

SCOPING OF ISSUES ASSOCIATED WITH THE WIND ENERGY FACILITY ON THE WEST COAST

CHAPTER 8

Construction activities for wind energy projects typically include land clearing for site preparation and access routes; excavation and filling; transportation of supply materials and fuels; construction of foundations involving excavations and placement of concrete; operating cranes for unloading and installation of equipment; and commissioning of new equipment. Decommissioning activities may include removal of project infrastructure and site rehabilitation. Environmental issues associated with these construction and decommissioning activities may include, among others, noise and vibration, soil erosion, and threats to biodiversity and ecological processes, including habitat alteration and impacts to wildlife. Due to the typically remote location of wind energy conversion facilities, the transport of equipment and materials during construction and decommissioning may present logistical challenges.

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

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

These and other environmental issues have been identified through a scoping evaluation of the proposed wind energy facility on the West Coast. The scoping process has involved input from specialist consultants, the project proponent, as well as input from key stakeholders (including government authorities) and interested and affected parties engaged through the public consultation process.

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

Tables 8.1 and 8.3 provide a summary of the findings of the environmental scoping study undertaken for potential impacts associated with the construction and operation phases of the proposed project. Potential direct and indirect impacts of the proposed wind energy facility are evaluated, and recommendations are made regarding further studies required within the EIA phase of the process.

In evaluating impacts associated with the proposed project, it has been assumed that although during **operation** the area affected will comprise 100 turbines (15 m x 15 m foundation areas each), access roads and a substation footprint, but that during **construction** the bulk of the approximately 25 km² required for the wind energy facility footprint could suffer some level of disturbance as a result of the required activities on site.

The cumulative impacts associated with the proposed wind energy facility are expected to be associated with the scale of the project, i.e. that up to 100 turbines will be located on the proposed site. The potential direct cumulative impacts associated with the project are expected to be associated predominantly with the visual impact on the surrounding area. Indirect cumulative impacts on flora, fauna and ecological processes are driven primarily by the on-going negative effects of mining activities in the area. Cumulative effects can only be assessed once the detailed layouts are known, and will be considered in the detailed specialist studies to be undertaken in the EIA phase.

Table 8.1: Evaluation of potential impacts associated with the **construction phase** of the proposed wind energy facility on the West Coast

Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
Impact on vegetation associated with the construction of the wind energy facility	Loss of natural vegetation within the footprint of the wind energy facility site	Local and regional. Direct loss of vegetation in this area (due to construction) is unlikely to amount to more than 30% of the Strandveld, and 10% of the Sand Fynbos on site. Informal road network created during construction could cause substantial local damage to the vegetation. Indirect impacts (disruption or change in ecological processes, shading, disturbance of wind flow, etc.) are likely to be minimal, and may be positive in some cases, especially if the proponent purchases the land and removes the livestock.	Low to Medium, negative impact.	No areas of High or Very High sensitivity. The sparse vegetation on clay soils, all pans, all rocky areas, and all Sand Fynbos areas assessed as having a Medium to High sensitivity, and should ideally not be disturbed. Ideally no infrastructure of any sort should be constructed in these areas. The least sensitive area is the previously cultivated area, which has a sensitivity of Low to Medium on a regional scale. No 'no go' areas identified.
Impact on vegetation associated with associated infrastructure	Loss of vegetation in any areas where new roads are required, as well as within the powerline corridor	Likely to be local, but depends largely on the final routing of any roads and powerline infrastructure.	Cannot be determined at this stage.	Cannot be assessed at this stage.
<p>Gaps in knowledge & recommendations for further study:</p> <ul style="list-style-type: none"> » An assessment of botanical impacts depends entirely on knowing exact development footprints. Eskom should prepare detailed infrastructure layouts for the EIA phase in order to allow for an accurate assessment of direct botanical impacts to be undertaken. » The specialist study to be undertaken in the EIA phase should assess local and regional impacts (direct and indirect), assess the need for possible biodiversity offsets, and make detailed mitigation suggestions for the planning, construction and operational stages. These recommendations should be 				

Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
included within the construction and operational phase EMPs. Further botanical fieldwork is unlikely to be required at the EIA stage, except for those areas not previously surveyed. .				
Impact on fauna during excavation activities	Direct mortality of species that cannot effectively vacate the affected areas by themselves during the construction phase of the wind energy facility, e.g. invertebrates, tortoises, burrowing lizards and burrowing mammals.	Local as a relatively small area would be affected.	Very low, negative impact	None identified
Impact on fauna	Loss of faunal habitat - inland Succulent Karoo. This habitat type has a considerable geographic extent along the west coast and no vertebrate species are specifically associated with it.	Local	Very low, negative impact	None identified
Impact on fauna	Increased road kill rate. Amphibians and reptiles tend to be particularly susceptible on two-lane roads with low to moderate traffic. Large and mid-sized mammals are especially susceptible on two-lane, high speed roads, and birds and small mammals on wider, high-speed highways	Local	Very low, negative significance. The Red Data species which may be present in the area would not be affected to any large degree by road kills as they are subterranean species and/or have low mobility.	None identified

Gaps in knowledge & recommendations for further study:				
<ul style="list-style-type: none"> » The absence of Red Data species on the proposed site needs to be confirmed. » Once the specific construction footprint for the establishment of the wind energy facility, access roads, substation and powerline have been delineated within the proposed site, it will be important to conduct a ground survey of the terrestrial fauna present on the site, specifically to ascertain whether any of the Red Data species that potentially occur in the study area, are in fact present on the site. This information is needed to finalise the significance rating of potential impacts associated with the energy facility, in particular that of direct mortality and habitat loss. The survey also needs to identify areas within the proposed site that may be more sensitive than other parts in terms of animal occupation. » Detailed impact assessment on fauna to be undertaken in EIA phase. 				
Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
Impacts on birds by wind energy facility and associated infrastructure	Disturbance of birds. Potentially impacting on all species in the area, particularly if breeding in the area.	Local. Site itself and the surrounding area.	Medium, negative.	Only sensitive features evident are small non-perennial pans that may hold water after rainfall, thereby attracting birds.
Impacts on birds by wind energy facility and associated infrastructure	Destruction of habitat. Potentially impacting on all species in the area.	Local. Restricted to the affected site.	Medium, negative.	Only sensitive features evident are small non-perennial pans that may hold water after rainfall, thereby attracting birds.
Gaps in knowledge & recommendations for further study:				
<ul style="list-style-type: none"> » The presence/location of non-perennial pans on the site will need to be investigated further during the EIA phase, and the significance of these pans will be assessed. Where possible the turbines and/or powerlines should be sited away from these pans (and any other sources of water) if possible, although these areas are not absolute no go areas. » Detailed impact assessment on avifauna to be undertaken in EIA phase. 				
Surface modification	Excavation of foundations for wind turbines & other project related infrastructure (e.g. access roads, substation, underground cables & powerline towers)	Local. Restricted to sites selected for the construction & installation of infrastructure.	Low, negative	None identified

Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
Soil Erosion	Accelerated aeolian sediment transport possibly leading to the development of deflation hollows. Accelerated fluvial sediment transport and hence erosion associated with overland flow. A loss of vegetation (or other) cover will increase the susceptibility of sediments to wind erosion.	Local	Low, negative.	Unvegetated and largely unvegetated aeolian dunes represent a high erosion risk and should be avoided for the siting of infrastructure wherever possible. Alternatively, strict mitigation will be required on site to address erosion concerns.
<p>Gaps in knowledge & recommendations for further study:</p> <ul style="list-style-type: none"> » Areas that may be classified as unvegetated and largely unvegetated aeolian dunes will need to be assessed during the site visit for the specialist study, in the EIA phase of the assessment process. » Steep slopes susceptible to slope failure, rock fall or that represent a very high erosion risk do not appear to be present with the area selected for the siting of the turbines. The absence of such areas within all areas potentially affected by project related infrastructure will require confirmation during the site visit for the specialist study, in the EIA phase of the assessment process. » Site-specific information is required to establish the various on-site parameters associated with soil erosion in the study area. Data of interest in this regard includes the mechanisms of erosion taking place, the various soil environments within which the erosion takes place, the significance of erosion should it continue unabated and whether such erosion is natural or a function of anthropogenic disturbance. 				
Wetland loss	A reduction in the surface area of wetlands e.g. (pans) in the study area as a result of the construction of roads, tracks or other infrastructure in wetlands.	International	High, negative; since South Africa is a signatory to the Ramsar Convention, implying wise use of wetland resources should be encouraged. This would exclude the loss or degradation of wetland	Pans identified within the study area and associated buffer zones (approx 100m) should be excluded from the development footprint.

Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
areas.				
Gaps in knowledge & recommendations for further study:				
» The occurrence and spatial extent of the small non-perennial pans within the study area requires further investigation for the siting of wind turbines and associated infrastructure.				
Impacts on pre-colonial archaeological sites	Physical disturbance of the material itself and its context affecting their significance.	Local. The deep excavations for 15m x15m tower bases/foundations will potentially impact buried archaeological material, similarly excavation of cable trenches and clearing of access roads could impact material that lies buried in the surface sand.	Undetermined at this stage. However, the locality of the study area away from the immediate coast substantially decreases the probability of impacts occurring as there are much less sites on the inland coastal plain.	None identified at this stage.
Impacts on colonial period heritage sites	Physical damage such as demolition and neglect. Also context sensitive, in that changes to the surrounding landscape or streetscape will affect their significance.	Local, regional or national (depending on significance of site).	None, as no historic structures in the study area and no significant structures lie within the vicinity of the study area.	None identified
Impacts on cultural landscape and sense of place	Conspicuous changes to a landscape such as tall buildings, landscape scaring, massed housing development altering the "feel" and atmosphere of a place irrevocably.	Local	Massed wind turbines, are without doubt conspicuous structures which will affect the atmosphere of the "place" (sense of place).	None identified
Gaps in knowledge & recommendations for further study:				
» The EIA for the proposed activity will require a detailed physical survey of the study area so that the locations of visible generally protected heritage can be recorded and the layout of the development adjusted, where necessary.				
» Detailed heritage impact assessment to be undertaken in the EIA Phase.				

Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
» The environmental management plan may need to include follow up heritage work such as monitoring of excavations or archaeological sampling.				
Service road alignment	A grid pattern of roads not following a particular contour (e.g. 100m contour) may result in roads being too steep to accommodate abnormally loaded vehicles getting to the turbine sites. To achieve smooth 'flat' gradients may require significant cut and fill earthworks.	Local Confined to the internal study area.	May result in extensive disturbance of the site. Could be very significant if a turbine location is not accessible by the abnormal transport vehicles.	None identified at this stage.
Gaps in knowledge & recommendations for further study:				
» The power and ability of the transport vehicles to traverse various gradients with abnormal loads need to be determined prior to designing the alignment of the internal service roads.				
Impact on road pavement structure	Transporting components & materials from sources external to the study area will add direct & cumulative axle loading impacts onto the existing road network. On bituminous surfaced roads, and depending on the cause of failure, likely to manifest as surface failures. Gravel roads will deteriorate faster, create significant dust, experience accelerated gravel loss and formation of corrugations.	Regional. The additional construction traffic has the potential to lead to premature failure of the roads, both surfaced and gravel, between the source and the site.	Significant negative impact on the existing road network external to the site. The impact on the existing external roads should be included in and mitigated as part of the project.	None identified at this stage.

Gaps in knowledge & recommendations for further study:				
<p>» Further investigation of the need for regular grading of gravel roads and the possibility of considering formalising the main local access to an asphalt surface, provided the existing pavement structure is adequate, will be required.</p> <p>» Detailed pavement design required to be undertaken by project proponent.</p>				
Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
Working platform and crawler crane lay down area	To achieve smooth 'flat' gradients may require significant cut & fill earthworks. A large area needs to be cleared, levelled & compacted at each turbine location resulting in localised disturbance.	Confined to the internal study area.	May result in extensive disturbance of the site. Extent of the impact could be reduced if part of the laydown area lies over the new service road alignment.	None identified
External road works	Likely to be road widening & corners of intersections, removal of traffic islands & replaced with road pavement structure, relocation of street furniture, installation of temporary support to culverts & canal crossings, vertical re-alignment of existing road to accommodate clearance of low-bed trailers & horizontal re-alignment of tight bends to accommodate 45m blade trailers.	Likely to be localised	Very significant to comply with the likely Permit conditions requirements.	None identified
Proclaimed Trunk, Main and Divisional Roads – Road	The un-surfaced gravel road to Skaapvlei (DR 2225) will be impacted by abnormal	All roads along the proposed transport routes Gravel roads (DR 2225 specifically)	High significance, depending on road and load. DRE's permit	None identified

Pavements	wheel loads (specifically those with load limitations) and construction traffic. These vehicles will impart additional axle loading onto the existing road pavement structure.		conditions are likely to be that the public road shall be accessible to the public at all times and kept in an acceptable condition and that the applicant shall be held responsible for returning the road to it's original if not better condition upon completion of the project.	
-----------	--	--	--	--

Gaps in knowledge & recommendations for further study:

- » After the tower dimensions have been agreed to, it is recommended that a dry-run with an empty extendable 45m blade trailer (or similar approved) and the most critical tower section trailer should be undertaken between the two harbours and the site entrance. This is in order to confirm the visual assessment contained in this report and test the requirements for road alterations both horizontally and vertically.
- » A full route access report is required, in order to determine the acceptability of 'Gross Vehicle Weights' and 'Axle loading' issues, for bridges, culverts and structures for the entire route. This will be required to be undertaken by the transport contractor.
- » Consider re-constructing DR 2225 as formal surfaced rural road between Koekenaap and Skaapvlei, with appropriate storm water drainage to provide a good quality transport route during construction and avoid the on-going gravel road routine maintenance that will be required to keep the road in good condition at all times.

Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
Construction of bitumen-based hard surfaces and roads	Phenol contamination of groundwater resource.	Local	Low, negative.	The southern corner of the proposed site.
Storage of diesel fuel for construction equipment	Volatile organic compound contamination of groundwater resource.	Local	Low, negative.	The southern corner of the proposed site.
On-site sanitation facilities for construction personnel	Bacteriological contamination of groundwater resource.	Local	Low, negative.	The southern corner of the proposed site.

Gaps in knowledge & recommendations for further study:				
» The southern corner of the proposed site should not be considered for the placement or development of infrastructure that poses a contamination risk to the groundwater resource unless site-specific groundwater studies indicate otherwise. Provided that this recommendation is followed, no further hydrogeological studies of the site are considered necessary.				
Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
Noise impacts	On-site construction noise associated with the establishment of the wind energy facility.	Local Impact restricted to residents at Skaapvlei.	Very low, negative. Land surrounding the proposed site largely uninhabited, other than at Skaapvlei & therefore on-site construction noise would not impact on receptors other than at Skaapvlei.	None identified
Noise impacts	Upgrading of existing gravel road to Skaapvlei via Koekenaap.	Local Impact restricted to several residential properties in Koekenaap situated along the road.	Cannot be determined at this stage.	None identified
Noise impacts	Truck movement to the facility site during construction.	Local It is assumed that construction and transportation vehicles to the site will travel through the towns of Vredendal and Lutzville.	Cannot be determined at this stage.	None identified
Gaps in knowledge & recommendations for further study:				
» Potential impacts of noise associated with the construction activities must be considered in more detail within the EIA phase in accordance with procedures contained in SANS 10328.				

Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
Impacts on the social environment	Potential up & down-stream economic opportunities for the local, regional and national economy.	Local, regional and national	Cannot be determined at this stage.	N/A
Impacts on the social environment	Job & business creation opportunities.	Local	Cannot be determined at this stage.	N/A
Impacts on the social environment	Influx of job seekers into the area. The influx of job seekers may result in an increase in sexually transmitted diseases, including HIV/AIDS; increase in prostitution; increase in alcohol & drug related incidents; increase in crime; & creation of tension & conflict in the community.	Local and regional	Cannot be determined at this stage.	N/A
Impacts on the social environment	Impacts on people residing in close proximity to the site	Local. Impact restricted to residents at Skaapvlei.	Cannot be determined at this stage.	N/A
Impacts on the social environment	Threat to farm safety due to increased number of people in the area and construction workers.	Local	Cannot be determined at this stage	N/A
<p>Gaps in knowledge & recommendations for further study:</p> <ul style="list-style-type: none"> » Assessment of impacts such as stock thefts, safety and security issues, dust and noise; damage to roads caused by heavy vehicles. » The identification and assessment of social impacts will be guided by the specialist SIA Guidelines adopted by DEA&DP in the Western Cape. » A detailed public consultation process will be undertaken during the EIA phase of the project. The consultation process for the SIA will be separate to the consultation process for the EIA. In this regard the consultation process for the SIA will focus on one-on-one interviews with key stakeholders and, where necessary, workshops and meetings with community representatives. 				

Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
Tourism potential	Potential impacts on the strategic tourism direction of the area.	Regional	Low to none	N/A
Gaps in knowledge & recommendations for further study:				
<ul style="list-style-type: none"> » The detailed tourism impacts during the construction phase of the project should be further investigated during the EIA stage. » Such site-specific potential negative impacts to be further investigated may include visual impacts, noise impacts, physical impacts. 				

Aspects identified, which should inform project planning and design, are associated with the conditions on site which may impact on construction. These issues are detailed in Table 8.2 below.

Table 8.2: Aspects identified to inform project planning and design (associated with the conditions on site) which may impact on construction

Aspect	Potential Issue	Gaps in knowledge & recommendations for further study
Seismicity	In terms of data available, no earthquake epicentres were located within a 100 km radius of the northernmost extremity of the study area between 1973 and the present. Detailed record of the seismicity of the study area. A seismic record of the area may be obtained from the Council for Geoscience. It is assumed that a future geotechnical assessment of the study area will include an evaluation of the seismic risk to structures. For example, the top of tall structures are likely to experience greater horizontal movement than that likely to be recorded at the base.	Detailed record of the seismicity of the study area. A seismic record of the area may be obtained from the Council for Geoscience. It is assumed that a future geotechnical assessment of the study area will include an evaluation of the seismic risk to structures. For example, the top of tall structures are likely to experience greater horizontal movement than that likely to be recorded at the base. The proponent should undertake a detailed engineering geological investigation once the EIA studies have been completed.

Aspect	Potential Issue	Gaps in knowledge & recommendations for further study
Study area topography	<p>It is important to identify and understand the various marine terrace levels occurring in the study area so that the platforms upon which the proposed wind energy infrastructure is earmarked can be properly understood and that correct planning decisions are made with regards the underlying geological/engineering geological environment.</p>	<p>The site-specific topographical environment is poorly mapped (i.e. the published data is too coarse) and needs to be established/confirmed during an on-site field investigation where recent coastal processes can be more accurately determined.</p> <p>The bioturbation (borrows and cavities) footprints indicated on the photographs needs to be confirmed by an appropriate terrestrial zoologist/entomologist to establish the normal extent of such habitats with a view to determining the potential impacts that these structures would have on the proposed wind energy facility. The above specialist components should be undertaken by the proponent during detailed engineering geological investigation once the EIA studies have been completed.</p>
Engineering geological constraints	<p>Engineering geological constraints that could be of concern from a planning and engineering perspective include the following:</p> <ul style="list-style-type: none"> » Where clayey material occurs close to surface this material may be expansive and should be tested to determine any heave characteristics. Heaving clays will result in structural damage to foundations during fluctuating moisture conditions if not taken into account by the project engineers during foundation design. » The unconsolidated aeolian sand would be erodible by both wind and water. These cover sands should, therefore, be protected by vegetation cover and excavation gradients of not steeper than 1:3 should be created to facilitate such growth. » Where cover sands are exposed to flowing water and high wind speeds the risk of soil erosion could be considered high. » The sands in the study area may contain a collapsible fabric 	<p>Many of these criteria should be proven during invasive field investigation techniques, including disturbed soil sample analysis. The suitability of material for construction applications such as turbine foundations and pavement layerworks should also be established during such detailed engineering geological investigation. Additional tests that should be carried out during the specialist investigation include the establishment of the erosion potential of the material occurring across the site (i.e. dispersiveness), the suitability of the material for construction applications, <i>in situ</i> bearing capacities and the chemical potential of the groundwater (perched) occurring across the site to impact negatively on reinforced concrete structures.</p> <p>The above requirements should be conducted as a specialist</p>

Aspect	Potential Issue	Gaps in knowledge & recommendations for further study
	<p>and should be tested to ascertain any inherent collapse potential. This implies structural damage to foundations where such soil movements have not been allowed for in the foundation design.</p> <ul style="list-style-type: none"> » Differential settlement concerns should be borne in mind where structures are founded on material of variable consistency such as very loose aeolian sand and well cemented calcareous dorbank (hardpan). Ground conditions in such environments should be checked by project engineers during construction to ensure risks such as these are eliminated/reduced. » Compressible soil and associated reduced bearing pressures within the aeolian environment. Engineers will, therefore, have to engineer improved ground conditions to ensure adequate bearing pressures are created to facilitate construction of all infrastructure associated with this project. » Compressible soil when wet and associated reduced bearing capacities of clayey material after wet periods. Where such clayey conditions occur adequate stormwater drainage will need to be installed to encourage water away from the area of interest. » Shallow well-cemented dorbank (considered highly likely) and less weathered bedrock (considered highly unlikely) with associated excavation concerns where deeper foundations/trenches are required. Where such excavation concerns are encountered stronger excavation equipment and even blasting may be required to facilitate deep trench excavation. » Shallow perched watertables in flatter areas especially after periods of heavy or prolonged precipitation. Adequate stormwater planning will be required to ensure that such 	<p>engineering geological investigation by the proponent once the EIA investigation has been completed. This engineering geological investigation is vital to ensure long-term integrity of the proposed wind energy facility and other infrastructure within this dynamic coastal environment.</p> <p>Engineering geological test procedures that should be undertaken during the above specialist investigation should include the following:</p> <ul style="list-style-type: none"> » Foundation Indicator for turbine and substation foundations (including hydrometer test). » Road Indicator for road pavement layerworks. » MOD CBR for both foundation and pavement design. » SCS Double Hydrometer to establish dispersive potential of the soil. » Corrosive test of groundwater (if encountered) to establish impact on reinforced concrete. <p>Should surfaced roads be proposed as part of the construction phase of the wind energy facility, then suitable construction material for paved road surfaces would have to be explored in the region. This level of information should be addressed in the detailed engineering geological investigation, which would be conducted out by the proponent upon completion of the EIA process.</p>

Aspect	Potential Issue	Gaps in knowledge & recommendations for further study
	<p>flooding scenarios are reduced/eliminated during the design stage of the project.</p> <ul style="list-style-type: none"> » Poor surface drainage and damp conditions where flat grades prevail. » Unstable excavation sidewalls where excavation trenches are opened where (a) shallow perched water tables prevail or (b) where deep excavations are opened within unconsolidated aeolian sand. » Karst topography and sinkholes cannot be excluded where thicker accumulations of calcareous material occur. Karstic weathering phenomena are well documented where groundwater ingress occurs into thick calcareous deposits such as occurring in the study area (considered unlikely in the study area due to low rainfall values). 	

Table 8.3: Evaluation of potential impacts associated with the **operation phase** of the proposed wind energy facility on the West Coast

Issue	Nature of Impact	Extent of Impact	Potential Significance
Visual impact	Visual exposure to wind turbines and associated infrastructure	<p>Local</p> <p>A core area of potentially uninterrupted exposure of the facility, greatly contained within the 25km buffer zone. The majority of impact occurs within the 0-10km zone. Visibility beyond the 25km mark becomes scattered and broken and ultimately negligible as it nears the 50km buffer distance. Visibility, even on a perfectly clear day, within this zone (25-50km), and beyond the</p>	<p>Structures would be easily and comfortable visible and would constitute a high visual prominence, potentially resulting in a high visual impact (negative) within the 0–25km zone.</p>

		<p>50km mark, would theoretically be possible although highly unlikely to constitute a negative visual impact. In practical terms this rationale implies that although the facility may potentially be visible from sections of the N7 national road (50km away), it would be difficult to distinguish within the larger landscape.</p>	
--	--	---	--

Gaps in knowledge & recommendations for further study:

- » Additional spatial analyses must be undertaken in order to create a visual impact index that will further aid in determining potential areas of visual impact. This exercise should be undertaken for the core wind energy facility as well as the ancillary infrastructure, as these (the substation, access road, and distribution line) are envisaged to have varying levels of visual impact at a more localised scale. Site-specific issues and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact. Consider the visual impacts of the turbines from all relevant viewing angles when considering locations of turbines and infrastructure.
- » The detailed visual impact assessment will be informed by the DEA&DP Guidelines for visual specialist studies, as well as the requirements of Report 6 of the Western Cape Provincial Guidelines for the determination of sites for the development of Wind Energy Facilities.

Issue	Nature of Impact	Extent of Impact	Potential Significance
Impacts on fauna	<p>Barrier effect across roads and fencing.</p> <p>The access road to the wind energy facility, as well as the on-site service road, may form significant barriers preventing movement of small animals such as lower vertebrates and invertebrates, whereas fencing would affect mammals.</p>	Local	Low, negative
Impacts on fauna	Bat collision fatalities.	Restricted to migrating bats rather than resident populations.	Low, negative

Gaps in knowledge & recommendations for further study:			
<p>» Keeping small to large mammals out of the wind facility terrain after the construction phase is a question that needs to be addressed and will depend on the extent of remaining natural habitat present within the terrain. Small mammal predators may be necessary to keep rodent populations within the terrain under control.</p> <p>» Detailed impact assessment on fauna to be undertaken in EIA phase.</p>			
Issue	Nature of Impact	Extent of Impact	Potential Significance
Impacts on birds	Disturbance of birds. Potentially impacting on all species in the area, particularly if breeding in the area.	Local Site itself and the surrounding area Powerline & access road servitude and the surrounding area.	Low to Medium, negative
Impacts on birds	Destruction of habitat. Potentially impacting on all species in the area.	Local Site itself Powerline and access road servitude.	Low to Medium, negative
Impacts on birds associated with the wind energy facility	Collision of birds with turbines. Species such as the raptors and smaller ground dwelling species such as larks are likely to be affected, although extent is unknown.	Turbine sites	Medium, negative
Impacts on birds associated with powerline infrastructure	Collision of birds with 132kV powerline	Site of power line	Medium, negative
Impacts on birds associated with powerline infrastructure	Electrocution of birds on 132kV powerline	Site of power line	Dependant on tower structure
Impact on infrastructure associated with birds	Impact of birds on quality of supply of 132kV powerline	Site of power line	Low, negative
Gaps in knowledge & recommendations for further study:			
<p>» Issues identified will must investigated in more detail during the EIA phase in a detailed avifauna impact assessment. In particular the significance of bird collisions with the turbines must be assessed in order to determine whether the risk warrants mitigation such as painting turbines. The result of the EIA phase will be a more detailed assessment of all impacts, recommended mitigation where necessary, and a monitoring programme.</p>			

Issue	Nature of Impact	Extent of Impact	Potential Significance
Electricity substation transformer oils	Volatile organic compound contamination of groundwater resources.	Site and immediate surroundings	Low, negative
Landscaping and gardening	Pesticide and nitrate contamination	Local	Low, negative
Gaps in knowledge & recommendations for further study:			
» Impacts can be managed, and will be addressed in the EMP. No further hydrogeological studies of the site are considered necessary.			
Agricultural potential	Impacts on agricultural potential/loss of agricultural land	Local Confined to areas within the site where turbines (15m x 15m) etc will be located, access roads, substation site, and powerline servitude.	Low, negative Mainly due to low potential of area, as well as 'scattered' nature of infrastructure.
Gaps in knowledge & recommendations for further study:			
» From the point of view of soils and agricultural potential, there is little scope for arable agriculture or anything other than very extensive grazing. For this reason, it is not anticipated that a more detailed soil survey will be required for the EIA phase of the project.			
Issue	Nature of Impact	Extent of Impact	Potential Significance
Increased runoff	Increased surface runoff from sealed surfaces (e.g. tarred/concrete roads, roofs) relative to the undisturbed reference state.	Local	Low, negative
Sediment deposition	Deposition of sediment by aeolian processes adjacent to or within infrastructure (e.g. substation or visitor's centre building).	Local	Moderate, negative
Sediment transport	Preferential aeolian erosion of sediment adjacent to structures and subsequent subsidence. The winnowing affect associated with local flow modification caused by structures may lead to subsidence if these structures are undercut.	Local	Low, negative

Issue	Nature of Impact	Extent of Impact	Potential Significance
Weathering	Sandblasting of structures leading to increased maintenance requirements. Loss of cement integrity due to the presence of hazardous soils. Rapid corrosion of metal infrastructure and hence increased maintenance costs.	Local	Low to high ⁸ , negative
<p>Gaps in knowledge & recommendations for further study:</p> <ul style="list-style-type: none"> » Provide a description of the Regional Geomorphic Setting (e.g. climate, geology, topography) of the potentially affected environment (viz. the powerline corridor and area selected for the siting of the turbines). » Provide a map to indicate the area covered by landforms sensitive to development (e.g. pans and drainage lines). » Describe and indicate on a map any geosites of significance that require management. » Assess the current state of the landscape in relation to geomorphological indicators of rangeland condition. » Assess potential projected related impacts listed in this report with a significance rating of low or greater. If applicable, identify other impacts that may not have been identified and assess them in the same way. » Propose means to avoid, mitigate or offset potential project related impacts. » Provide a description of assumptions, limitations and gaps in knowledge where applicable. 			
Noise impacts	Noise impacts associated with the operation of the wind energy facility.	Local Impact on land within approximately 7 km radius of the proposed site.	Low, negative
Noise impacts	Low-frequency noise impact. Impact might be considered intrusive.	Local Noise emission from the proposed WEF might result in low-frequency sound being perceived within dwellings at the identified noise sensitive sites.	Low, negative

⁸ Hazardous soils in this context refers to acid sulphate soils, gypsiferous soils and saline soils. It is assumed that these aspects will be investigated in a geotechnical study that will be undertaken outside of the EIA process.

Gaps in knowledge & recommendations for further study:			
» Potential impacts of noise associated with the operation activities must be considered in more detail within the EIA phase in accordance with procedures contained in SANS 10328.			
Issue	Nature of Impact	Extent of Impact	Potential Significance
Tourism potential	Potential impacts on the strategic tourism direction of the area.	Regional	Low to none
Tourism potential	Potential impacts on tourism market demand.	Local	Low to none; or positive Once the wind energy facility has been completed, it may become a drawcard for enticing a segment of visitors specifically interested in renewable energy to travel via Lutzville
Tourism potential	Potential positive tourism impacts. The proposed wind energy facility could become a major attraction in the area, should it be accompanied by high quality interpretation facilities.	Local	Not determined at this stage.
Gaps in knowledge & recommendations for further study:			
» The detailed tourism impacts i) during the construction phase and ii) during the operations phase of the project should be further investigated during the EIA stage.			
» Such site-specific potential negative impacts to be further investigated may include visual impacts, noise impacts, physical impacts, and positive impacts associated with economic impacts and improvements in the site setting and surrounds.			
» More specifically tourism inputs during the detailed phase should include:			
<ul style="list-style-type: none"> • A more detailed analyses of extent and significance of the potential tourism impacts of the facility and the related road and powerline infrastructures, taking into account the results of specialist studies pertaining to visual, noise and other potential impacts during the various phases of the project; • Analysis and investigation of the properties and potential mitigation measures to improve the site and surrounds from a tourism perspective and the extent and significance of such measures; • Further consultation with tourism role-players to ascertain their views and potential level of involvement in the project 			

Impacts on the social environment	Potential up & down-stream economic opportunities for the local, regional and national economy.	Local, regional and national	Cannot be determined at this stage
Impacts on the social environment	Job & business creation opportunities.	Local.	Cannot be determined at this stage
Impacts on the social environment	Creation of potential opportunities to support local communities, including education & training, & community based projects and programmes.	Local and regional	Cannot be determined at this stage
Impacts on the social environment	Impact on property prices.	Local	Cannot be determined at this stage
Impacts on the social environment	Impact on rural sense of place (closely linked to the visual impacts).	Local	Cannot be determined at this stage
Impacts on the social environment	Impacts on people residing in close proximity to the site.	Local Impact restricted to residents in close proximity to the site.	Cannot be determined at this stage
Impacts on the social environment	Threat to farm safety due to increased number of people in the area and construction workers.	Local.	Cannot be determined at this stage
<p><u>Gaps in knowledge & recommendations for further study:</u></p> <ul style="list-style-type: none"> » The identification and assessment of social impacts will be guided by the specialist SIA Guidelines adopted by DEA&DP in the Western Cape. » A detailed public consultation process will be undertaken during the EIA phase of the project. The consultation process for the SIA will be separate to the consultation process for the EIA. In this regard the consultation process for the SIA will focus on one-on-one interviews with key stakeholders and, where necessary, workshops and meetings with community representatives. 			