LIST OF TABLES

LIST OF PLATES

LIST OF ACRONYMS AND ABBREVIATIONS

ASGISA:	Accelerated Shared Growth Initiative for South Africa
BBBEE:	Broad Based Black Economic Empowerment
BID:	Background Information Document
BPEO:	Best Practice Environmental Option
CARA:	Conservation of Agricultural Resources Act
CES:	Coastal and Environmental Services
CITES:	Committee for International Trade in Endangered Species
DEA:	Department of Environmental Affairs
DEAT:	Department of Environmental Affairs and Tourism
DMS:	Degrees, Minutes, Seconds
DSR:	Draft Scoping Report
DWA:	Department of Water Affairs
DWAF:	Department of Water Affairs and Forestry
EAP:	Environmental Assessment Practitioner
EC:	Eastern Cape
ECDC:	Eastern Cape Development Corporation
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment
EIR:	Environmental Impact Report
EMP:	Environmental Management Plan
FSR:	Final Scoping Report
GDP:	Gross Domestic Product
GNR:	Government Notice Regulation
ha:	Hectare
I&APs:	Interested and Affected Parties
IBA:	Important Bird Area
IDP:	Integrated Development Plan
IDZ:	Industrial Development Zone
IPP:	Independent Power Producer
IUCN:	International Union for Conservation of Nature
Kv:	Kilovolt
Ltd:	Limited
MW:	Megawatt
NEMA:	National Environmental Management Act 107 of 1998
NERSA:	National Energy Regulator of South Africa
PGDP:	Provincial Growth and Development Plan
PoS:	Plan of Study
PNCO:	Provincial Conservation Ordinance
PPA:	Power Purchase Agreement
PPP:	Public Participation Process
RDB:	Red Data Book
REFIT:	Renewable Feed In Tarriff
REPA:	Renewable Energy Purchasing Agency
SABAP2:	South African Bird Atlas Project 2
SSC:	Species of Special Concern
STEP:	Sub-tropical Thicket Ecosystem Planning
WfW:	Working for Water
WT:	Wind Turbine

1 INTRODUCTION

1.1 Background to the Study

Terra Power Solutions (Pty) Limited (TPS) - a renewable energy company and General Electric International (Benelux) B.V. the largest wind turbine manufacturer in the world, formed a joint development company – Terra Wind Energy-Golden Valley (Pty) Ltd, which plans to develop a wind power generation facility (known as a 'wind farm') on the eleven farms: Olive Wood Estate, Olive Fonteyn, Quaggas Kuyl, Lushof, Kroonkop, Oude Smoor Drift, Maatjiefontein, Leuwe Drift, Gedagtenis, Varkens Kuyl and Wagenaarsdrift all found around Cookhouse, located in the Blue Crane Route Local Municipality (BCRM) in the Eastern Cape Province of South Africa.

As described in the Background Information Document (BID) and Newspaper Advertisements, the proposed project had originally been planned to host between 150-200 turbines, each with a nominal power output ranging between 1.5 and 2.5 Megawatts (MW). The total potential output of the wind farm would have been 300MW with the wind farm covering an area of approximately 29 400 hectares (ha). **Please note** that the proposed project is now planned to host 214 turbines (as per the *Final Scoping Report: Proposed Cookhouse Wind Energy Project, Blue Crane Route Local Municipality*. CES, Grahamstown dated December 2009), each with a nominal power output of 2.5MW. The total potential output of the wind farm will therefore be 500 MW but the wind farm will still cover the same area of approximately 29 400 ha.

In accordance with the requirements of the National Environmental Management Act (Act No 107 of 1998) (NEMA), and relevant EIA regulations made in terms of this Act and promulgated in April 2006 (Government Notice No 385), and listed activities under (Government Notice Nos 386 and 387), the proposed project requires a full Scoping and Environmental Impact Assessment (EIA).

Coastal & Environmental Services (CES) have been appointed by Terra Wind Energy-Golden Valley (Pty) Limited as Environmental Assessment Practitioner (EAP) to conduct the EIA.

1.2 The Environmental Impact Assessment Process

The International Association for Impact Assessment (1999) defines an Environmental Impact Assessment (EIA) as, "*the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made*."

The EIA process is guided by regulations made in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998) (NEMA), published as Government Notice No R.385 in Government Gazette No 28753 of 21st April 2006. The regulations set out the procedures and criteria for the submission, processing and consideration of and decisions on applications for the environmental authorisation of activities. Two lists of activities, published on 21st April 2006, as Government Notices No R.386 and R.387, define the activities that require, respectively, a Basic Assessment (applies to activities with limited environmental impacts), or a full Scoping and Environmental Impact Assessment (applies to activities which are significant in extent and duration).

The activities triggered by the proposed Terra Wind Energy-Golden Valley Project are listed in Table 1-1. Because the proposed development triggers a number of listed activities from GNR.387 it will require a full Scoping and Environmental Impact Assessment. This process (Figure 1-1) is regulated by Chapter 3, Part 3 of the EIA regulations. The EIA process is divided into two main phases, which are the Scoping Phase and the Environmental Impact Assessment Phase. Provided in Sections 1.2.1 and 1.2.2 below is a description of the EIA process undertaken for the proposed project. However, a detailed description of the EIA process in general is provided in Appendix B of this report.

Table 1-1: Amended listed activities triggered by the proposed Terra Wind Energy Golden Valley Project

Number and date of the relevant notice	Activity No(s)	Description of listed activity
GN No R.387 21st April 2006	1 (a)	The construction of facilities or infrastructure, including associated structures or infrastructure, for – (b) The generation of electricity where – (i) the electricity output is 20 megawatts or more; or (ii) the elements of the facility cover a combined area in excess of 1 hectare.
	1 (l)	The transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more; (the need for above ground cables is uncertain at this stage but has been included for completeness)
	2	Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more;
GN No R.386 21st April 2006	1(m)	any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including – (vi) canals; (vii) channels; (viii) bridges; (ix) dams; and (x) weirs
	7	The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30m³ but less than 1 000m³ at any one location or site.
	12	The transformation or removal of indigenous vegetation of 3 ha or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004).
	14	The construction of masts of any material of type and of any height, including those used for telecommunications broadcasting and radio transmission, but excluding (d) masts of 15m and lower exclusively used (i) by radio amateurs; or (ii) for lighting purposes (e) flagpoles; and (f) lightning conductor poles
	15	The construction of a road that is wider than 4 metres or that has a road reserve wider than 6 metres, excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 metres long.
	16 (a)	The transformation of undeveloped, vacant, or derelict land to residential, mixed, retail, commercial, industrial or institutional use where such development does not constitute infill and where the total area to be transformed is bigger than 1 hectare.

1.2.1 Scoping Phase

The main aim of the Scoping phase of an EIA is to inform the public of the proposed project and EIA process as well as to identify issues and concerns that need to be addressed in the Environmental Impact Assessment (EIA) phase of the EIA process. The Scoping phase therefore has the following key objectives –

- To encourage and allow for the involvement of Interested and Affected Parties (I&APs) in the identification of issues;

- To identify reasonable alternatives;
- To ensure that all key issues and environmental impacts that will be generated by the proposed project are identified; and
- To identify any Fatal Flaws.

The full involvement of Interested and Affected Parties (I&APs) in the process ensures an open participatory approach to the study. It also ensures that all the impacts are identified and that planning and decision-making are done in an informed, transparent and accountable manner.

The Scoping Phase for the proposed project took place between September and December 2009. The Draft Scoping Report (DSR) was distributed to Interested and Affected Parties (I&APs) for comment for a period of just over four weeks between 30 October and 30 November 2009. Comments and the appropriate responses were included into the Final Scoping Report (FSR) which was submitted together with a Plan of Study (PoS) for the detailed EIR phase to the competent authority that must consider and decide on the application for authorisation. More specifically, the FSR and PoS were submitted to the National Department of Environmental Affairs (DEA), formerly the Department of Environmental Affairs and Tourism (DEAT), for review and comment on 8 December 2010. DEAT acknowledged receipt of the FSR and PoS on 15 January 2010.

A detailed description of the scoping phase for the proposed Terra Wind Energy-Golden Valley Project and the outcomes thereof are included in **Volume 1: "*Final Scoping Report: Proposed Cookhouse Wind Energy- Project , Blue Crane Route Local Municipality*" (CES, December 2009).**

Following review of the FSR, DEA issued their approval of the FSR and PoS for EIA and instructed the EAP to proceed with the EIA Process as contemplated in the PoS on 12 February 2010.

Please note that the EIR contains an amended list of activities for which authorisation is sought. The updated list of activities is presented in Table 1-1 above. In terms of R386 additional activities are: 1(m), 7, 12 and 14. The activities in terms of R387 remain the same as reported in the FSR.

Table 1-2: The main issues and concerns raised during the scoping phase of the proposed Terra Wind Energy-Golden Valley Project included but were not limited to:-

Issue	Question/statement
Electricity supply	How will we be getting the electricity?
	Will you be building a power line from the farms to Poseidon?
	Will the electricity always be coming from the wind farm for the local system?
Visual	What will the visual impact of the facility be, especially in terms of the effect on tourism development in the area?
Construction	Will a thorough assessment of the wind resources be conducted prior to construction of the facility to avoid the perceived problems associated with the facility at Darling Wind Farm which we understand is not operational at the moment?
Site	The municipality has no problem with this wind farm, but is concerned that there are so many popping up in the area.
Financial	If the wind measurement data proves that there is enough wind for the wind farm, are you sure about finances to start the project?
	What is happening with Eskom Power Purchase Agreement and how will it affect this project?
Synergy	What are the options for people working together - will you be happy to work with the municipality?

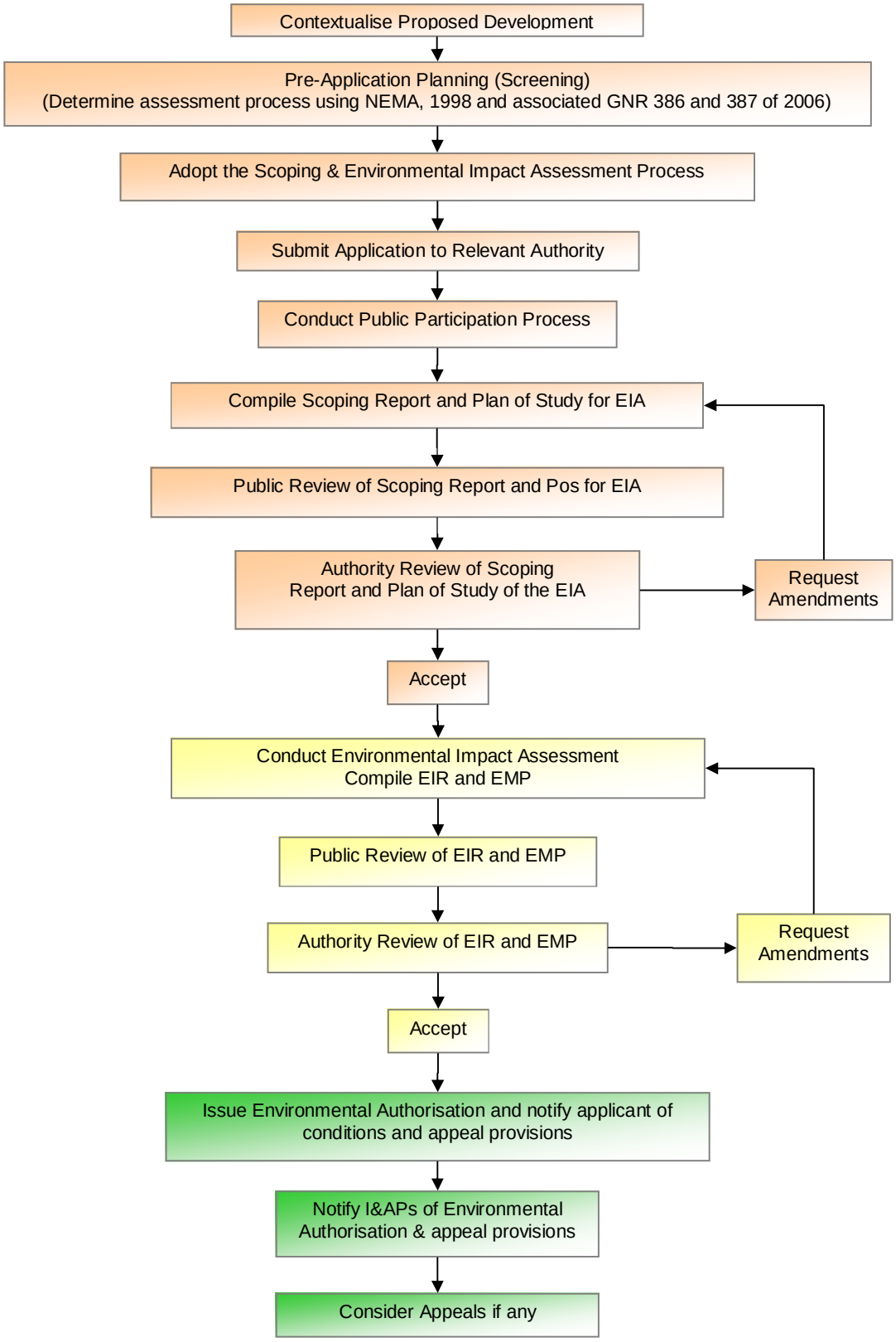

Figure 1-1: The EIA process under current legislation (NEMA 1998).
* Scoping Phase (orange), Environmental Impact Assessment Phase (yellow), and Environmental Authorisation Phase (green).

The competent authority that must consider and decide on the application for authorisation in respect of the activities listed in Table 1-1 above is the Department of Environmental Affairs (DEA), formerly the Department of Environmental Affairs and Tourism (DEAT), since the Department has recently reached agreement with all Provinces, except Gauteng, that all electricity-related projects, including generation, transmission and distribution, are to be submitted to DEA, irrespective of the nature of the applicant. This decision has been made in terms of Section 24(C)(3) of the National Environmental Management Act (Act No 107 of 1998) and is effective for all projects commencing from now until approximately 2015.

A detailed description of the Scoping phase for the proposed Terra Wind Energy-Golden Valley Project and the outcomes thereof are included in Volume 1: "*Final Scoping Report: Proposed Cookhouse Wind Energy Project*" (CES, December 2009) and are therefore not discussed further here.

1.2.1.1. Site inspection

No site inspection to date has been carried out by DEA for this proposed project.

1.2.1.2. Plan of Study

A Plan of Study (PoS) for the detailed EIR phase was also submitted together with the FSR. This was in fulfilment of section 29 (1) (i) of the EIA regulations (2006) which states that, "*A Plan of Study for environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, must be submitted and it must include -*

- *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 option of not proceeding with the activity; and*
- *Particulars of the public participation process that will be conducted during the environmental impact assessment process; and*
- *Any specific information required by the competent authority.*

A copy of the PoS that was submitted to DEA is attached as Appendix C, together with the PoS Approval from DEA. DEA approved the PoS and advised the EAP in terms of Regulation 31(1) (a) to, "*proceed with the tasks contemplated in the PoS for environmental impact assessment*" i.e. the detailed EIA Phase.

DEA also requested that "*comments from all relevant authorities are submitted to the Department with the Final Environmental Impact Report. This includes but is not limited to the: Eastern Cape Department of Economic Affairs, Environment and Tourism*" (see Appendix C).

1.2.2 Environmental Impact Assessment Phase

The EIA phase follows directly from the Scoping Phase. The aim of the detailed EIA Phase is to undertake a comprehensive evaluation and study that addresses all the issues raised in the Scoping Phase, and produce a report that contains all the relevant information that is necessary for the competent authority to consider the application and to reach a decision contemplated in Regulation 36. More specifically, the EIA Phase has seven key objectives:

- Describe the biophysical and socio-economic environment that is likely to be affected by the proposed development.
- Undertake specialist studies to address the key biophysical and socio-economic issues.
- Assess the significance of impacts that may occur from the proposed development.
- Assess the alternatives proposed during the Scoping Phase.

- Provide details of mitigation measures and management recommendations to reduce the significance of impacts.
- Provide a framework for the development of Environmental Management Plans (EMPs).
- Continue with the public participation process.

This EIR phase includes the following steps -

1. **Specialist Studies,** which include the specialist assessments identified in the Scoping Report and any additional studies required by the authorities. This requires the appointment of specialists to gather baseline information in their fields of expertise, and to assess the impacts and make recommendations to mitigate negative impacts and optimise benefits. The resulting information is synthesised into the Environmental Impact Assessment Report (EIR).
2. **Environmental Impact Assessment Report**. The main purpose of this report is to gather and evaluate environmental information, so as to provide sufficient supporting arguments to evaluate overall impacts, consider mitigation measures and alternative options, and make a value judgement in choosing the best development alternative. The EIR is made available for public and authority review. The availability of the report is advertised at least one Provincial newspaper and is situated at an easily accessible location.
3. **Comments Report,** which compiles comments, issues and concerns raised by I&APs and the authorities and the relevant responses to these comments.
4. **Environmental Management Plan** informs the client and the technical team of the guidelines which will need to be followed during construction and operation to ensure that there are no lasting or cumulative negative impacts of these processes on the environment.

1.3 Details and Expertise of the Environmental Assessment Practitioner

In terms of Section 32 (2) of the EIA Regulations (2006), ***an environmental impact assessment report must include-***

(a) The details of -
(i) The EAP who compiled the report; and
(ii) The expertise of the EAP to carry out an environmental impact assessment.

In fulfillment of the above-mentioned legislative requirement as well as Section 18 of the EIA Regulations (2006) which states that, "*an EAP must have expertise in conducting environmental impact assessments, including knowledge of the Act, these Regulations and any guidelines that have relevance to the proposed activity*", provided below are the details of the Environmental Assessment Practitioner (EAP) that prepared this Environmental Impact Assessment Report (EIR) as well as the expertise of the individual members of the study team.

1.3.1 Details of the EAP

Coastal and Environmental Services (CES)
Physical Address: 67 African Street, Grahamstown 6139
Postal Address: P.O. Box 934, Grahamstown 6140
Telephone: +27 46 622 2364
Fax: +27 46 622 6564
Website: www.cesnet.co.za
Email: info@cesnet.co.za

1.3.2 Expertise of the EAP

CES is one of the largest specialist environmental consulting firms in southern Africa. Established in 1990, and with offices in Grahamstown and East London, we primarily specialise in assessing the impacts of development on the natural, social and economic environments. CES's core expertise lies in the fields of strategic environmental assessment, environmental management

plans, environmental management systems, ecological/environmental water requirements, environmental risk assessment, environmental auditing and monitoring, integrated coastal zone management, social impact assessment and state of environment reporting. In addition to adhering to all relevant national legislative requirements, which we are often required to review and summarise for specific projects, acquisition of equity funding from the majority of financial institutions demands that developments must meet certain minimum standards that are generally benchmarked against the Policy and Performance Standards of the International Finance Corporation and the World Bank Operational Directives and Policies. The quality of our work during our long and extensive association with heavy mineral mining in Africa (we have worked on large projects in South Africa, Mozambique, Malawi, Kenya, Madagascar and Egypt) has been acknowledged by international lenders such as the World Bank and the International Finance Corporation, and the large mining companies continue to approach us as their preferred environmental consultant for this type of project.

Provided below are short *curriculum vitae* (CVs) of each of the team members involved in the proposed Terra Wind Energy Golden Valley Project EIA.

Marc Hardy *(Project Leader and Report Reviewer)*
Marc holds an M. Phil (Environmental Management) from the University of Stellenbosch's School of Public Management and Planning. His professional interests include environmental impact reporting for linear, energy and bulk infrastructure projects, strategic environmental policy development and reporting – mostly relating to Environmental Management Frameworks (EMFs) - compliance monitoring and environmental auditing. Marc has been in the private consulting industry for 2 years prior to joining CES (previously with Bohlweki-SSI Environmental, Johannesburg) and has, amongst others, been project manager for the Dinokeng EMF (Gauteng), the Milnerton Refinery to Ankerlig Power Station Liquid Fuels Transportation Infrastructure Project (on behalf of Eskom Generation – Cape Town), numerous Eskom Transmission and Distribution power line and substation EIAs countrywide, mining EMPR compliance audits, the Return-To-Service compliance audits for Camden, Grootvlei and Komati Power Stations (Mpumalanga Province) and the new high hazard waste management facility for the Coega Development Corporation (Coega IDZ). Before entering the consulting field he gained extensive experience in the EIA regulatory field whilst in the employ of the Gauteng Department of Agriculture, Conservation and Environment being responsible for the review of infrastructure projects like the Gautrain Rapid Rail Link and representing the Department on various EMF, SDF and IDP project steering committees. He is currently managing the EIA processes for numerous wind energy developments.

Kate Bezuidenhout *(Project Manager and Report Production)*
Kate holds an M.CESM (Corporate Environmental and Sustainability Management) from Monash University, Melbourne. She also has an undergraduate (BA Development and Environment) and honours degree (Hons Public and Development Management) from Stellenbosch University. Kate's experience in the consulting field includes Basic Environmental Assessments, Scoping and full EIA studies (mostly in the integrated waste management sector), Environmental Management Plan Reports for numerous gravel borrowpits in the West Coast District, Environmental Management Plans (EMPs) for waste disposal facilities, waste recycling facilities etc, Construction EMPs for various construction projects relating to roads, structures and municipal systems, Environmental Control Officer Duties and Environmental Awareness Training for numerous construction projects (the biggest being the N7 Potsdam Interchange – Project Value R77m), Integrated Waste Management Plans, including public awareness and education programs, and Corporate Sustainability and Reporting. Kate has four years experience in the environmental engineering industry and has recently returned from Australia after completing her Masters degree.

Ms. Natalie O'Neill, *(Public Participation Specialist and Maintenance of I&AP Database)*
Natalie has a Diploma in Game Ranging and Game Farm Management from Damelin College in Durban, South Africa. This involved training in Kruger National Park and Selati Game Reserve with Eco-training. She has her FGASA level 1, is THETA assessed and certified, and is an official DEAT registered South African tour guide. Natalie is a keen horse rider, enjoys birding, fishing, scuba diving and has worked as a horse guide throughout Southern Africa, including the Wild Coast and the Okavango swamps. She has managed lodges in the Free State and Eastern Cape which has lead her to work with South Africans from all walks of life as well as international clients. She is fluent in English and Afrikaans. Natalie's role at CES is to assist with all aspects of public participation. This includes assisting consultants with all logistics associated with public meetings as well as designing electronic templates for various documents including project reports and background information documents.

In addition, to the above EIA team members, provided in Table 1-3 are the details of the **specialist consultants** that conducted the specialist studies which provided information for inclusion in this final EIR.

To view short CVs detailing the expertise of each of these specialists to undertake these studies as well as a **declaration of their independence** to conduct these studies, please refer to Appendix B-1 and B-3 in ***Volume 2: Proposed Terra Wind Energy Golden Valley Project: Specialist Reports* (CES, October 2010**), for the proposed project.

1.4 The Environmental Impact Report

In accordance with regulation 32 (2) of the EIA Regulations (2006) which states that, "*an environmental impact assessment report must contain all information that is necessary for the competent authority to reach a decision contemplated in terms of regulation 36* - Decisions on applications", the overall purpose of the EIR is to communicate the findings of the EIA to the authorities in order to inform the decision as to whether or not to authorise the proposed project. More specifically, the objectives of the EIR are to -

- Confirm which issues have been investigated further and addressed in the EIR;
- Identify and assess impacts of feasible alternatives within the development proposal;
- Provide a comprehensive assessment of predicted impacts that may result from the proposed project, in accordance with the specified impact assessment methodology;
- Where alternatives have been assessed, make recommendations for the best practice environmental option (BPEO);
- Recommend actions to mitigate negative impacts or enhance benefits;
- Provide recommendations for monitoring programmes.

This report is the third of a number of reports produced in the EIA process. This EIR has been produced in accordance with the requirements as stipulated in Section 32 (2) of the EIA regulations (GNR 385), which clearly outlines the content of environmental impact assessment reports, and Sections 56-59 which cover the activities necessary for a successful Public Participation Process (PPP). Section 1.4.1 provides the detailed structure of this final EIR and Section 1.4.2 that follows outlines the limitations and assumptions under which this report was compiled.

Table 1-3: The specialists involved in the Proposed Terra Wind Energy-Golden Valley Project EIA Phase

Specialist Study	Organisation	Name of Lead Specialist(s)	Contact Details
Noise	Safetech	Mr. Brett Williams	P.O. Box 27607, Greenacres, Port Elizabeth 6056
Heritage	ACO Associates cc: Archaeology and Heritage Specialists	Dr Tim Hart and Dr Lita Webley	8 Jacob's Ladder, St James, 7945, Cape Town
Avifauna	Endangered Wildlife Trust (EWT)	Mr. Luke Strugnell	Private bag X11, Parkview, 2122
Visual	MapThis	Mr. Henry Holland	8 Cathcart Street, Grahamstown 6139
Palaeontological	Natura Viva cc	Dr John Almond	PO Box 12410, Mill Street Cape Town
Ecological	Coastal and Environmental Services	Prof. Roy Lubke and Ms. Leigh-Ann De Wet	67 African Street, Grahamstown 6139

1.4.1 Nature and Structure of this Report

In accordance with the EIA Regulations (2006), an EIA report must contain all the information that is necessary for the competent authority to consider the application and to reach a decision and must include those points laid out in Table 1-4. In order to facilitate review by the competent authority, this report, which forms Volume 3 of the suite of EIA documents related to the proposed project, is structured around these requirements.

Table 1-4: EIA regulation requirements and structure of the report

EIA Regulation Requirements	Section/Chapter
Details of the Environmental Assessment Practitioner (EAP) and its expertise	Section 1.3
A detailed description of the proposed activity	Chapter 2
A description of the property on which the activity is to be undertaken and the location of the activity on the property	Chapter 2
A description of the environment that may be affected by the activity and the manner in which it may be affected	Chapter 3
Details of the public participation process conducted	Chapter 4
A description of the need and desirability of the proposed activity	Chapter 5
Identification of potential alternatives to the proposed activity	Chapter 6
An indication of the methodology used in determining the significance of potential environmental impacts	Chapter 7
A description and comparative assessment of alternatives	Chapter 6
A summary of the findings and recommendations of specialist reports.	Chapter 8
A description of all environmental issues, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures	Chapter 9
A description of any assumptions, uncertainties and gaps in knowledge	Section 1.4.2
An opinion as to whether the activity should or should not be authorised	Chapter 10
An environmental impact statement which contains a summary of the findings and a comparative assessment of the positive and negative implications.	Chapter 10
A draft Environmental Management Plan (EMP)	Volume 4
Copies of the Specialist Reports	Volume 2
Any additional information that may be required by the competent authority.	Appendices

In line with Table 1-4, the structure of this report is therefore as follows:-

Chapter 1 - Introduction: Provides background information on the proposed project, a brief description of the EIA process required by NEMA and its regulations, and describes the key steps in the EIA process that have been undertaken. The details and expertise of the Environmental Assessment Practitioner (EAP) who compiled this report are also provided in this Chapter.

Chapter 2 – Project Description: Provides a detailed description of the proposed development, the property on which the development is to be undertaken and the location of the development on the property. The technical details of the process to be undertaken are also provided in this Chapter.

Chapter 3 – Description of the Affected Environment: Provides a description of the environment that may be affected by the proposed activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity.

Chapter 4 – Public Participation Process: Provides details of the public participation process conducted in terms of regulation (32) sub-regulation (1) including -

- Steps undertaken in accordance with the Plan of Study (PoS);
- A list of all persons, organisations and organs of stated that were identified and registered in terms of Regulation 57 as I&APs in relation to the application.
- A summary of the comments received from, and a summary of the issues raised by registered I&APs, the date of receipt of these comments and the response of the EAP to those comments; and
- Copies of any representations, objections and comments received from registered I&APs.

Chapter 5 – Need and Desirability: Provides a description of the need and desirability of the proposed activity, including advantages and disadvantages of the proposed activity.

Chapter 6 – Alternatives: Provides a description of the alternatives to the proposed development or parts of the proposed development. It also includes a comparative assessment of viable alternatives.

Chapter 7 – Methodology for Assessing Impacts: Provides an indication of the methodology used in determining the significance of potential environmental impacts.

Chapter 8 – Key Findings of the Specialist Studies: This Chapter summarises the findings of the specialist studies which are included in detail in ***Volume 2: Proposed Terra Wind Energy-Golden Valley Project: Specialist Reports*** **(CES, December 2009).**

Chapter 9 – Assessment of Impacts: Provides:-

- A description of all environmental issues relating to all phases of the proposed development that were identified during the EIA process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures.
- An assessment of each identified potentially significant impact, including -
    i. Cumulative impacts;
    ii. The nature of the impact;
    iii. The extent and duration of the impact;
    iv. The probability of the impact occurring;
    v. The degree to which the impact can be reversed;
    vi. The degree to which the impact may cause irreplaceable loss of resources; and
    vii. The degree to which the impact can be mitigated.

Chapter 10 – Conclusions and Recommendations: Provides -

- An 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 –
    i. A summary of the key findings of the environmental impact assessment; and
    ii. A comparative assessment of the positive and negative implications of the proposed activity and identified alternatives.

References: Cites any texts referred to during preparation of this report.

Appendices

Volume 1 - Final Scoping Report: The FSR has already been submitted to and approved by the Department of Environmental Affairs. This report is not included in the final EIA submission to DEA as it has already been approved by the Department.

Volume 2 - Specialist Reports: Provides copies of the specialist reports and reports on specialised processes complying with Regulation 33 of the EIA Regulations (GNR 385).

Volume 3 – Environmental Impact Assessment report: This report represents the final EIR. The DRAFT EIR was released for public and revised once all comments were received. The FINAL EIR will now be submitted to the relevant competent authority for Environmental Authorisation.

Volume 4 - Environmental Management Plan: Provides an Environmental Management Plan (EMP) that complies with Regulation 34 of the EIA Regulations (GNR 385).

1.4.2 Assumptions and Limitations

The following limitations and assumptions are implicit this report –

- The primary assumption underpinning this EIA and the individual specialist studies upon which this EIR is based is that all information received from Terra Power (Pty) Limited and other stakeholders including registered I&APs was correct and valid at the time of the study.
- To ensure that the significance of impacts was not under-estimated, the specialists assessed impacts under the worst-case scenario situation.

2 PROJECT DESCRIPTION

In terms of Section 32 (2) of the EIA Regulations (2006), *an environmental impact assessment report must include-*

(b) A detailed description of the proposed activity;
(c) A description of the property on which the activity is to be undertaken and the location of the activity on the property……

In fulfilment of the above-mentioned legislative requirement, this Chapter of the EIR identifies the location and size of the site of the proposed Terra Wind Energy-Golden Valley Project, and provides a description of its various components and arrangements on the site.

2.1 Location and Site Description of the Proposed Development

The proposed Terra Wind Energy-Golden Valley Project is to be constructed on 29 400 hectares (ha) (total area of the development and not the actual physical footprint of the turbines) encompassing the eleven farms Olive Wood Estate, Olive Fonteyn, Quaggas Kuyl, Lushof, Kroonkop, Oude Smoor Drift, Maatjiesfontein, Leuwe Drift, Gedagtenis, Varkens Kuyl and Wagenaarsdrift all found around Cookhouse (refer to Table 2-1 for details of the portions/erf numbers that comprise these farms), located in the Blue Crane Route Municipality (BCRM) in the Eastern Cape Province of South Africa (Figure 2-1 and Figure 2-1). Table 2-2 provides the coordinates of the proposed project site including the revised location of each wind turbine.

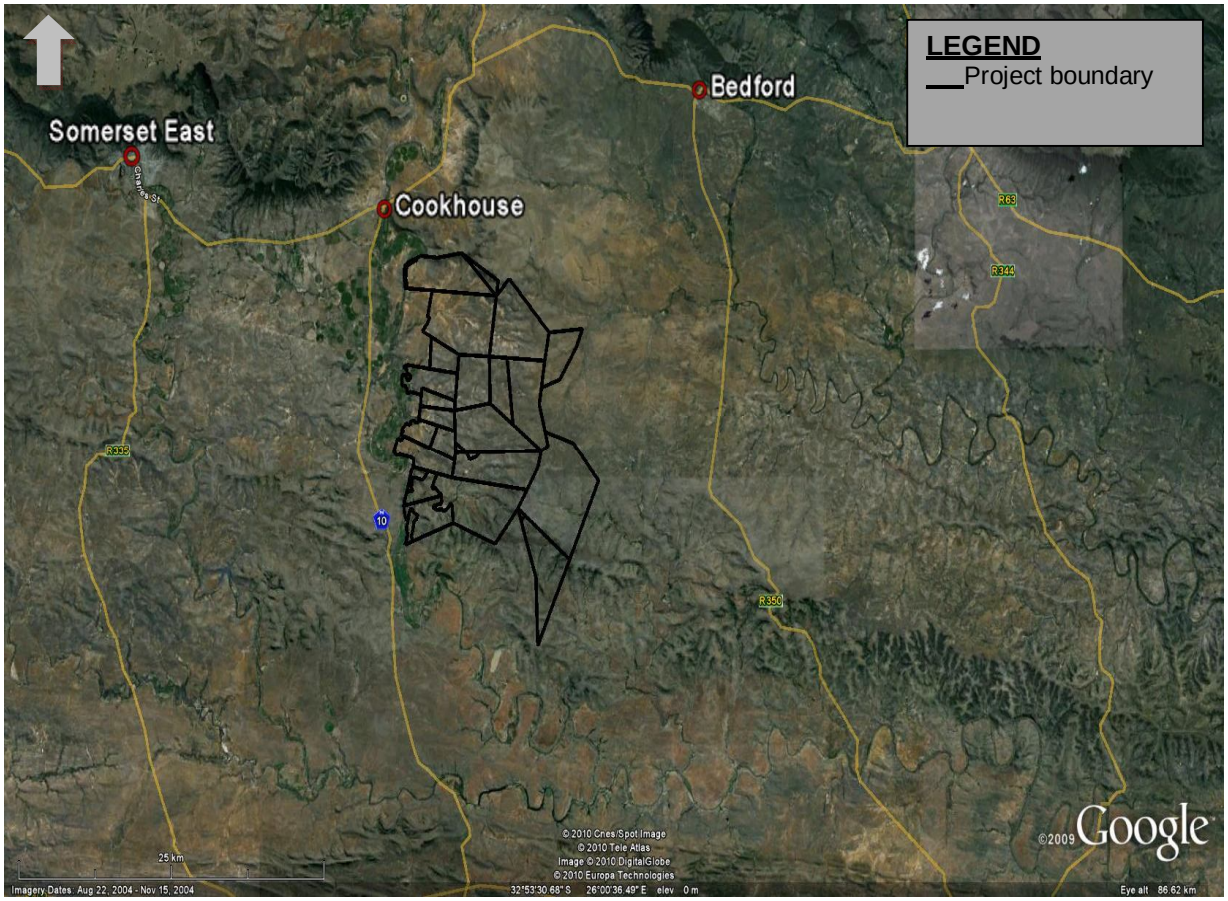

Figure 2-1: Locality map of the proposed Terra Wind Energy Golden Valley Project, showing the boundary of the project site in relation to surrounding towns.

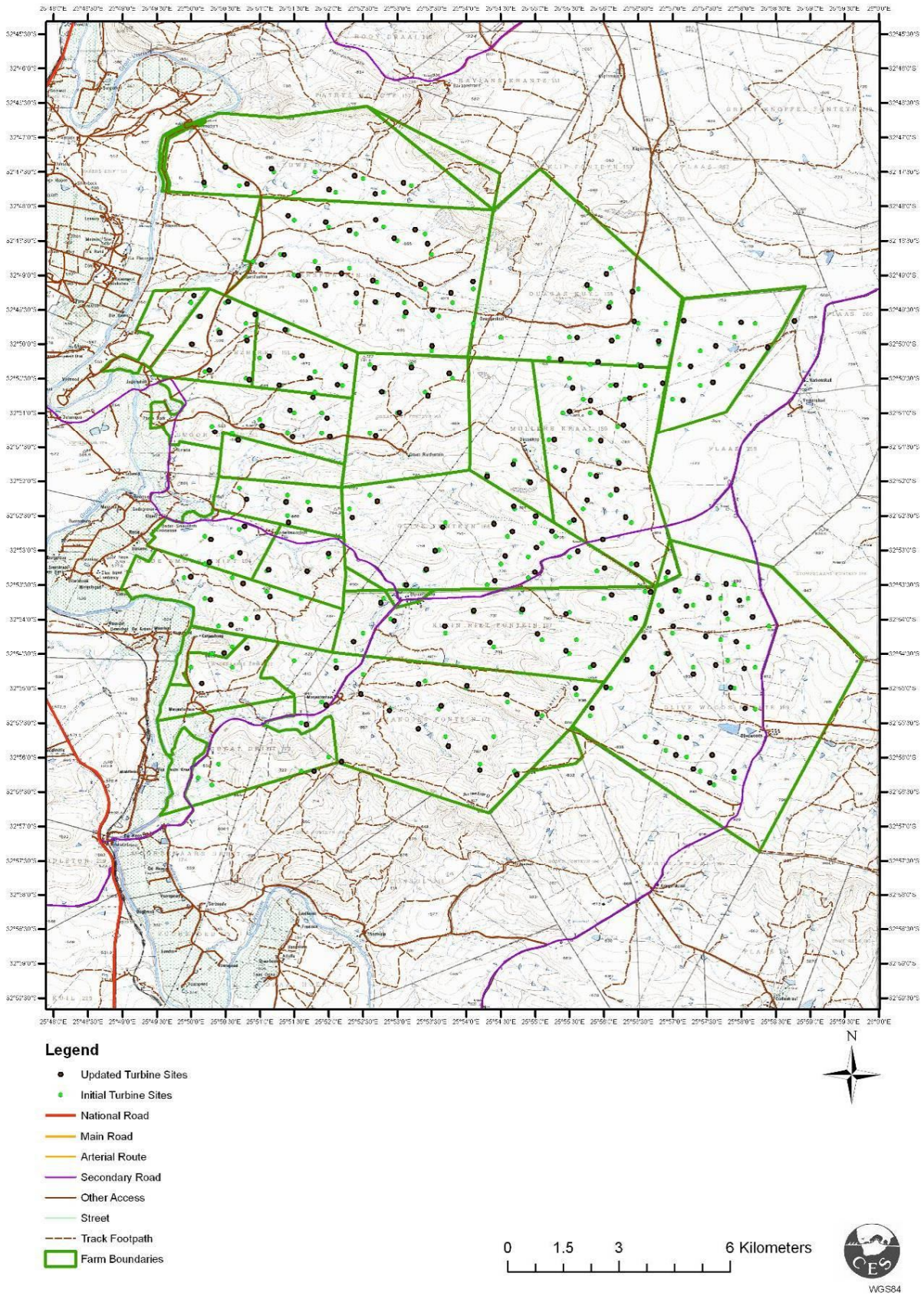

Figure 2-2: Site layout plan of the proposed Terra Wind Energy Golden Valley Project, showing the initial (light green dots) and revised (dark green dots) location of turbines.

Table 2-1: Details of the portions/erf numbers of the study area farms

FARM NAME	ERF NUMBERS
Olive Wood Estate	• Portion 2 of the consolidated Farm Olive Woods No. 169, Bedford, in the Nxuba Municipality, Division of Bedford, Eastern Cape Province
Olive Fonteyn	• The Farm Olive Fonteyn No. 166, situated as below • Remainder of the Farm Mullerskraal No. 159, Bedford, in the Nxuba Municipality, Division of Bedford, Eastern Cape Province • The Farm Klein Rietfontein No. 167, situated as above
Quaggas Kuyl	• The Farm Quaggas Kuyl No. 155, Bedford, in the Nxuba Municipality, Division of Bedford, Eastern Cape Province • The Farm Jagersfontein No. 154, situated as above • Portion 10 of the Farm Gezhiret No. 161, situated as above • Portion 17 of the Farm Smoor Drift No. 162, as situated as above • The Farm Great Riet Fonteyn No. 160, situated as above
Lushof	• Portion 24 of the Farm Oude Smoor Drift No. 164, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • Portion 37 of the Farm Oude Smoor Drift No. 164, as situate above. • Portion 47 of the Farm Oude Smoor Drift No. 164, as situate above. • Portion 14 of the Farm Smoor Drift No. 162, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province
Kroonkop	• Portion 3 of the Farm Oude Smoor Drift No. 164, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • Portion 7 of the Farm Oude Smoor Drift No. 164, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • Portion 16 of the Farm Oude Smoor Drift No. 164, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • Portion 1 of the Farm Mullerskraal No. 159, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province
Ondersmoordrift	• Portion 40 of the Farm Oude Smoor Drift No. 164 • Portion 42 of the Farm Oude Smoor Drift No. 164
Matjiesfontein	• Portion 1 of the Farm Creguskraal No. 181, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • The Farm No. 283 Matjiesfontein, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province
Leuwe Drift	• Remainder extent of the Farm 153, Leuwe Drift, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • Portion 1 of the Farm Bavians Krantz No. 151, situated as above
Gedagtenis	• Portion 14 of the Farm 164, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • Portion 34 of the Farm 164, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • Portion 35 of the Farm 164, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • Portion 36 of the Farm 164, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • Portion 38 of the Farm 164, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province
Varkens Kuyl	• Portion 1 of the Farm Varkens Kuyl No. 158, Bedford, in the Nxuba Municipality, Division of Bedford, Eastern Cape Province
Wagenaarsdrift	• The Farm No. 172, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • Portion 2 of the Farm No. 172, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • Portion 2 of the Farm No. 173, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province • The Farm No. 284, Bedford, in the Blue Crane Route Municipality, Division of Bedford, Eastern Cape Province

Table 2-2: Revised coordinates of the turbines for the proposed Terra Wind Energy-Golden Valley Project given in Decimal Degrees)

Note: 214 turbines are proposed for the Terra Wind Energy-Golden Valley Project. 204 turbines are shown on this table as a preliminary turbine layout.

Turbine Number (Also refer to Figure 2-1)	Coordinates (DD)		Wind Turbine Number	Coordinates (DD)		Wind Turbine Number	Coordinates (DD)		Wind Turbine Number	Coordinates (DD)	
	SOUTH	EAST		SOUTH	EAST		SOUTH	EAST		SOUTH	EAST
Turbine 1	-32.82768	25.95267	Turbine 56	-32.83697	25.92292	Turbine 111	-32.89174	25.88544	Turbine 166	-32.93619	25.95503
Turbine 2	-32.79456	25.84688	Turbine 57	-32.84392	25.92580	Turbine 112	-32.89600	25.87935	Turbine 167	-32.93952	25.95900
Turbine 3	-32.82667	25.83547	Turbine 58	-32.84329	25.93627	Turbine 113	-32.90041	25.88258	Turbine 168	-32.92865	25.95335
Turbine 4	-32.79050	25.84156	Turbine 59	-32.84279	25.94759	Turbine 114	-32.89955	25.84940	Turbine 169	-32.92970	25.94599
Turbine 5	-32.79421	25.83646	Turbine 60	-32.84256	25.95980	Turbine 115	-32.89447	25.85243	Turbine 170	-32.91319	25.94525
Turbine 6	-32.79085	25.85288	Turbine 61	-32.84684	25.95259	Turbine 116	-32.88801	25.85213	Turbine 171	-32.91636	25.93388
Turbine 7	-32.79588	25.86674	Turbine 62	-32.84638	25.93960	Turbine 117	-32.88840	25.86150	Turbine 172	-32.90972	25.93887
Turbine 8	-32.79701	25.87800	Turbine 63	-32.84691	25.93010	Turbine 118	-32.88419	25.86663	Turbine 173	-32.90425	25.94310
Turbine 9	-32.79256	25.87292	Turbine 64	-32.84995	25.93254	Turbine 119	-32.89532	25.83803	Turbine 174	-32.90759	25.92417
Turbine 10	-32.79427	25.88485	Turbine 65	-32.84963	25.92495	Turbine 120	-32.89132	25.84590	Turbine 175	-32.91102	25.93079
Turbine 11	-32.80325	25.87809	Turbine 66	-32.85299	25.93813	Turbine 121	-32.88975	25.83320	Turbine 176	-32.90357	25.91721
Turbine 12	-32.80767	25.88257	Turbine 67	-32.85657	25.92126	Turbine 122	-32.88622	25.83772	Turbine 177	-32.90563	25.90576
Turbine 13	-32.80562	25.88762	Turbine 68	-32.85685	25.93258	Turbine 123	-32.88394	25.84521	Turbine 178	-32.90169	25.89476
Turbine 14	-32.80901	25.89066	Turbine 69	-32.86223	25.93703	Turbine 124	-32.88073	25.83809	Turbine 179	-32.91669	25.92653
Turbine 15	-32.80583	25.87166	Turbine 70	-32.86535	25.93156	Turbine 125	-32.87658	25.85696	Turbine 180	-32.92140	25.93048
Turbine 16	-32.80381	25.86599	Turbine 71	-32.86402	25.92366	Turbine 126	-32.87760	25.84631	Turbine 181	-32.92278	25.91720
Turbine 17	-32.80230	25.85685	Turbine 72	-32.86688	25.91542	Turbine 127	-32.87150	25.87843	Turbine 182	-32.91816	25.90976
Turbine 18	-32.81677	25.85931	Turbine 73	-32.86262	25.91139	Turbine 128	-32.87356	25.86207	Turbine 183	-32.91608	25.90023
Turbine 19	-32.81169	25.85585	Turbine 74	-32.86545	25.90500	Turbine 129	-32.87165	25.85629	Turbine 184	-32.91556	25.88846
Turbine 20	-32.81410	25.85036	Turbine 75	-32.87270	25.91155	Turbine 130	-32.87104	25.84684	Turbine 185	-32.92093	25.89391
Turbine 21	-32.81504	25.86418	Turbine 76	-32.87123	25.92932	Turbine 131	-32.83970	25.83769	Turbine 186	-32.92650	25.88838
Turbine 22	-32.81622	25.86985	Turbine 77	-32.86872	25.93643	Turbine 132	-32.84190	25.84747	Turbine 187	-32.93645	25.90334
Turbine 23	-32.81796	25.87735	Turbine 78	-32.87507	25.91682	Turbine 133	-32.83623	25.85225	Turbine 188	-32.93059	25.89571

Turbine Number (Also refer to Figure 2-1)	Coordinates (DD)		Wind Turbine Number	Coordinates (DD)		Wind Turbine Number	Coordinates (DD)		Wind Turbine Number	Coordinates (DD)	
	SOUTH	EAST		SOUTH	EAST		SOUTH	EAST		SOUTH	EAST
Turbine 24	-32.81630	25.93396	Turbine 79	-32.87692	25.90672	Turbine 134	-32.83614	25.86017	Turbine 189	-32.93104	25.90462
Turbine 25	-32.83339	25.83347	Turbine 80	-32.87881	25.91112	Turbine 135	-32.84329	25.85475	Turbine 190	-32.93754	25.91222
Turbine 26	-32.83243	25.84686	Turbine 81	-32.87880	25.92079	Turbine 136	-32.83870	25.87067	Turbine 191	-32.92204	25.88139
Turbine 27	-32.82613	25.84892	Turbine 82	-32.87603	25.92602	Turbine 137	-32.84321	25.86879	Turbine 192	-32.91800	25.87450
Turbine 28	-32.83052	25.84028	Turbine 83	-32.88352	25.92705	Turbine 138	-32.83902	25.87785	Turbine 193	-32.90542	25.87266
Turbine 29	-32.82992	25.85619	Turbine 84	-32.88272	25.91700	Turbine 139	-32.84491	25.87953	Turbine 194	-32.91176	25.86853
Turbine 30	-32.82158	25.83410	Turbine 85	-32.88076	25.93311	Turbine 140	-32.83893	25.88668	Turbine 195	-32.92069	25.86600
Turbine 31	-32.82309	25.84232	Turbine 86	-32.87777	25.89439	Turbine 141	-32.83376	25.89177	Turbine 196	-32.92536	25.86131
Turbine 32	-32.81909	25.86588	Turbine 87	-32.88339	25.89247	Turbine 142	-32.84036	25.89583	Turbine 197	-32.93441	25.86978
Turbine 33	-32.82101	25.87340	Turbine 88	-32.88795	25.89027	Turbine 143	-32.84579	25.89074	Turbine 198	-32.93669	25.86314
Turbine 34	-32.82310	25.87802	Turbine 89	-32.88472	25.90947	Turbine 144	-32.84995	25.88380	Turbine 199	-32.90132	25.84308
Turbine 35	-32.82143	25.88345	Turbine 90	-32.88863	25.91660	Turbine 145	-32.85564	25.87811	Turbine 200	-32.90693	25.84692
Turbine 36	-32.81883	25.88892	Turbine 91	-32.89067	25.90692	Turbine 146	-32.85129	25.86629	Turbine 201	-32.90815	25.84132
Turbine 37	-32.82090	25.89632	Turbine 92	-32.89790	25.90179	Turbine 147	-32.84940	25.85736	Turbine 202	-32.91548	25.83590
Turbine 38	-32.81816	25.90165	Turbine 93	-32.89763	25.91354	Turbine 148	-32.85471	25.83904	Turbine 203	-32.84625	25.86291
Turbine 39	-32.82569	25.88532	Turbine 94	-32.89868	25.92415	Turbine 149	-32.85664	25.84474	Turbine 204	-32.84157	25.86205
Turbine 40	-32.82507	25.89183	Turbine 95	-32.88762	25.93352	Turbine 150	-32.85312	25.85054	Turbine 205	To be confirmed on final micro-siting of turbines	
Turbine 41	-32.81905	25.92925	Turbine 96	-32.89412	25.93526	Turbine 151	-32.85593	25.85792	Turbine 206		
Turbine 42	-32.82428	25.93458	Turbine 97	-32.87536	25.93864	Turbine 152	-32.85584	25.86693	Turbine 207		
Turbine 43	-32.82067	25.94029	Turbine 98	-32.88675	25.94126	Turbine 153	-32.87541	25.87245	Turbine 208		
Turbine 44	-32.83248	25.93520	Turbine 99	-32.89344	25.94462	Turbine 154	-32.91647	25.96403	Turbine 209		
Turbine 45	-32.82778	25.94071	Turbine 100	-32.89962	25.94099	Turbine 155	-32.93681	25.96484	Turbine 210		
Turbine 46	-32.83262	25.94663	Turbine 101	-32.89802	25.94732	Turbine 156	-32.90543	25.96538	Turbine 211		
Turbine 47	-32.82806	25.96661	Turbine 102	-32.88867	25.94886	Turbine 157	-32.91192	25.96744	Turbine 212		
Turbine 48	-32.82768	25.97951	Turbine 103	-32.89009	25.95605	Turbine 158	-32.92155	25.96755	Turbine 213		
Turbine 49	-32.83371	25.96045	Turbine 104	-32.89683	25.95335	Turbine 159	-32.90168	25.95012	Turbine 214		

Turbine Number (Also refer to Figure 2-1)	Coordinates (DD)		Wind Turbine Number	Coordinates (DD)		Wind Turbine Number	Coordinates (DD)		Wind Turbine Number	Coordinates (DD)	
	SOUTH	EAST		SOUTH	EAST		SOUTH	EAST		SOUTH	EAST
Turbine 50	-32.83408	25.97307	Turbine 105	-32.89299	25.95064	Turbine 160	-32.90827	25.94893			
Turbine 51	-32.83869	25.95437	Turbine 106	-32.89478	25.95879	Turbine 161	-32.90413	25.95806			
Turbine 52	-32.83865	25.96693	Turbine 107	-32.89863	25.96290	Turbine 162	-32.91100	25.96043			
Turbine 53	-32.83856	25.94235	Turbine 108	-32.89146	25.96303	Turbine 163	-32.91328	25.95500			
Turbine 54	-32.83765	25.93187	Turbine 109	-32.89550	25.96619	Turbine 164	-32.93276	25.95076			
Turbine 55	-32.83175	25.92684	Turbine 110	-32.89942	25.96939	Turbine 165	-32.93279	25.95957			

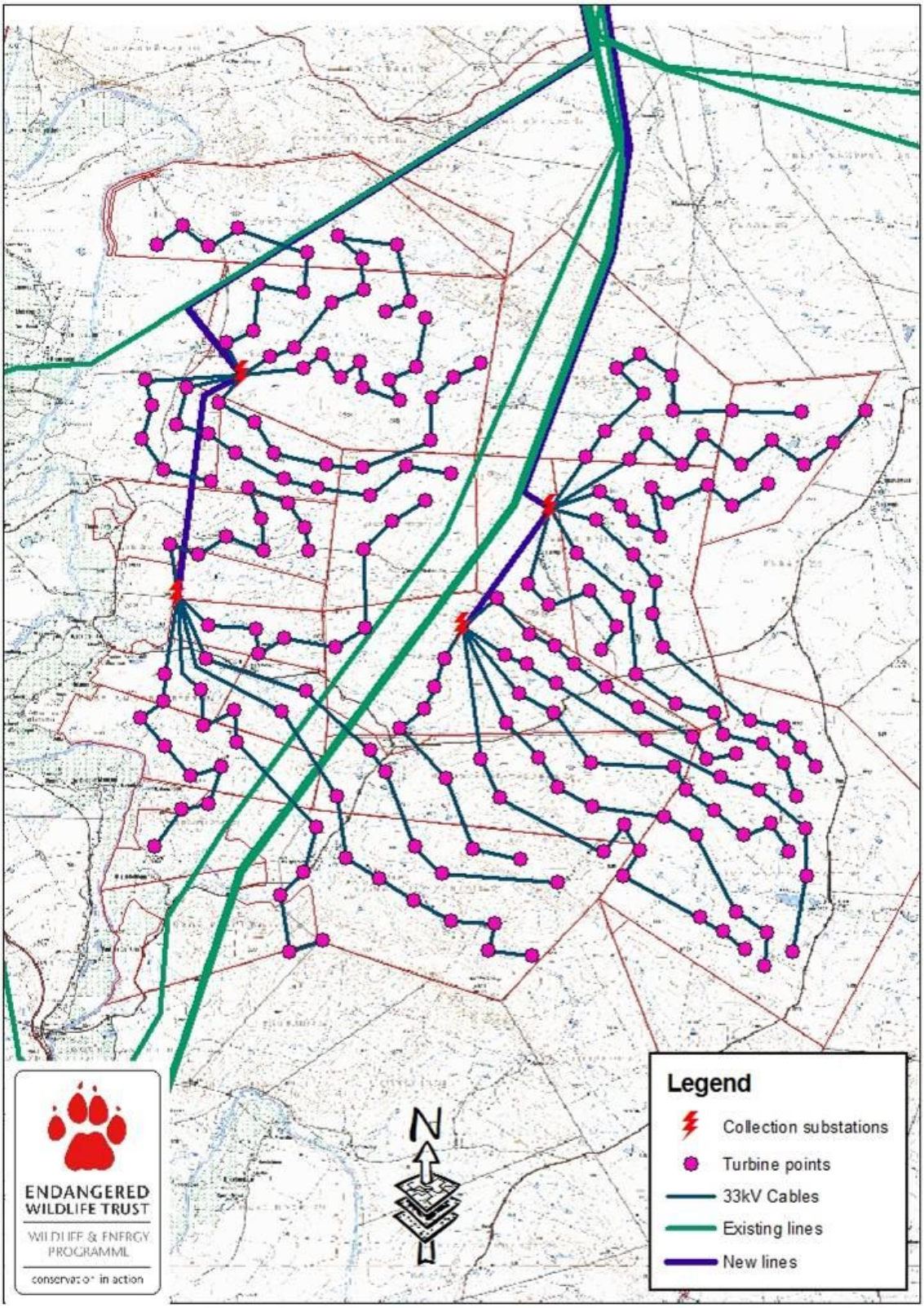

Figure 2-3: Locality map indicating the electrical cable and sub-station layout of the proposed Terra Wind Energy-Golden Valley Project. Turbines are represented by the pink circles

Source: Strugnell, LB. Endangered Wildlife Trust, March 2010. Proposed Terra Wind Energy Golden Valley Project, Blue Crane Route Local Municipality: Avifaunal Specialist study Impact Assessment, Endangered Wildlife Trust, Johannesburg, South Africa

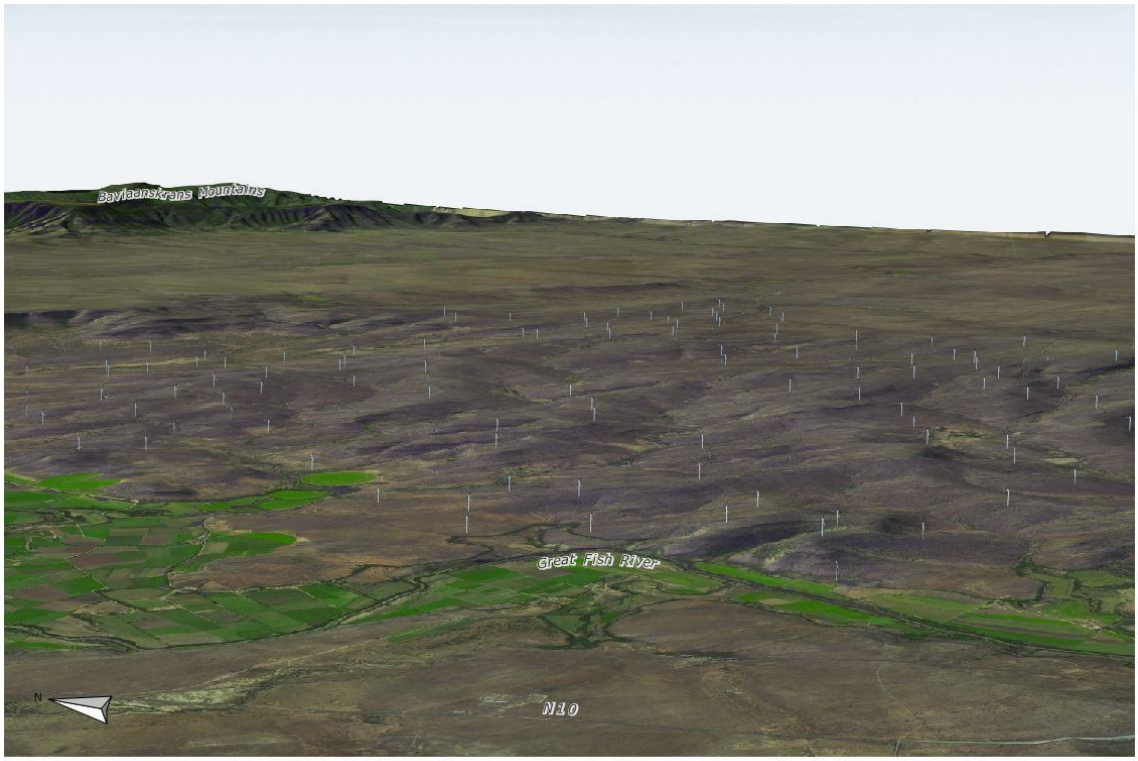

Figure 2-4: Proposed Terra Wind Energy-Golden Valley Project in relation to recognisable features in the landscape: N10, Great Fish River and Baviaanskrans Mountains in the background.

Figure 2-5: View south-east from Cookhouse with wind turbines super-imposed in the background. The closest wind turbine is 6km away.

Figure 2-6: View west from Olyvenfontein residence with turbine superimposed in the photo. The turbine is 500m away

Figure 2-7: A potential scenic view from the ridge north of the wind farm site. The view is towards the south-west with the Baviaanskrans farmstead just below this site and to the left of the photograph. The farm house has a view down onto the wind farm, but the house faces west and is surrounded by high trees, particularly in the direction of this view. The turbines have been superimposed in the photo.

Figure 2-8: Current view north-east on the N10 with wind turbines superimposed in the background.

2.2 Detailed description of the proposed Terra Wind Energy-Golden Valley Project

2.2.1 Roads

Figure 2-9 indicates the proposed location of the roads associated with the proposed Terra Wind Energy-Golden Valley Project. During construction, it will be necessary to transport large turbine components (including blades each with a length of 49 metres) to the site and, as such, there are specific requirements for the roads. The general requirement is that all roads should have a width of approximately 5 metres with 8 metres horizontal clearance. However, Terra Wind Energy-Golden Vally predict that a road width of 5 metres will be sufficient.

2.2.2 Machinery and cables

Wind energy is a form of renewable energy. Winds are caused by the uneven heating of the atmosphere by the sun, the irregularities of the earth's surface, and rotation of the earth. Wind flow patterns are modified by the earth's terrain, bodies of water, and vegetation. This wind flow or motion energy (kinetic energy) can be used for generating electricity. The term “wind energy” describes the process by which wind is used to generate mechanical power or electricity. Wind turbines convert the kinetic energy in the wind into mechanical power and a generator can then be used to convert this mechanical power into electricity.