Environmental Impact Assessment for the proposed Ubuntu Wind Energy Project near Jeffrey's Bay, Eastern Cape: Final Environmental Impact Assessment Report

Chapter 4: Approach to the EIA

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CHAPTER 4. APPROACH TO THE EIA

This chapter presents the approach to the impact assessment phase of the EIA process, including public participation. For information on the approach to Scoping, including the relevant legislation, key principles and guidelines that provide the context for this EIA process, refer to the Final Scoping Report (CSIR, 2011). As explained in the Final Scoping Report, the Ubuntu EIA process commenced in December 2009 and is therefore being conducted in terms of the 2006 EIA Regulations. A review was conducted to identify whether there are any additional listed activities arising from the promulgation of the 2010 EIA Regulations.

4.1 IDENTIFICATION OF ISSUES

The DEA *General Guide to the EIA Regulations* (Guideline 3, 2006) states that when the competent authority has accepted the Final Scoping Report and Plan of Study for EIA (PSEIA), the EIA phase may commence. The purpose of the EIA phase is to:

- Address issues that have been raised through the Scoping Process;
- 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.

The EIA phase consists of three parallel and overlapping processes:

- Central assessment process involving the authorities where inputs are integrated and presented in documents that are submitted for approval by authorities (Section 4.5);
- Public participation process whereby findings of the EIA phase are communicated and discussed with I&APs and responses are documented (Section 4.3); and
- Specialist studies that provide additional information required to address the issues raised in the Scoping phase (Sections 4.6 and 4.7).

4.2 OVERVIEW OF APPROACH TO PREPARING THE EIA REPORT AND EMP

The results of the specialist studies and other relevant project information were summarized and integrated into the Draft EIA Report. The Draft EIA Report was released for a 40-day I&AP and authority review period, as outlined in Section 4.3. All I&APs on the project database were notified in writing of the release of the Draft EIA for review and were invited to attend a public meeting. In addition to the public meeting a focus group meeting was held with a local community representative. The purpose of these meetings was to provide an overview of the outcome and recommendations from the specialist studies, as well as provide opportunity for comment. Comments raised through written correspondence (emails, comments, forms) and at meetings (public meeting and focus group meetings) have been captured in the Comments and Responses Trail for inclusion in the Final EIA Report. Comments raised have been responded to by the CSIR EIA team and/or the applicant. These responses indicate how the issue has been dealt with in the EIA process. Should the comment received fall beyond the scope of this EIA,

clear reasoning has been provided. All comments received are attached as Appendix G to the Final EIA Report.

The Draft EIA Report included a draft Environmental Management Plan (EMP), which was prepared in compliance with the relevant regulations. This EMP is based broadly on the environmental management philosophy presented in the ISO 14001 standard, which embodies an approach of continual improvement. Actions in the EMP were drawn primarily from the management actions in the specialist studies for the construction and operational phases of the project. If the project components are decommissioned or re-developed, this will need to be done in accordance with the relevant environmental standards and clean-up/remediation requirements applicable at the time.

An overview of the approach to the EIA process is provided in Figure 4.1.

4.3 PUBLIC PARTICIPATION PROCESS

The key steps in the public participation process for the EIA phase are described below. This approach has been accepted by DEA through their approval of the PSEIA. For background on the public participation during the Scoping Phase, refer to Chapter 4 of the Final Scoping Report (CSIR 2011).

Task 1: Review of Draft EIA Report and EMP

The first stage in the process entailed the release of the Draft EIA Report for a 40-day public and authority review period, which extended from the 18 August 2011 to the 26 September 2011. Relevant organs of state and I&APs were informed of the review process in the following manner:

- **Newspaper Adverts** - Advertisements were placed in two newspapers, Our Times and The Herald, advertising the availability of the Draft EIA report for review as well as providing details of the public meeting to be held-see Table 4.1 below. A copy of the newspaper advertisements placed are included as Appendix E of this report;

Table 4.1: Advertisements to indicate the availability of the Draft EIA Report.

Newspaper Name	Date Placed	Distribution
Our Times	18 August 2011	Local distribution
The Herald	18 August 2011	Provincial Distribution

- **Correspondence to I&APs** – In addition to the newspaper advertisements placed all I&APs on the project database, **75 registered I&APs** (Appendix C), were mailed a letter of notification regarding the 40 day review period, the public meeting and availability of the Draft EIA Report for review. Letter 4 to all I&APs (including authorities) (Appendix F), included an executive summary of the Draft EIA report as well as a comment form.
- **Public Meeting** – All I&APs were invited, via newspaper advertisements placed as well as Letter 4 to I&APs, to attend a Public Meeting, which was held on the 23 September 2011 at the Newton Hall in Jeffrey's Bay (Appendix F). The purpose of the meeting was

to present the key findings of the EIA report to I&APs and create the opportunity for I&APs to make comments on the findings of the report and engage with the EIA team and project proponent. The meeting was attended by 10 I&APs. The comments received at the meeting have been included in the Comments and Responses Trail in Appendix I of this report. A copy of the registration form and notes from the meeting are included as Appendix.H1.and .H2. respectively;

- **Focus Group Meeting(s) with I&APs –** one focus group meeting was held with a local community representative on the 23 September 2011. The comments received at the meeting have been included in the Comments and Responses Trail in Appendix I of this report. A copy of the registration form and notes from the meeting are included as Appendix.H1. and H2 respectively;
- Meeting(s) with key authorities involved in decision-making for this EIA, if requested.
- **Report Availability** - The Draft EIA Report and EMP were made available and distributed through the following mechanisms to ensure access to information on the project and to communicate the outcome of specialist studies:

    - Copies of the report were placed at the Jeffrey's Bay and Humansdorp Municipal Libraries;
    - Relevant organs of state and key I&APs were provided with a hard copy or CD version of the report;
    - The Report was placed on the project website: www.publicprocess.co.za

- **Database Maintenance** - The project database was been regularly updated as and when information is sent to or received from I&APs. At the conclusion of the Scoping Process the project database included 70 registered I&APs (Appendix C). Subsequent to the submission of the Final Scoping Report, I&APs have requested to register their interest on the project database and the National Department of Environmental Affairs instructed that specific I&APs are included on the database. The database was amended to take into account the Local Government elections and newly elected Councillors for the area, which were included on the updated project database. At the time of release of the Draft EIA for review the database included 75 registered I&APs. A copy of the project database is included as Appendix C of this report. The database has been updated to indicate interaction with I&APs during the review of the Draft EIA, through comments received and participation at meetings held. The database for the Final EIA report includes **80 registered I&APs**.

Task 2: Comments and Responses Trail

A key component of the EIA process is documenting and responding to the comments received from I&APs and the authorities. Subsequent to the submission of the Final Scoping Report to DEA and prior to the release of the Draft EIA, comments were received from I&APs. These comments are captured in the Comments and Responses Trail of Appendix I of this report. Copies of the comments received are included in Appendix G..

The following provides an overview of how comments on the Draft EIA Report and EMP, have been documented:

- Written and email comments (e.g. letters and completed comment forms);

- Comments made at public meetings;
- Comments made at focus group meetings;
- Telephonic communication and/or consultation; and
- One on one meetings with key authorities and/or I&APs.

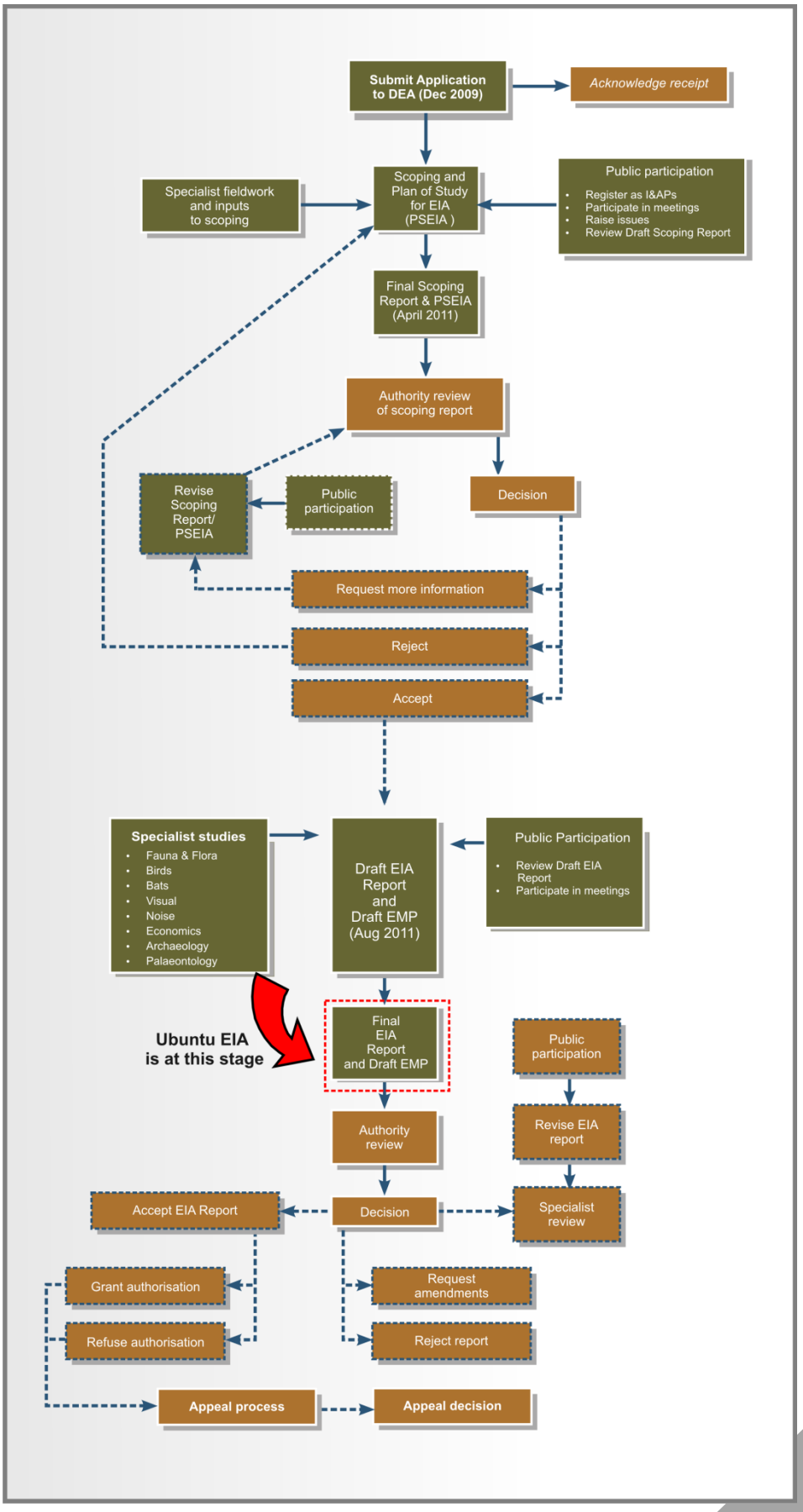
The comments received have been compiled into an updated Comments and Responses Trail and have been included as Appendix I in the Final EIA Report. The Comments and Responses trail indicates the nature of the comment, when and who raised the comment. The comments received have been considered by the EIA team and appropriate responses provided by the relevant member of the team and/or specialist. The response provided indicates how the comment received has been considered in the Final EIA Report, in the project design or EMP for the project.

Task 3: Compilation of Final EIA Report for submission to Authorities

The Final EIA Report, including the Comments and Responses Trail and EMP, will be submitted to the authorities for decision making. Letter 5 will be sent to all I&APs on the project database notifying them of the submission of the final report. The Final EIA Report will be distributed as follows:

- Copies of the report will be placed at the Jeffrey's Bay and Humansdorp Municipal Libraries;
- Relevant organs of state and key I&APs will be provided with a hard copy or CD version of the report; and
- Report to be placed on the project website www.publicprocess.co.za.

Figure 4.1: EIA process for the Ubuntu project



Task 4: Environmental Authorisation and Appeal Period

All I&APs on the project database will be notified of the issuing of the Environmental Authorisation and the Appeal period. The following process will be followed for the distribution of Environmental Authorisation and notification of the appeal period:

- Copies of the Environmental Authorisation will be placed at the Jeffrey's Bay and Humansdorp Municipal Libraries;
- Letter 6 to be sent to all I&APs (including organs of state), with notification on the availability of the Environmental Authorisation and information on the Appeal Period; and
- Environmental Authorisation to be placed on the project website.

All I&APs on the project database will be notified of the outcome of the appeal period, this notification will be included in Letter 7 to I&APs.

4.4 AUTHORITY CONSULTATION DURING THE EIA PHASE

Authority consultation is integrated into the public consultation process, with additional one-on-one meetings held with the lead authorities where necessary. The authority consultation process for the EIA Process is outlined in Table 4.2 below.

Table 4.2. Authority consultation schedule for the EIA phase

Stage in EIA Phase	Form of Consultation (including provisional dates)
During Scoping phase	Ad hoc communications with DEA to discuss the outcome of the Scoping process.
During preparation of draft EIA Report and Draft EMP	Ad hoc communications with DEA to discuss the outcome of the Scoping process, preparation of the draft EIA and draft EMP and other legislative issues that may arise.
Public Review of draft EIA report and draft EMP; and attend public meeting	Review of draft reports: Authorities, together with other stakeholders, had the opportunity to review the Draft EIA and EMP reports during the 40- day review period; and to attend the public meeting.
During the EIA process	The CSIR project manager, Ms Minnelise Levendal and representatives from WKN-Windcurrent conducted a site visit with the DEA case officer, Ms Linda Poll-Jonker, on Thursday, 25 August 2011.
During Final EIA report phase	Decision on final reports: Meetings with dedicated departments, if requested by DEA, with jurisdiction over particular aspects of the project (e.g. Local Authority) and potentially including relevant specialists.

4.5 APPROACH TO SPECIALIST STUDIES AND IMPACT ASSESSMENT

This section outlines the assessment methodology and legal context for specialist studies, in accordance with *Section 3: Assessment of Impacts*, in DEA Guideline 5, June 2006.

4.5.1 Generic Terms of Reference for the assessment of impacts

The identification of potential impacts should include impacts that may occur during the construction and operational phases of the activity. The assessment of impacts is to include direct, indirect as well as cumulative impacts.

In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed activity is well understood so that the impacts associated with the activity can be understood. The process of identification and assessment of impacts will include:

- Determine the current environmental conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured;
- Determine future changes to the environment that will occur if the activity does not proceed; and
- An understanding of the activity in sufficient detail to understand its consequences; and
- The identification of significant impacts which are likely to occur if the activity is undertaken.

As per DEA *Guideline 5: Assessment of Alternatives and Impacts* the following methodology is to be applied to the predication and assessment of impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

- **Cumulative impacts** are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

- **Spatial extent** – The size of the area that will be affected by the impact:
    - Site specific
    - Local (<2 km from site)
    - Regional (within 30 km of site)
    - National.

- **Intensity** –The anticipated severity of the impact:
  - High (severe alteration of natural systems, patterns or processes)
  - Medium (notable alteration of natural systems, patterns or processes)
  - Low (negligible alteration of natural systems, patterns or processes).

- **Duration** –The timeframe during which the impact will be experienced:
  - Temporary (less than 1 year)
  - Short term (1 to 6 years)
  - Medium term (6 to 15 years)
  - Long term (the impact will cease after the operational life of the activity)
  - Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient).

Using the criteria above, the impacts will further be assessed in terms of the following:

- **Probability** –The probability of the impact occurring:
  - Improbable (little or no chance of occurring)
  - Probable (<50% chance of occurring)
  - Highly probable (50 – 90% chance of occurring)
  - Definite (>90% chance of occurring).

- **Significance** – Will the impact cause a notable alteration of the environment?
  - Low to very low (the impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making)
  - Medium (the impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated)
  - High (the impacts will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making).

- **Status** - Whether the impact on the overall environment will be:
  - positive - environment overall will benefit from the impact
  - negative - environment overall will be adversely affected by the impact
  - neutral - environment overall not be affected.

- **Confidence** – The degree of confidence in predictions based on available information and specialist knowledge:
  - Low
  - Medium
  - High.

- Management Actions and Monitoring of the Impacts (EMP)
- Where negative impacts are identified, mitigatory measures will be identified to avoid or reduce negative impacts. Where no mitigatory measures are possible this will be stated
- Where positive impacts are identified, augmentation measures will be identified to potentially enhance positive impacts

- Quantifiable standards for measuring and monitoring mitigatory measures and enhancements will be set. This will include a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness.

The Table below is to be used by specialists for the rating of impacts.

Table 4.3: Table for rating of impacts

Direct Impacts							
Mitigation	**Spatial Extent**	**Intensity**	**Duration**	**Probability**	**Significance & Status**		**Confidence**
					Without Mitigation	**With Mitigation**	
Impact on Flora from increased risk of alien invasion in disturbed areas							
Alien invasive monitoring to be implemented as per EMP	Site	Medium	Long term	High	Medium	Low	Medium

Other aspects to be taken into consideration in the assessment of impact significance are:

- Impacts will be evaluated for the construction and operation phases of the development. The assessment of impacts for the decommissioning phase will be brief, as there is limited understanding at this stage of what this might entail. The relevant rehabilitation guidelines and legal requirements applicable at the time will need to be applied;
- The impact evaluation will, where possible, take into consideration the cumulative effects associated with this and other facilities/projects which are either developed or in the process of being developed in the local area; and
- The impact assessment will attempt to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

4.6 SPECIFIC ISSUES TO BE ADDRESSED IN SPECIALIST STUDIES

Based on an evaluation of issues to date, the following Specialist Studies are proposed as part of the EIA phase:

Table 4.4: EIA Team

EIA Management Team		
Paul Lochner	CSIR	Project Leader (EAP-SA)
Minnelise Levendal	CSIR	Project Manager
Specialist Team		
Jamie Pote	Private Consultant	Ecology (Flora and Fauna)
Chris van Rooyen	Chris van Rooyen Consultants	Birds
Stephanie Dippenaar Anna Doty	Private Consultant Nelson Mandela Metro University	Bats
Henry Holland	Mapthis	Visual impacts
Brett Williams	SafeTech	Noise
Dr Hugo van Zyl	Independent Economic Researchers	Economics
Dr Johan Binneman	Albany Museum	Archaeology
Dr John Almond	Natura Viva	Palaeontology
Mr Johann Lanz	Private Consultant	Soil agricultural potential
Public Participation Process		
Sandy Wren	Public Process Consultants	Public Participation Process

The Terms of Reference (ToR) for the specialist studies essentially consisted of the generic assessment requirements and the specific issues identified for each study. These issues have been identified through the baseline studies, I&AP and authority consultation, as well as input from the proposed specialists based on their experience. As part of the review of the Draft Scoping Report, specialists were requested to propose any additional issues for inclusion in the specialist studies. Additional issues, identified through public and authority consultation during Scoping, as well as specialist inputs, were included in the final Terms of Reference for specialists.

4.6.1 Fauna and Flora

The ecological specialist study included the following:

- Describe the vegetation in the study area;
- Determine species composition of each vegetation type, and the presence of potential protected species;
- Describe the current state of the vegetation on site;
- Describe the conservation status and value of the vegetation;
- Describe transformations and invasive alien plant species;
- Provide a vegetation sensitivity map of the site;

- Include Faunal Assessment (Mammal; amphibian and reptile);
- Identify and assess potential impacts on fauna and flora, outline mitigatory measures and outline additional management guidelines;
- Assess the significance of the impacts;
- Indicate potential no go areas;
- Identify management actions to avoid or reduce negative impacts on fauna and flora for inclusion in the EMP.

4.6.2 Birds

The bird specialist study included the following:

- A desktop review of available information that can support and inform the specialist study i.e. potential impacts on birds.
- Establish which species may occur in the area, their relevant conservation status and which ones would be potentially most at risk.
- Identification of issues and potential impacts related to birds, which are to be considered in combination with any additional relevant issues that may be raised through the public consultation process.
- Assessment of the potential, as well as potential cumulative, impacts on birds, both positive and negative, associated with the proposed project for the construction, operation and decommissioning phases.
- Compilation of a bird sensitivity map or identification of buffer zones to inform the turbine layout.
- Identification of management actions to avoid or reduce negative impacts; and to enhance positive benefits of the project on avifauna.
- In addition to the specialist study, a pre-construction bird monitoring programme should be undertaken. The results and recommendations of this monitoring programme should be included in the specialist bird reports and the EMP.
  Note: It should be noted that a pre-construction bird monitoring programme was undertaken. The results and recommendations are included in the bird specialist report and (see Chapter 6) and the EMP of this Final EIA Report.

4.6.3 Bats

The bat specialist study included the following:

- Identify and assess the potential impacts of the wind project on bats and bat mortality.
- Establish which species may occur in the area and their relevant conservation status.
- Conduct field work to assess bat species presence at the proposed site, the presence of any large bat roosts or maternity colonies, and areas of foraging activity.
- Identify potential management plans to reduce the impact of the wind farm on the local bat community.
- Compilation of a bat sensitivity map or identification of buffer zones to inform the turbine layout.

In addition to the specialist study, a pre-construction bat monitoring programme is being undertaken.

4.6.4 Visual

The visual specialist study included the following:

- Conduct a desktop review of available information that can support and inform the specialist study.
- Identify and assess the potential visual impacts of the wind project on landscape character and sense of place, including a viewshed analysis and taking into consideration factors such as visual sensitivity and visual absorption capacity. This should be done in combination with any additional relevant issues that may be raised through the public consultation process.
- Identify possible cumulative impacts related to the visual aspects for the proposed project.
- Assess the potential impact/impacts, both positive and negative, associated with the proposed project for the construction, operation and decommissioning phases.
- Identify management actions to avoid or reduce negative noise impacts for inclusion in the EMP.

4.6.5 Noise

The noise specialist study included the following:

- Conduct a site visit to identify potential noise sensitive receptors.
- Identify issues and potential impacts, as well as possible cumulative impacts, related to the noise aspects for the proposed project.
- The measurement of the existing ambient noise (day and night time).
- A noise study/modelling of the future impact during construction and operation of the proposed project, taking into consideration sensitive receptors.
- Identify and assess the potential impacts associated with the proposed project for the construction, operation and decommissioning phases.
- Identify management actions to avoid or reduce negative noise impacts for inclusion in the EMP.

4.6.6 Economic

The Economic specialist study included the following:

- Describe the existing socio-economic characteristics/context of the local area and broader region.
- Identify and assess potential socio-economic impacts (e.g. job creation, skills development and training, community investment programmes, promotion of secondary industries etc) at local as well as wider scales as relevant. These are expected to include the following:

- Broad level review of the need and financial viability/risks associated with the project.
- Degree of fit with local, regional and national economic development visions and plans including renewable energy planning.
- Impacts on overall economic development potential in the area including impacts on commercial enterprises nearby the site (incl. agriculture, small businesses, tourism establishments and others).
- Impacts associated with project expenditure on direct and indirect employment and household incomes. These impacts should be investigated through an examination of how the project and the spending injection associated with it may impact on the local, regional and national economy.
- Impacts associated with environmental impacts that have economic implications. This should focus on positive impacts associated with renewable energy use as well as potential negative impacts on neighbouring land owners should they be relevant.

- Recommend mitigation measures to both minimise the negative socio-economic effects, and to maximise the positive socio-economic effects of the proposed development, both during construction and operations.
- Address any additional issues raised through the public participation process, and
- Propose and implement additional ToR, if required, based on professional expertise, experience and compliance with the relevant specialist study guidelines and best practice.

4.6.7 Heritage (archaeology, palaeontology, historical and cultural aspects)

- Identify and assess potential impact on archaeology (e.g. stone age artefacts)
- Identify and assess potential impacts on the built environment or places of historical and cultural significance (e.g. national monuments and grave sites).
- Identify and assess potential impact of excavations on palaeontology (e.g. fossils).

4.7 SUPPORTING TECHNICAL STUDIES

Soil potential
An **agricultural study** for the Ubuntu site was commissioned by WKN-Windcurrent during the preparation of the Draft EIA report. Johann Lanz, a soil scientist was contracted to investigate and report on soil conditions at the Ubuntu wind farm site. The aim of the investigation was to make an assessment of the agricultural suitability of the land that will be potentially impacted by the proposed wind farm project. The study was commissioned in response to a request from DEA to undertake a soil study after the review of the Scoping Report.

Aviation
WKN-Windcurrent obtained approval from the South African Civil Aviation Authority for the proposed Ubuntu project (see Appendix D).

4.8 APPROACH TO THE ASSESSMENT OF ALTERNATIVES

As per *Guideline 5: Assessment of Alternatives and Impacts* (DEA, June 2006), the EIA Regulations require that alternatives to a proposed activity be considered. Alternatives are

different means of meeting the general purpose and need of a proposed activity. This may include the assessment of site alternatives, activity alternatives, process or technology alternatives, temporal alternatives and/or the no-go alternative.

The EIA Regulations indicate that alternatives that are considered in an assessment process be reasonable and feasible. I&APs must also be provided with an opportunity of providing inputs into the process of formulating alternatives. The assessment of alternatives should, as a minimum, include the following:

- The consideration of the no-go alternative as a baseline scenario;
- A comparison of the selected alternatives; and
- The providing of reasons for the elimination of an alternative.

The approach to investigating alternatives was presented in the Scoping Report (refer to Final Scoping Report, CSIR, 2011). An overview of these alternatives is provided below, together with updated information that incorporates the revised layout alternatives and findings from the specialist studies.

4.8.1 Location Alternatives

During the pre-feasibility for the project, WKN-Windcurrent reviewed a range of potential sites in the Kouga Region. These sites were evaluated based on a range of criteria such as:

- Local wind climate, using data from local weather stations in the area;
- Local power line network, including existing grid availability, stability and capacity, local power utilisation, future developments and planned power line upgrades;
- Road access for construction and operational maintenance and the topography of the site;
- Existing wind farm development proposals;
- Engagement with landowners; and
- The visibility of the project with regard to local habitation and tourism.

Based on the above review, WKN-Windcurrent selected the Ubuntu site located near Jeffrey's Bay (subject of this EIA) as its option. Following site selection WKN-Windcurrent moved forward towards a feasibility study. An environmental screening study for the Ubuntu site was undertaken by the CSIR in November 2009. Based on this preliminary screening, it was concluded that there were no fatal flaws identified from an environmental perspective that would necessitate termination of the project at this stage, provided that the exclusion criteria are reviewed in more detail as part of the forthcoming planning in the EIA phase.

4.8.2 No-go alternative

The main negative implication of the no-go option is lack of power supply through the wind farm.

Selecting the no-go alternative will reduce the risk of bird and bat mortalities as no turbines would be erected. Furthermore, potential negative impacts on vegetation, biodiversity and the visual character of the area would also be avoided by the no-go alternative.

4.8.3 Land use alternative

At present the proposed site is zoned for Agriculture, and is mainly used for extensive cattle grazing.

The physical footprint of the turbines is very limited. Turbines will be supported on foundations dimensioned to the geotechnical properties, for example reinforced concrete spread foundations of approximately 20 m by 20 m and 3 m in depth. The farm covers approximately 1138 hectares. After construction, the turbine mast footprints will cover approximately 0.09 % of the total area. Current cattle farming activities would continue beneath and around the turbines.

4.8.4 Activity alternatives as part of the development

The fundamental goal of the WKN-Windcurrent project is the economically viable generation of renewable energy (RE) on a commercial scale. Theoretically, RE alternatives which could potentially achieve the same power generation targets include solar power generation (concentrated solar power and photovoltaic), hydro-electricity and biomass-based energy generation. Wind energy was selected as the energy source of choice due to the very favourable wind regime of the Kouga area, compared to the relatively poor solar, hydro and biomass resources in the study area (refer to Figures 4.2 to 4.5).

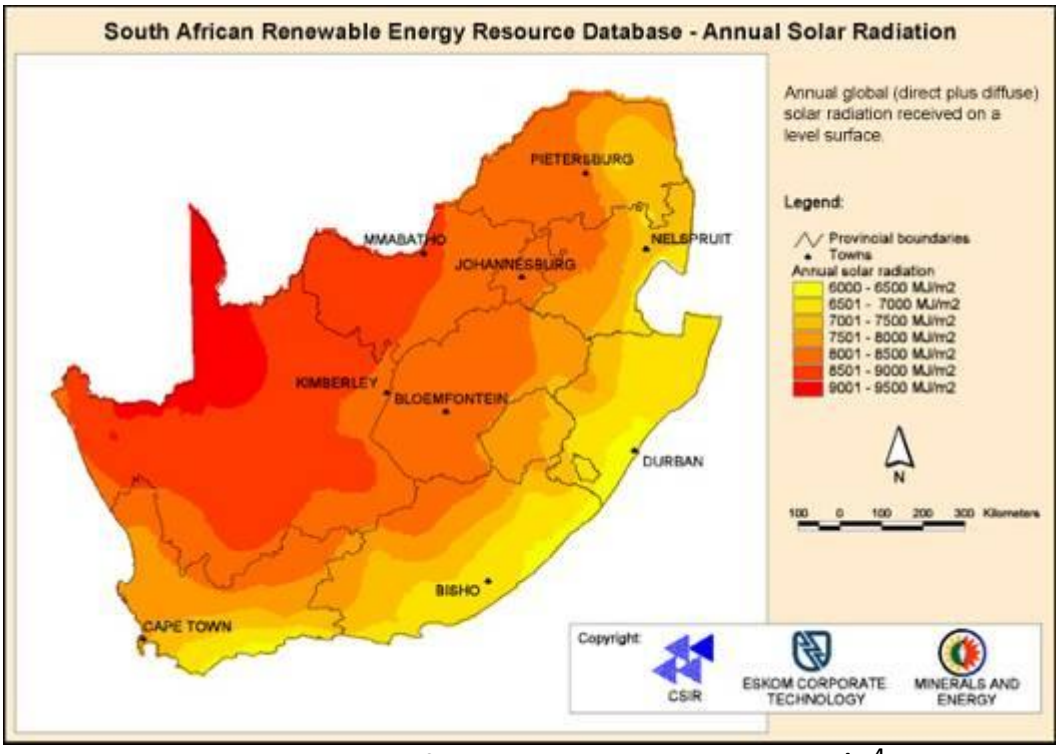


Figure 4.2: South African annual solar radiation in MJ/m^4

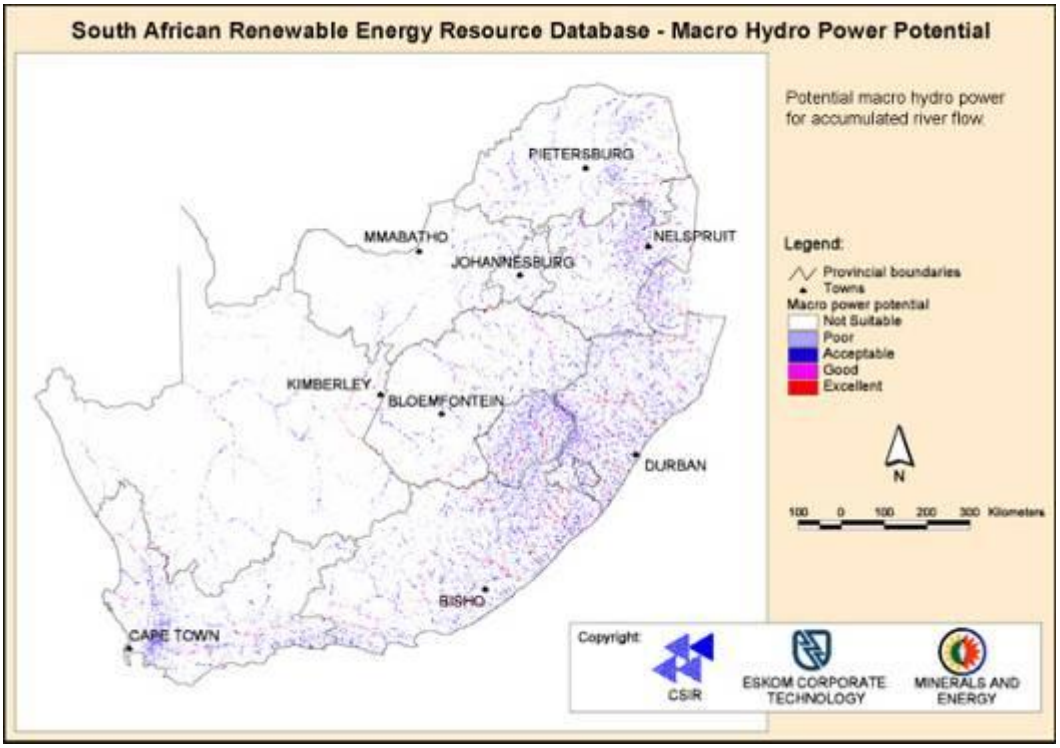


Figure 4.3: South African macro hydro power potential

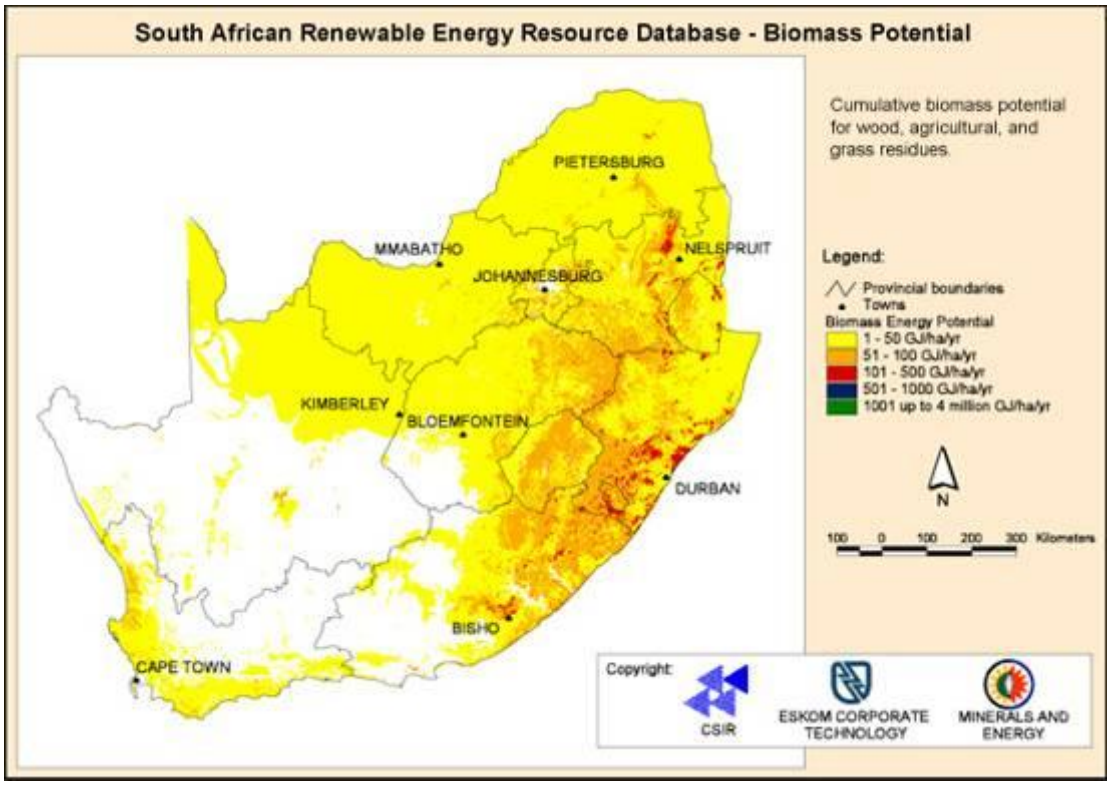


Figure 4.4: South African biomass potential

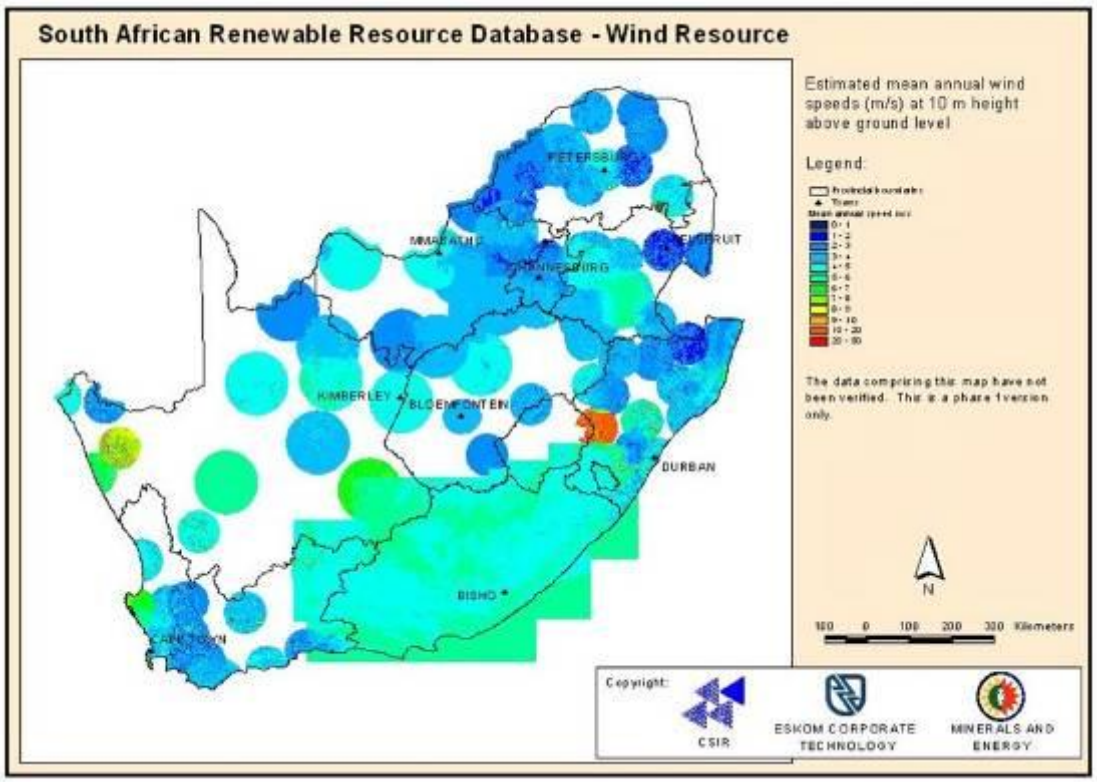


Figure 4.5: South African wind resource with the study area receiving between 4-5m & 5-6m/second mean annual wind speeds

4.8.5 Technology alternatives as part of the development

The only feasible technological alternative to the horizontal axis wind turbine (HAWT) is the vertical axis wind turbine (VAWT). With the VAWT system, the turbine rotor shaft is mounted vertically as opposed to the horizontal mount of the HAWT (Figure 4.6). Such a configuration affords the VAWT various advantages, most notably; easy access to the turbine gearbox and relative quiet operation. WKN-Windcurrent, however, did not consider VAWT to be a reasonable alternative technology due to the unproven nature of these turbines at a commercial or Megawatt scale as well as its reduced efficiency (due to its relative low height and subsequent lower wind speeds at ground level) compared to that of HAWT (REFOCUS, 2003). Further the HAWT have proven worldwide that it has installed capacity of more than hundred GW.

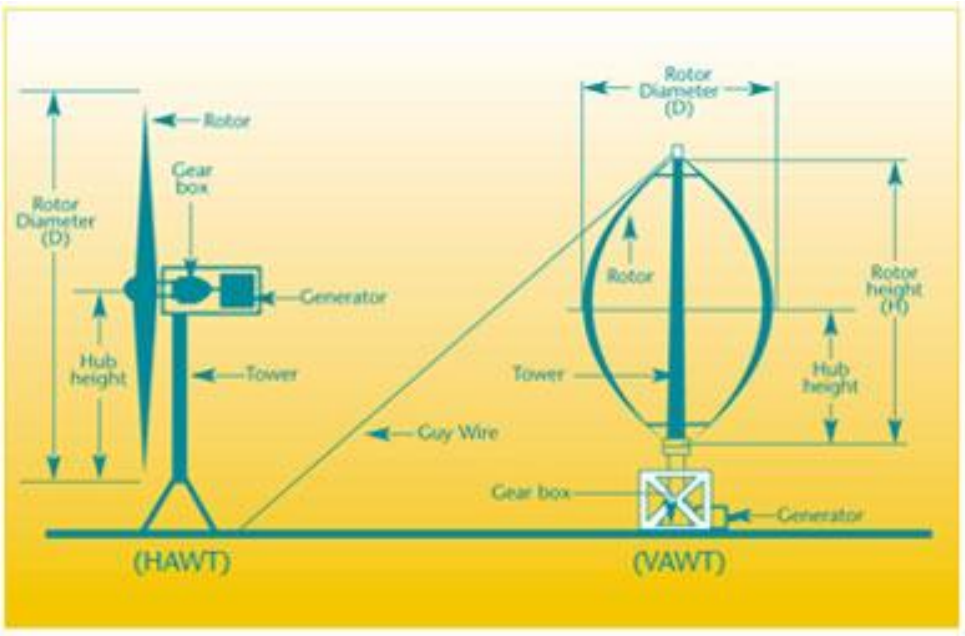


Figure 4.6: Comparison between HAWT and VAWT systems (not to scale)

4.8.6 Activity and layout alternatives as part of the development

Different scales of turbines and different turbine technology providers were considered by WKN-Windcurrent. When considering alternative suppliers, key factors were availability of turbines on the international market, suitable to the South African wind climate, and service levels and experience in South Africa.

WKN-Windcurrent has selected the alternative turbine suppliers and sizes listed below for the proposed Ubuntu wind energy project. The selection of the turbine providers might however still change according to market and price variables. WKN-Windcurrent has prepared three alternative layouts based on these alternative suppliers and turbine sizes (see Figures 4.7-4.9).

- Vestas V90 (2 MW) – will comprise 50 turbines (see layout in Figure 4.7);
- Vestas V112 (3 MW) – will comprise 33 turbines (see layout in Figure 4.8); and
- Nordex N100 turbines (2.5 MW) – will comprise 40 turbines (see layout in Figure 4.9).

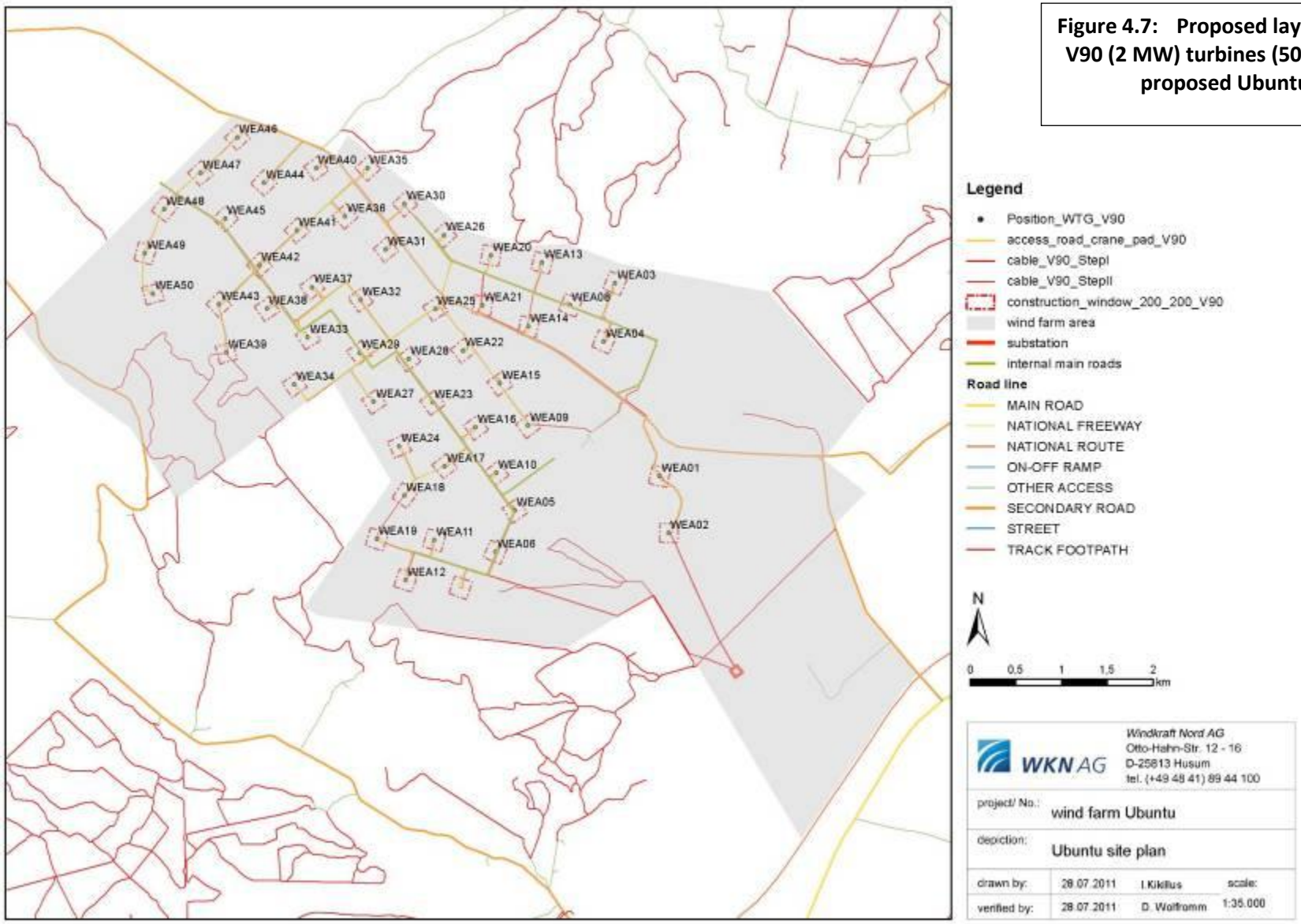


Figure 4.7: Proposed layout for the Vestas V90 (2 MW) turbines (50 turbines) for the proposed Ubuntu project.

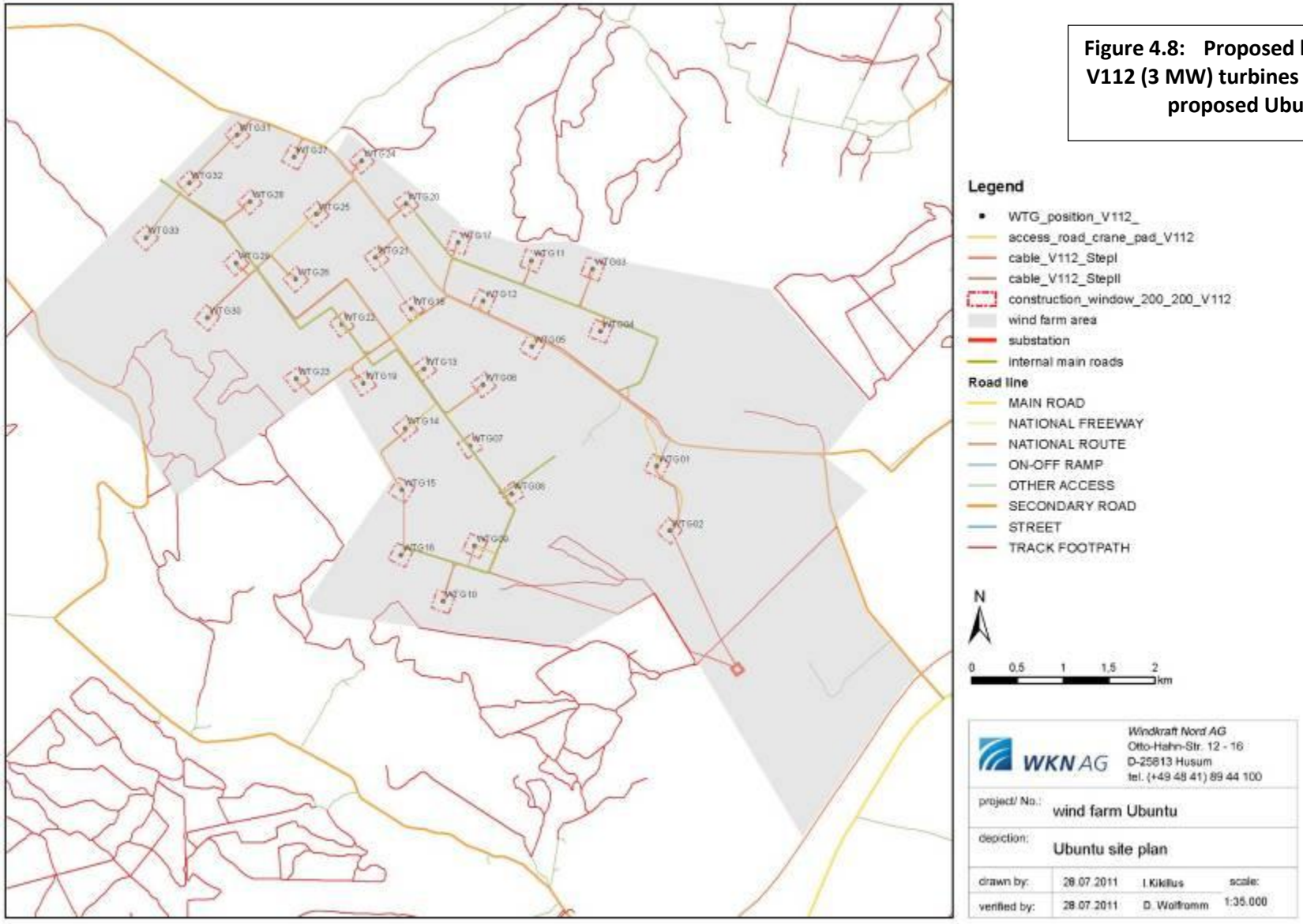


Figure 4.8: Proposed layout for the Vestas V112 (3 MW) turbines (33 turbines) for the proposed Ubuntu project.

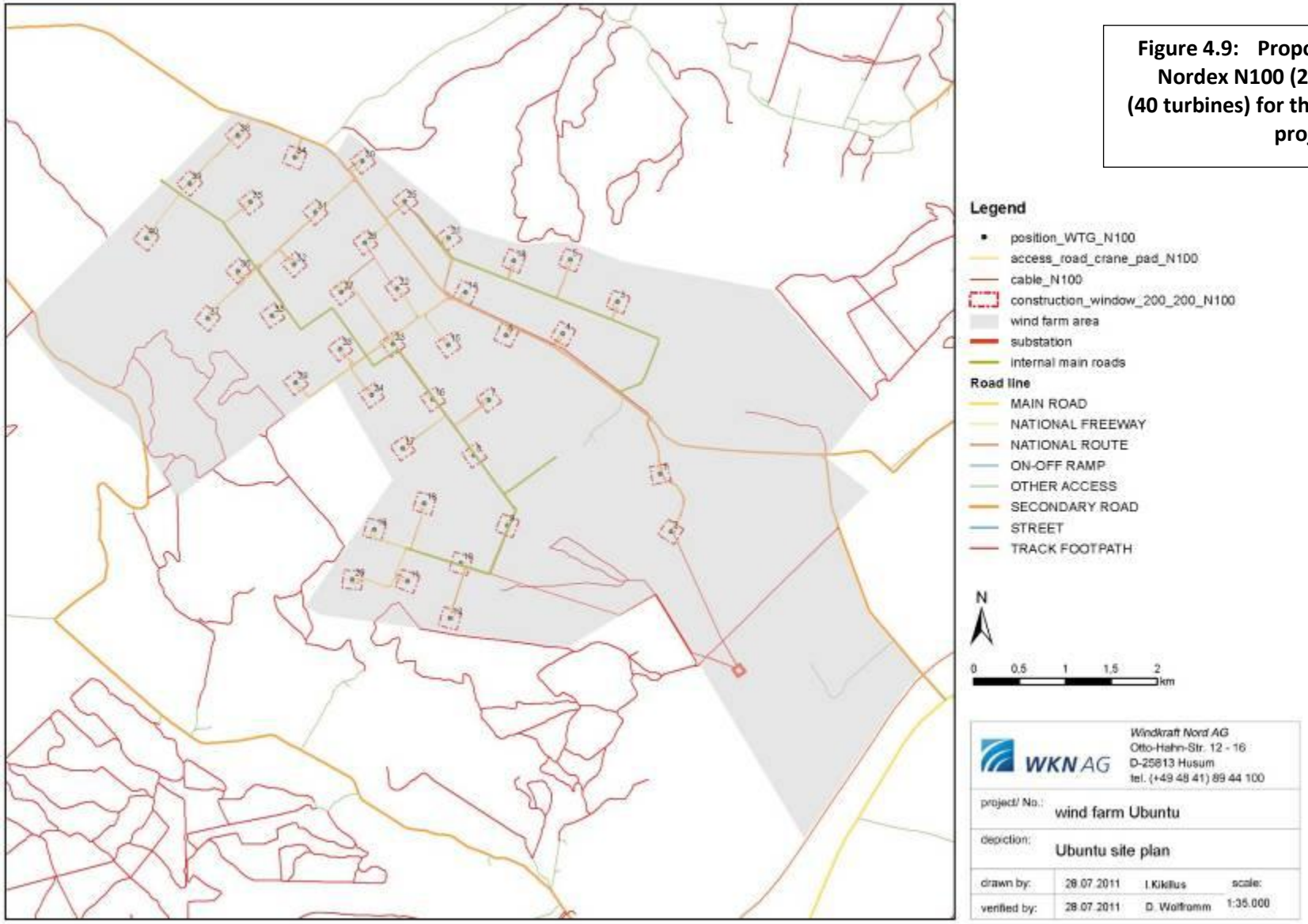


Figure 4.9: Proposed layout for the Nordex N100 (2.5 MW) turbines (40 turbines) for the proposed Ubuntu project.

In addition to the three potential turbine layouts shown in Figures 4.7-4.9, WKN-Windcurrent is also proposing four additional turbine locations (see Figure 4.10). These alternative turbine locations will be used should individual turbine locations of the current proposed locations not be favourable from an environmental perspective.

These layouts prepared by WKN-Windcurrent were reviewed by the specialists working on the project and went through several iterations. The layouts were informed by the identification of buffer zones or no-go areas identified by the specialists (see Figure 4.11). These include factors such as the proximity to the dwellings, proximity to roads, linkage to access road, undisturbed natural areas, proximity to wetlands, the botanical sensitivity of the proposed area as well as the sensitivity of the area from a birds and bats perspective. The turbine layouts were also informed by the wind regime (climate). The wind measurement data were obtained from the existing wind measuring mast which informed the alignment of the turbines to ensure maximum wind absorption.

Subsequent to the selection of the three turbine types above, WKN-Windcurrent identified the REpower 3.2 MW turbine as potentially suitable for this project, one of the reasons being that it allows for a larger local manufacturing component. The 3.2 MW REpower turbine has been included in the Final EIA Report as an alternative turbine type that may be used. The range of turbine sizes in the Final EIA report is therefore from 2.0 to 3.2 MW. The total number of turbines could therefore vary from 31 turbines of 3.2 MW, to 50 turbines if a 2 MW turbine is used. The specifications (e.g. physical scale and noise emissions) for the 3.2 MW REpower turbine are directly comparable to the Vestas V122 3.0 MW turbine that was assessed as one of the typical turbines in the specialist studies. The final turbine selection will depend on the availability of turbines, commercial factors and local manufacturing opportunities

4.9 SCHEDULE FOR THE EIA

The proposed schedule for the EIA, based on the legislated EIA process, is presented in Table 4.5. It should be noted that this schedule might be revised during the EIA process, depending on factors such as the time required for decisions from authorities.

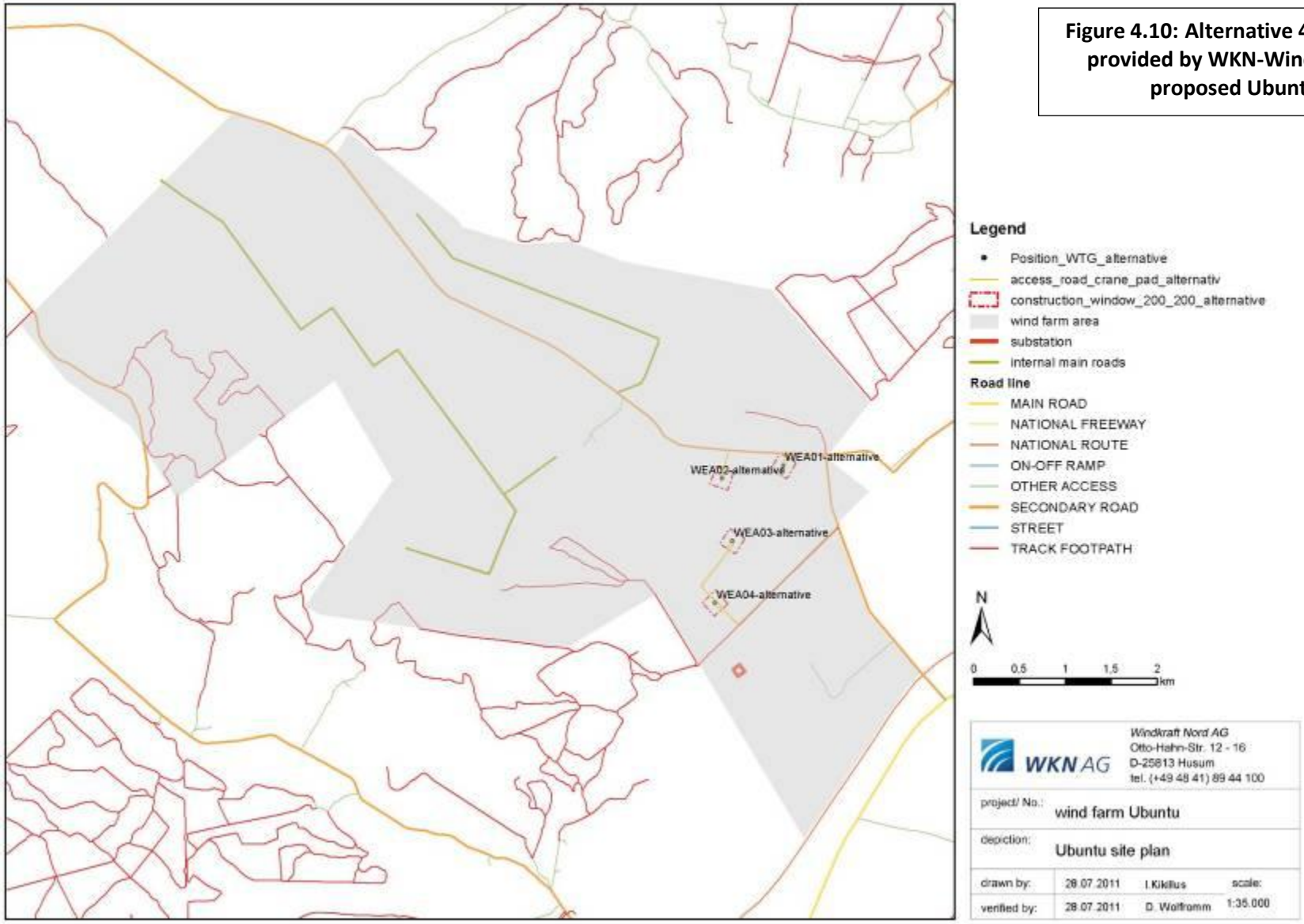


Figure 4.10: Alternative 4 turbine locations provided by WKN-Windcurrent for the proposed Ubuntu project

Figure 4.11: Proposed no-go areas identified in the specialist studies for the proposed Ubuntu project.

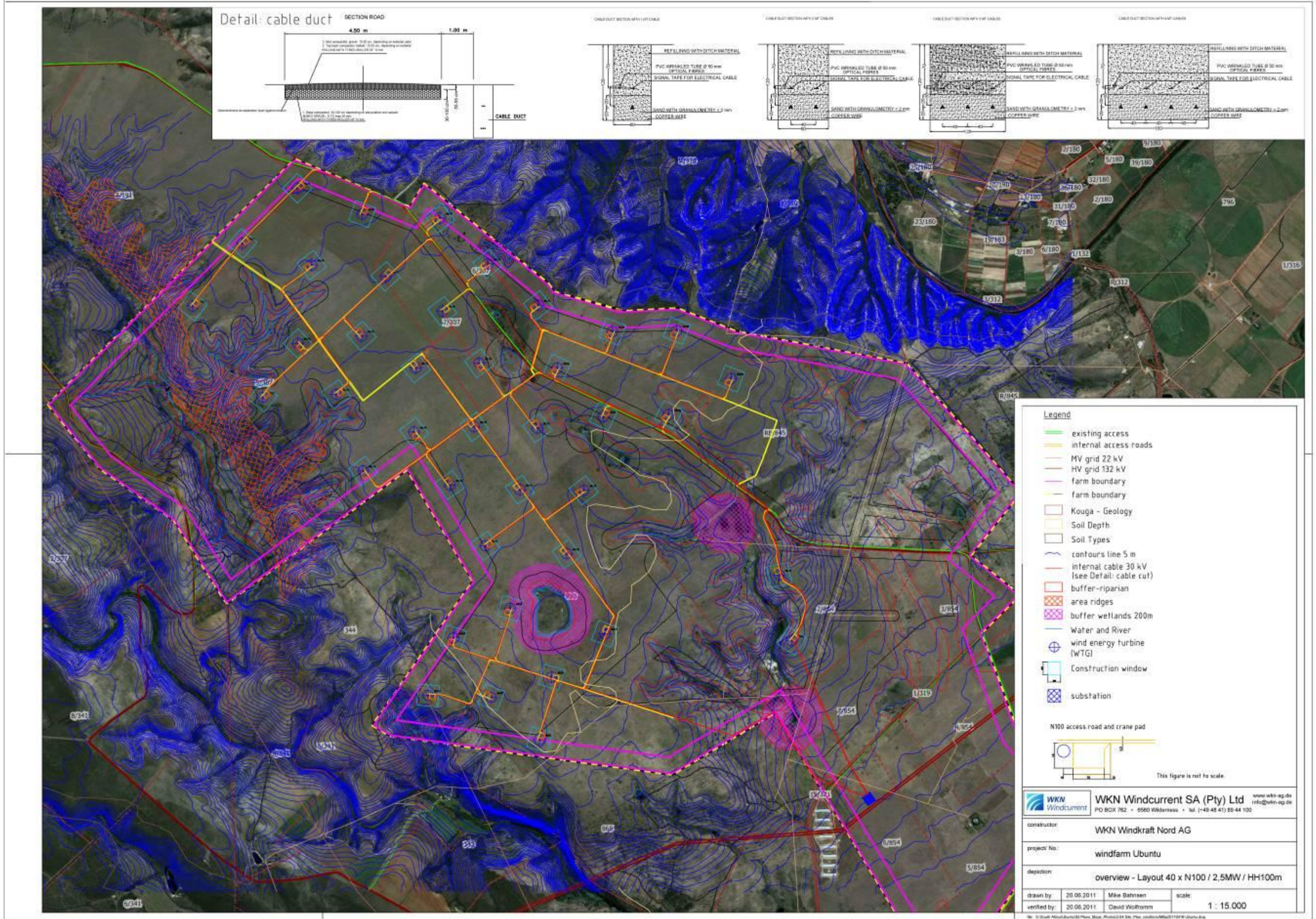


Table 4.5: EIA Schedule for the Ubuntu Wind Energy Project

TASKS		EIA SCHEDULE (MONTHS)																	
		2010 Nov	Dec	2011 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2012 Jan	Feb	Mar
1	Establish I&AP database, prepare BID and announce EIA																	
2	I&AP registration & meetings with key stakeholders to source issues																	
3	Prepare Draft Scoping Report (DSR) and Plan of Study for EIA (PSEIA)																	
4	Public comments period (40-days) on DSR and stakeholder meetings																	
5	Submit Final Scoping Report (FSR) and PSEIA to authorities for decision (30 days)																	
6	Communicate authority decision to I&APs and process for next phase																	
7	Specialist studies (including fieldwork)																	
8	Prepare Draft EIA Report and EMP and submit to DEA																	
9	Public review of Draft EIA Report and EMP (40-days)																	
10	Submit Final EIA Report and Draft EMP to authorities																	
11	Decision by authorities (115 days)																	
12	Appeal process																	→

Key:

BID: Background Information Document
DEA: National Department of Environmental Affairs
DEIA: Draft EIA report
DSR: Draft Scoping Report
PSEIA: Plan of Study for EIA
EMP: Environmental Management Plan