenpost, which is located immediately to the north of the study area. A map (Figure 7.6) by Frederici, dated 1788, shows an approximate location for the outpost.
but the map is very inaccurate and it is impossible to be exact. The map also indicates the approximate location of the Patrysenberg farmstead to the east of the Patrysberg.

**Figure 7.6**: Map of the outpost at St Helena Bay dating to 1788 (in Sleigh 1993), with the position of the Soldantenpost outlined in red and the Patrysberg homestead in green (Frederici, J Map M1/955, Cape Archives). Note the spine of the Patrysberg runs almost directly north-south along the eastern section of the Vredenburg peninsula.

The farm Patrysenberg features prominently in all these early records of European settlement on the Vredenburg Peninsula. Subsequently, the farm was subdivided into a number of smaller farms, one of them becoming Lange Klip 47. The Surveyor General diagram (**Figure 7.7**) shows that this subdivision took place in 1882.
Cultural landscape and sense of place

The cultural landscape associated with the study area comprises the granite mountain range of Patrysberg. These granitic outcrops are very typical of the Vredenburg peninsula. They are often covered in indigenous vegetation and rise above the surrounding wheat fields, forming important geographic landmarks. It is possible that the proposed wind farm will be visible from the town of Vredenburg as well as from the R399 which connects Vredenburg with Veldrif. This visual impact of the proposed project will be addressed further through the visual impact assessment.

Perusal of international literature indicates that visual impact and changes to sense of place or setting are among the most contentious issues that the wind energy industry has had to face in terms of finding social acceptability within a given community. Various nations in the developed world have developed best practice guidelines to deal with the kinds of complex impacts that wind energy facilities can have on the heritage and landscape qualities of an area. In Europe there is a trend towards discouragement of large “wind parks” due to the visual impact they have on landscape. South African landscapes are very different and will have different capacities in terms of their “aesthetic absorption” ability. As yet South Africa does not have well developed guidelines or the benefit of experience within our own landscapes, which is an issue that needs to be addressed and workshopped at the level of the South African Heritage Resources Agency (SAHRA). The proliferation of wind energy facilities in South Africa in the absence of heritage guidelines or policy is a cause for concern in terms of accumulative impacts. Wind energy facilities which require vast amounts of landscape threaten significant impacts in terms of potential loss of iconic vistas, and landscape character change, especially in the Cape...
Province where the identity of the region is strongly linked to its spectacular landscape character.

7.4.3 Noise climate

The proposed wind farm is located between Vredenburg and Laingville in St Helena Bay, Western Cape (Figure 7.8). The project site is surrounded by farm lands, with the closest community being Laingville, approximately 3 km away. Potentially noise-sensitive receptors around the proposed site include communities and local dwellings in:

- Laingville;
- West Point;
- Brandhuis;
- St Helena Bay;
- Vredenburg; and
- Farm houses around the wind farm site.

Figure 7.8: Location of St Helena Community Wind Farm Site relative to adjacent towns

The proposed wind farm site is situated in a rural area, where little vehicular traffic is
anticipated along the local road network. The Velddrift Road (R399) and the St Helena Main Road are close to the site and, together with human activities, are expected to dominate the local noise environment. Based on the South African Bureau of Standards (SABS) 10103 of 2008, the guidelines for typical outdoor noise levels of a rural area are 45 dB(A) during the day and 35 dB(A) at night. The ambient noise levels in relevant noise-sensitive areas will be determined via noise measurements during the EIA phase.
8. POTENTIAL ISSUES AND IMPACTS

8.1 Introduction

This proposed project will be registered with the Nations Framework Convention for Climate Change (UNFCCC) as part of the Clean Development Mechanisms (CDM) Programme. Just Energy considers this project as a 'green' initiative and have decided to, where possible, commit to making environmentally favourable decisions in respect of the project as a whole.

The potential issues and impacts associated with this project were identified and described by the various biophysical environmental and socio-economic environmental specialists. The findings of these various studies are set out below. The identified potential issues will be investigated in detail within the impact assessment phase of the project with respect to the alternatives discussed in Chapter 4.

8.2 Biophysical Environment

8.2.1 Flora and Fauna Assessment

The following information was obtained from the Ecological Specialist Study included in Appendix H

Potential issues relevant to potential impacts on the fauna and flora of the study area include the following:

- Impacts on biodiversity: this includes any impacts on populations of individual species of concern.
- Impacts on sensitive habitats: this includes impacts on any habitats that are important for threatened fauna.
- Impacts on ecosystem function: this includes impacts on any processes or factors that maintain ecosystem health and character, including the following:
  - disruption to nutrient-flow dynamics;
  - impedance of movement of material or water;
  - habitat fragmentation;
  - changes to abiotic environmental conditions;
  - changes to disturbance regimes, e.g. increased or decreased incidence of fire;
  - changes to successional processes;
  - effects on pollinators; and
  - increased invasion by alien plants.

Changes to factors such as these may lead to a reduction in the resilience of habitats and ecosystems or loss or change in ecosystem function.

- Secondary and cumulative impacts on fauna: this includes an assessment of the impacts of the proposed project taken in combination with the impacts of other
known projects for the area or secondary impacts that may arise from changes in
the social, economic or ecological environment.

A number of direct risks to ecosystems would result from construction of the proposed
wind farm, as follows:

- Habitat fragmentation;
- Clearing of land for construction;
- Construction of internal access roads;
- Placement of underground cables linking turbines;
- Establishment of borrow and spoil areas;
- Chemical contamination of the soil by construction vehicles and machinery;
- Operation of construction camps; and
- Storage of materials required for construction.

There are also risks associated with operation of the proposed wind farm, as follows:

- Collisions with flying animals (primarily birds and bats). This may have local
  impacts on populations as well as cumulative effects on species over wider areas.
- Maintenance of surrounding vegetation as part of management of the wind farm,
  including the use of fire.

Major potential impacts are described briefly below. These are compiled from a generic
list of possible impacts derived from previous projects of this nature and from a
literature review of the potential impacts of wind energy facilities on the ecological
environment. There are two major ways that wind-energy development may influence
ecosystem structure and functioning—through direct impacts on individual organisms
and through impacts on habitat structure and functioning. The most important potential
negative ecological impacts of a wind farm are related to bird and bat mortality and loss
of habitat. Impacts on birds are covered separately in the avifaunal assessment. For
the preliminary assessments below, it is assumed that impacts will definitely occur. The
infrastructure layout is, however, unknown at this stage and some impacts may not
occur.

**Impact 1: Loss of habitat for threatened fauna**

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. Construction of pylons, access roads, electricity cables and
other infrastructure associated with the wind farm will lead to direct loss of habitat.
There are some small patches of natural habitat remaining on site. The condition of this
is unknown. This vegetation potentially provides habitat for a number of threatened or
near threatened species (threatened species include those classified as critically
endangered, endangered or vulnerable), including the White-tailed Rat (EN), the Cape
Caco (VU), the Cape Sand Snake (VU), the Armadillo Girdled Lizard (VU), the
Namaqua Plated Lizard (NT) and Gronovi’s Dwarf Burrowing Skink (NT). The potential
value of this natural habitat for these species of conservation concern is affected by the
particular requirements of each species and the availability of habitat on site.

For any other species a loss of individuals or localized populations is unlikely to lead to
a change in the conservation status of the species. However, in the case of threatened
animal species, loss of a population or individuals could lead to a direct change in the
conservation status of the species. The value of the site for each of these species can


only be evaluated once the site has been evaluated during field work. Consequences may include:

- fragmentation of populations of affected species;
- reduction in area of occupancy of affected species; and
- loss of genetic variation within affected species.

These may all lead to a negative change in conservation status of the affected species which implies a reduction in the chances of the species overall survival chances.

**Extent:** The impact will occur at the site of the proposed wind farm, specifically at the scale of the infrastructure within the site. At its greatest extent this may affect the entire site, but is likely to only affect a smaller proportion of the site. The potential impact may differ from one species to another, but could affect regional processes within species populations.

**Potential Significance:** The suitability of the site for these species can only be assessed by assessing the habitat on site. This will provide an indication of the probability of this impact occurring for different species. However, due to the threatened status of the species concerned, the possible permanent duration of the impact and the potentially regional effect of the impact, the impact is most likely to be of moderate significance.

**Impact 2: Collisions of bats with infrastructure**

Bird and bat deaths are one of the most controversial biological issues related to wind turbines. The deaths of birds and bats at wind farm sites have raised concerns by conservation agencies internationally. In order to address this issue in South Africa, the Endangered Wildlife Trust (EWT) and Bird Life South Africa (BLSA) have combined efforts to lobby for the appropriate consideration of the potential negative effects of wind energy production.

Bats have been found to be particularly vulnerable to being killed by wind turbines. It has long been a mystery why they should be so badly affected since bat echo-location allows them to detect moving objects very well. A recent study in America has found that the 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 the bat's lungs. 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.

The most vulnerable species are those that are already classified as threatened species, including those classified as critically endangered, endangered or vulnerable. For any other species a loss of individuals or localized populations is unlikely to lead to a change in the conservation status of the species unless the impact occurs across a wide area that co-incides with their overall distribution range. Loss of a population or individuals could lead to a direct change in the conservation status of the species. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations or the habitat that they depend on. Consequences may include:

- fragmentation of populations of affected species;
- reduction in area of occupancy of affected species; and
- loss of genetic variation within affected species.

These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species overall survival chances.

It has been evaluated that there are three near threatened bat species that could potentially be affected by the proposed wind farm. These are Lesueur’s Wing-gland bat (NT), Natal long-fingered bat (NT) and the Cape horseshoe bat (NT).

**Extent:** The impact will occur at the site of the proposed wind farm, but will have an impact at a more regional level, since it affects entire populations of affected species and may affect migration routes of species.

**Potential Significance:** The suitability of the site for these species can only be assessed by assessing the habitat on site. This will provide an indication of the probability of this impact occurring for different species. Due to the near threatened status of the species concerned, which will potentially result in impacts of moderate magnitude (may result in population processes continuing in a modified way), the possible long-term duration of the impact and the potentially regional effect of the impact, the impact is most likely to be of moderate to high significance.

**Impact 3: 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, but are also affected by overall loss of habitat.

Threatened species include those classified as critically endangered, endangered or vulnerable. For any other species a loss of individuals or localized populations is unlikely to lead to a change in the conservation status of the species. However, in the case of threatened plant species, loss of a population or individuals could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations. Consequences may include:

- fragmentation of populations of affected species;
- reduction in area of occupancy of affected species; and
- loss of genetic variation within affected species.

These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species overall survival chances.

There are 52 Red List plant species that have a geographic distribution that includes the site and which have a chance of occurring in the study area. This includes three species listed as Critically Endangered (CR), sixteen as Endangered (EN), sixteen as Vulnerable (VU) and seventeen as Near Threatened (NT). This is an exceptionally high number of threatened species, even by Fynbos Biome standards. There is therefore a very high likelihood of more than one threatened plant species occurring on site or being dependant on natural habitats on site remaining in a natural state.

**Extent:** The impact will occur at the site of the proposed St Helena Wind Farm, but will have an impact at a global level, since it potentially affects the global status of affected
species. For plant populations, the location of infrastructure is critical - infrastructure placed in the wrong position could destroy sensitive populations.

**Potential Significance:** The suitability of the site for these species can only be assessed by assessing the habitat on site. This will provide an indication of the probability of this impact occurring for different species. The initial assessment is that there is a very high probability of impacts occurring if infrastructure is planned to be placed within remaining natural habitat. Due to the threatened status of the species concerned, which will potentially result in impacts of very high magnitude (may result in population processes being altered to the extent that they temporarily or permanently cease), the possible permanent duration of the impact and the potentially global effect of the impact, the impact is most likely to be of high significance (for any infrastructure placed within remaining natural areas).

**Impact 4: Impacts on protected tree species**

There are a number of tree species that are protected according to Government Notice no. 1012 under section 12(I)(d) of the National Forests Act, 1998 (Act No. 84 of 1998). In terms of section 15(1) of the National Forests Act, 1998 “no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated”.

One species has a geographic distribution that includes the study area and may occur on site: *Sideroxylon inerme* subsp. *inerme* (white milkwood). It may occur within thicket in drainage lines on site.

**Extent:** The impact will occur at the site of the proposed wind farm. It may affect single individuals of the protected species.

**Potential Significance:** One protected tree species was assessed as possibly occurring on site. If this species occurs on site, it is likely to only be a small number of individuals. The possible presence of these species on site can only be assessed by assessing the habitat on site. This will provide an indication of the probability of this impact occurring. If protected trees are affected by the project, the impact is likely to be of moderate magnitude (may result in population processes continuing in a modified way), of permanent duration and the impact could potentially have an effect on a scale of site and surroundings. The impact is therefore likely to be of moderate to high significance. A permit would need to be obtained for any protected trees that are affected, so a legal obligation remains irrespective of the significance of the impact. Knowledge of the location of any protected trees could assist in planning the location of infrastructure to avoid the impact.

**Impact 5: 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 fynbos vegetation. Where this vegetation has already been stressed due to degradation and transformation at a regional level, the loss may lead to increased vulnerability (susceptibility to future damage) of the habitat. Consequences of the impact occurring may include:
- negative change in conservation status of habitat;
- increased vulnerability of remaining portions to future disturbance;
- general loss of habitat for sensitive species;
- loss in variation within sensitive habitats due to loss of portions of it;
- general reduction in biodiversity;
- increased fragmentation (depending on location of impact);
- disturbance to processes maintaining biodiversity and ecosystem goods and services; and
- loss of ecosystem goods and services.

It has been established that most of the site falls within a vegetation type classified as Endangered (listed in scientific literature and on Draft Ecosystem List as Endangered). All remaining natural habitat on site falls within this vegetation type.

The site falls within the Cape Floristic Region and also affects areas classified as important corridors or habitats in the Saldanha Bay Municipality Critical Biodiversity Areas (CBAs) map.

**Extent:** The impact will occur at the site of the proposed wind farm, but will have an impact at a more regional level, since it potentially affects areas classified regionally as having high conservation value (Cape Floristic Region, Endangered vegetation type and a Critical Biodiversity Area). The construction of wind turbines and associated infrastructure could potentially affect a significant proportion of natural vegetation on site.

**Potential Significance:** The proportion of the site containing vegetation in a moderate to good condition needs to be established before this impact can be properly assessed. A proper assessment also requires a plan of the exact position of all proposed infrastructure. Due to the fact that remaining patches of natural vegetation fall within a vegetation type classified as Endangered, the potential magnitude of this impact could potentially be high at a local (site) and regional scale. Impacts will be of permanent duration. The impact is therefore likely to be of high significance.

**Impact 6: Impacts on wetlands**

Construction may lead to some direct or indirect loss of or damage to seasonal 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 (susceptibility to future damage) of the habitat. Physical alteration to wetlands can have an impact on the functioning of those wetlands. Consequences may include:

- increased loss of soil;
- loss of or disturbance to indigenous wetland vegetation;
- loss of sensitive wetland habitats;
- loss or disturbance to individuals of rare, endangered, endemic and/or protected species that occur in wetlands;
- fragmentation of sensitive habitats;
- impairment of wetland function;
- change in channel morphology in downstream wetlands, potentially leading to further loss of wetland vegetation; and
- reduction in water quality in wetlands downstream of road.

The site contains a number of drainage lines in which wetlands occur, one of which is identified in the Saldanha Bay Municipality CBAs map as being of significant importance.

**Extent:** The impact will occur at the site of the proposed wind farm, but could have downstream impacts. The extent of the potential impact is therefore on the site and surroundings.

**Potential Significance:** The potential magnitude of this impact could potentially be moderate due to the sensitivity of wetlands to disturbance - impacts on wetlands may result in processes continuing but in a modified way. Impacts are likely to be long-term to permanent. The potential significance of this impact is therefore likely to be high. An understanding of the location of wetlands could ensure that mitigation measures could be put in place to avoid or reduce the potential impact to a low significance. There is also a legal obligation to apply for a Water Use Licence for any wetlands that may be affected, since they are classified in the National Water Act as a water resource.

**Impact 7: Change in runoff and drainage patterns**

Infrastructure and roads crossing landscapes cause local hydrological and erosion effects resulting in major peak-flow and sediment impacts. This may occur around construction sites, but also in areas where the infiltration rates of the landscape are changed due to an impermeable surface being constructed. Increased runoff associated with infrastructure may increase the rates and extent of erosion, reduce percolation and aquifer recharge rates, alter channel morphology and increase stream discharge rates. Consequences may include:

- increased loss of soil;
- loss of or disturbance to indigenous vegetation, especially in wetlands;
- loss of sensitive habitats, especially in wetlands;
- loss or disturbance to individuals of rare, endangered, endemic and/or protected species;
- fragmentation of sensitive habitats;
- impairment of wetland function;
- change in channel morphology in downstream wetlands, potentially leading to loss of wetland vegetation; and
- reduction in water quality in wetlands downstream of road.

There are both steep slopes and wetlands potentially occurring on site and wetlands occurring downstream.

**Extent:** The impact will occur at the site of the proposed wind farm, but may also affect downstream and down-slope areas. The potential impact may therefore occur at a scale of the site and surrounding areas.

**Potential Significance:** The potential significance of this impact depends almost entirely on ecological processes and patterns that may be affected, should this impact take place. The substrate on site is probably a combination of shallow soil over rock in some places and sandy substrates in others, which could potentially erode very easily. Severe soil erosion could cause ecological and hydrological processes to continue, but in a modified way, which is defined as an impact of moderate magnitude. This
alteration is likely to be of permanent duration. The impact is therefore likely to be of moderate to high significance, depending on the planned location of infrastructure.

**Impact 8: Establishment and spread of declared weeds and alien invader plants**

Major factors contributing to invasion by alien invader plants includes high disturbance. Exotic species are often more prominent near infrastructural disturbances than further away. Consequences of this may include:

- loss of indigenous vegetation;
- change in vegetation structure leading to change in various habitat characteristics;
- change in plant species composition;
- change in soil chemical properties;
- loss of sensitive habitats;
- loss or disturbance to individuals of rare, endangered, endemic and/or protected species;
- fragmentation of sensitive habitats;
- change in flammability of vegetation, depending on alien species;
- hydrological impacts due to increased transpiration and runoff; and
- impairment of wetland function.

It is not known what alien plants currently occur on site. A checklist of species previously recorded in the grid in which the site is located and botanical knowledge of the area indicates that the following woody species are likely to invade the site, given the right conditions: *Acacia cyclops* and *Acacia mearnsii*. The potential exists for extensive invasion of the site. The habitats most likely to be affected are watercourses and any natural vegetation adjacent to existing disturbance.

**Extent:** The impact will occur at the site of the proposed wind farm, but could potentially spread extensively into the surrounding landscape, depending on the habitat and the alien species that could potentially invade the site. The impact will therefore be evaluated at a scale of site and surroundings or regional.

**Potential Significance:** There is a moderate likelihood that alien species will spread on site in the absence of control measures. It is likely to be a long-term impact with potentially high magnitude of impact on local ecosystems. The impact is therefore likely to be of moderate to high significance. Standard control measures, if put in place, would adequately control this impact and reduce the significance to low.

**Impact 9: Increased risk of veld fires**

During construction there is a higher risk of veld fires around construction sites due to the use of fires for cooking and warmth by construction workers. During operation, various factors may lead to fire within the vegetation surrounding the infrastructure. Impacts that may arise from this may include:

- Damage to sensitive habitats, especially damage to strandveld vegetation;
- Damage to populations of sensitive plant species;
- Loss of vegetation biomass; and
- Increased soil erosion due to loss of vegetation cover.

The site is within an area of strandveld that is partially in a natural state. This is an area that does not experience high frequencies of natural fires. Fire in strandveld along the
West Coast hardly ever occurs due to low fuel loads. It can, however, be important for maintaining vegetation mosaics. It is important that the fire frequency is not significantly elevated or that uniform burns do not reduce ecosystem diversity otherwise it may lead to negative impacts on species and ecosystems. It is possible that increased fire frequencies would occur as a result of the construction or operation of the infrastructure.

**Extent:** The impact will occur at the site of the proposed wind farm and possibly surrounding areas, if fires spread.

**Potential Significance:** The magnitude of the impact could be medium due to the potential to disrupt natural processes. The impact could affect ecological processes in the long-term. There is a distinct possibility that the impact could occur. The potential significance of this impact is therefore likely to be medium.

### 8.2.2 Avifauna

The following information was obtained from the Avifauna Specialist Study included in Appendix I.

The impacts of a wind farm on birds are highly variable and depend on a wide range of factors including the specification of the development, the topography of the surrounding land, the habitats affected and the number and species of birds present. With so many variables involved, the impacts of each wind farm must be assessed individually. The principal areas of concern with regard to effects on birds are listed below. Each of these potential effects can interact with each other, either increasing the overall impact on birds or, in some cases, reducing a particular impact (for example where habitat loss or displacement causes a reduction in birds using an area which might then reduce the risk of collision).

- Collision mortality on the wind turbines;
- Collision with the proposed power line;
- Displacement due to disturbance; and
- Displacement caused by habitat transformation.

It is important to note that the assessment is made on the status quo as it is currently on site. The possible change in land use in the area where the wind farm is situated is not taken into account because the extent and nature of future developments are unknown at this stage. It is however highly unlikely that the land use will change in the foreseeable future.

The potential impacts are described in greater detail below:

**Impact 1: Collision mortality on wind turbines**

Internationally, it is widely accepted that bird mortalities from collisions with wind turbines contribute a relatively small proportion of the total mortality from all causes. The US National Wind Coordinating Committee (NWCC) conducted a comparison of wind farm bird mortality with that caused by other man-made structures in the USA. The NWCC did not conduct its own study, but analyzed all of the research done to date on various causes of avian mortality, including commercial wind farm turbines. It reports that "data collected outside California indicate an average of 1.83 avian fatalities per turbine (for all species combined), and 0.006 raptor fatalities per turbine per year. Based on current projections of 3,500 operational wind turbines in the US by
the end of 2001, excluding California, the total annual mortality was estimated at approximately 6,400 bird fatalities per year for all species combined”.

The NWCC report states that its intent is to "put avian mortality associated with windpower development into perspective with other significant sources of avian collision mortality across the United States”. It further reports that: "Based on current estimates, windplant related avian collision fatalities probably represent from 0.01% to 0.02% (i.e. 1 out of every 5,000 to 10,000) of the annual avian collision fatalities in the United States”. That is, commercial wind turbines cause the direct deaths of only 0.01% to 0.02% of all of the birds killed by collisions with man-made structures and activities in the USA.

Also in the USA, a Western EcoSystems Technology Inc. study found a range of between 100 million to 1 billion bird fatalities due to collisions with artificial structures such as vehicles, buildings and windows, power lines and communication towers, in comparison to 33,000 fatalities attributed to wind turbines. The study reports that “windplant-related avian collision fatalities probably represent from 0.01% to 0.02% (i.e. one out of every 5,000 to 10,000 avian fatalities) of the annual avian collision fatalities in the United States, while some may perceive this level of mortality as small, all efforts to reduce avian mortality are important”. A Finnish study reported 10 bird fatalities from turbines, and 820,000 birds killed annually from colliding with other structures such as buildings, electricity pylons and lines, telephone and television masts, lighthouses and floodlights.

The majority of studies on collisions caused by wind turbines have recorded relatively low mortality levels. This is perhaps largely a reflection of the fact that many of the studied wind farms are located away from large concentrations of birds. It is also important to note that many records are based only on finding corpses, with no correction for corpses that are overlooked or removed by scavengers.

Relatively high collision mortality rates have been recorded at several large, poorly sited wind farms in areas where large concentrations of birds are present (including Important Bird Areas (IBAs)), especially among migrating birds, large raptors or other large soaring species, e.g. in the Altamont Pass in California, USA, and in Tarifa and Navarra in Spain. In these cases actual deaths resulting from collision are high, notably of Golden Eagle *Aquila chrysaetos* and Eurasian Griffon *Gyps fulvus*, respectively.

In a study in Spain, it was found that the distribution of collisions with wind turbines was clearly associated with the frequencies at which soaring birds flew close to rotating blades. Patterns of risky flights and mortality included a temporal component (deaths concentrated in some seasons), a spatial component (deaths aggregated in space), a taxonomic component (a few species suffered most losses), and a migration component (resident populations were more vulnerable). Clearly, the risk is likely to be greater on or near areas regularly used by large numbers of feeding or roosting birds, or on migratory flyways or local flight paths, especially where these are intercepted by the turbines.

Risk also changes with weather conditions, with evidence from some studies showing that more birds collide with structures when visibility is poor due to fog or rain, although this effect may to some extent be offset by lower levels of flight activity in such conditions. Strong headwinds also affect collision rates and migrating birds in particular tend to fly lower when flying into the wind. The same applies for Blue Cranes flying between roosting and foraging areas.
Accepting that many wind farms may only cause low levels of mortality, even these levels of additional mortality may be significant for long-lived species with low productivity and slow maturation rates (e.g. Blue Crane, Denham’s Bustard, Martial Eagle and Secretarybird), especially when rarer species of conservation concern are affected. In such cases there could be significant effects at the population level (locally, regionally or, in the case of rare and restricted species, nationally), particularly in situations where cumulative mortality takes place as a result of multiple installations.

Large birds with poor manoeuvrability (such as cranes, bustards and secretarybirds) are generally at greater risk of collision with structures, and species that habitually fly at dawn and dusk or at night are perhaps less likely to detect and avoid turbines (e.g. cranes arriving at a roost site after sunset, or flamingos flying at night). Collision risk may also vary for a particular species, depending on age, behaviour and stage of annual cycle. While the flight characteristics of cranes, flamingos and bustards make them obvious candidates for collisions with power lines, it is noted that these classes of birds (unlike raptors) do not feature prominently in literature as wind turbine collision victims. It may be that they avoid wind farms entirely, resulting in lower collision risks (see the discussion on Displacement in section 3.1.2 below). However, this can only be verified through on-site post-construction monitoring.

The precise location of a wind farm site can be critical. Soaring species may use particular topographic features for lift or such features can result in large numbers of birds being funnelled through an area of turbines. For example, absence of thermals on cold, overcast days may force larger, soaring species (e.g. Martial Eagle and Secretarybird) to use slopes for lift, which may increase their exposure to turbines. Birds also lower their flight height in some locations, for example when following the coastline or crossing a ridge, which might place them at greater risk of collision with rotors.

The size and alignment of turbines and rotor speed are likely to influence collision risk; however, physical structure is probably only significant in combination with other factors, especially wind speed, with gentle winds resulting in the highest risk. Lattice towers are generally regarded as more dangerous than tubular towers because many raptors use them for perching and occasionally for nesting; however it has been found tower structure to have no effect on mortality, and that mortality may be directly related to abundance for certain species. It has been found that turbine height and higher elevations may heighten the risk (taller/higher = higher risk), but that abundance was not directly related to collision risk, at least for Eurasian Griffon Vulture *Gyps fulvus*.

A review of the available literature indicates that, where collisions have been recorded, the rates per turbine are highly variable with averages ranging from 0.01 to 23 bird collisions annually (the highest figure is the value, following correction for scavenger removal, for a coastal site in Belgium and relates to gulls, terns and ducks among other species). Although providing a helpful and standardised indication of collision rates, average rates per turbine must be viewed with some caution as they are often cited without variance and can mask significantly higher rates for individual turbines or groups of turbines.

Some of the highest mortality levels have been for raptors in the Altamont Pass in California and at Tarifa and Navarre in Spain. These cases are of particular concern because they affect relatively rare and long-lived species such as Griffon Vulture *Gyps fulvus* and Golden Eagle *Aquila chrysaetos* that have low reproductive rates and are vulnerable to additive mortality. Golden Eagles congregate in Altamont Pass to feed on super-abundant prey which supports very high densities of breeding birds. In the
Spanish cases, extensive wind farms were built in topographical bottlenecks where large numbers of migrating and local birds fly through a relatively confined area due to the nature of the surrounding landscape, for example through mountain passes, or use rising winds to gain lift over ridges. Although the average numbers of annual fatalities per turbine (ranging from 0.02 to 0.15 collisions/turbine) were generally low in the Altamont Pass and at Tarifa, overall collision rates were high because of the large numbers of turbines involved (over 7 000 in the case of Altamont).

At Navarre, corrected annual estimates ranging from 3.6 to 64.3 mortalities/turbine were obtained for birds and bats (unpublished data). Thus, a minimum of 75 Golden Eagles are killed annually in Altamont and over 400 Griffon Vultures are estimated (following the application of correction factors) to have collided with turbines at Navarre. Work on Golden Eagles in the Altamont Pass indicated that the population was declining in this area thought to be due, at least in part, to collision mortality.

**Impact 2: Displacement due to disturbance**

The displacement of birds from areas within and surrounding wind farms due to visual intrusion and disturbance effectively can amount to habitat loss. Displacement may occur during both the construction and operational phases of wind farms, and may be caused by the presence of the turbines themselves through visual, noise and vibration impacts, or as a result of vehicle and personnel movements related to site maintenance. The scale and degree of disturbance will vary according to site- and species-specific factors and must be assessed on a site-by-site basis.

Unfortunately, few studies of displacement due to disturbance are conclusive, often because of the lack of before-and-after and control-impact (BACI) assessments. Onshore, disturbance distances (in other words the distance from wind farms up to which birds are absent or less abundant than expected) up to 800 m (including zero) have been recorded for wintering waterfowl, though 600 m is widely accepted as the maximum reliably recorded distance. The variability of displacement distances is illustrated by one study which found lower post-construction densities of feeding European White-fronted Geese *Anser albifrons* within 600 m of the turbines at a wind farm in Rheiderland, Germany, while another showed displacement of Pink-footed Geese *Anser brachyrhynchus* up to only 100–200 m from turbines at a wind farm in Denmark. Indications are that Great Bustard *Otis tarda* (a species related to the Denham’s Bustard) are displaced by wind farms within one kilometre of the facility.

Studies of breeding birds are also largely inconclusive or suggest lower disturbance distances, though this apparent lack of effect may be due to the high site fidelity and long life-span of the breeding species studied. This might mean that the true impacts of disturbance on breeding birds will only be evident in the longer term, when new recruits replace existing breeding birds. Few studies have considered the possibility of displacement for short-lived passerines (such as larks), although it has been found increased densities of breeding grassland passerines with increased distance from wind turbines, and higher densities in the reference area than within 80 m of the turbines, indicating that displacement did occur at least in this case. The consequences of displacement for breeding productivity and survival are crucial to whether or not there is likely to be a significant impact on population size. In the absence of any reliable information on the effects of displacement on birds, it is precautionary to assume that significant displacement will lead to a population reduction.

Studies show that the scale of disturbance caused by wind farms varies greatly. This variation is likely to depend on a wide range of factors including seasonal and diurnal patterns of use by birds, location with respect to important habitats, availability of
alternative habitats and perhaps also turbine and wind farm specifications. Behavioural responses vary not only between different species, but between individuals of the same species, depending on such factors as stage of life cycle (wintering, moulting, breeding), flock size and degree of habituation.

The possibility that wintering birds in particular might habituate to the presence of turbines has been raised, though it is acknowledged that there is little evidence and few studies of long enough duration to show this, and at least one study has found that habituation may not happen. A recent systematic review of the effects of wind turbines on bird abundance has shown that increasing time since operation resulted in greater declines in bird abundance. This evidence that impacts are likely to persist or worsen with time suggests that habituation is unlikely, at least in some cases.

The effect of birds altering their migration flyways or local flight paths to avoid a wind farm is also a form of displacement. This effect is of concern because of the possibility of increased energy expenditure when birds have to fly further, as a result of avoiding a large array of turbines, and the potential disruption of linkages between distant feeding, roosting, moulting and breeding areas otherwise unaffected by the wind farm. The effect depends on species, type of bird movement, flight height, distance to turbines, the layout and operational status of turbines, time of day and wind force and direction, and can be highly variable, ranging from a slight ‘check’ in flight direction, height or speed, through to significant diversions which may reduce the numbers of birds using areas beyond the wind farm.

A review of the literature suggests that none of the barrier effects identified so far have significant impacts on populations. However, there are circumstances where the barrier effect might lead indirectly to population level impacts; for example where a wind farm effectively blocks a regularly used flight line between nesting and foraging areas, or where several wind farms interact cumulatively to create an extensive barrier which could lead to diversions of many tens of kilometres, thereby incurring increased energy costs.

There is a dearth of literature on the displacement effect of wind farm developments on key species assemblages in the study area, particularly cranes. As mentioned above, indications are that Great Bustard *Otis tarda* is displaced by wind farms within one kilometre of the facility. If this happens with Blue Cranes in the current study area, it may have longer term habitat fragmentation impacts if the number of wind farms in the Swartland increases significantly.

**Impact 3: Habitat change and loss**

The scale of direct habitat loss resulting from the construction of a wind farm and associated infrastructure depends on the size of the project but, generally speaking, is likely to be small per turbine base. Typically, actual habitat loss amounts to 2–5% of the total development area, though effects could be more widespread where developments interfere with hydrological patterns or flows on wetland or peatland sites (unpublished data). Some changes could also be beneficial. For example, habitat changes following the development of the Altamont Pass wind farm in California led to increased mammal prey availability for some species of raptor (for example through greater availability of burrows for Pocket Gophers *Thomomys bottae* around turbine bases), though this may also have increased collision risk.

**Impact 4: Electricity transmission lines**
A proposed low voltage feeder power line that will link the wind facility to the grid could pose a collision risk should this be placed above ground, irrespective of which alignments are used. In addition, the turbines will be linked to each other with reticulation cables. It has not yet been determined if the cables linking the turbines will be underground or overhead.

Because of their size and prominence, electrical infrastructures constitute an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, but two common problems in southern Africa are electrocution of birds (and other animals) and birds colliding with power lines. Electrocututions are not envisaged to be a problem on the proposed electricity network. Collisions, on the other hand, could be a major potential problem.

Collisions kill far more birds annually in southern Africa than electrocututions. Most heavily impacted upon are bustards, storks, cranes and various species of water birds. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines. Unfortunately, many of the collision sensitive species are considered threatened in southern Africa - of the 2369 avian mortalities on distribution lines recorded by the EWT since August 1996, 1512 (63.8%) were Red Data species.

In the Overberg, which has a very similar avifaunal species composition to the Swartland, the power line collisions have long been recorded as a major source of avian mortality. Most numerous amongst power line collision victims are Blue Crane and Ludwig’s Bustard. It has been estimated that as many as 10% of the Blue Crane population in the Overberg are killed annually on power lines, and figure for Denham’s Bustard might be as high as 30% of the Overberg population. These figures are extremely concerning, as it represents a possible unsustainable source of unnatural mortality. The study area supports a very high density of Blue Cranes, but Denham’s Bustard does not occur in the Swartland.

Unfortunately, the dynamics of the collision problem is poorly understood. In the most recent study on this problem in the Overberg, Previous research have identified cultivated land and region as the significant factors influencing power line collision risk. Lines that cross cultivated land pose a higher risk, as expected, as this is the preferred habitat of Blue Cranes in the Western Cape. Collision rates are higher for birds in flocks, as they may panic, or lack visibility and room for manoeuvre because of the close proximity of other birds.

Other factors, such as proximity to dams, wind direction and proximity to roads and dwellings did not emerge as significant factors, but she readily admits that her broad-scale analysis may have been too crude to demonstrate their effects. It is for example a well known fact that cranes are particularly vulnerable to power lines skirting water bodies used as roosts, as they often arrive there or leave again in low light conditions.

**Impact 5: Lighting of turbines**

The effects of night-time illumination have not been adequately tested, and the results of studies are contradictory.

Studies involving lighted objects or towers indicate that lights may attract birds, rather than disorient or repel them, resulting in collision mortality. This is mostly a problem for nocturnal migrants (primarily passerines) during poor visibility conditions. Different colour lights vary in their attractiveness to birds and their effect on orientation. Several studies have shown that intermittent lights have less than an effect on birds than
constant lights, with reduced rates of mortality. In addition, some studies suggest that replacing white lights with red coloured lights may reduce mortality by up to 80%. This may be due to the change in light intensity rather than the change in wavelength.

However, previous research suggests that birds are more sensitive to red lights and may be attracted to them. Quickly flashing white strobe lights appear to be less attractive. The issue is however far from settled - a study at Buffalo Ridge, Minnesota, where most of the collision fatalities were classified as nocturnal migrants, found little difference between lighted and unlighted turbines.

The consensus among researchers is to avoid lighting the turbines if possible, but that is against civil aviation regulations. Furthermore, the potential for collisions with the wind turbines due to presence of lights is not envisaged to be significant, primarily because the phenomenon of mass nocturnal passerine migrations is not a feature of the study area. Post – construction monitoring (carcass searches) will be required to assess the extent (if any) of nocturnal fatalities that may be linked to the lighting on the turbines.

8.2.3 Geotechnical

The following information was obtained from the Geotechnical Study included in Appendix J

Wind turbines are normally founded on large round or square raft-like concrete bases with a central base with a basal diameter of 5.5 m to 7.0 m surrounded by a concrete raft with a diameter of approximately 17.3 m. The mast structures are not particularly heavy in terms of foundation loading, as the load is distributed evenly over the large foundation area. However, the masts are subjected to high wind shear and thus dense soil with a moderate to high shear strength and bearing capacity is required for founding. Foundation conditions are therefore a key constraint on engineering costs and affect project feasibility.

The ‘soft to intermediate’ rock condition in this area is considered highly favourable for founding the masts. In general founding depth would be approximately 1.9 m, which corresponds closely to the expected depth of excavation possible in the rock without the need for rock blasting. The bearing capacity in the fractured shales is estimated to be at least 500 kPa which is double the required bearing capacity for the anticipated loads of the operating wind turbines. If the rock condition at the bottom of the excavation is highly uneven rock dowels can be used to prevent sliding of the concrete base. After casting, the foundation area is backfilled with compacted rock and soil to a level of 0.95 m above the concrete foundation and flush with the base.

The hard sandstone that forms the hill ridges should be avoided in the specific locating of individual masts. The rock would require blasting in order to provide the depth of foundation required for the masts. The location of the wind turbines on the higher ground ensures that there is no influence of the water table on foundations and reduces the risk of chemical corrosion of the concrete bases.

8.3 Social and Cultural Environment

8.3.1 Social environment
The following information was obtained from the Social Impact Specialist Study included in Appendix K.

This section identifies the key social issues that are likely to arise and will need to be assessed by the Social Impact Assessment (SIA) specialist study. The issues identified will be discussed under key planning and policy issues as well as local and site specific issues.

**Key Planning and Policy Issues**

Legislative and policy context plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents.

The review of the relevant planning and policy documents has been undertaken as a part of the Scoping Study assessment. The key documents reviewed included:

- The White Paper on Renewable Energy (2003);
- White Paper on Sustainable Energy for the Western Cape (Final Draft, 2008);
- Climate Change Strategy and Action Plan for the Western Cape (2008);
- Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape. Towards a Regional Methodology for Wind Energy Site Selection (2006);
- The Western Cape Provincial Spatial Development Framework (2009);
- Guideline for the Management of Development on Mountains, Hills and Ridges in the Western Cape (2002);
- Saldanha Bay Municipality Draft Municipal Spatial Development Framework (July 2010);

**Policy issues**

The findings of the review indicated that wind energy was strongly supported at both a national, provincial and local level.

At a national level the While Paper on Energy Policy (1998) notes:

- Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future;
- The support for renewable energy policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly solar and wind and that renewable applications are in fact the least cost energy service in many cases; more so when social and environmental costs are taken into account.

At a provincial level the Draft Western Cape Integrated Energy Strategy (January 2007) notes:

- Wind energy potential in the Western Cape is high (3 000 MW). The potential advantages associated with wind include:
  - Technology and capital costs are reducing rapidly;
  - Low maintenance;
  - Clean option;
  - Can be quickly installed in areas needing new supply.
• The Provincial Government of the Western Cape is committed to energy efficiency and renewable energy, and to reducing the Province’s carbon footprint and eradicating energy poverty. In order to achieve this vision, the PGWC will:
  - Support an approach to energy planning, which takes into account environmental, social and economic considerations;
  - Support research and development around renewable energy and energy efficiency technologies.

• The Strategic Assessment for establishing Wind Farms (May, 2006) undertaken by DEA&DP notes:
  - It is important that at the national level (SA being signatories to the Kyoto Protocol) that positive policy is enacted to encourage wind energy (and indeed all renewable) development. A national perspective should ensure that wind resource rich provinces and regions are identified in order to ensure a co-ordinated and holistic national strategy. In this regard, it is accepted that the Cape West Coast (the study area and beyond to the north – indeed to the Orange River) will inevitably be attractive to wind energy developers due to the prevalence of coastal wind regimes. However, the importance of employing an effective cumulative impact model must be emphasised.

• The PSDF (2009) recognises the importance of developing renewable energy generation resources, including wind energy generation facilities. In that regard, provincial government has set a target of 25% renewable energy generation for the Province by 2020. The PSDF however also notes the importance of preserving the integrity of the province’s scenic resources, including landscapes, and therefore provides that associated infrastructure should be sensitively sited.

At a local level, the Saldanha Bay Municipality 2006-2011 IDP and the 2010 Draft SDF both note the potential of the SBLM area to accommodate WEFs. However, the SDF also comments in the potential visual and sense of place impacts associated with WEFs, and makes reference to the need to adhere to the locational criteria contained in the Regional Methodology, specifically those related to avoiding landscapes with high scenic value, preferred siting in disturbed landscapes, and avoiding potential cumulative impacts. The SDF does not provide any spatial guidance with regards to areas within the SBLM area, which would be suitable to accommodating WEFs.

**Site related issues**

A review of the Western Cape Regional Methodology for Wind Energy Site Selection (2006), PSDF (2009) and Guideline for development on Mountains, Hills and Ridges (2003) indicates that the siting of WEFs and associated infrastructure should ideally adhere to the following principles:

• Large WEFs should be spaced at least 30-50 km apart (Regional Methodology);
• Development on hills and ridgelines should where possible be avoided Guidelines for Mountains, Hills and Ridges);
• Preference should be given to disturbed rural landscapes, particularly vertically disturbed ones (Regional Methodology);
• Siting should be mindful of potential impacts on touristic and wilderness visual and sense of place values (Regional Methodology);
• WEFs should be sited in locations where they have the least potential visual impact (PSDF);
• New power lines should follow existing transport or power line corridors in as far as possible, and point-to-point cross-country routes should be avoided (PSDF).
• Landform features should be preserved through ensuring that the siting of facilities is related to environmental resilience and visual screening capabilities of the landscape (Guideline);
• Ensure that the scale, density and nature of the activities or developments are harmonious and in keeping with the sense of place and character of the area (Guideline);

In this regard, the proposed St Helena Bay WEF:

• Is located in an area that is characterised by an undulating landscape consisting of low, rounded, rolling hills;
• Is located on hills and ridgelines;
• Is located in relatively close proximity to three other proposed WEFs;
• Is located in a rural, agricultural area, whose visual characterized by open, expansive views. Existing disturbances on the site and surrounding area are limited to cultivated fields, farmsteads, roads and telephone lines. The western boundary of the site is traversed by an existing transmission line;
• Is located en-route to the coastal towns of St Helena Bay, Stompneus Bay and Britannia Bay, which are well known tourist destinations. The site will also be visible from the main access road to these coastal towns (MR 533).

Local and site specific issues

Based on review of information relating to wind energy facilities, experience with the West Coast 1 Wind Farm and other wind farms and the findings of the review of the development proposal as well as contextual and demographic data for the study area, the most important issues that are likely to be raised and will need to be assessed during the EIA include:

Local communities and individuals

• Potential impact on rural sense of place (this will be closely linked to the visual impacts);
• Potential negative impact on tourism, both locally and regionally (this will be closely linked to the visual impacts from routes currently serving a scenic/touristic function, specifically the MR 533 and R 399);
• Potential impact on property prices in the area;
• 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;
• Potential opportunities for the Seeland Development Trust and the community of Laingville to benefit from the proposed development;
• Potential impact on tourism;
• Traffic impacts associated with the construction phase and impact on local residents and tourists;
• Cumulative impact, specifically visual and associated impact on rural sense of place and the landscape character of the area; and
• Provision of clean, renewable energy source for the national grid.

_Farmers on and adjacent to the St Helena Wind Farm site_

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 farm infrastructure (during the construction and operational phase);
• Potential damage to roads by heavy equipment and increased traffic volumes (during the construction and operational phase); and
• Potential impact on farming operations and loss of productive land (during the construction and operational phase).

8.3.2 **Heritage**

The following information was obtained from the Heritage Impact Study included in **Appendix L**. The EIA phase study needs to fulfil the requirements of heritage impact assessment as defined in section 38 of the National Heritage Resources Act 25 of 1999 (NHRA). This means that the assessment has to cover the full range of potential cultural heritage as defined by the term “culture” contained in the NHRA.

**Palaeontological material**

While the recovery of fossil material is unlikely on the top of the Patrysberg, it is possible that the Environmental Management Plan (EMP) may require a professional palaeontologist to undertake periodic monitoring of the excavations for the turbines.

**Archaeological heritage**

The proposed study area needs to be subject to a detailed survey by an archaeologist who will need to walk a pattern of transects over the site recording details and locations of any heritage material found. The significance of each find will need to be assessed along with the impacts of the proposed activity. A field survey will determine the presence of surface archaeological material (pre-colonial and colonial). It is expected that mitigation through avoidance of sensitive areas may be possible. Adjustments to turbine footings, deviations in service trenches, road alignments or power line towers may be all that is required. If for any reason mitigation by avoidance is not feasible, a Phase 2 Archaeological Impact Assessment may be required. A Phase 2 Archaeological Impact Assessment includes the recording and sampling of the archaeological site (with a permit issued by Heritage Western Cape), before its destruction is permitted. The costs of the test excavations are for the developer.
Un-identified archaeological material, fossils and fossil bone

There is always a chance that archaeological material may be exposed during bulk excavation for services and foundations. All archaeological material over 100 years of age is protected and may only be altered or removed from its place of origin under a permit issued by Heritage Western Cape (HWC). In the event of anything unusual being encountered, the HWC archaeology unit must be consulted immediately so that mitigation action can be determined and be implemented if necessary (find-stop scenario). Mitigation is at the cost of the developer, while time delays and diversion of machinery/plant may be necessary until mitigation in the form of conservation or archaeological/palaeontological sampling is completed.

Built Environment

The Langeklip farmstead falls within the area of the proposed wind energy facility. It is not expected that the farm buildings and possible graveyard, comprising the built environment, will be directly impacted by the proposal unless it becomes necessary to demolish structures that are greater than 60 years of age. It is important to note that the CNdv (2006) draft recommendations have proposed a buffer zone between the placement of turbines and heritage sites. It may therefore be necessary to move turbine locations to avoid visual impacts on the built environment.

Cultural landscape and sense of place

This is perhaps the most difficult heritage impact to address. There is no doubt that the wind turbines will affect the landscape qualities of the site, however the degree of impact will be very closely related to the visual impacts of the proposed activity (the visual impact will be separately addressed). The locating of infrastructure close to historical farms and settlements may result in impacts to the quality of the place and detract from sense of history and/or wilderness. From this perspective the layout of the facility will need to respond to the findings of the heritage impact component of the EIA along with close input from the visual specialist.

8.3.3 Noise

The following information was obtained from the Noise Impact Study included in Appendix M.

The wind farm project will introduce noise sources into the local rural noise environment. The project\’s main noise sources and activities include:

- The construction equipment and activities during the construction phase; and
- The wind turbines during the operational phase.

Construction

Noise associated with construction activities is generally of local extent and short duration. The construction operations are not expected to have any significant impact on the nearest local dwellings or residential communities. The noise impact, therefore, is expected to be of low significance and will be determined in detail in the EIA phase.

Operation

The introduction of the 10 to 35 wind turbines could have a noise impact, as a result of
the increase of the noise levels within and around the wind farm site due to their operation.

The noise emission information under various wind speeds will be utilised in 3-dimensional noise propagation modelling, in order to determine the resulting operational sound pressure levels and assess the cumulative noise impact.

From existing noise emission data from various turbine manufacturers, it is anticipated that the overall spectrum of wind turbines will be broad band, with no prominent third octave bands. Therefore, under normal operation, the wind turbines are not expected to generate any clearly audible tones or impulses that may cause community responses at lower noise levels. This, however, will be verified once the sound power spectrum data is available from the manufacturer and/or by direct measurements, if deemed necessary.

The duration of the noise impact is expected to be long-term, i.e. for the duration of the operational life of the project. The impact is expected to be of low to medium significance, and together with its extent will be assessed in detail in the EIA phase of the project.

8.3.4 Visual

The following information was obtained from the Visual Impact Study included in Appendix N.

The viewshed is defined as the theoretical outermost limit of the area from which views of development on the site many be possible. Therefore the viewshed defines the area that will be assessed in the VIA.

The coastal plain in the study area is relatively flat, and due to the site being located on one of the highest points of the Saldanha Peninsula, it should theoretically have a very large viewshed. The view of the site to the north is blocked by low hills, and the site should therefore not be visible from the settlements along the coast west of Laingville. Once turning back inland from Stompeus Bay along the Stompeus Bay - Vredenburg road, the site once again becomes visible, albeit at a large distance (approximately 10 km). Paternoster, on the far north-western portion of the peninsula, is 15km from the site, and although there is line of site from here to the proposed wind farm site, the distance would result in very poor visibility of the wind turbines.

To the east and south of the site, the theoretical viewshed stretches as far as Saldanha Bay (21 km south of the site). The closest settlement from which the site could be viewed is Vredenburg. There are no significant topographical features to the southeast of the wind farm site to acts as a boundary for the viewshed. However, it is unlikely that the wind turbines would remain visible for a distance of more than 10km from the site. For comparative purposes, the appearance of the wind turbines at Darling along the R27 is indicated in Figure 8.1 and Figure 8.2. Although these wind turbines have a hub height of 50m, which could be less than the proposed turbines for St. Helena, it is clear that at a distance of more than 4 km, the wind turbines are hardly visible.
Key views to and from the site are illustrated in Figures xxx to Figure xxx below, and provide an indication of the surrounding areas which will be impacted visually by the proposed wind farm.
Figure 8.3: View from Stemmet’s Kop (252 m above sea level) looking south in the direction of Saldanha Bay and Vredenburg, showing the current 50 m test mast.
Figure 8.4: View from Stemmet’s Kop looking south in the direction of Saldanha Bay and Vredenburg.

Figure 8.5: View north towards Laingville and Velddrif, showing the current transmission lines and the Atlantic Ocean.
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Figure 8.6: View looking southwest along the Vredenburg – St. Helena road, showing the position and height of the test mast, 3km from the test mast.

Test mast

Figure 8.7: View looking southeast from the Stompneus Bay – Vredenburg Road, 9.7km from the test mast site. The test mast is not visible from this point.
Figure 8.8: View looking northeast from the northern outskirts of Vredenburg towards the test mast site, over a distance of 8 km. The test mast is not visible from this point due to the distance, but its position has been indicated.
In terms of visual impacts, the following issues will be addressed in the impact assessment phase:

- Potential visibility of the wind turbines from tourism-orientated towns in the vicinity, including Velddrif;
- Potential visibility of the proposed wind turbines to the south from the towns of Saldanha, Vredenburg and Langebaan;
- Potential visibility of the proposed wind turbines from the West Coast National Park;
- The degree to which increased distance from the proposed wind turbine site mitigates the visual impact, in spite of the fact that the turbines will be situated on one of the highest points in the landscape and will be visible against the skyline;
- The degree to which the hills to the north of the site for the proposed wind turbines screen the turbines from the settlements around the northern and western side of the peninsula, between Laingville and Paternoster;
- Potential cumulative impacts of the proposed wind farm when considered together with other possible wind farm proposals in this region;
- The increase in the visual impact required by the potential requirement for red and white colouring of the wind turbine masts for aeronautical purposes; and
- The optimal placing of the wind turbines and the number of wind turbines to mitigate the visual impact.

8.4 Conclusion

This chapter provides a discussion of potential impacts which can be expected to arise as a result of the proposed Caledon wind farm, associated infrastructure and power lines. These potential impacts were identified through the various the specialists’ studies. The more detailed description and assessment of these potential impacts, as well as any mitigation measures, will be conducted during the Environmental Impact Assessment phase.
9 CONCLUSIONS

9.1 Introduction

9.1.1 Project Background

Just Energy is proposing to establish a community wind farm in association with the Seeland Development Trust and associated infrastructure on Langeklip Farm (Erf 47) near St Helena Bay in the Saldanha Bay Municipality, Western Cape Province. The proposed St Helena Community Wind Farm Development is expected to generate approximately 30 MW and will comprise of between 10 to 35 wind turbines. Associated infrastructure will include on-site transformers and control equipment buildings, access roads to the various turbines and on site during construction and electrical cables connecting the turbines to a new substation site where the connecting cables will link into the electricity grid through a possible overhead powerline.

In terms of the EIA Regulations, an application of this nature has to undergo both Scoping and Environmental Impact Assessment (EIA). Arcus GIBB (Pty) Ltd have been commissioned by Just Energy, who is the (appointed project manager) project developer, to undertake the EIA process.

This report documents the tasks which have been undertaken as part of the Scoping phase of the EIA. These tasks include the public participation process and specialist studies, as well as the documentation of the issues which have been identified as a result of these activities.

To date, tasks that have commenced include the:

- Identification of stakeholders or I&APs;
- Notification and advertisements;
- Background Information Documents;
- Specialist scoping studies; and
- Ongoing consultation and engagement

Detail on the above has been discussed in Chapter 6.

This Draft Scoping Report has been released for public review and comment for a period of 40 days from 5 April 2011 – 19 May 2011. During the review period additional public participation process (PPP) will be undertaken, allowing Interested and Affected Parties (I&APs) and Key Stakeholders from government and the private sector to engage with the project proponents and independent environmental consultants. The PPP will consist of key stakeholder workshops, focus group meetings, public open days and one-on-one interactions. Issues raised by I&APs and key stakeholders during the public participation process will be documented and included in the Final Scoping Report.

The relevant authorities required to review the proposed project and provide Environmental Authorisation were consulted from the outset of this study, and have been engaged throughout the project process. These supervisory authorities include the National Department of Environmental Affairs (DEA), who are the lead authority for this project. The Western Cape Department Environmental Affairs and...
Development Planning (WC DEA&DP) is noted as a key commenting authority. In addition, a number of other authorities have been consulted. For a comprehensive list refer to Chapter 6.

The Scoping phase of an EIA serves to define the scope of the detailed assessment of the potential impacts of a proposed project. Scoping has been undertaken in accordance with the requirements of Government Notices R543 of 2010, and the IEM Information Series (DEA, 2002). The objectives of the Scoping phase are to:

- Ensure that the process is open and transparent and involves the Authorities, proponent and stakeholders;
- Identify the important characteristics of the affected environment;
- Ensure that feasible alternatives are identified and selected for further assessment;
- Assess and determine potential impacts of the proposed project on the biophysical and socio-economic environment and associated mitigation measures; and
- Ensure compliance with the relevant legislation.

Specialist studies were undertaken to identify potential impacts that may occur as a result of the proposed project. The studies undertaken are listed in Table 9.1.

Table 9.1: Specialist studies undertaken within the Scoping Phase of the project

<table>
<thead>
<tr>
<th>Specialist Study</th>
<th>Name of Specialist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flora Impact Assessment</td>
<td>David Hoare of David Hoare Consulting CC</td>
</tr>
<tr>
<td>Fauna Impact Assessment</td>
<td>David Hoare of David Hoare Consulting CC</td>
</tr>
<tr>
<td>Avifauna Impact Assessment</td>
<td>Chris van Rooyen of Chris van Rooyen Consulting</td>
</tr>
<tr>
<td>Geotechnical Study</td>
<td>Jon McStay of WSP</td>
</tr>
<tr>
<td>Social Impact Assessment</td>
<td>Tony Barbour of Tony Barbour Environmental</td>
</tr>
<tr>
<td>Heritage Impact Assessment</td>
<td>Dr. Lita Webley/ Tim Hart of UCT</td>
</tr>
<tr>
<td>Noise Impact Assessment</td>
<td>Demos Dracoulides of DDA Environmental Engineers</td>
</tr>
<tr>
<td>Visual Impact Assessment</td>
<td>Reuben Heydenrych of Arcus GIBB</td>
</tr>
</tbody>
</table>

The specialist studies identified potential impacts that could occur as a result of the proposed project and which will require detailed investigation during the Impact Assessment phase of the EIA. The conclusions of the Scoping phase specialist studies are discussed below.

9.2 Findings and Recommendations of the Specialist Studies

9.2.1 Flora and Fauna

The study site is located within the Cape Floristic Region (CFR), which is recognized as one of the principal centres of diversity and endemism in Africa. Fynbos and Renosterveld are considered to be the main vegetation types in the CFR. Fynbos is very species rich, but has been transformed or degraded to a high degree and is therefore considered to be of high conservation concern.

The site occurs within one main vegetation type: Saldanha Granite Strandveld, classified as Endangered (Mucina et al. 2005, Mucina & Rutherford 2006). There is also a small area of Saldanha Flats Strandveld along the eastern boundary, classified as Endangered (Mucina et al. 2005, Mucina & Rutherford 2006). The Endangered vegetation types are protected under the Draft National List of Threatened Ecosystems (GN1477 of 2009), published under the National Environmental
Management: Biodiversity Act (Act No. 10, 2004). Any remaining patches of natural vegetation on site therefore have a very high conservation value.

Large parts of the study area appear to be in a transformed state and consists primarily of agricultural lands. There are, however, significant areas of remaining natural vegetation. The vegetation-type descriptions provide an indication that remaining natural vegetation on site consists primarily of strandveld. There are, however, also strips of thicket along drainage lines in the areas of steeper topography and wetland vegetation within the remaining drainage lines.

Drainage lines (wetlands) represent particularly vital natural corridors as they function both as wildlife habitat, providing resources needed for survival, reproduction and movement, and as biological corridors, providing for movement between habitat patches. Both functions are potentially critical to conservation of biological diversity as the landscape becomes increasingly fragmented into smaller, more isolated patches (Rosenberg et al., 1997).

Despite high levels of transformation on site, there are a number of different habitat types that may provide suitable habitat for a variety of flora and fauna species. There are a number of plant and animal species of conservation concern that may occur in habitats within the study area. There are 52 Red List plant species that have a geographic distribution that includes the site and which have a chance of occurring in the study area. This includes three species listed as Critically Endangered, sixteen as Endangered, sixteen as Vulnerable and seventeen as Near Threatened. This is an exceptionally high number of threatened species, even by Fynbos biome standards. There is therefore a very high likelihood of more than one threatened plant species occurring on site or being dependant on natural habitats on site remaining in a natural state.

There are nine animal species of conservation concern that may occur in habitats within the study area or that may be affected by the proposed wind farm. This includes one species classified as Endangered (EN), three as Vulnerable (VU) and five as Near Threatened, including the White-tailed Rat (EN), the Cape Caco (VU), the Cape Sand Snake (VU), the Armadillo Girdled Lizard (VU), the Namaqua Plated Lizard (NT), Gronovi’s Dwarf Burrowing Skink (NT), Lesueur’s Wing-gland bat (NT), Natal long-fingered bat (NT) and the Cape horseshoe bat (NT).

Bat deaths are one of the most controversial biological issues related to wind turbines. Bats have been found to be particularly vulnerable to being killed by wind turbines. It has long been a mystery why they should be so badly affected since bat echo-location allows them to detect moving objects very well. A recent study in America has found that the 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 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.

Steep slopes can be problematic in constructing infrastructure due to the fact that any impact can have an effect downslope from that point. Depending on the steepness and the length of the slope, particular areas may be more sensitive to disturbance than others. Any steep slopes are therefore considered to have elevated sensitivity. Potential issues that may arise from development of these areas includes erosion of substrates downslope and the impacts of stormwater runoff.
Other than protected ecosystems and threatened plant and animal species, forests and wetlands are both protected under national legislation (National Forests Act and National Wetlands Act respectively). Any impacts on these areas would require a permit from the relevant National Department. There is one tree species that is protected under the National Forests Act that has a geographic distribution that includes this area (Sideroxylon inerme subsp. inerne), which has a moderate likelihood of occurring on site. Any impacts on individuals of this species requires a permit from the National Department.

A risk assessment was undertaken which identified nine main potential negative impacts on fauna, flora and ecology of the site. The significance of these impacts will be assessed during the EIA phase after collection of relevant field data. An initial assessment indicates that these impacts are likely to be significant. The identified potential impacts are the following (likely significance of impacts in brackets):

1. Impacts on habitats of threatened fauna (Medium)
2. Impacts due to collision of bats with infrastructure (Medium to High)
3. Impacts on threatened plants (High).
4. Impacts on protected tree species (Medium to High).
5. Impacts on indigenous natural vegetation (High).
6. Impacts on wetlands (High).
7. Change in runoff and drainage patterns (Medium to High).
8. Establishment and spread of declared weeds and alien invader plants (Medium to High).
9. Increased risk of veld fires (Medium).

The majority of these impacts would only be significant if remaining areas of natural vegetation are developed. If infrastructure is restricted to previously transformed areas (primarily cultivated lands), the significance of impacts would be LOW for most of these impacts.

- It is not recommended that any remaining natural vegetation on site is disturbed by the proposed development. This is on the basis of the Endangered status of the vegetation on site, the fact that it occurs within a Critical Biodiversity Area and also due to the high number of threatened plant species that have a potential to occur on site within natural habitats. It is recommended that these natural areas become part of a "no-go" zone within the site and that a buffer zone of a minimum of 30 m is maintained around these areas. The initial assessment of potential impacts indicates that there is a probability of seven impacts of HIGH significance if infrastructure is planned to be placed within remaining areas of natural vegetation. For impacts rated as having high significance, the decision whether to develop the area is at stake.
- If it is decided to go against the advice of the first recommendation, a comprehensive threatened plant species specialist study is required of all remaining natural areas on site to determine the presence, identity and position of any populations of threatened and near threatened plant species on site. This survey will have to undertaken during the appropriate flowering time of the species listed in Appendix 1 and may require more than one survey.
- It is recommended that a bat specialist study be undertaken to determine the presence, identity and relative density of bats in the area.

9.2.2 Avifauna
The principal areas of concern with regard to effects on birds are listed below. Each of these potential effects can interact with each other, either increasing the overall impact on birds or, in some cases, reducing a particular impact (for example where habitat loss or displacement causes a reduction in birds using an area which might then reduce the risk of collision):

- Collision mortality on the wind turbines
- Collision with the proposed power line
- Displacement due to disturbance
- Displacement caused by habitat transformation.

It is important to note that the detailed assessment will be made on the status quo as it is currently on site. The possible change in land use in the area where the wind farm is situated will not be taken into account because the extent and nature of future developments are unknown at this stage. It is however highly unlikely that the land use will change in the foreseeable future.

The economic activity at the Langeklip farm consists mostly of sheep farming. At some stage in the past, several sand quarries were also active on the farm. There are no cereal crops at this stage, but a substantial part of the farm consists of old cereal lands which are now use for grazing sheep. Based on observations during the field visit and using satellite imagery, the bird habitat on the Langeklip Farm is classified as follows:

- Natural strandveld vegetation (app. 45%)
- Old lands (app. 42%)
- Old sand quarries (app. 9%)
- Other e.g. roads, dwellings (4%)

Priority species that could be affected by the wind facility include Blue Cranes and several species of raptors and waterbirds.

9.2.3 Geotechnical Study

There are no predictable geological or geotechnical impacts associated with the construction or operations of the wind turbines that cannot be adequately addressed by simple engineering measures.

Ground conditions are stable, there are no severe slope stability problems that require unusual or special construction measures to be used.

Geotechnical constraints relate to the presence of shallow rock over much of the area. In terms of foundation conditions this results in highly variable excavation depth to hard rock and difficulty in establishing a large flat foundation base for casting the large concrete plinth required for the masts. Rock blasting is a highly likely over most of the preferred turbine locations.

The shallow rock condition will increase the costs and timeframes associated with excavation for turbines and cable trenches,

The hard domes of granite and small outcrops are clearly visible. These areas can be avoided during the specific location of individual masts to reduce impacts due to rock blasting.
The soils are highly conductive and will require cathodic protection for the underground powerlines. Similarly the local soil conditions are not ideal in terms of their thermal resistivity, both issues can be mitigated in the selection of an imported quartz sand for pipe bedding.

The soils are dispersive and have a moderate to high susceptibility to erosion. Rehabilitation of re-vegetation of disturbed areas after the completion of construction will be necessary to mitigate against erosion and loss of topsoil.

The overall geotechnical assessment is that the site is favourable for the operation of a wind farm and that detailed geotechnical investigations are not required for the assessment of environmental impacts but should be undertaken to provide detailed information for engineering design once final locations and routes are confirmed.

9.2.4 Social

The key conclusions of the Scoping level study are the following:

- The establishment of wind energy facilities are supported at national, provincial and local levels;
- The proposed St Helena Bay WEF site conflicts with a number of principles relating to site selection contained in the Western Cape Regional Methodology for Wind Energy Site Selection (2006), PSDF (2009) and Guideline for development on Mountains, Hills and Ridges (2003);
- Key potential construction phase issues for further investigation during the EIA phase relate to the recruitment and on-site management of construction labour and the management of impacts on local roads;
- Key potential operational phase issues relate to the potential negative impacts on the scenic integrity (visual) of the landscape. In this regard the potential for negative cumulative impacts on the visual character of the area exists. This issue is likely to represent one of the key issues in terms of the assessment of the proposed St Helena Bay WEF.

9.2.5 Heritage Resources

It is anticipated that the impact on the Palaeontological heritage of the Study Area is likely to be minimal. However, a palaeontologist may request monitoring of the turbine trenches during construction.

Indications are that the proposed activity may impact on the archaeological (pre-colonial and colonial) heritage and built environment of the Study Area. However, it is expected that impacts may be mitigated through avoidance of sensitive areas which will be identified during the fieldwork phase of the project. The impacts are likely to be limited and controllable. If impacts cannot be avoided, then second phase archaeological work may be required.

A Phase 2 Archaeological Impact Assessment includes the recording and sampling of the archaeological site (with a permit issued by Heritage Western Cape), before its destruction is permitted. The costs of the test excavations are for the developer.

In terms of the natural cultural landscape qualities of the site, the impacts are expected to be more significant especially since the proposed activity is situated on a prominent landscape feature and in a scenic area. The degree and nature of the impact is going to depend on how the wind turbines are arranged on the landscape,
and the ability of the topography to absorb their presence which is an issue which will require close attention during the course of the EIA.

It is anticipated that the landscape impacts of the proposal will receive close scrutiny from Heritage Western Cape.

Follow up heritage work such as monitoring of excavations by a palaeontologist or archaeological sampling is likely to be a requirement of the Environmental Management Plan.

9.2.6 Noise

The wind farm project will introduce noise sources into the local rural noise environment. The project’s main noise sources and activities include:

- The construction equipment and activities during the construction phase.
- The wind turbines during the operational phase.

Noise associated with construction activities is generally of local extent and short duration. The construction operations are not expected to have any significant impact on the nearest local dwellings or residential communities. The noise impact, therefore, is expected to be of low significance and will be quantified in detail in the EIA phase.

The introduction of the wind turbines could have a noise impact, as a result of the increase of the noise levels within and around the wind farm site due to their operation. The noise emission information under various wind speeds will be utilised in 3-dimensional noise propagation modelling, in order to determine the resulting operational sound pressure levels and assess the cumulative noise impact. From past experience and noise emission data from various turbine manufacturers, it is anticipated that the overall spectrum of wind turbines will be broad band, with no prominent third octave bands. Therefore, under normal operation, the wind turbines are not expected to generate any clearly audible tones or impulses that may cause community responses at lower noise levels. This, however, will be verified once the sound power spectrum data is available from the manufacturer and/or by direct measurements, if deemed necessary. The duration of the noise impact is expected to be long-term, i.e. for the duration of the operational life of the project. The impact is expected to be of low to medium significance, and together with its extent will be assessed in detail in the EIA phase of the project.

9.2.7 Visual

The proposed St. Helena wind farm will be located on one of the highest points in the Vredenburg-Saldanha region, at a height of some 232 m above sea level. The topography is gently rolling and does offer screening between the proposed wind farm site and the settlements around the northern side of the peninsula, from Laingville west to Stompneus Bay and possibly as far as Paternoster.

The sense of place in the region varies greatly. The West Coast National Park, which is centred on the Langebaan Lagoon, has a wilderness atmosphere and is focused on tourism. The town of Langebaan similarly has a tourism focus. However, the town of Saldanha, the iron ore export terminal in Saldanha Bay, the Saldanha Steel plant and the Namakwa Sands smelting plant result in an industrial atmosphere around the northern rim of Saldanha Bay and the areas inland of this. The settlements that hug the coastline to the north of the proposed site are tourist towns, which derive their
visual amenity from north-facing sea views. Velddrif is also tourism-focused, and is orientated towards the Berg River lagoon.

There is little doubt that there will be direct line of sight to the proposed wind turbines from the east, south and west. However, the area to the south has an industrial character, and it is doubtful that the turbines would be visible from Langebaan and the West Coast National Park, due to the long distance to the site. The views from Vredenburg and Velddrif are important, as they are from the closer distance. It is essential to provide simulations of the appearance of the turbines from these viewpoints.

Based on the above factors, it is considered that the risk that the project may not be authorised on the basis of visual impacts is not significant. In spite of the wind turbine site being situated in one of the highest points in the study area, the impacts is expected to be moderate due to the screening from a number of tourist towns north of the site, as well as the long distance over which the wind farm will be viewed. However, this needs to be confirmed through visual simulations. The recommendation by Heritage Western Cape will also be key to determining the viability of the project. Although Heritage Western Cape is not the decision-making body from an EIA perspective, their decision will be regarded as important by the national Department of Environmental Affairs, which will be the competent authority in this instance.

According to the DEA&DP guideline document for VIAs, the proposed development can be expected to result in high visual impacts, and accordingly a Level 4 assessment is required for this project, should it proceed to the EIA phase. The VIA must be based on computer modelling to make the assessment and comparison of various scenarios possible.

9.3 Alternatives for Evaluation in the Impact Assessment Phase

The following project alternatives will be investigated in the EIA:

- **The “do nothing” alternative:** The ‘do-nothing’ alternative is the option of not establishing a wind farm in St Helena Bay in the Western Cape Province.
- **Layout and design alternatives (site specific):** This includes placement / micro-siting for the turbines, varying turbine sizes from 0.85 MW to 3 MW and the alignment and placement of the transmission lines connecting the wind farm to the grid.
- **Associated Infrastructure:** The alignment of the various access roads.

The selection of the most suitable project alternatives will be based on the following principles:
• The opinion of the public, ascertained through the public consultation process;
• Specialists’ recommendations;
• Environmental constraints;
• Minimal environmental impacts;
• Optimisation of existing infrastructure, such as access roads;
• Technical and Feasibility Studies; and
• Economic cost-benefit analyses.

9.4 Conclusions and Recommendations

Based on the specialist studies no environmental fatal flaws have been identified to date. However, a number of potentially significant environmental impacts have been identified as requiring further in-depth study. Therefore, a detailed Environmental Impact Assessment is required to be undertaken in order to provide an assessment of these potential impacts and recommend appropriate mitigation measures, where required.

The terms of references for the detailed specialist studies required in the Impact Assessment phase of the project are included in the Plan of Study for EIA (Chapter 10).
10 PLAN OF STUDY FOR EIA

10.1 Introduction

This Draft Scoping Report was compiled in line with the requirements of the NEMA EIA Regulations and has provided a brief description of the pre-development biophysical and socio-economic environment of the broader region, a description of the nature and extent of the project, as well as the potential issues identified and evaluated to date in the scoping phase of the EIA. This provides the context for the Plan of Study for the impact assessment phase of the project. The Plan of Study describes how the impact assessment phase of the project will proceed and provides the terms of reference for specialists, the impact assessment methodology to be used to rate impacts as well as clearly indicating the deliverables of the impact assessment phase and the proposed timeframe.

Following acceptance of the Final Scoping Report, the detailed impact assessment phase of the EIA process commences. This phase considers the potential impacts identified for the proposed project on the environment taking into account the following:

- Potential impacts of the proposed project during the construction phase;
- Potential impacts of the proposed project during the operational phase; and
- The potential cumulative impacts of the proposed project.

10.2 Purpose of the Plan of Study for EIA

The Plan of Study for EIA sets out the proposed approach to the EIA. The following requirements of Regulation 28 of Government Notices R 543 promulgated in terms of section 24 of NEMA have been considered in compiling this Plan of Study for EIA:

- A description of the tasks that will be undertaken as part of the Environmental Impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken;
- An indication of the stages at which the competent authority will be consulted;
- A description of the proposed method of assessing the environmental issues and alternatives, including the no development option;
10.3 Detailed Impact assessment phase

10.3.1 Introduction

The purpose of the Impact assessment phase of an EIA is as follows (DEA, 2005):

- Address issues that have been raised during the Scoping phase;
- Assess alternatives to the proposed activity in a comparative manner;
- Assess all identified impacts and determine the significance of each impact; and
- Formulate mitigation measures in order to minimise negative impacts and optimise the effects of positive impacts.

Numerous acceptable approaches and methodologies exist by which the above purpose can be achieved. The legislation in South Africa, including the guideline documents published in support thereof, does not provide a specific methodology for the assessment of impacts. Rather, an assessment framework is provided within which Environmental Assessment Practitioners (EAPs) are expected to structure a project-specific assessment methodology. This assessment framework recognises that there are different methodologies available for assessing the impact of a development but that the specific methodology selected must provide for the following (DEA, 2005):

- A clear process for impact identification, prediction and evaluation;
- The specification of impact identification techniques;
- Criteria for evaluating the significance of impacts;
- The design of mitigation measures to address impacts;
- Defining types of impacts (direct, indirect or cumulative); and
- Specification of uncertainties.

This section of the Plan of Study for EIA serves to describe the manner in which Arcus GIBB, as the appointed EAP, intends undertaking the detailed impact assessment phase of the EIA process. To ensure consistency in the assessment, all the specialists will be required to make use of the same assessment methodology.
10.3.2 Impact Assessment Methodology

The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise because of the proposed St Helena Community Wind Farm Development and associated infrastructure. The process of assessing the potential impacts of the project encompasses the following four activities:

- Identification and assessment of potential impacts;
- Prediction of the nature, magnitude, extent and duration of potentially significant impacts;
- Identification of mitigation measures that could be implemented to reduce the severity or significance of the impacts of the activity; and
- Evaluation of the significance of the impact after the mitigation measures have been implemented i.e. the significance of the residual impact.

The possible impacts associated with the proposed St Helena Wind Farm are identified in the Scoping phase through public and stakeholder consultation, as well as through input from the authorities and the EIA team. These impacts are derived from the issues that are identified in respect of all phases of the development including the construction and operational phases. During the detailed Impact assessment phase of the EIA process, additional impacts will be identified through the various specialist studies to be undertaken and through the ongoing consultation process with I&APs.

In accordance with GNR 543, promulgated in terms of section 24 of NEMA, specialists will be required to assess the significance of potential impacts in terms of the following criteria:

- Cumulative impacts;
- Nature of the impact;
- Extent of the impact;
- Intensity of the impact;
- Duration of the impact;
- Probability of the impact occurring;
- Impact non-reversibility;
- Impact on irreplaceable resources;
- Confidence level; and
- Degree to which the impact can be mitigated
**Table 10.1** provides a summary of the criteria and the rating scales, which will be used in this regard. The assignment of a rating\(^1\) will be done based on past experience of the EIA team, the professional judgement of the specialists as well as through desktop research.

Once the potential impacts have been assessed in terms of the above criteria a consequence rating will be applied as per the convention in **Table 10.2**. The consequence of the potential impacts will be determined according to the main criteria for determining the consequence of impacts, namely the extent, duration and intensity of the impacts. This assessment will be done initially for the scenario where no mitigation measures are implemented. The professional experience of the specialists will determine the allocation of the pre-mitigation impact consequence rating.

The overall significance of the impacts will be defined based on the result of a combination of the consequence rating and the probability rating, as set out in

\(^1\) Cumulative impacts, impact non-reversibility, and impact on irreplaceable resources will together inform the impact intensity rating.
Table 10.3.

Mitigation measures will then be identified and considered for each impact and the assessment repeated in order to determine the significance of the residual impacts (the impact remaining after the mitigation measure has been implemented).

The criteria that will be used to determine the significance of the residual impacts will include the following:

- Probability of the mitigation measure being implemented; and
- Extent to which the mitigation measure will affect the assessment criteria in
Table 10.3.

The results of the assessment of the significance of the residual impacts will then be linked to decision-making by authorities in the following manner:

- **Low** – will not have an influence on the decision to proceed with the proposed project, provided that recommended mitigation measures are implemented;

- **Medium** – should influence the decision to proceed with the proposed project, provided that recommended mitigation measures are implemented; and

- **High** – would strongly influence the decision to proceed with the proposed project regardless of the implementation of recommended mitigation measures.
Table 10.1: Impact assessment Criteria and Rating Scales

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Rating Scales</th>
</tr>
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</table>
| Cumulative impacts (incremental impacts of the activity and other past, present and future activities on a common resource) | • Low (there is still significant capacity of the environmental resources within the geographic area to respond to change and withstand further stress)  
• Medium (the capacity of the environmental resources within the geographic area to respond to change and withstand further stress is reduced)  
• High (the capacity of the environmental resources within the geographic area to respond to change and withstand further stress has been or is close to being exceeded) |
| Nature | • Positive  
• Negative  
• Neutral |
| Extent (the spatial limit of the impact) | • Local (site-specific and/or immediate surrounding areas)  
• Regional (Western Cape / TWK Municipality)  
• National or beyond |
| Intensity (the severity of the impact) | • Low - where the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected  
• Medium - where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected  
• High - where natural, cultural or social functions and processes are altered to the extent that it will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected |
| Duration (the predicted lifetime of the impact) | • Short-term (0 to 5 years)  
• Medium term (6 to 15 years)  
• Long term (16 to 30 years) - where the impact will cease after the operational life of the activity either because of natural processes or by human intervention |
| Probability (the likelihood of the impact occurring) | • Improbable – where the possibility of the impact occurring is very low  
• Probable – where there is a good possibility (<50 % chance) that the impact will occur  
• Highly probable – where it is most likely (50-90 % chance) that the impact will occur  
• Definite – where the impact will occur regardless of any prevention measures (>90 % chance of occurring) |
| Non-Reversibility (ability of the impacted environment to return to its pre-impacted state once the cause of the impact has been removed) | • Low (impacted natural, cultural or social functions and processes will return to their pre-impacted state within the short-term)  
• Medium (impacted natural, cultural or social functions and processes will return to their pre-impacted state within the medium to long term)  
• High (impacted natural, cultural or social functions and processes will never return to their pre-impacted state) |
| Impact on irreplaceable\(^2\) resources (is an irreplaceable resource impacted upon) | • Yes  
• No |
| Confidence level (the specialist’s degree of confidence in the) | • Low  
• Medium  
• High |

\(^2\) A resource for which no reasonable substitute exists, such as Red Data species and their habitat requirements
### Table 10.2: Convention for Assigning a Consequence Rating

<table>
<thead>
<tr>
<th>Consequence Rating</th>
<th>Intensity, Extent and Duration Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HIGH</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Consequence        | • High intensity at a **regional level** and endure in the **long term**  
|                    | • High intensity at a **national level** and endure in the **medium term**  
|                    | • Medium intensity at a **national level** and endure in the **long term**  
|                    | • High intensity at a **regional level** and endure in the **medium term**  
|                    | • High intensity at a **national level** and endure in the **short term**  
|                    | • Medium intensity at a **national level** and endure in the **medium term**  
|                    | • Low intensity at a **national level** and endure in the **long term**  
|                    | • High intensity at a **local level** and endure in the **long term**  
|                    | • Medium intensity at a **regional level** and endure in the **long term**  |
| **MEDIUM**         |                                      |
| Consequence        | • High intensity at a **local level** and endure in the **medium term**  
|                    | • Medium intensity at a **regional level** and endure in the **medium term**  
|                    | • High intensity at a **regional level** and endure in the **short term**  
|                    | • Medium intensity at a **national level** and endure in the **short term**  
|                    | • Medium intensity at a **local level** and endure in the **medium term**  
|                    | • Medium intensity at a **local level** and endure in the **long term**  
|                    | • Low intensity at a **national level** and endure in the **medium term**  
|                    | • Low intensity at a **regional level** and endure in the **long term**  |
| **LOW**            |                                      |
| Consequence        | • Low intensity at a **regional level** and endure in the **medium term**  
|                    | • Low intensity at a **national level** and endure in the **short term**  
|                    | • High intensity at a **local level** and endure in the **short term**  
|                    | • Medium intensity at a **regional level** and endure in the **short term**  
|                    | • Low intensity at a **local level** and endure in the **long term**  
|                    | • Low intensity at a **local level** and endure in the **medium term**  
|                    | • Low intensity at a **regional level** and endure in the **short term**  
|                    | • Low to medium intensity at a **local level** and endure in the **short term** |
Table 10.3: Convention for Assigning a Significance Rating

<table>
<thead>
<tr>
<th>Consequence Rating</th>
<th>Consequence x Probability</th>
</tr>
</thead>
</table>
| **HIGH** Significance | • High x Definite  
                        | • High x Highly Probable  
                        | • High x Probable  
                        | • High x Improbable  
                        | • Medium x Definite |
| **MEDIUM** Significance | • Medium x Highly Probable  
                        | • Medium x Probable |
| **LOW** Significance | • Medium x Improbable  
                        | • Low x Definite  
                        | • Low x Highly Probable  
                        | • Low x Probable  
                        | • Low x Improbable |

10.3.3 Consideration of Alternatives

The following project alternatives will be investigated in the EIA:

- **The “do nothing” or ‘no-go’ alternative:** The ‘do-nothing’ alternative is the option of not establishing a community wind farm in St Helena Bay in the Western Cape Province.
- **Layout and design alternatives (site specific):** This includes micro-siting (positioning) for the turbines, varying turbine sizes from 0.85 MW to 3 MW and the alignment and placement of the transmission lines connecting the wind farm to the grid.
- **Associated Infrastructure:** The alignment of the various access roads.

The selection of the most suitable project alternatives will be based on the following principles:

- The opinion of the public, ascertained through the public consultation process;
- Specialists’ recommendations;
- Environmental constraints;
- Minimal environmental impacts;
- Optimisation of existing infrastructure, such as access roads and power lines;
- Technical and feasibility Studies; and
- Economic cost-benefit analyses.

10.3.4 Assessment of Potential Impacts

Based on the findings of the scoping phase, the issues presented in Table 10.4 below were identified as requiring further investigation within the Impact assessment phase. The specialists involved in the EIA are also reflected in Table 10.4. These specialist
studies will consider the site proposed for the development of the wind farm and associated infrastructure, as well as all of the project alternatives. The ToR for the specialist studies is provided in Section 10.4 below.

**Table 10.4:** Summary of issues which require further investigation in the Impact assessment phase

<table>
<thead>
<tr>
<th>Specialist Study</th>
<th>Potential Impact</th>
<th>Specialist Name</th>
</tr>
</thead>
</table>
| Ecological Assessment (Fauna and Flora) | • Impacts on habitats of threatened fauna  
• Impacts due to collision of bats with infrastructure  
• Impacts on threatened plants  
• Impacts on protected tree species  
• Impacts on indigenous natural vegetation  
• Impacts on wetlands  
• Change in runoff and drainage patterns  
• Establishment and spread of declared weeds and alien invader plants  
• Increased risk of veld fires | David Hoare of David Hoare Consulting CC |
| Avifauna Assessment                     | • Collision mortality on the wind turbines  
• Collision with the proposed power line  
• Displacement due to disturbance  
• Displacement caused by habitat transformation. | Chris van Rooyen of Chris van Rooyen Consulting |
| Geotechnical Investigation              | • The overall geotechnical assessment undertaken in the scoping phase concluded that the site is highly favourable for the operation of a wind farm and that detailed geotechnical investigations are not required for the assessment of environmental impacts, but should be undertaken to provide detailed information for engineering design once final locations and routes are confirmed. | Jon McStay of WSP |
| Social Assessment                       | Impacts on local communities and individuals:  
• Potential impact on rural sense of place (this will be closely linked to the visual impacts);  
• Potential negative impact on tourism, both locally and regionally (this will be closely linked to the visual impacts from routes | Tony Barbour of Tony Barbour Environmental Consultants |
currently serving a scenic/touristic function, specifically the MR 533 and R 399);

- Potential impact on property prices in the area;
- 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;
- Potential opportunities for the Seeland Development Trust and the community of Laingville to benefit from the proposed development;
- Potential impact on tourism;
- Traffic impacts associated with the construction phase and impact on local residents and tourists;
- Cumulative impact, specifically visual and associated impact on rural sense of place and the landscape character of the area;
- Provision of clean, renewable energy source for the national grid.

Impact on farmers on and adjacent to the site:

- 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 farm infrastructure (during the construction and operational phase);
- Potential damage to roads by heavy equipment and increased traffic volumes (during the construction and operational
<table>
<thead>
<tr>
<th>Phase</th>
<th>Impact Description</th>
<th>Assessment Person(s)</th>
</tr>
</thead>
</table>
| Heritage Assessment | • Impacts to pre-colonial archaeology  
• Impacts to colonial period heritage.  
• Impacts to cultural landscape and sense of place.  
• Paleontological impacts  
• Impacts on the built environment | Lita Webley/Tim Hart of University of Cape Town |
| Noise Assessment | • Road traffic noise from the transportation of equipment and goods to the site.  
• Noise from the assembly of the wind turbines.  
• Noise from the operation of the wind turbines. | Demos Dracoulides of DDA Environmental Engineers |
| Visual Assessment | • Potential visibility of the wind turbines from tourism-orientated towns in the vicinity, including Velddrif;  
• Potential visibility of the proposed wind turbines to the south from the towns of Saldanha, Vredenburg and Langebaan;  
• Potential visibility of the proposed wind turbines from the West Coast National Park;  
• The degree to which increased distance from the proposed wind turbine site mitigates the visual impact, in spite of the fact that the turbines will be situated on one of the highest points in the landscape and will be visible against the skyline;  
• The degree to which the hills to the north of the site for the proposed wind turbines screen the turbines from the settlements around the northern and western side of the peninsula, between Laingville and Paternoster;  
• Potential cumulative impacts of the proposed wind farm when considered together with other possible wind farm proposals in this region;  
• The increase in the visual impact required by the potential requirement for red and | Reuben Heydenrych of Arcus GIBB |
white colouring of the wind turbine masts for aeronautical purposes;
• The optimal placing of the wind turbines and the number of wind turbines to mitigate the visual impact.

10.3.5 Public Participation Process (PPP)

Ongoing consultation with all stakeholders and registered I&APs will continue beyond the approval of the Scoping Report into the impact assessment phase of the EIA process. Consultation will continue in the form of the following:

• Maintaining an open channel of communication with all stakeholders and authorities;
• Distribution of all project information and findings to registered I&APs;
• Public information sharing meeting on completion of the Draft EIR;
• Commenting period on the Draft EIR prior to submission of the report to the authorities; and
• Information in the media and press (if required).

10.3.6 Environmental Impact Report

The contents of the Environmental Impact Report (EIR) will include the following:

• Details and expertise of the EAP to undertake an EIA;
• Detailed description of the proposed activity;
• Detailed description of the property on which the activity is to be undertaken and the location of the activity on the property;
• 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 PPP conducted during the detailed assessment phase of the EIA process;
• A description of the need and desirability of the proposed activity 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 any specialist report or report on specialised process;

• 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 issues could be addressed by the adoption of mitigation measures;

• An assessment of each identified potentially significant impact in terms of cumulative impacts, the nature of the impact, the extent and duration of the impact, the probability of the impact occurring, the degree to which the impact can be reversed, the degree to which the impact may cause irreplaceable loss of resources and the degree to which the impact can be mitigated;

• A description of any assumptions, uncertainties and gaps in knowledge;

• A reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;

• An environmental impact statement which contains a summary of the key findings of the environmental impact assessment, a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives;

• A draft Environmental Management Plan (EMP);

• Copies of any specialist reports and reports on specialised processes; and

• Any specific information that may be required by the competent authority.

10.3.7 Draft Environmental Management Plan (EMP)

During the compilation of the EIA Report, a draft EMP will be compiled in accordance with the NEMA EIA Regulations. The draft EMP will provide the actions for the management of identified environmental impacts emanating from the proposed project and a detailed outline of the implementation programme to minimise and/ or eliminate the anticipated negative environmental impacts. The draft EMP will provide strategies to be used to address the roles and responsibilities of environmental management personnel on site, and a framework for environmental compliance and monitoring. The draft EMP will be included as part of the EIR.

The EMP will include the following:

• Details and expertise of the person who prepared the EMP;

• Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that are identified in the Environmental Impact Report (EIR), including environmental impacts or objectives in respect of planning and design, pre-construction and construction activities, operation or undertaking of the activities, rehabilitation of the environment and closure where relevant;
- A detailed description of the aspects of the activity that are covered by the draft EMP;
- An identification of the persons who will be responsible for the implementation of the measures;
- Proposed mechanisms for monitoring compliance with the EMP and reporting thereon;
- As far as possible, measures to rehabilitate the environmental affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development, including where appropriate concurrent or progressive rehabilitation measures;
- A description of the manner in which it intends to modify, remedy activities causing pollution or environmental degradation and how it will comply with prescribed environmental management standards and provision of any relevant Acts;
- Time periods within which the measures contemplated in the EMP must be implemented;
- The process for managing any environmental damage, pollution, ecological degradation as a result of undertaking a listed activity;
- An environmental awareness plan describing the manner in which the applicant will inform his or her employees of environmental risk and how risk must be dealt with to avoid pollution; and
- Where appropriate, closure plans, including closure objectives.

10.3.8 Public Review of EIR and EMP

The Draft EIR will be distributed to suitable public venues with comment sheets, which will be collected at the end of the comment period. I&APs will be informed of the location and contact details of the public venues.

A commenting period of at least 40 days will be provided for I&APs to comment on the Draft EIR. Comments on the Draft EIR will be captured and responded to in the updated IRR. A Revised Draft EIR will be compiled should the comments suggest that substantial amendments to the document will be necessary and this Revised Draft EIR will be circulated. Thereafter, the Draft EIR will be finalised into a Final EIR, which will be submitted to the DEA for their review. All registered I&APs will be informed of the availability of the Final EIA Report. Any comments received on the Final EIA Report will be submitted directly to the DEA for their review and consideration.

10.3.9 Consultation with the DEA

It is envisaged that consultation with the DEA will coincide with the compilation of the following key documents:

- Scoping Report and Plan of Study for EIA;
10.3.10 Proposed Project Programme for the EIA

The programme for the EIA suggests the following timeframes with respect to the most important activities to be undertaken:

- Submission of the Final Scoping Report to the DEA – June 2011;
- Submission of the Draft EIR for public comment – September to October 2011;
- Submission of the Final EIR to the DEA – November 2011.

The EIA process is iterative by nature and it should therefore be appreciated that the above dates are provided as guidance only and are subject to change.

10.4 Terms of Reference for Specialist Studies

A team of seven (7) specialists will be involved in the detailed impact assessment phase of the EIA process. A summary of the specialist studies and the proposed specialist responsible for that study is provided in Table 10.5 below.

Table 10.5: Specialist Studies to be undertaken during the impact assessment phase of the project

<table>
<thead>
<tr>
<th>Specialist Study</th>
<th>Name of Specialist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flora Impact Assessment</td>
<td>David Hoare of David Hoare Consulting CC</td>
</tr>
<tr>
<td>Fauna Impact Assessment</td>
<td>David Hoare of David Hoare Consulting CC</td>
</tr>
<tr>
<td>Avifauna Impact Assessment</td>
<td>Chris van Rooyen of Chris van Rooyen Consulting</td>
</tr>
<tr>
<td>Geotechnical Study</td>
<td>Jon McStay of WSP</td>
</tr>
<tr>
<td>Social Impact Assessment</td>
<td>Tony Barbour of Tony Barbour Environmental</td>
</tr>
<tr>
<td>Heritage Impact Assessment</td>
<td>Dr. Lita Webley/ Tim Hart of UCT</td>
</tr>
<tr>
<td>Noise Impact Assessment</td>
<td>Demos Dracoulides of DDA Environmental Engineers</td>
</tr>
<tr>
<td>Visual Impact Assessment</td>
<td>Reuben Heydennych of Arcus GIBB</td>
</tr>
</tbody>
</table>

The scope of each of the above individual studies is provided in this section of the Plan of Study for EIA.

10.4.1 General Terms of Reference for all Specialist Studies

In April 2006, the Department of Environmental Affairs and Tourism (DEAT), now known as the Department of Environment Affairs (DEA) issued guidelines for involving specialists in EIA processes. The specialists should make themselves
aware of these guidelines and amendments thereof, as well as any other guidelines, codes, standards, or applicable legislation relative to their field of expertise, and will utilise them to more precisely determine methods and approaches to their specialist studies and will reference compliance with the above-mentioned requirements accordingly. Specialists are also expected to consider best practise when undertaking their study.

The assessment of impacts should be broadly undertaken in accordance with the guidelines provided in the Guideline Document: EIA Regulations (DEA, 1998), NEMA principles, Section 24(4) of NEMA (as amended) and both the DEA and the Western Cape Department of Environmental Affairs and Development Planning (WC DEADP) guideline documents as appropriate to the specific field of study. In addition, the following General Terms of Reference apply to each of the specialist studies:

- Attend a one day site visit;
- Design and undertake the specialist study in accordance with the specifications provided;
- Describe the baseline conditions that exist in the study area and identify any sensitive areas that would need special consideration;
- Provide an outline of the approach used in the study;
- Assessment of all project alternatives including the no-go alternative;
- Identify, assess and evaluate the possible impacts of the wind farm, transmission lines and associated infrastructure during all development phases (construction and operation) of the proposed project;
- Identify and assess any cumulative impacts arising from the proposed project;
- Determine the significance of assessed impacts according to the methodology provided by the Environmental Assessment Practitioner (EAP) and provide a revised significance rating of assessed impacts after the implementation of mitigation measures (Schedule 5);
- Undertake field surveys, as appropriate to the requirements of the particular specialist study;
- Identify areas where integration of studies with other specialists would ensure a better assessment and coordinate with other specialists in this regard;
- Apply the precautionary principle in the assessment of impacts, in particular where there is major uncertainty, low levels of confidence in predictions and poor data or information;
- Recommend practicable mitigation measures to minimise or eliminate negative impacts and/or enhance potential project benefits;
- Recommend appropriate auditing, monitoring and review measures;
- Compile all information into a stand-alone report according to the format provided by Arcus GIBB; and
- All specialist studies must take cognisance of and comply with the relevant guideline documents applicable to that specialist study.

10.4.2 Specific Terms of Reference

The specific terms of reference for all specialist studies are presented below:
(a) Flora and Fauna Assessment

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 St Helena Community Wind Farm:

- The vegetation status in different parts of the site will be confirmed. This is due to the fact that large parts of the site have been previously cultivated and it is important to identify any remaining patches of natural vegetation on site.
- 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.
- Searches will be undertaken in the thicket in the drainage lines to determine whether any protected trees occur on site or not. The species that is likely to occur on site is Sideroxylon inerme (white milkwood), but other species may also occur.
- The identity of any alien woody plants in and around the site will be documented.
- The potential presence of species of concern will be evaluated during the EIA phase. This will be done by assessing habitat suitability for those plant and animal species of conservation concern that have been assessed as potentially occurring in the area. The lists provided in this Scoping Report will form the basis for this assessment. Particular attention will be paid to those plant and animal species classified as threatened (VU, EN or CR), Near Threatened or Critically Rare, including 52 plant species and nine animal species. It must be noted that this assessment does not constitute a detailed search for these species, which requires separate specialist studies, if required, as indicated in the Flora and Fauna recommendations.

(b) Avifaunal Impact Assessment

The following methodology will be applied for the bird impact assessment study for the EIA phase of the project:

- An additional site visit will be undertaken to supplement the monitoring of bird habitat, populations and flight patterns that has commenced with the scoping phase.
- Additional information on avifaunal occurrence and habitat use will be gathered from local experts, particularly the West Coast Bird Club and ornithologists working on other proposed wind farm developments in the St Helena Bay area.
- The potential impacts on avifauna will be assessed according a set of assessment criteria provided by the Environmental Impact Assessment practitioner.
- Sensitive bird habitat will be mapped.
- The need for a pre-construction monitoring programme will be assessed and a recommendation will be made in this respect.

(c) Social Impact Assessment
The approach to the Social Impact Assessment (SIA) study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February, 2007). These guidelines are based on international best practice and have also been endorsed by DWEA. The key activities in the SIA process embodied in the guidelines include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, location), the communities likely to be affected and determining the need and scope of the SIA;
- Collecting baseline data on the current social environment and historical social trends;
- Identifying and collecting data on the Social Impact Assessment variables and social change processes related to the proposed intervention. This requires consultation with affected individuals and communities;
- Assessing and documenting the significance of social impacts associated with the proposed intervention;
- Identifying alternatives and mitigation measures.

In this regard the study will include:

- Review of demographic data from the 2001 Census Survey and other relevant sources, including local IDP documents etc;
- Review of relevant planning and policy frameworks for the area, including the Western Cape Provincial SDF;
- Site specific information collected during the site visits to the area;
- Review of information from similar projects;
- Interviews with key interested and affected parties and stakeholders;
- Identification of social issues associated with the proposed project;
- Identification of potential mitigation and or enhancement measures.

The detailed public consultation process will be undertaken during the EIA phase of the project. Issues raised through this process will feed into the SIA for the proposed power lines.

(d) Heritage Impact Assessment

The following methodology will be applied for the heritage impact assessment study for the EIA phase of the project:

- A field survey to determine whether heritage resources will be impacted during the construction, maintenance and decommissioning of the wind farm;
- Recommendations for mitigation of any impacts;
- Mitigation (Phase 2 Archaeological Impact Assessment) may include test excavations with a permit issued by Heritage Western Cape;
- A Final HIA report.

The EIA phase study needs to fulfill the requirements of heritage impact assessment as defined in section 38 of the NHRA. This means that the assessment has to cover the full range of potential cultural heritage as defined by the term “culture” contained in the National Heritage Resources Act 25 of 1999.
**Palaeontological material**
While the recovery of fossil material is unlikely (Pether & Almond 2008) on the top of the Patrysberg, it is possible that the EMP may require a professional palaeontologist to undertake periodic monitoring of the excavations for the turbines.

**Archaeological heritage**
The proposed study area needs to be subject to a detailed survey by an archaeologist who will need to walk a pattern of transects over the site recording details and locations of any heritage material found. The significance of each find will need to be assessed along with the impacts of the proposed activity. A field survey will determine the presence of surface archaeological material (pre-colonial and colonial). It is expected that mitigation through avoidance of sensitive areas may be possible. Adjustments to turbine footings, deviations in service trenches, road alignments or power line towers may be all that is required. If for any reason mitigation by avoidance is not feasible, a Phase 2 Archaeological Impact Assessment may be required.

A Phase 2 Archaeological Impact Assessment includes the recording and sampling of the archaeological site (with a permit issued by Heritage Western Cape), before its destruction is permitted. The costs of the test excavations are for the developer.

**Un-identified archaeological material, fossils and fossil bone**
There is always a chance that archaeological material may be exposed during bulk excavation for services and foundations. All archaeological material over 100 years of age is protected and may only be altered or removed from its place of origin under a permit issued by Heritage Western Cape (HWC). In the event of anything unusual being encountered, the HWC archaeology unit must be consulted immediately so that mitigation action can be determined and be implemented if necessary (find-stop scenario). Mitigation is at the cost of the developer, while time delays and diversion of machinery/plant may be necessary until mitigation in the form of conservation or archaeological/palaeontological sampling is completed.

**Built Environment**
The Langeklip farmstead falls within the study area being considered for the proposed wind energy facility. It is not expected that the farm buildings and possible graveyard, comprising the built environment, will be directly impacted by the proposal unless it becomes necessary to demolish structures that are greater than 60 years of age. It is important to note that the CNdV (2006) draft recommendations have proposed a buffer zone between the placement of turbines and heritage sites. It may therefore be necessary to move turbine locations to avoid visual impacts on the built environment.

**Cultural Landscape and Sense of Place**
This is perhaps the most difficult heritage impact to address. There is no doubt that the wind turbines will affect the landscape qualities of the site, however the degree of impact will be very closely related to the visual impacts of the proposed activity (the visual impact will be separately addressed). The locating of
infrastructure close to historical farms and settlements may result in impacts to the quality of the place and detract from sense of history and/or wilderness. From this perspective the layout of the facility will need to respond to the findings of the heritage impact component of the EIA along with close input from the visual specialist.

(e) Noise Impact Assessment

The noise impact assessment study of the EIA phase will:

- Determine the existing noise levels within and around the perimeter of the proposed wind farm site, as well as in the surrounding communities and sensitive receptors in the extended area.
- Create a representative 3-dimensional noise model, in order to simulate the sound propagation and determine the resulting sound levels due to the proposed project.
- Determine the noise impacts based on the current Western Cape legislation and international guidelines.
- Identify potential noise emission reduction opportunities and cost-effective emission abatement strategies for the construction and operational phases of the project.
- Provide recommendations regarding the optimum turbine sitting, noise monitoring positions and the establishment of a noise monitoring programme.

Study Methodology

The baseline noise study will be based on noise measurements in accordance with the current Western Cape Noise Control Regulations, as well as SANS 10103:2008 and SANS 10328:2008.

An initial assessment of the site will be performed, in order to determine the optimum selection of the noise measurement points. The noise measurements will be made during daytime and night-time hours, in order to generate results comparable to legislation and the Codes applicable at the time of the survey. All measurements will be A-weighted equivalent sound pressure levels obtained with I-time weighting or those required by the applicable standard. The occurring maximum and minimum levels during the measurement period will also be recorded. Abnormal disturbances, such as loud noise generation in close proximity or sudden noise bursts that affect the measurement, will be discarded.

For the modelling of the 3-dimensional sound propagation, the internationally recognised CADNA software will be used. The noise contours from all the noise sources will be generated for day- and night-time conditions. This will enable various scenarios to be realised and tested to optimise layouts of potentially noisy activities and equipment and determine the resulting noise levels in the extended area.

The model utilises standard and user-defined sound power profiles, as well as detailed terrain elevations and potential site buildings as input. The profile and noise calculation algorithms are based on several guidance documents that
address atmospheric absorption, noise attenuation and screening, in accordance with the SANS Codes.

The main output from the model will be noise exposure contours for land use compatibility mappings and impact assessment. The model supports 16 different pre-defined noise metrics such as A-Weighted, C-Weighted, and user-defined metrics may also be created from these families.

The noise levels at specific positions, such as dwellings, guest houses or other sensitive locations can also be predicted. For these grid points, the model reports detailed information to the analyst for the determination of the cumulative noise levels and noise impact at each location.

The predicted noise levels will then be compared against current legislated limits, as well as local and international guidelines, in order to quantify the noise impacts in the surrounding areas. Based on the expected locations with maximum impact, an appropriate noise monitoring programme will be presented, in order to ensure future compliance with noise guidelines.

(i) Visual Impact Assessment

Terms of Reference for the impact assessment phase are based on the findings of the site visit, as well as interpretation of the guideline document for VIAs (Oberholzer 2005) commissioned by the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP).

In terms of this guideline document, the depth and scope of a VIA is based on a combination of the sensitivity of the environment and the nature of the existing environment. The type of environment and type of development and both divided into five categories, which are indicated in a matrix (Table 1 from Oberholzer 2005). The category of development is based on Box 3 from the same document (see below).
It is clear from the above that wind farms are categorised as Category 5 developments, and accordingly for the landscape in the study area, which is regarded to be of medium scenic significance, the development can be expected to result in a development of high visual impact.

Accordingly, the level of VIA that would be required, based on the expected level of impact (obtained from Table 1), is determined by Table 2 (see below).
Table 2: Categorisation of approaches used for visual assessment

<table>
<thead>
<tr>
<th>Approach</th>
<th>Type of issue (see Box 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Little or no visual impact expected</td>
</tr>
<tr>
<td>Level of visual input</td>
<td>Level 1 visual input</td>
</tr>
<tr>
<td>recommended</td>
<td>Level 2 visual input</td>
</tr>
<tr>
<td></td>
<td>Level 3 visual assessment</td>
</tr>
<tr>
<td></td>
<td>Level 4 visual assessment</td>
</tr>
</tbody>
</table>

The approach required for a Level 4 VIA includes the following:

- Identification of issues raised in the scoping phase, and site visit;
- Description of the receiving environment and the proposed project;
- Establishment of view catchment area, view corridors, viewpoints and receptors;
- Indication of potential visual impacts using established criteria;
- Inclusion of potential lighting impacts at night;
- Description of alternatives, mitigation measures and monitoring programmes.
- Review by independent, experienced visual specialist (if required);
- Complete 3D modelling and simulations, with and without mitigation; and
- Review by independent, experienced visual specialist (if required).

10.5 Conclusion

This Plan of Study for EIA is aimed at meeting the requirements of the EIA Regulations as a minimum.

The methodologies proposed for obtaining the information required to effectively identify and assess the potential environmental impacts of the project are considered to be comprehensive and sufficient to allow for the compilation of an EIR which addresses I&AP concerns and which will provide the competent authority with the appropriate information necessary to allow for informed decision-making on the application for authorisation.