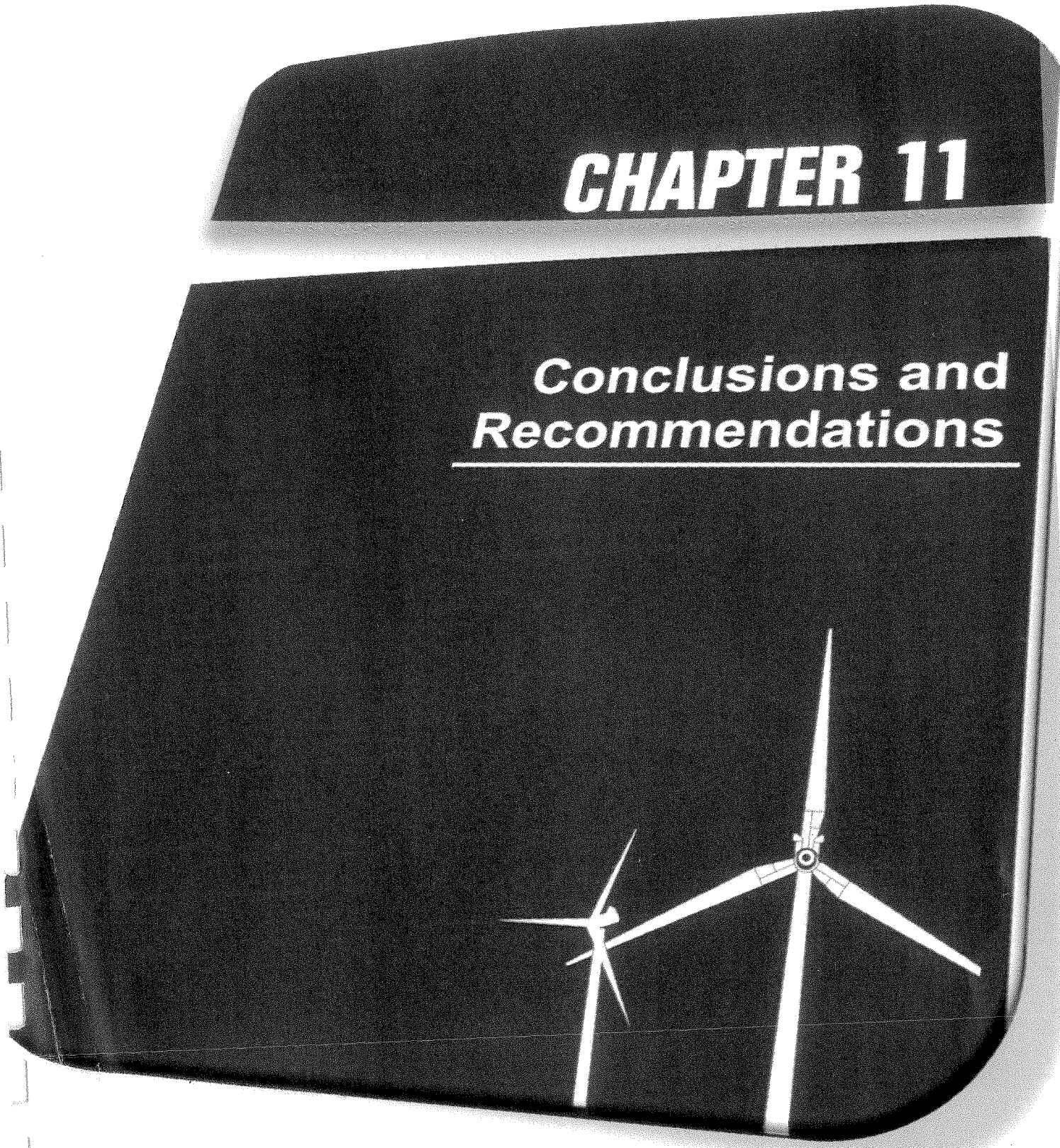
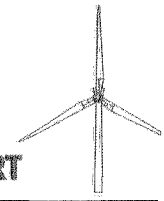
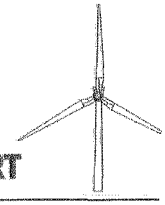
CHAPTER 11

Conclusions and Recommendations

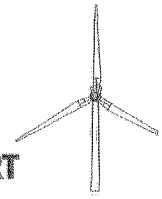




Contents



Tables & Figures



CHAPTER 11: CONCLUSIONS AND RECOMMENDATIONS

11.1 Introduction

This section presents the conclusion on the most significant impacts identified through the EIA process, together with the management actions required to avoid or mitigate the negative impacts; or to enhance the positive benefits.

The assessment of impacts is presented in the following sections:

- Impact on Terrestrial Flora and Fauna
- Impact on Birds
- Impact on Bats
- Visual Impact
- Noise Impact
- Impact on Heritage (Archaeology and Palaeontology).

For each of above impacts, specialist studies were conducted, the results of which are included in Chapters 5 to 10 of the EIA Report.

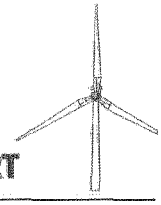
11.2 Impact on terrestrial flora and fauna

11.2.1 Flora

The total physical footprint of the proposed Universal Wind energy project within the Coega IDZ is estimated to be approximately 10 ha, which includes the turbine base, hard standing areas, access roads and areas cleared for the construction laydown yards. This is approximately 0.1% of the total extent of the 12 000 ha included by the Coega IDZ.

When considering the location of the turbines within the context of various conservation plans and the existing habitat in the IDZ, the overall impact of the proposed project on flora and fauna is predicted to be **negative** and of **low to medium significance** (with mitigation), dependant on the existing level of transformation of the turbine sites and their proximity to the Coega Open Space System. No impacts were assessed as being of high significance after mitigation

The Universal Wind turbine layout is mostly situated outside of proposed IDZ ecological process areas, but sites 1, 2, 5, 13-15 and 17-20 are situated within or directly adjacent to NMB CAP designated Critical Biodiversity areas. All turbine sites and the



proposed road network are predominantly within intact Grassridge Bontveld, and can be regarded as having a moderate vulnerability status, under the current Conservation status of the vegetation unit being Vulnerable. Regional Planning strategies recommend that 'Vulnerable' areas "can withstand only limited loss of natural area or limited disturbance through human activities and developments". In these areas, proposed disturbance or developments should preferably take place on sites that have undergone disturbance, rather than on undisturbed sites. Vulnerable areas are identified as being suited for activities "of limited extent", which is suitable for the construction of windfarm infrastructure.

No designated Critically Endangered or Endangered vegetation types will be directly impacted upon by the proposed development. Regional planning corridors (e.g. Coega River) may be impacted upon along their periphery by the proposed development.

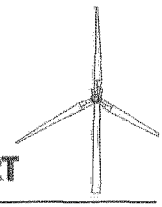
Mitigation:

Direct loss of habitat:

- Ecological areas of high sensitivity should be avoided where possible, and recommendations implemented. Sites should not intrude into designated open space areas and ecological process areas.
- Final siting of footprints should be undertaken by the ECO in consultation with respective specialists to minimise any unnecessary loss. Construction footprints should be clearly demarcated during site clearing and construction activities.
- Roads should be incorporated into the existing major IDZ road network as far as possible and link roads should be as short as possible, and routed according to minimizing loss of habitat.
- Access roads to turbines must avoid any ephemeral pans, if present.
- Although no turbine sites are located within 32 meters of any watercourse, pan or wetland within the site, any changes to layout should not infringe on these areas.
- Greater impacts will occur where roads and turbine sites impact exposed outcrop habitat, small thicket clumps (microhabitats) and traverse seep areas (if affected by final road layout.).
- Additional infrastructure (construction and lay-down areas) should be sited in areas approved in consultation with IDZ ECO and engineer areas, preferably where habitat is already transformed.

Loss of Species of Special Concern (SSC) and associated habitat:

- Protected plant species must be removed from the sites prior to any development taking place. A suitable timeframe must be allowed before construction commences to undertake the plant rescue and relocation operation.
- Final siting of footprints should be undertaken by the ECO in consultation with respective specialists to minimise the loss of SSC.
- Relocate SSC where unavoidable into adjacent areas or to the CDC nursery (or another suitable nursery). Plants that are not necessarily SSC but which can be



used during rehabilitation should be identified and stored appropriately in the approved nursery, or on-site for use after construction.

Species composition and ecological processes:

- The layout and design of access roads (in particular, stormwater drainage and crossing of drainage lines) must take cognisance of surface runoff and drainage patterns, in order to avoid impacting on seeps and wetlands.

Fire risk and alien invasion from visitors / traffic

- A fire management plan and awareness/signage must be implemented as part of the project EMP.
- A comprehensive alien plant management plan (at the turbine sites) must be included in the Universal Wind EMP for the construction and operational phases.
- A long term alien management plan to eradicate and control invasive species must be implemented within lease areas and areas and that have been disturbed during construction.

National and Regional Conservation Planning:

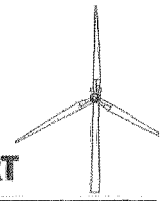
- Mitigation measures (including fauna and flora search and rescue) must be implemented and construction/disturbance footprints must be kept to minimum requirements. Post construction rehabilitation should be prioritised at these sites, outside of permanent hard-standing surface.
- Sites adjacent to the designated IDZ ecological process areas should not encroach into or result in additional vegetation clearing within designated no-go area. Road access alignment should furthermore utilise already disturbed areas as well. Any crossings should be limited to cable requirements
- Where possible Open Space areas should be incorporated into design (including any site buffers) so that a contribution towards the conservation of intact Grassridge Bontveld is made.

Protected Flora:

- Endemic and protected flora must be removed from the development footprint to be safeguarded from destruction and relocated either to undeveloped areas or off-site in consultation with conservation authorities and relevant botanical specialists.
- Clearing of *Acacia saligna* and *Acacia cyclops*, especially from the buffer areas and along road verges should be set as a priority. A long-term alien management plan to control this invasive must be implemented within the immediate surrounds of the turbine and road footprints.
- Kikuyu grass must NOT be utilised during regrassing of verges, turbine footprints and other landscaped areas within the site, particularly adjacent to riparian habitat.

No-go Areas:

- No go areas must be clearly demarcated (using fencing and appropriate signage) before construction commences.



- Contractors and construction workers must be clearly informed of the no-go areas and held accountable for any infringements that may occur.
- No access to the demarcated areas should be permitted during the construction phase and contractors must be clearly informed of these areas. A suitable control measure (such as a fine system) must be implemented to discourage infringement by contractors.
- Activities including but not restricted to the following must not be permitted in designated no go areas:
    - Dumping of any material during and after construction;
    - Turning of vehicles;
    - Trampling and urination by construction workers.

Alien vegetation clearing:

- An alien removal program must be implemented to remove alien vegetation from within the no go areas and should run concurrently with construction activities;
- Cleared alien vegetation must be temporarily stored in a demarcated area (in consultation with the relevant botanical specialist);
- Cleared vegetation must be either removed from site or burned *in-situ* in the temporary storage area;
- Any seed bearing material should be removed from the drainage area to prevent the spread of seed.
- Chopped brushwood can be used to stabilise steep areas that may be susceptible to erosion during clearing activities;
- A suitable revegetation or rehabilitation plan must be implemented after alien vegetation clearing.
- A long-term alien maintenance plan must be designed and implemented in conjunction with a suitably qualified expert.

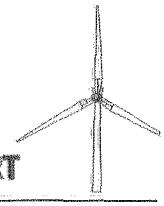
Rehabilitation:

Detailed rehabilitation guidelines have been provided by the botanical specialist and incorporated in the project EMP. Key components of the rehabilitation programme are:

- Plant search and rescue phase for protected species and/or Species of special concern
- Management of pre-construction (site preparation) activities including access roads.
- Construction management activities to minimise impacts and guide rehabilitation.
- Post-construction activities, including the landscaping of peripheral areas of the sites that may have been disturbed during construction.

11.2.2 Fauna

The impacts on fauna are mostly rated as being **negative** and of **low to medium significance**. Some positive impacts result, for example from creation of additional habitat



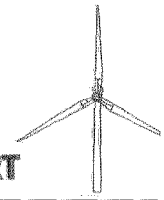
(i.e. any potential buildings / structures) for species such as reptiles, and introduction of lighting, which can assist animals such as reptiles and small mammals in catching insects. The species that will be most affected during the construction phase of this project is the species that cannot vacate the affected area themselves, e.g. tortoises, burrowing reptiles and burrowing mammals. Species of special concern are found in the area, and may be affected by the development. All amphibians are of *least concern* and are well protected elsewhere. Most mammal species are data deficient, but are likely to move away from construction activities. Some reptile species of concern are present and impacts would include loss of habitat (*Bitis albanica*) and road mortalities. The impact will have a temporary affect on the terrestrial fauna, which will return to its normal state after construction.

Mitigation:

- Before doing site clearing, affected areas should be thoroughly searched for tortoises and other reptiles. Tortoises and other reptiles found must be released in adjacent unaffected areas.
- A professional reptile remover (with the necessary permits) should be contacted to remove dangerous reptiles (e.g. poisonous snakes) when in conflict with construction workers.
- Project design should be such that it does not impede on any ecological corridors unnecessarily.
- Riparian zone and stream crossings should be designed to allow for animal movement where necessary;
- No off-road vehicle use outside of designated road network should be permitted;
- Limit road activity where possible to daylight working hours;
- A speed limit of 60 km/h should be implemented on the access roads to the site and a 40 km/h speed limit on the construction site for the cranes and on access roads during rainstorms.
- Road kills should be removed to avoid additional mortalities of scavengers
- Construction of roads over wetlands/rivers/streams must be designed so that the water is allowed to flow under the road, this will secure corridor continuity for amphibians.

11.3 Impact on birds

On Coega IDZ Zone 12, there are more than 60 bird species that are likely to collide with wind turbines, including many that are of conservation significance. Among the latter are Blue Crane (Vulnerable), Denham's Bustard (Vulnerable), Secretarybird (Vulnerable) and Martial Eagle (Vulnerable) which all occur regularly on site. These facts indicate that avifaunal issues are relevant for the proposed Universal WEF. The impacts of WEFs on birds fall into two broad categories: they either relate to (1) death through collision with infrastructure, or (2) decreases in local bird populations due to the displacement effect of infrastructure. The most significant negative impacts therefore include:

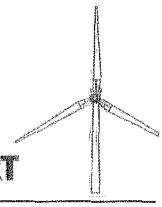


- **Bird habitat destruction and fragmentation (especially Coega Bontveld)**
  Development on the footprint inevitably causes the loss of foraging and nesting habitat for birds. In addition, lay-down areas for machinery and materials will be heavily impacted, albeit not permanently. Birds displaced by this loss of habitat must find alternative suitable habitat, which may be less favourable, and there the displaced birds must compete for resources with the established population of birds of the same or other species, potentially to the detriment of both. The result is a reduction in the local population of most small birds. This can be of conservation concern if the vegetation types affected supports endemic or threatened species of birds, especially so if the plant community is rare in the wider environment.

- **Bird collisions with turbines and overhead power lines**
  Multiple variables affect the potential risk of birds colliding with wind turbines. Many variables are site specific and relate to regional topography and local bird diversity, which usually varies seasonally. This is why each proposed WEF requires prior monitoring of birdlife across a calendar year. A key issue is in the siting of turbines. Several studies have found that the majority of bird deaths through collision are related to one or a few turbines in an array. These "killer" turbines can be those occupying sites where bird passage is concentrated between breeding colonies or night roosts and preferred foraging areas, i.e., sites across which birds frequently commute. Turbine T2 situated on the leading edge of a ridge had a relatively high reporting rate of birds flying through the vicinity at risk height. Birds flying parallel to the rail line passed over Turbine positions T5, 6 & 20. In addition, this area was favoured by the Black-shouldered Kites and a Cape Crow flock sometimes flew up and down the valley to and from turbine positions T16-18. The Cape Crow flock feeding around turbine positions T16-T18 inflated bird numbers at these turbines. The higher number of observations at T18 was due to birds flying along the PPC haul road and raptors hunting in the area several times. The least observations were for turbines T8 to T15, in the upper (north and northwest) portions of the valley.

  Most birds can fly and generally do so within 100 m of the ground. Electrical infrastructures – transmission lines with their support structures, and wind turbines – intrude on this air space. This leads to collisions which are both globally and in southern Africa, the most direct and widespread impact of electrical infrastructure on birds. Birds may collide with stay-wires (where they are used to support pylons) or with the conductors, but usually hit the earth wires which are generally the thinnest, least conspicuous, and highest-rigged component of electricity pylon configurations.

- **Disturbance and displacement of birds from their habitats (especially Coega Bontveld).**
  Development of WEFs can impact birds in several ways additional to collisions. These are: habitat loss or modification, disturbance and deterrence, all of which displace birds from the vicinity of the turbines and even the wider surrounding area. Taken singly, displacement effects, where they occur, may be minor.



However, as there is often synergy between different effects, this may result in more pronounced impacts on birds that are cumulative over time. The best mitigation for habitat impacts is to locate WEFs in degraded or already altered habitat and to minimise the footprint of the WEF by clustering turbines in echelon rather than linear configurations. As bigger birds need larger territories, displacements by WEFs can disrupt these to the extent that territories become too small to adequately support breeding pairs and their offspring.

Mitigation:
The principal and most important recommended mitigations are:

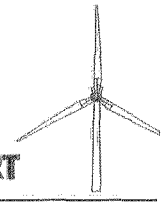
- Micro-site turbine locations such so as to preserve the largest and least fragmented area of Bontveld that is possible.
- Compensate for the loss of Bontveld habitat by means of expansion of the Coega Open Space System to include an additional 66 ha of Bontveld.
- Introduce design features on turbines and overhead power lines to improve visibility to birds and divert their flight.
- Expand the pre-construction bird-monitoring programme to a total of four seasonal monitoring sessions, so that there will be more detailed information on which to base final decisions on the placement of turbines.

11.4 Impact on bats

The impact of the wind turbines on bats at the Universal Wind Energy Project site at Coega is of **medium** significance with mitigation (based on the once off monitoring data). If it is confirmed that there is little bat activity on the site, the predicted impact could then be deemed to be **medium-low**. However at present, as a precautionary principle, the impact is stated to be **medium**. Potential impacts on bats related to the project include a loss of habitat; and mortality due to collisions with turning turbine blades, or due to barotraumas.

The proposed turbine site falls within the distributional ranges of 16 species that have been recorded in the area. An additional five species are listed that might occur in the area, but have not been recorded so far south. The site visit conducted in September 2011 as part of the specialist study recorded three species on site. These species correlate with species which have distribution ranges overlaying the proposed site, as well as species recorded at other wind developments within the Coega IDZ and carcasses found at the installed Electrawinds pilot wind turbine situated in Zone 7 of the IDZ. They include: *Neoromicia capensis,* a clutter edge forager, and *Tadarida aegyptiaca* and *Taphozous mauritianus*, both open air foragers. All of these species have a South African and Global conservation status of Least Concerned. No large caves or maternity colonies supporting large concentrations of bats in single locations, were identified in the vicinity of the proposed turbine sites.

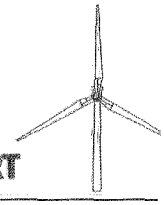
Mitigation:



a) Actions to inform the detailed design (pre-construction)
   - ***Pre-Construction Monitoring*** – At national and project scale, research is needed to provide more information on specific impacts and novel mitigation measures that might reduce impacts of wind turbines on South African species of bats. *The South African Good Practice Guidelines for Surveying Bats in Wind Farm Developments* (Sowler and Stoffberg, 2011) which were finalised during May 2011, recommend monitoring of at least "7 consecutive days (during good weather conditions) per month over a period of 12 consecutive months." The full 12 months of pre-construction monitoring should be completed and the monitoring report submitted to DEA before construction should be permitted to start. If the monitoring data shows high activity, the client and a bat specialist should investigate possible ways to minimise bat mortality. The findings of this monitoring must be incorporated into the EMP for the project and inform the following actions:
     - potential need to seal off existing buildings within the study area;
     - possible need to refine turbine operational procedures (described below);
     - possible need to re-look at the turbine layout; and
     - potential placement of bat roost boxes in safe areas away from turbines.

b) Actions to reduce impacts during construction
   - ***Protect existing bat habitat*** - Destruction of trees, especially limited stands of indigenous trees in the drainage lines and the scattered aloe plants on site, must be avoided as far as possible as they may provide existing roosts.
   - ***Avoid creating bat habitat close to turbines*** - Care needs to be taken to completely seal off roofs of any buildings (e.g. substations), which do not house bats, within the study area to prevent bats from moving in, thus making them more prone to coming into contact with the turbines in the surrounding area.
   - ***Creating permanent waterbodies and structures*** - Bats visit waterbodies to drink and therefore it is recommended that no new water bodies are created, such as fountains for landscaping, on the proposed site or on any neighbouring developments.
   - ***Setbacks*** - If high bat occurrence is found at any particular area on the proposed development site during monitoring, setback areas should be reconsidered and discussed with a bat specialist.

c) Actions to reduce impacts during operation
   - ***Operational management of blade speeds*** - An effective and tested mitigation at present is changing cut-in speeds. For example, the cut-in speed of the turbines could be increased to 5m per second, so that turbines start operating under slightly stronger wind conditions when bats are less likely to be active. This mitigation measure is costly in terms of energy efficiency, and is not recommended if not necessary. It may also only be applicable at certain times of the year such as during bat migration periods.
   - ***Attract bats away from turbines*** - If a high number of bats are recorded, bat roost sites could be established (e.g. roost boxes) as a trade-off to offset potential mortalities during turbine operation.



11.5 Visual impact

In other proposed wind farm projects, sensitive viewers are often in favour of wind farms as an answer to environmental concerns and sustainable energy generation. They normally suggest that wind farms should be located in industrial areas (with the Coega IDZ often mentioned). Clearly, there are sensitive viewers living in close proximity to the Coega IDZ who may not agree with this view, but the understanding is that wind energy facilities are industrial type developments. The existing wind turbine that was built by Electrawinds in Zone 7 of the IDZ was generally met with positive reaction. Universal Wind now proposes to build 20 turbines in Zone 12 of the IDZ.

The main visual impacts of the wind turbines proposed by Universal Wind are:

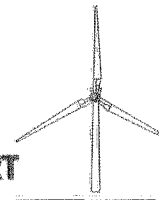
- Impact of introducing highly visible wind turbines into an industrial landscape
- Intrusion of large and highly visible construction activity on sensitive viewers
- Intrusion of large wind turbines on the existing views of sensitive visual receptors
- Impact of night lights on existing nightscape
- Cumulative visual impact on wind farms proposed for the Coega region

There are residents living in close proximity (i.e. within 10km) to the proposed Universal Wind farm site who will have views on many of the turbines. The same views will also contain many other elements associated with industrial zones such as high voltage power lines and pylons, large buildings, towers, and in this region also open pit mines that create large scars against hillsides. The views are constantly changing as the peri-urban and industrial developments expand.
The quality of their views (especially in the direction of the IDZ) is seen as low, although not unexpected for industrial areas. It is therefore unlikely that the intrusion of wind turbines on these views will have a high impact. Large wind farms are required for the national goal for sustainable energy generation, and in terms of visual impact the Coega IDZ should be seen as an appropriate area to locate wind farms.

Mitigation:
Impact of introducing highly visible wind turbines into an industrial landscape:
There are no mitigation measures that will change the significance of the landscape impact other than avoiding the site entirely. A reduction in wind turbine numbers is unlikely to have an appreciable effect since even a few wind turbines will still have high visibility.

Intrusion of large and highly visible construction activity on sensitive viewers:

- Construction of new roads should be minimised and existing roads should be used where possible.
- The contractor should maintain good housekeeping on site to avoid litter and minimise waste.



- Clearance of indigenous vegetation should be minimised and rehabilitation of cleared areas should start as soon as possible.
- Erosion risks should be assessed and minimised as erosion scarring can create areas of strong visual contrast which can often be seen from long distances.
- Laydown areas and stockyards should be located in low visibility areas (e.g. valleys between ridges) and existing vegetation should be used to screen them from views where possible.
- Night lighting of the construction sites should be minimised within requirements of safety and efficiency. See section on lighting for more specific measures.
- Fires and fire hazards need to be managed appropriately.

Intrusion of large wind turbines on the existing views of sensitive visual receptors:

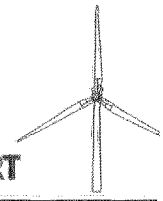
- Ensure that there are no wind turbines closer than 500m to a residence or farm building.
- Maintenance of the turbines are important. A spinning rotor is perceived as being useful. If a rotor is stationary when the wind is blowing it is seen as not fulfilling its purpose and a negative impression is created (Gipe, 1995).
- Signs near wind turbines should be avoided unless they serve to inform the public about wind turbines and their function. Advertising billboards should be avoided.
- According to the Aviation Act, 1962, Thirteenth Amendment of the Civil Aviation Regulations, 1997: "Wind turbines shall be painted bright white to provide maximum daytime conspicuousness. The colours grey, blue and darker shades of white should be avoided altogether. If such colours have been used, the wind turbines shall be supplemented with daytime lighting, as required."
- Lighting should be designed to minimise light pollution without compromising safety. Investigate using motion sensitive lights for security lighting. Turbines are to be lit according to Civil Aviation regulations.
- An information kiosk (provided that the kiosk and parking area is located in a low visibility area) and trails along the wind farm can enhance the project by educating the public about the need and benefits of wind power. 'Engaging school groups can also assist the wind farm proponent, as energy education is paramount in developing good public relations over the long term. Instilling the concept of sustainability, and creating awareness of the need for wind farm developments, is an important process that can engage the entire community' (Johnston, 2001).

Impact of night lights on existing nightscape:

Lighting of ancillary buildings and structures should be designed to minimise light pollution without compromising safety. Motion sensitive lighting can be used for security purposes.

11.6 Noise impact

Provided that the mitigation measures presented in the noise specialist study are implemented effectively, the noise from the turbines at the identified noise sensitive areas is predicted to be less than the 45 dB(A) limit for rural areas presented in SANS



10103:2008. The overall noise impact with recommended mitigation is therefore expected to be **negative** and of **low** significance.

Noise impacts will be generated and were assessed for the construction and operational phases of development.

Construction Phase:
There will be a short term increase in noise in the vicinity of the site during the construction phase as the ambient noise level will be exceeded. Given the context of the project in the Coega IDZ, the significance of the construction noise impact is predicted to be ***low*** (without mitigation).

1) There will be an impact on the immediate surrounding environment from the construction activities, especially if pile driving is to be done. This, however, will only occur if the underlying geological structure requires piling.
2) The area surrounding the construction site will be affected for short periods of time in all directions by construction noise impacts, should several pieces of construction equipment be used simultaneously.
3) The number of construction vehicles that will be used in the project will add to the existing ambient levels and will most likely cause a disturbing noise, albeit for a short period of time.

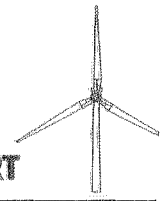
Operational Phase:
The site is situated in an industrial development zone. Zone 12 of the Coega IDZ constitutes the northern extent of the IDZ, and is located adjacent to a farming community. Several homesteads are located in proximity to where the turbines will be erected. 8 sensitive noise receptors were recorded, comprising of 3 potential and 5 existing sensitive noise receptors. The proposed first row of dwellings of the Tanka–Tara development have been identified as the closest noise sensitive areas. This development has not received authorisation as yet by the relevant authorities, thus the impact at this site is only potential and may thus not occur

Noise impacts were modelled for the operations phase at wind speeds 4m/s to 12m/s, taking into consideration sensitive noise receptors. It must be remembered that as the wind speed increases, so too does the background noise. Therefore predicted noise levels below 8m/s are of more concern those above 8m/s. The critical wind speeds are thus between 4-6 m/s when there is a possibility of little masking. Above 8m/s the wind noise starts masking the wind turbine noise. Two turbine models were selected for the modelling, namely the Vestas 2 MW unit and the Siemens 3.6MW unit.

The noise modelling indicates that, in general, noise from the turbines will be below the SANS10103 limits for rural areas at a distance of approximately 500 m from the turbines.

The results indicate the following:

- The Vestas V90 2MW unit did not exceed the 45 dB(A) guideline at any of the identified noise sensitive sources.



- The Siemens SWT 3.6MW unit did not exceed the 45 dB(A) guideline at any of the identified noise sensitive sources except for the proposed Tanka-Tara 1 site when the wind is at 12m/s. It is however highly unlikely that the noise from the turbine will be heard at 12m/s at this location as there will be substantial background wind noise masking. As previously stated, the Tanka-Tara development may not occur if authorisation is not received.
- The cumulative effect of the WTG's from the Electrawinds and Innowind projects will not impact the Universal Wind project.

All the turbine positions met the required 500m setback distance.

Mitigation:

Construction Activities
- All construction operations should only occur during daylight hours, if possible.
- No construction piling should occur at night. Piling should only occur during the hottest part of the day to take advantage of unstable atmospheric conditions.
- Construction staff should be given "noise sensitivity" training in order to mitigate the noise impacts caused during construction.

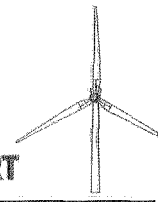
Operational Activities:
Ambient noise monitoring is recommended at all noise sensitive areas once the turbines are erected. This is to determine if the noise rating limits are not being exceeded.

11.7 Impact on heritage

11.7.1 Palaeontology

The potential impact of the project on palaeontology primarily arises from the excavations of the foundations that the turbines require. The exact excavations required for turbine construction will ultimately depend on the type and size of turbine technology selected for implementation.

In all cases, irrespective of its permanent nature, the palaeontological impact significance of the construction phase of the proposed wind energy facility development is rated as **low**, given its local extent (confined to the immediate development footprint) and the generally sparse occurrence of fossils in most of the sedimentary rocks concerned. High negative impacts to palaeontological heritage are only envisioned should rich fossil occurrences be exposed during construction and not mitigated as recommended here. On the other hand, should specialist mitigation be followed through, this would represent a significant ***positive*** impact since our understanding of previously hidden fossil heritage will thereby be enhanced. The operational and decommissioning phases of the wind energy facility will not involve significant additional adverse or other impacts on palaeontological heritage



Mitigation:

- Wherever development involving bedrock excavation occurs within the Coega IDZ, the responsible ECOs should be alerted to the possibility of buried fossil heritage.
- Substantial (i.e. high-volume) new excavations into either the Sundays River Formation should be examined by a professional palaeontologist while they are still fresh so that any fossil material or interesting sedimentological features can be recorded and sampled.

11.7.2 Archaeology

Although the area investigated was occupied extensively in the past (judging from the large quantity of flaked stone randomly scattered throughout the area), it would appear that the area is relatively poor in large and important archaeological sites. However, many sites/materials and human remains may be covered by soil and vegetation.

is an archaeologically sensitive area, with archaeological features such as shell middens and human remains having been recorded in the coastal mobile dunes. The turbine sites are in the inland vegetated dunes, where dense vegetation (e.g. *Acacia cyclops*) severely restricts access. This makes it very difficult to conduct an archaeological survey. For some turbines in Zone 5, site access and visibility is also difficult due to dense thicket vegetation.

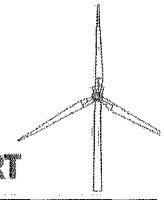
Overall, the Coega area appears to be relatively poor in large and important archaeological sites. However, archaeological features may be covered by soil and vegetation. Typical features found in the IDZ include shell middens and pottery fragments. Based on archaeological findings to date in the Coega IDZ, it is anticipated that archaeological features (if found early in the Electrawinds construction phase) could either be avoided by micro-siting to shift the location of the project footprint or rescued from the site, in accordance with the requirements of the National Heritage Resources Act.

Mitigation and monitoring during construction:

- Agree with an archaeological specialist on the approach to clearing vegetation on the turbine sites where access is restricted by thick vegetation (e.g. on Zone 10 and some sites in Zone 5), and identify with which sites are priorities for an archaeological inspection.
- Short strips of vegetation should then be cleared on the sites using small-scale machinery.
- When the sites are cleared and accessible, the archaeologist is to conduct an inspection of sites that are of potential archaeological value (in particular, turbine sites in Zone 10).

11.7.3 Historical and cultural features

In the historical/cultural component of the heritage study for the Coega IDZ (2010), no cemeteries or burial sites have been identified or mapped in Zone 12. Therefore no



impacts on such features are expected. Nonetheless, it is noted as a general mitigation measure that if new burials are recognised they must be protected and conserved, and no development is allowed within 15m from the fence line surrounding the grave (M. Galimberti, SAHRA, letter dated 7 June 2011).

11.8 No go option

The "no go" option was investigated during the EIA. If the project does not proceed, the following opportunities would be lost:

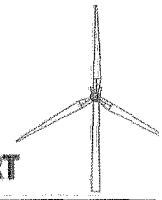
- Lost opportunity for investment in renewable energy facilities the Coega IDZ and in the promotion of renewable energy.
- Lost opportunity for increased electricity generation capacity in the Eastern Cape (in particular, the Nelson Mandela Metro), a region that requires increased power supply and grid stability.
- Delay in the Metro reaching its target of 10% power from renewable energy. At full generation capacity (i.e. 80 MW), the Universal Wind project could provide in the order of 10% of the Metro's power requirements, which is a significant contribution.
- Lost opportunity to contribute up to 80 MW of additional generative capacity of green energy to the South Africa, with zero CO_2 emissions. Using the current energy mix in South Africa as a reference, this translates into a saving of 113 000 ton (for 45 MW) to 192 000 tonnes of CO2 per year (for 75 MW), or 2 825 000 to 4 800 000 tonnes of CO2 over the lifetime (25 years) of the project. Additional power to the local grid will continue to be provided via Eskom, with power generation approximately 90% coal-based with associated high levels of CO2 emissions and water consumption.

Conversely, if the project does not proceed, the following negative impacts could be avoided:

- Avoid the visual impact of the additional 20 turbines on the local environment.
- Avoid the impact of the turbines on birds and bats. However, additional fossil-based electricity would, however, still be required to meet the projected growth of the Coega IDZ and Nelson Mandela Bay Metro, necessitating additional transmission, which would in turn escalate the risk of bird and bat mortalities.
- Avoid the impact of the project footprint on flora and fauna in the IDZ. However, the total project footprint is approximately 10 ha which is negligible in the 12 000 ha of the IDZ including the port. Furthermore, the intended establishment of large-scale industrial developments in the Coega IDZ would effectively negate such avoided impacts.

Based on the findings of this EIA process, the "no-go" option is not recommended, for the following reasons:

- The Coega IDZ is an appropriate location for a wind energy project of this scale.
- With mitigation applied effectively, the predicted negative impacts of the project are mostly of **low** significance.



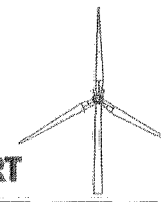
- For certain sites, the impacts are predicted to be of **medium** significance (with mitigation). For example: (i) Impact of turbines on birds and bats (note: monitoring is essential to building a better understand and manage these impacts); (ii) Impact of turbine footprint on species of special concern in the Grassveld Bontveld; (iii) Impact of turbine footprint on ecological processes; and (iv) Impact of turbine footprint on ecological processes.
- It should be noted that this assessment is based on the current state of the IDZ, where there is a low level of development. As the IDZ develops, it is likely that these impacts will become less significant.
- The environmental and economic benefits from a renewable energy project are considered to outweigh the negative impacts and the cost to effectively implement the recommended mitigation measures.
- Existing power lines and high voltage substations are already located in the IDZ in close proximity to the turbines, thus reducing the impacts of additional overhead power lines (e.g. impacts on birds; visual impacts).

11.9 Consideration of alternatives

When considering alternatives, it is important to present the strategic-level evaluation that was conducted by Universal Wind during the pre-feasibility stage of the project that led to the Coega IDZ being selected as the location for the proposed project. Universal Wind identified the potential opportunity for wind energy projects in other parts of Europe and Africa. One of these opportunities was for a potential project in South Africa. An investigation was conducted to review potential sites, which led to the Coega IDZ being selected as a suitable location. Several criteria were used to inform this site selection (refer to Chapter 4 for more detail).

Apart from the "no-go" alternative, various other types of alternatives are considered in this EIA. These are described in Chapter 4 of this EIA Report, with the main alternatives being:

- **Land use alternatives** – The physical footprint of the Universal Wind project is limited to an area which covers approximately 10 ha in total and therefore has a negligible influence on land use alternatives in the IDZ, which covers approximately 12 000 ha.
- **Technology alternatives** – A number of wind turbine manufacturers and different wind turbine technologies are being investigated by Universal Wind. A final decision regarding the size and type of wind turbine, and the manufacturer to make use of will be determined by product availability and suitability to and experience in the South African market and environment.
- **Site location alternatives within the Coega IDZ** – The proposed turbine sites presented in this EIA Report are the result of detailed planning by the CDC and Universal Wind that ultimately led to the selection of the proposed 20 sites. Key factors considered in the investigation are: a parallel location to the predominant east-west wind direction; being on higher-lying ridges; and minimising the constraints placed on other potential development in the IDZ. The turbines would



be suited to Zone 12 given the areas light industrial land use zone, and will all be situated outside of the Coega OSMP.

11.10 Cumulative effects

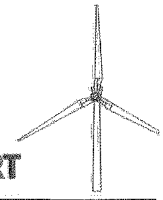
In terms of cumulative effects, two other wind energy projects have been authorised for development in the Coega IDZ and surrounding area (see Figure 12.1). These include the Electrawinds energy project which is to be constructed in Zones 4, 5, 9 and 10 of the IDZ; and the InnoWind energy project will be constructed in Zone 14 of the Coega IDZ and on land situated to the north-east of the IDZ and on PPC owned land situated north-west of the Coega IDZ. Both of these projects have received environmental authorisation from the Department of Environmental Affairs. The cumulative impact of the three wind energy projects (i.e. Universal Wind, Electrawinds and InnoWinds) was assessed as part of this EIA and the results are provided below.

Cumulative Impact on Flora and Fauna:

- Cumulative loss of Grassridge Bontveld habitat (and associated fauna and flora and species of special concern) for the proposed wind farm development combined with additional proposed wind farm developments within the Coega IDZ will be insignificant when considered in conjunction with the development of the IDZ as a whole. Both the Innowinds and Universal wind farms will result in a loss of Grassridge Bontveld. However the Electrawinds windfarm is spread over a range of vegetation units, so the cumulative impact will be less significant.
- Cumulative impacts to ecological processes of the proposed Universal wind farm in combination with the other proposed wind farm within the IDZ will be moderately significant in the short term, since the wind farms within the IDZ (both Electrawinds and Universal Winds) tend to be situated adjacent to IDZ OSMP ecological process areas.
- Once the IDZ becomes fully developed, the cumulative impact of the wind farm footprint will be negligible.

Cumulative Impact on Birds:

- The locally endemic Bontveld vegetation is largely restricted to an area between the Swartkops and Sundays rivers and within 25 km of the coast.
- The Bontveld, together with an area of grassland at Tankatara near to the Sundays River estuary, supports small local populations of high conservation status: Blue Crane (2-3 pairs locally), Secretarybird (3-4 pairs locally) and Denham's Bustard (~6 pairs locally). These species have been observed feeding in the Bontveld areas around the proposed wind farm and flying through the risk area of the site. Bontveld, which is a relatively open habitat type, offers these species suitable foraging habitat in contrast to thicket vegetation which is more widespread in the Eastern Cape.
- Developments are planned for most of the Bontveld vegetation type around Coega. Pretoria Portland Cement (PPC) has mining rights over Bontveld in the Grassridge area and industry is planned for the Coega IDZ.



- A positive Environmental Authorisation dated 29 August 2011 has been issued for a large 70-turbine InnoWind WEF in Zone 14 of the Coega IDZ and on the PPC property at Grassridge, as well as for 25 turbines in the Coega IDZ. The is also an Electrawinds project authorised for the district. If Blue Cranes, Denham's Bustards and Secretarybirds prove to be vulnerable to collisions with wind energy infrastructure, or if they are displaced from areas around wind turbines, this could have a severe impact on regional Bontveld populations of these species.
- Many wind farms are planned for the Eastern Cape in areas such as Cape St Francis and Cookhouse/Somerset East, areas known to be important for Blue Cranes and Denham's Bustards. The cumulative impacts of wind farms on Eastern Cape populations of these species could be severe if the species prove to be badly affected by WEFs.
- The area around the proposed WEF already has numerous aerial obstacles comprising several 400 kV powerlines, smaller powerlines and overhead power for the railway. Wind turbines will add another component at a higher elevation.

Cumulative Impact on Bats:

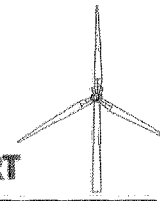
- The presence of a wind farm, and particularly the cumulative effect of several wind farms situated in a sensitive bat area, might not only be the cause of a disruption of the ecological balance, but also a reduction in the positive contribution bats make to the economy.
- It is expected that the combined proposed wind developments in the area will have a cumulative impact on the bat population, at least through a loss of habitat.
- Although the species most likely to be negatively impacted upon (open-air foragers such as *Tadarida aegyptiaca*) are listed as *Least Concern* in terms of their conservation status and are fairly common, numerous wind farms erected in a particular geographic area could contribute to a drastic decline in population numbers through the cumulative effect of bat fatalities.

Cumulative Visual Impact:

- The effect of the wind turbine developments on the regional landscape will be significant, but it is unclear whether the cumulative effect will be markedly different from that of individual developments due to the high visibility of wind turbines. Most views in, and of, the Coega region will include industrial type structures (something that is bound to become more apparent as other large industrial developments in the CDC come on line), such as numerous high-voltage power lines, substations, railway lines and stations, port activities and structures and large buildings. Coega and the IDZ constitute a landscape which is rapidly changing with many developments (high density urban and industrial) planned for the future. The cumulative impact of these three wind farms on the landscape are therefore seen as **low** and congruent with its future development.

Cumulative Noise Impact:

- The cumulative noise impact of the Innowind project was modelled using the WinWind WWD3 – 3MW unit. The effect of the ElectraWinds project was investigated and it was determined that it would not have a cumulative effect on identified noise sensitive receptors.



- The cumulative impact of the three proposed wind energy projects in the IDZ has been assessed. The impact on the existing and potential noise sensitive receptors has been found to be negligible. This is most due to the distance between the projects and the noise sensitive receptors.

Based on the findings of the specialist studies the cumulative impact of the three wind farm developments is not considered to pose any unacceptable impacts to the proposed project. Those cumulative impacts which do exist and which are not found to be negligible (i.e. loss of habitat) can be mitigated to acceptable levels through the application of appropriate mitigation measures (e.g. micro-siting of turbines to avoid undisturbed valuable habitat).

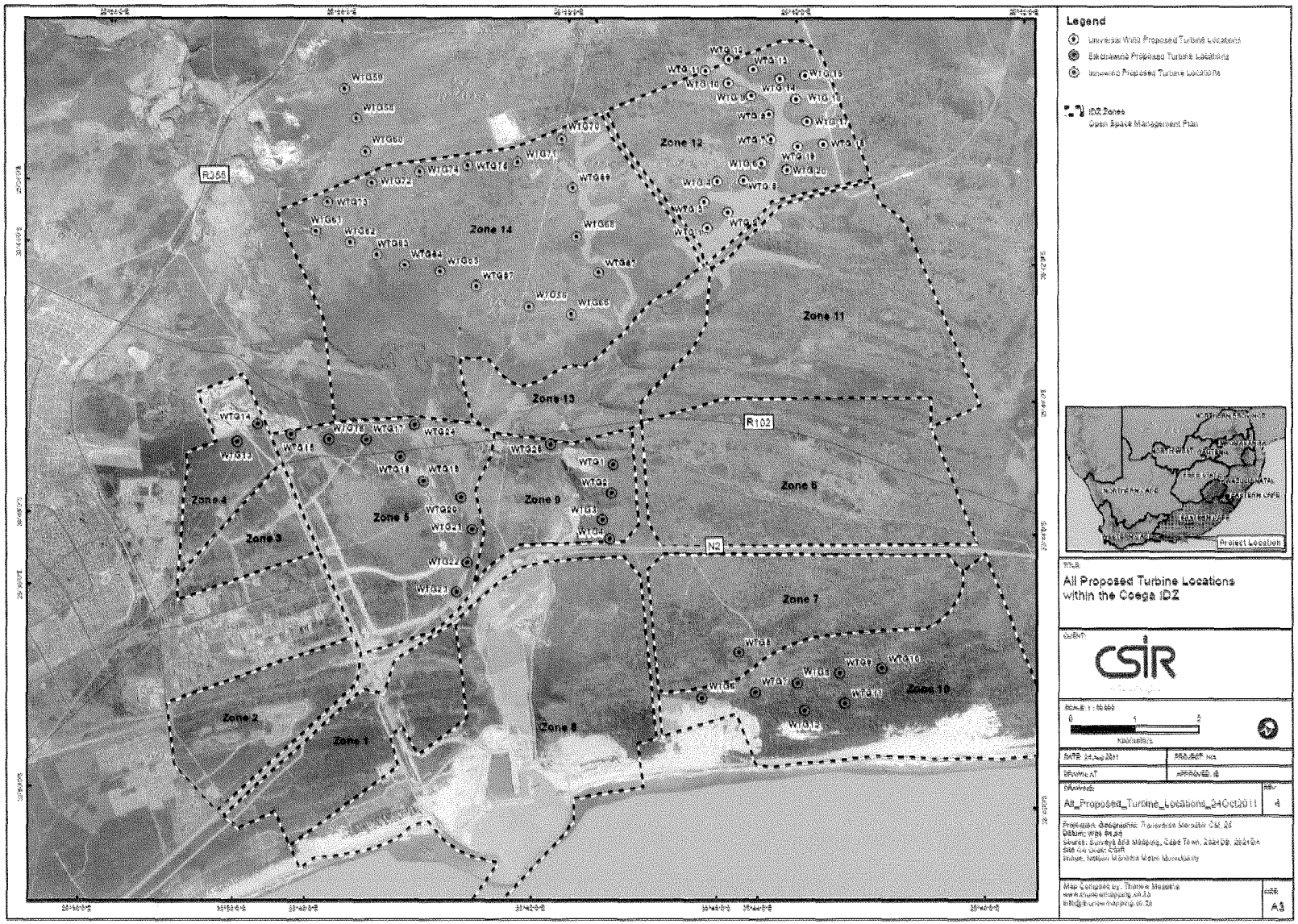
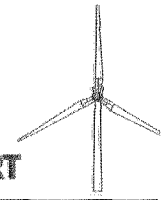


Figure 11.1: Map depicting the location of the three Wind Energy Projects within the Coega IDZ



11.11 Permit and permission requirements

Before clearing of the proposed site is initiated, the appropriate environmental authorisation must be obtained in terms of the National Environmental Management Act (NEMA) and associated EIA Regulations. Should the project proceed, micro-siting and planning of access roads would need to be conducted and the site development programme agreed to with the Coega Development Corporation.

If the project leads to the removal of protected plant or animal species, then a permit is needed from the provincial department of Economic Development and Environmental Affairs (DEDEA) for the removal and/or destruction of species protected by the Provincial Nature Conservation Ordinance of 1974. In order to obtain permission to remove or destroy species occurring under the Provincial Nature Conservation Ordinance of 1974 DEDEA must receive notification of the area(s) intended to be cleaned together with an application form.

Should any archaeological or palaeontological materials/sites be found during construction of the wind farm, a permit must be obtained from the South African Heritage Resources Agency (SAHRA) to remove such remains. Such removal should be undertaken by a professional archaeologist.

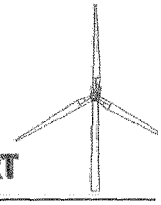
11.12 Overall evaluation of impacts by the environmental assessment practitioner

No negative impacts have been identified that, in the opinion of the Environmental Assessment Practitioner, should be considered "fatal flaws" from an environmental perspective, and thereby necessitate substantial re-design or termination of the project.

Residual negative impacts are those that are expected to remain once appropriate mitigation has been implemented. The main residual negative impacts of the proposed Universal Wind project in Zone 12 of the Coega IDZ are summarized below:

- **Impact of the project on birds** – This negative impact is predicted to be negative and of **medium** significance. The main impacts are on larger bird species of conservation importance, such as Blue Crane (Vulnerable), Denham's Bustard (Vulnerable), Secretarybird (Vulnerable) and Martial Eagle (Vulnerable). These birds could be impacted through direct collision with turbines or displacement from habitat.

- **Impact of the project on bats** - This negative impact is predicted to be of **medium** significance, as a result of loss of habitat, mortality due to collisions with turning turbine blades, or due to barotraumas. There is a general paucity of bat



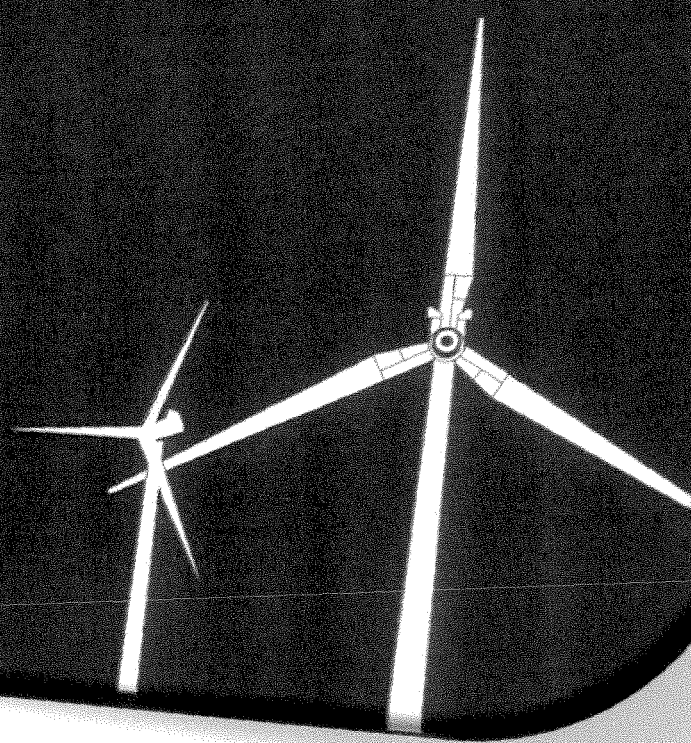
data in South Africa, and therefore ongoing monitoring of bats in the IDZ is proposed to build a better understanding of the bat populations present and determine what management actions could be effective.

- **Visual impact of the turbines** (including construction activities and night lighting) is predicted to be negative and of **medium** significance, as the turbines will alter the visual landscape of the surrounding area. However, the Coega IDZ and port is already transforming into an industrial landscape, with vertical structures such as port cranes, substations, high-voltage powerlines and tall lighting structures. It should be noted that the wind turbines could be perceived as a positive visual impact as the project represents a move towards renewable energy.

Taking into consideration the findings of the EIA process for the proposed Universal Wind energy project in Zone 12 of the Coega IDZ, it is the opinion of the Environmental Assessment Practitioner that the project benefits outweigh the costs, and that the project will make a positive contribution to steering South Africa on a pathway towards sustainable development. Provided that the specified mitigation measures are applied effectively, it is proposed that the project receive environmental authorization in terms of the EIA Regulations promulgated under the National Environmental Management Act (NEMA).

CHAPTER 12

References



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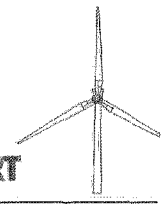


CHAPTER 12: REFERENCES

Ahlen I. 2003. Wind turbines and bats – a pilot study. Report to Swedish National Energy Administration. Uppsala, Sweden.

Alerstam T. 1990. Bird migration. Cambridge, U.K.: University Press

Alexander, G. & Marais, J. 2007. A Guide to the Reptiles of Southern Africa, Struik Publishers. Cape Town, 408 pp.

Almond, J.E. 2010a. Palaeontological heritage assessment of the Coega IDZ, Eastern Cape Province, 112 pp. plus appendix. Natura Viva cc, Cape Town.

Animal Demography Unit, Department of Zoology, University of Cape Town. 2010. Summary Data of the Frogs of South Africa, Lesotho and Swaziland. Downloaded from: http://adu.org.za/frog_atlas.php; accessed on 10/04/2010.

Anon 2001. Wind turbine environmental assessment – draft screening document. Prepared by Dillon Consulting Ltd. For TREC and Toronto Hydro Energy Services Inc. Appendix B p. 3.

Arnett, E.B., Brown, K., Erickson, W.P., Fiedler, J., Henry, T.H., Johnson, G.D., Kerns, J., Kolford, R.R., Nicholson, C.P., O'Connell, T., Piorkowski, M., Tankersly, J.R., 2008. Patterns of fatality of bats at wind energy facilities in North America. Journal of Wildlife Management 72:61 - 78

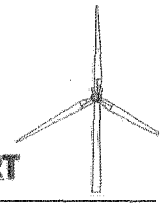
Australia Environmental Protect Agency - Wind farms - environmental noise guidelines. July 2009.

Baerwald, E.F., D'Amours, G.H., Klug, B.J., Barclay R.M.R., 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. Current Biology 18(16) R696

Baerwald, E.F., Edworthy, J., Holder, M., Barclay, R.M.R., 2009. A large-scale mitigation experiment to reduce bat fatalities at wind energy farms. Journal of Wildlife Management 73: 1077-1081

Band W., Madders M. & Whitfield D.P. 2007. Developing field and analytical methods to assess avian collision risks at wind farms. In De Lucas M, Janss GFE & Ferrer M (eds) Birds and wind farms. Madrid: Quercus.

Barclay, R.M.R., Baerwald, E.F., Gruver, J.C, 2007. Variation in bat and bird fatalities at wind energy facilities: assessing the effects of rotor size and tower height. Canadian Journal of Zoology 85:381-387



Barnes, K.N. (ed) (1998). The important bird areas of southern Africa. BirdLife South Africa, Johannesburg.

Barnes, K.N. (ED.), 2000. The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. Birdlife South Africa, Johannesburg, 169pp.

Barrios L. & Rodriguez A. 2004. Behavioural and environmental correlates of soaring-bird mortality at on-shore wind turbines. J. Applied Ecology 41: 72-81.

Bell Acoustic Consulting. Low frequency noise and infrasound

Bevanger, K. 1998. Biological and conservation aspects of bird mortality caused by electric power lines: a review. Biological Conservation 86: 67-76.

Biewener A.A. 2003. Animal locomotion. Oxford: Oxford University Press.

Bourquin, O. 1987. The recent geographical range extension of Hemidactylus mabouia mabouia. Lammergeyer 38: 12-14.

Boyles, J.G., Cryan, P.M., .McCracken, G.F.,Kunz, T.H.: Economic Importance of Bats in Agriculture; AAAS; SCIENCE VOL 332, http://www.sciencemag.org/ downloaded on April 1, 2011.,

Branch, W.R, 2002. The Conservation Status of South Africa's Threatened Reptiles. pp 89-103. In: "The State of South Africa's Species" Proceedings of a conference held at the Rosebank Hotel in Johannesburg 4 - 7 September 2001, Endangered Wildlife Trust and WWF-SA.

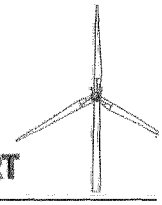
Branch, W.R. 1988a. Terrestrial reptiles and amphibians. In: A Field Guide to the Eastern Cape Coast, R. A. Lubke, F. W. Gess and M. N. Bruton (eds.), Grahamstown Centre for the Wildlife Soc. S. Afr., 251 264.

Branch, W.R. (1999). Save our species: Threatened small adders. Africa Environment and Wildlife 7(4): 36-37.

Branch, W.R. (ED.) 1988b. South African Red Data Book - Reptiles and Amphibians. S. Afr. Nat. Sci. Prog. Rpt 151: i-iv, 242p.

Branch, W.R. 1998. Field Guide to the Snakes and other Reptiles of Southern Africa. Rev. ed. Struik Publ., Cape Town, 399pp.

Brown W.M. 1993. Avian collisions with utility structure: biological perspectives. In: Proceedings international workshop on avian interactions with utility structures, September 13-16, 1992, Miami, Florida. Electric Power Research Institute and Avian Power Line Interaction Committee, Palo Alto, California.



Brownlie S. 2005. Guideline for involving biodiversity specialists in EIA processes: Edition 1. CSIR Report No. ENV-S-C 2005 053 C. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.

CES 2011. Environmental Impact Assessment for the Proposed Coega Wind Energy Project. Volume 3: Environmental Impact Assessment Report. Coastal & Environmental Services, Grahamstown

Chamberlain D., Freeman S., Rehfisch M., Fox T. & Desholm M. 2005. Appraisal of Scottish Natural Heritage's wind farm collision risk model and its application. BTO [British Trust for Ornithology] Report 401.

CKA, 2002. Coega Industrial Development Zone Visual Guidelines for Development, Pretoria: Cave Klapwijk and Associates.

CMS 2006. Convention on the Conservation of Migratory Species of Wild Animals, Appendices I and II (as amended by the Conference of the Parties in 2005).

CSIR, 2011. Environmental Impact Assessment for the proposed Universal Wind Energy Project in Zone 12 of the Coega Industrial Development Zone: Final Scoping Report. CSIR Report Number: CSIR/CAS/EMS/ER/2011/0003/B

Coastal and Environmental Services (CES) (2001). The subsequent Environmental Impact Report for the Proposed Port of Ngura. Coastal and Environmental Services, Grahamstown.

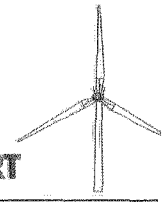
Coega IDZ. 2003. Coega Industrial Development Zone and Port: Coega Open Space Management Plan (OSMP). Metroplan and Coastal and Environmental Services.

Coetzee, P.S., Kerley, G.I.H., Campbell, E.E., de Ruyck, A., Wooldridge, T., Boshoff, A. and Bate, G. (1996). Zinc smelter environmental impact assessment: Flora and fauna baseline study for the Coega precinct. SAB Institute for Coastal Research, Port Elizabeth.

Cowling R.M., Lombard A.T., Rouget M., Kerley G.I.H., Wolf T., Sims-Castley R., Knight A., Vlok J.H.J., Pierce S.M., Boshoff A.F., Wilson, S.L. 2003. A Conservation Assessment for the Subtropical Thicket Biome. TERU Report 43. University of Port Elizabeth.

Cowling, R,M, and Heijnis, C.E. 2001. Broad Habitat Units as biodiversity entities for conservation planning in the Cape Floristic Region. S. Afr. J. Bot. 67: 15-38.

Cowling, R.M.; Pressey, R.L.; Lombard, A.T.; Heijnis, C.E.; Richardson, D.M. and Cole, N. 1999. Framework for a conservation plan for the Cape Floristic Region. IPC Report 9902. Institute for Plant Conservation, University of Cape Town.



Crawford R.L. & Engstrom R.T. 2001. Characteristics of avian mortality at a north Florida television tower: A 29-year study. J. Field Ornithology 72: 380-388.

CSIR, 2010. Environmental Impact Assessment for the proposed Electrawinds Wind Project in the Coega Industrial Development Zone (IDZ): Draft Scoping Report, Stellenbosch: CSIR.

De Lucas M., Janss G.F.E. & Ferrer M. 2004. The effects of a wind farm on birds in a migration point: the Strait of Gibraltar. Biodiversity & Conservation 13: 395-407.

De Villiers CC, Driver A, Clark B, Euston-Brown DIW, Day EG, Job N, Helme NA, Holmes PM, Brownlie S and Rebelo AB. 2005. Fynbos Forum: Ecosystem Guidelines for Environmental Assessment in the Western Cape. Fynbos Forum and Botanical Society of South Africa, Kirstenbosch.

DEAT 2007. National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004): Publication of Lists of Critically Endangered, Endangered, Vulnerable and Protected Species. Government Gazette No. 29657, Regulation R151, 23 February 2007

DEFRA – United Kingdom A Review of Published Research on

Degraw, S., 2009. Giant Wind Turbine. World's Toughest Fixes. Available at: http://channel.nationalgeographic.com/series/worlds-toughest-fixes/4218/Overview [Accessed February 1, 2010].

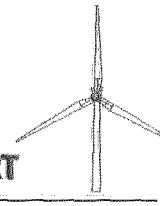
Department of Energy (DoE) (2003). White Paper on Renewable Energy. Department of Energy.

Department of Environmental Affairs and Tourism (DEAT) (2009). Greenhouse Gas Inventory South Africa 1990 to 2000. Compilation under the United Nations Framework Convention on Climate Change (UNFCCC). Department of Environmental Affairs and Tourism, National Inventory Report.

Department of Environmental Affairs and Tourism (DEAT) (2010). Guideline on Public Participation. Government Gazette, Pretoria

Department of Environmental Affairs and Tourism (DEAT) (2006). Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations. Government Gazette, Pretoria.

Deutschlander M.E., Phillips J.B. & Borland S.C. 1999. The case for light-dependent magnetic orientation in animals. J. Experimental Biology 202: 891-908.



Douglas D.J.T., Bellamy P.E. & Pearce-Higgins J.W. 2011. Changes in the abundance and distribution of upland breeding birds at an operational wind farm. Bird Study 58: 37-43.

Drewitt A.L. & Langston R.H.W. 2006. Assessing the impacts of wind farms on birds. Ibis 148: 29-42.

Drewitt A.L. & Langston R.H.W. 2008. Collision effects of wind-power generators and other obstacles on birds. Annals New York Academy of Science 1134: 233-266.

DTI – United Kingdom The measurement of low frequency noise at 3 UK Wind Farms. Hayes Mackenzie. 2006

Erickson W.P., Johnson G.D., Strickland M.D., Young D.P., Sernka K.J. & Good R.E. 2001. Avian collisions with wind turbines: a summary of existing studies and comparisons to other sources of avian collision mortality in the United States. National Wind Coordinating Committee Resource Document.

Everaert J. & Stienen E.W.M. 2007. Impact of wind turbines on birds in Zeebrugge (Belgium). Significant effect on breeding tern colony due to collisions. Biodiversity & Conservation 16: 3345-3359.

EWEA ed., 2009. Wind Energy - The Facts: A guide to the technology, economics and future of wind power, Earthscan. Available at: http://www.wind-energy-the-facts.org/.

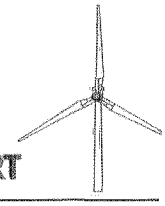
EWT & BLSA 2011. Position statement on avifaunal and bat impact assessment for wind energy facilities in South Africa. Endangered Wildlife Trust & Birdlife South Africa, March 2011.

Exo K.M., Huppop O. & Garthe S. 2003. Birds and offshore wind farms: a hot topic in marine ecology. Wader Study Bulletin 100: 50-53.

filmsfromyes2wind, 2010. Delivery and assembly of a wind turbine, Available at: http://www.youtube.com/watch?v=r0DZUDQyw_0&feature=youtube_gdata_player [Accessed September 26, 2010].

Forman R.T.T. & Deblinger R.D. 2000. The ecological road-effect zone of a Massachusetts (USA) suburban highway. Conservation Biology 14: 36-46

Fox A.D., Desholm M., Kahlert J., Christensen T.K. & Krag Petersen I.N. 2006. Information needs to support environmental impact assessments of the effects of European marine offshore wind farms on birds. in Wind, Fire & Water: Renewable Energy & Birds. Ibis 148 (supplement1) 129-144.



Friedmann, Y. & Daly, B. (eds.) 2004. Red Data Book of the Mammals of South Africa: A Conservation Assessment. CBSG Southern Africa, Conservation Breeding Specialist Group (SSG/IUCN), Endangered Wildlife Trust, South Africa. 722 pp.

Frost, D. 1985. Amphibian species of the World. Association of Systematic Collections, Kansas.

Gehring J., Kerlinger P. & Manville A.M. 2009. Communication towers, lights, and birds: successful methods of reducing the frequency of avian collisions. Ecological Applications 19: 505-514.

Gipe, P., 1995. Design as if People Matter: Aesthetic Guidelines for the Wind Industry. Design as if People Matter: Aesthetic Guidelines for the Wind Industry. Available at: http://www.wind-works.org/articles/design.html [Accessed September 22, 2008].

GLVIA, 2002. Guidelines for Landscape and Visual Impact Assessment 2nd ed., United Kingdom: Spon Press.

Gold Coast Desalination Alliance (GCDA) – 2006 Environmental Impact Assessment Queensland Desalination Plant (Chapter 11).

Golding, J. 2002. Workshop Proceedings: Revision of the national list of protected trees as per section 12, National Forests Act of 1998. Roodeplaat. Pretoria.

Gresse, P.G., Von Veh, M.W. & Frimmel, H.E., 2006. Namibian (Neoproterozoic) to early Cambrian successions. In The Geology of South Africa. pp. 395-420.

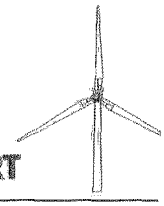
Hockey, P.A.R., Dean W.R.J., Ryan, P.G. (EDS) 2005. Roberts - Birds of Southern Africa, VIIth ed. The Trustees of the John Voelcker Bird Book Fund.

Hodos W. 2003. Minimization of motion smear: reducing avian collisions with wind turbines. Report NREL/SR -500-33249. Washington D.C.: National renewable Energy Laboratory.

Horn, J. W., Arnett, E.B., Kunz, T.H. 2008. Behavioural responses of bats to operating wind turbines. Journal of Wildlife Management 72:123 -132.

Horner & MClennan & Envision, 2006. Visual representation of windfarms, good practice guidance, Scotland: Scottish Natural Heritage. http://www.esajournals.org/doi/abs/10.1890/1540-9295(2007)5%5B315:EIOWED%5D2.0.CO;2

Huppop 0., Dierschke J., Exo K.M., Fredrich E. & Hill R. 2006. Bird migration studies and potential collision risk with offshore wind turbines. Ibis 148 (Supplement 1): 90-109.



Huso, M.P. and Hayes, J.P. 2010: Effectiveness of Changing Wind Turbine Cut-in Speed to reduce Bat fatalities at Wind Facilities, Final Report, Bats and Wind Energy cooperative and the Pennsylvania Game Commission.

Illenberger, W.K. & Burkinshaw, J.R., 2008. Coastal dunes and dunefields. In Geomorphology of the Eastern Cape: South Africa. Grahamstown, South Africa: NISC South Africa, pp. 85-106.

International Association For Impact Assessment 2005. Biodiversity in impact assessment. IAIA Special Publication Series No. 3. IAIA, North Dakota.

International Finance Corporation – 2007 General EHS Guidelines: Environmental Noise. ISO 9613-2 - Acoustics – Attenuation of sound during propagation outdoors. Part 2 – General method of calculation.

Jans G.F.E. 2000. Avian mortality from power lines: a morphologic approach of a species-specific mortality. Biological Conservation 95: 353-359.

Janss G.F.E. & Ferrer M. (eds) 2007. Birds and wind farms. Madrid: Quercus.

Jenkins A.R., Van Rooyen C.S., Smallie J.J., Anderson M.D. & Smit H.A. 2011. Best practise guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa. Wildlife and Energy Programme, Endangered Wildlife Trust & Birdlife South Africa.

Jenkins, A.R. 2011. Winds of change: birds and wind energy development in South Africa. Africa – Birds & Birding 15(6): 35-38.

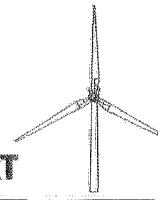
Johnston, A., 2001. Wind Energy Projects in SA. Environment South Australia. Available at: http://www.ccsa.asn.au/esa/wind.htm [Accessed September 4, 2008].

Jordan M. & Smallie J. 2010. A briefing document on best practice for pre-construction assessment of the impacts of onshore wind farms on birds. Endangered Wildlife Trust – Wildlife & Energy Programme

Kelly T.C., Buuurma L., O'callaghan M.J.A. & Bolger R. 2000. Why do birds collide with aircraft? A behavioural approach. International Bird Strike Committee IBSC25/WP-054: 47-48.

Kemper, N. P. 2001. Riparian Vegetation Index. Water Research Commission.

Kerlinger P., Gehring J., & Curry R. 2011. Understanding bird collisions at communication towers and wind turbines: Status of impacts and research. Birding, January 2011: 43-52.



Kerlinger P., Gehring J., Erickson W., Curry R., Jain A. & Guarnaccia J. 2010. Night migrant fatalities and obstruction lighting at wind turbines in North America: a review. Wilson J Ornithology 122: 744-754.

Klein, H. 2002. Legislation regarding harmful plants in South Africa. PPRI Leaflet Series: Weeds Biocontrol , 12, 1-4.

Kleynhans CJ, Mackenzie J, Louw MD. 2007. Module F: Riparian Vegetation Response Assessment Index in River EcoClassification: Manual for EcoStatus Determination (version 2). Joint Water Research Commission and Department of Water Affairs and Forestry report. WRC Report No.

Kleynhans, C. 2000. Desktop estimates of the ecological importance and sensitivity categories (EISC), default ecological management classes (DEMC), present ecological status categories (PESC), present attainable EMC (present AEMC), and best AEMC for quat. Catchments in SA. Institute for Water Quality Studies.

Kochert M.N. & Olendorf R.R. 1999. Creating raptor benefits from powerline problems. J. Raptor research 33: 39-42.

Krijgsveld K.L., Akershoek K., Schenk F., Dijk F., & Dirksen S. 2009. Collision risk of birds with modern large wind turbines. Ardea 37: 357-366.

Kunz T.H., Arnett E.B., Cooper B.M., Erickson W.P., Larkin R.P., Mabee T., Morrison M.L., Strickland M.D. & Szewcak J.M. 2007. Assessing impacts of wind-energy development on nocturnally active birds and bats: a guidance document. J. Wildlife Management 71: 2449-2486.

Kunz, H.T., and M.B. Fenton, 2005; Bat Ecology, University of Chicago Press, USA

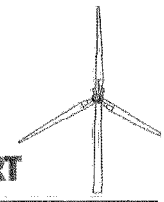
Kunz, T.H., Arnett, E.B., Ecrickson, W.P., Hoar, A.R., Johnson, G.D., Larkin, R.P., Strickland, D.S., Thresher, R.W., Tuttle, M.D., 2007: Ecological impacts of wind energy development on bats: questions, research needs, and hypotheses. Frontiers in Ecology and the Environment 5: 315–324.

Larsen J.K. & Madsen J. 2000. Effects of wind turbines and other physical elements on field utilization by Pink-footed Geese (Anser brachyrhynchus): a landscape perspective. Landscape Ecology 15: 755-764.

Leddy K.L., Higgins K.F. & Naugle D.E. 1999. Effects of wind turbines on upland nesting birds in conservation reserve program grasslands. Wilson Bulletin 111: 100-104.

Leventhall, Geoff, 2003. Low Frequency Noise and its Effects.

Liechti F. 2006. Birds: blowin" by the wind? J. Ornithology 147: 202-211.



Lombard, A.T., Wolf, T. & Cole, N., 2003. GIS Coverages and spatial analyses for the Subtropical Thicket Ecosystem Planning (STEP) Project, Port Elizabeth: University of Port Elizabeth.

Longridge M.W. 1986. The environmental impacts of transmission lines on bird flight behaviour, with reference to collision mortality and systems reliability. Report of the Bird Research Committee. Johannesburg, South Africa: ESCOM.

Low, A.B. and Rebelo, A.G. 1996. Vegetation of South Africa, Lesotho and Swaziland. Department of Environmental Affairs and Tourism, Pretoria.

Lubke, R.A., Gess, F.W. & Bruton, M.N. 1988. A field guide to the Eastern Cape Coast. Grahamstown centre of the Wildlife Society of Southern Africa.

Majeke, B. et al., 2002. Updated National Land-Cover Database of South Africa. In Proceedings of Map Africa 2006. Map Africa 2006. Johannesburg, South Africa: CSIR. Available at: http://www.gisdevelopment.net/technology/survey/maf06_19abs.htm [Accessed May 24, 2010].

Marais, J. 2004. A Complete Guide to the Snakes of Southern Africa, Struik Publishers. Cape Town.

Martin G.R. & Shaw J.M. 2010. Bird collisions with power lines: failing to see the way ahead? Biological Conservation 143: 2695-2702.

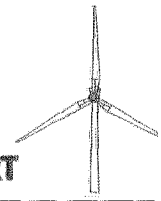
Martin G.R. 2011. Understanding bird collisions with man-made objects: a sensory ecology approach. Ibis 153: 239-254.

Martin, P. 2011. Universal Wind energy project, Coega Industrial Development Zone, Nelson Mandela Bay Municipality, Eastern Cape: environmental impact assessment: description of relevant bird populations and results of baseline avifauna monitoring August/September 2011. Report for CSIR, Durban.

Martinéz, J.E., Calco, J.F., Martinéz, J.A., Zuberogoitia, I., Cerezo, E., Manrique, J., Gómez, G.J., Nevado, J.C., Sánchez, M., Sánchez, R., Bayo, J. Pallarés, A., González, C., Gómez, J.M., Pérez, P. & Motos, J. 2010. Potential impact of wind farms on territories of large eagles in south-eastern Spain. Biodiversity and Conservation 19: 3757-3767.

Masden, E.A., Fox, A.D., Furness, R.W., Bullman, R. & Haydon, D.T. 2009. Cumulative impact assessments and bird/wind farm interactions: Developing a conceptual framework. Environmental Impact Assessment Review 30: 1-7.

McCarthy, T. & Rubidge, B., 2006. The Story Of Earth & Life: A Southern African Perspective on a 4.6-Billion-Year Journey, Struik Publishers.



McISAAC H.P. 2001. Raptor acuity and wind turbine blade conspicuity. In Schwartz SS (ed) Proceedings of the National Avian-Wind power planning meeting IV, Carmel, CA May 2000: 59-87. Washington D.C.: RESOLVE Inc.

Miller J.R. 2005. Biodiversity conservation and the extinction of experience. Trends in Ecology and Evolution. 20(8): 430-434.

Minister of Transport, 1997. Aviation Act, 1962 (Act no 74 of 1962) Thirteenth Amendment of the Civil Aviation Regulations (CAR's), Available at: http://www.caa.co.za/lexisnexis/lnb.asp?/jilc/ubxe/kexe/3v6mb/uexe/6yxe#0 [Accessed November 30, 2010].

Minter L.R., Burger M., Harrison J.A., Braack, H.H., Bishop, P.J. & Kloepfer, D. 2004. (eds.). Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland. SI/MAB Series #9. Smithsonian Institution, Washington, DC.

Monadjem, A., Taylor, P.J., Cotterill, F.P.D., Schoeman, M.C., 2010: Bats of Southern and Central Africa: A Biogeographic and Taxonomic Synthesis. University of the Witwatersrand, Johannesburg.

Mucina, L., & Rutherford, M. 2006. The Vegetation of South Africa, Lesotho and Swaziland. Pretoria: South African Biodiversity Institute.

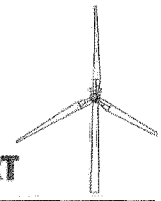
Newton I. & Little B. 2009. Assessment of wind farm and other bird casualties from carcasses found on a Northumbrian beach over an 11-year period. Bird Study 56: 158-167.

Norberg U.M. 1990. Vertebrate flight: mechanics, physiology, morphology, ecology and evolution. Berlin: Springer Verlag.

Nygård, T., Bevanger, K., Lie Dahl, E., Flagstad, Ø., Follestad, A., Hoel, P.L., May, R. & Reitan, O. 2010. A study of the White-tailed Eagle Haliaeetus albicilla movements and mortality at a wind farm in Norway. In: BOU Proceedings - Climate Change and Birds. British Ornithologists' Union. http://www.bou.org.uk/bouproc-net/ccb/nygard-etal.pdf.

Oberholzer, B., 2005. Guideline for involving visual & aesthetic specialists in EIA processes, Cape Town: CSIR, Provincial Government of the Western Cape, Department of Environmental Affairs & Development. Available at: http://www.capegateway.gov.za/Text/2005/10/5_deadp_visual_guideline_june05.pdf.

Partridge, T.C., Botha, G.A. & Haddon, I.G., 2006. Cenozoic deposits of the interior. In The Geology of South Africa. pp. 585-604.



Pearce-Higgins J.W., Stephen L., Langston R.H.W., Bainbridge I.P. & Bullman R. 2009. The distribution of breeding birds around upland wind farms. J. Applied Ecology 46:: 1323-1331.

Pedersen M.B. & Poulsen E. 1991. Impact of a 90 m/2MW wind turbine on birds. Avian responses to the implementation of the Tjaereborg wind turbine at the Danish Wadden Sea. Danks Vildtundersogelser Haefte 47. Ronde, Denmark: Danmarks Miljoundersogelser.

Phillips, K., 1994. Tracking the vanishing frogs. Penguin Books, New York, 244.

Pierce, S.M. 2003. The STEP Mapbook, part of: The STEP Handbook. Integrating the natural environment into land use decisions at the municipal level: towards sustainable development. Terrestrial Ecology Research Unit Report No. 47. University of Port Elizabeth, South Africa.

Poot H., Ens B.J., De Vries H., Donners M.A.H., Wernand M.R. & Marquenie J.M. 2008. Green light for nocturnally migrating birds. Ecology & Society 13: article 47.

Renewable Energy Research Laboratory - Department of Mechanical and Industrial Engineering. University of Massachusetts at Amherst. A White Paper on Wind Turbine Acoustic Noise. Authors: Anthony L. Rogers, Ph.D. James F. Manwell, Ph.D. Sally Wright. Amended January 2006

Rheindt, F.E. 2003. The impact of roads on birds: Does song frequency play a role in determining susceptibility to noise pollution? J. Ornithology 144: 295-306.

Roberts, D.L. et al., 2006. Coastal Cenozoic deposits. In The Geology of South Africa. pp. 605-628.

Rubolini, D., Gustin, M., Bogliani, G. & Garavaglia, R. 2005. Birds and powerlines in Italy: an assessment. Bird Conservation International 15: 131-145.

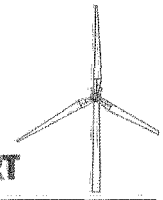
Rutherford, M.C. and Westfall, R.H. 1994. Biomes of southern Africa: an objective categorization. National Botanical Institute, Pretoria. 94 pp.

Schwartzel, E., 2011: Pa. wind turbines deadly to bats, costly to farmers. Pittsburgh Post-Gazette, Sunday, July 17, 2011.

Shaw J.M., Jenkins A.R., Ryan P.G. & Smallie J.J. 2010. A preliminary survey of avian mortality on power lines in the Overberg, South Africa. Ostrich 81: 109-113.

Shone, R.W., 2006. Onshore Post-Karoo Mesozoic Deposits. In The Geology of South Africa. Geological Society of South Africa, Johannesburg/Council of Geoscience, Pretoria, pp. 541-552.

Skinner, J.D. & Smithers, R. H. N., 1990. The Mammals of the Southern African subregion. new ed. University of Pretoria, Pretoria. 769p



Smallwood, K.S. 2007. Estimating wind turbine-caused bird mortality. Journal of Wildlife Management 71: 2781-2791.

Smithers, R. H. N., 1986. South African Red Data Book - Terrestrial Mammals. S. Afr. Nat. Sci. Prog. Rpt. 125, 214p.

Sodhi N.S. 2002. Competition in the air: birds versus aircraft. Auk 119: 587-595.

South Africa - GNR.154 of January 1992: Noise control regulations in terms of section 25 of the Environment Conservation Act (ECA), 1989 (Act No. 73 of 1989)

South Africa - GNR.155 of 10 January 1992: Application of noise control regulations made under section 25 of the Environment Conservation Act, 1989 (Act No. 73 of 1989)

South Africa - SANS 10103:2008 Version 6 - The measurement and rating of environmental noise with respect to annoyance and to speech communication.

South Africa - SANS 10210:2004 Edition 2.2 – Calculating and predicting road traffic noise

South Africa - SANS 10357:2004 Version 2.1 - The calculation of sound propagation by the Concawe method

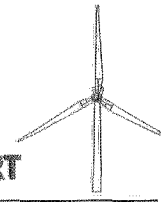
Sowler, S., and Stoffberg, S., 2011: The South African Good Practice Guidelines for Surveying Bats in Wind Farm Development, Wildlife & Energy Programme of the Endangered Wildlife Trust, South Africa

SRK 2010. Final Conservation Assessment and Plan for the Nelson Mandela Bay Municipality. December 2010. Port Elizabeth.

SRK Consulting, 2007. Draft Conservation Assessment and Plan for the Nelson Mandela Bay Municipality, Nelson Mandela Bay: Nelson Mandela Bay Metropolitan Municipality. Available at: http://www.srk.co.za/publicDocuments/365595-3%20-%20NMBM%20-%20Draft%20Conservation%20Assessment%20and%20Plan%20for%20the%20Nelson%20Mandela%20Bay%20Municipality%20-%20161107.pdf [Accessed August 19, 2008].

Stanton, C., 1996. The Landscape Impact and Visual Design of Windfarms, Edinburgh College of Art.

Stewart, W., Cowling, R., Martin, A., du Preez, D., & Lombard, A. 2004. A Biodiversity Conservation Assessment and Framework for an Open Space System for the Nelson Mandela Metropole, Cape Floristic Region, South Africa. A report of the C.A.P.E. Project for the Table Mountain Fund (WWF-SA).



Stewart, W.I., Cowling, R.M., Du Preez, D.R., Martin, A.P. & Lombard, A.T. 2003. Framework for a Conservation Plan for the Nelson Mandela Metropole, Cape Floristic Region, South Africa, 1st Edition. Unpublished Technical Report to the Table Mountain Fund: WWF-SA.

Stienen E.W.M., Courtens W., Everaert J. & Van De Walle M. 2008. Sex-biased mortality of Common Terns in wind farm collisions. Condor 110: 154-157.

Stillwater Sciences, Rainey, W.,Pierson, E., Corbon, C., 2003: Sacramento River Ecological Indicators Pilot Study, Final, The Nature Conservancy, Chico, USA.

Stuart, C.T & Stuart, M.D. 2000. A Field Guide to the Tracks & Signs of Southern and East African Wildlife. 3rd ed. Struik Publishers, Cape Town.

Swedish Environmental Protection Agency – Noise Annoyance from Wind Turbines – a Review. Authors: Eja Pedersen, Högskolan i Halmstad. August 2003.

Taylor, P.J., 2000. Bats of Southern Africa. Natal University Press, Scottsville. Pp 206.

University of Groningen - 11th International Meeting on Low Frequency Noise and Vibration and its Control. Do wind turbines produce significant low frequency sound levels? GP. van den Berg. September 2003.

Van Rooyen C.S. & Ledger J.A. 1999. Birds and utility structures: Developments in southern Africa. In: Ferrer M. & G.F.M. Janns. (eds.) Birds and Power lines. Quercus, Madrid. Pp 205-230.

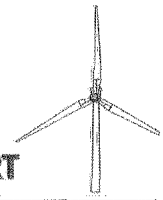
Victor, J.E., and Dold, A.P. 2003. Threatened plants of the Albany centre of Floristic Endemism, South Africa. SAJSci. 99:437-446.

Vissering, J., 2005. Wind Energy and Vermont's Scenic Landscape, Vermont. Available at: http://publicservice.vermont.gov/energy-efficiency/ee_files/wind/vissering_report.pdf [Accessed September 4, 2008].

Vlok, J.H.J. and Euston-Brown, D.I.W. (2002). The patterns within, and the ecological processes that sustain, the Subtropical Thicket Vegetation in the planning domain for the Subtropical Thicket Ecosystem Planning (STEP) Project. Terrestrial Ecology Research Unit, Report No. 40. University of Port Elizabeth, Port Elizabeth.

Walker D., Mcgrady M., Mcluskie A., Madders M. & Mcleod D.R.A. 2005. Resident Golden Eagle ranging behaviour before and after construction of a windfarm in Argyll. Scottish Birds 25: 24-40.

White, S.W. and Kulcinski, G.L. (2000). Birth to death analysis of the energy payback ratio and CO2 gas emission rates from coal, fission, wind, and DT-fusion electrical power plants. Fusion Engineering and Design 48 (248) 473 – 481. University of Kansas Energy Research Centre, USA.



Wiltschko W., Munro U., FORD H. & WILTSCHKO R. 1993. Red light disrupts magnetic orientation of migratory birds. Nature 364: 525-527.

Wind turbine generators: A literature review. George Bellhouse. June 2004.

Winkelman J.E. 1992. The impact of the Sep wind park near Oosterbierum, the Netherlands on birds 2: Nocturnal collision risks. RIN Report 92/3 Arnhem: Rijksinstituut voor Natuurbeheer.

World Health Organization – Guidelines for Community Noise. 1999

APPENDICES

Appendix A – Curriculum Vitae: Paul Lochner and Ismail Banoo

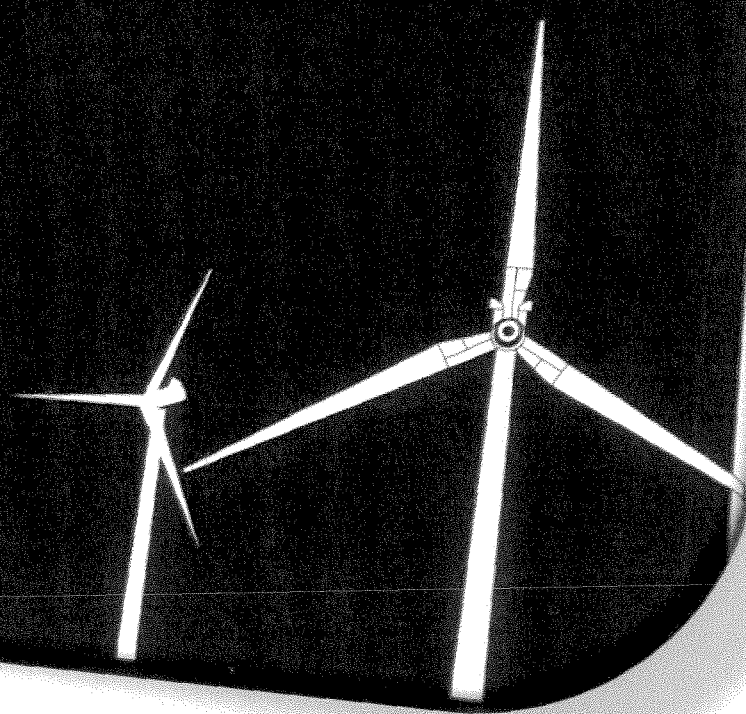
Appendix B – DEA's Acceptance Letter for the Final Scoping Report and Plan of Study for EIA

Appendix C – Database of registered I&AP's

Appendix D – Correspondence sent to I&AP's prior to the release of the Draft EIA Report

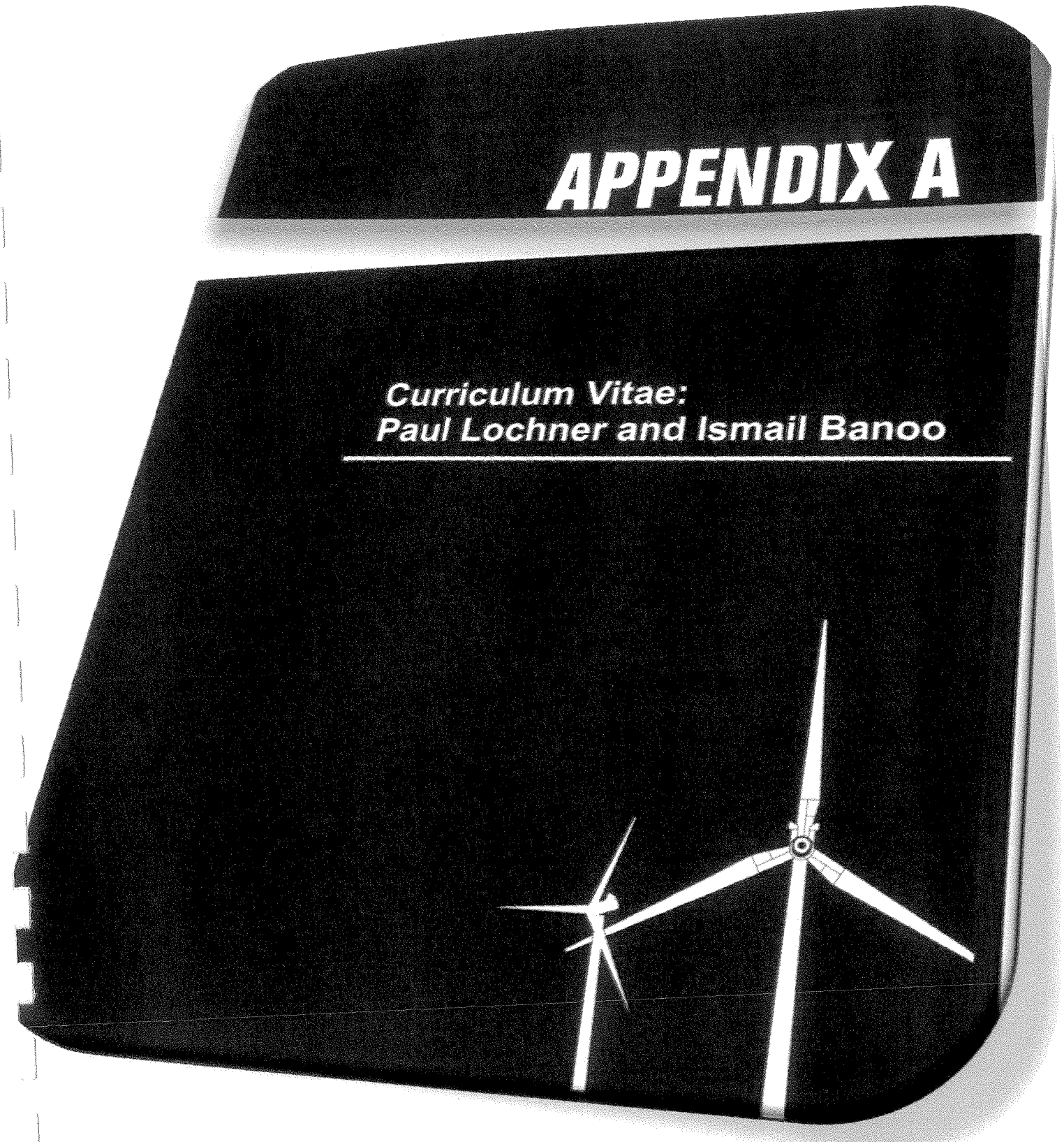
Appendix E – Copies of comments received from I&AP's on the Final Scoping Report

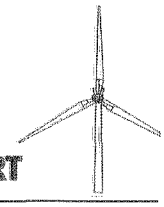
Appendix F – Comments and Response Trail



APPENDIX A

Curriculum Vitae: Paul Lochner and Ismail Banoo





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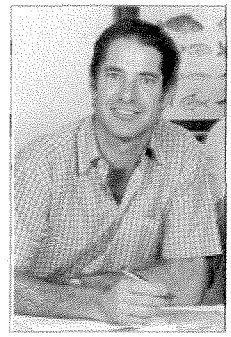


Curriculum Vitae

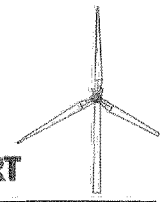
Paul Lochner

Name of firm	CSIR
Name of staff	Paul Andrew Lochner
Profession	Environmental Assessment and Management
Position in firm	Project Leader in Environmental Assessment & Management
Date of birth	13 June 1969
Years with firm	18 years
Nationality	South African

Biographical sketch

Paul Lochner commenced work at CSIR in 1992, after completing a degree in Civil Engineering and a Masters in Environmental Science, both at the University of Cape Town. His initial work at CSIR focused on sediment dynamics and soft engineering applications in the coastal zone, in particular, beach and dune management. He conducted several shoreline erosion analyses and prepared coastal zone management plans for beaches. He also prepared wetland management plans.

As the market for environmental assessment work grew, he led Environmental Impact Assessments (EIAs), in particular for coastal resort developments and large-scale industrial developments located on the coast; and Environmental Management Plans (EMPs), in particular for wetlands, estuaries and coastal developments. He has also been involved in researching and applying higher-level approaches to environmental assessment and management, such as Strategic Environmental Assessment (SEA). In 1998 and 1999, he coordinated the SEA research programme within the CSIR, and was a lead author of the Guideline Document for SEA in South Africa, published jointly by CSIR and the national Department of Environmental Affairs and Tourism in February 2000.



In 1999 and 2000, he was the project manager for the legal, institutional, policy, financial and socio-economic component of the Cape Action Plan for the Environment ("CAPE"), a large-scale multi-disciplinary study to ensure the sustainable conservation of the Cape Floral Kingdom. This was funded by the Global Environmental Fund (GEF) and prepared for WWF-South Africa. The study required extensive stakeholder interaction, in particular with government institutions, leading to the development of a Strategy and Action Plan for regional conservation.

In July 2003, he was certified as an Environmental Assessment Practitioner by the Interim Certification Board for Environmental Assessment Practitioners of South Africa. In 2004 he was lead author of the *Overview of IEM* document in the updated Integrated Environmental Management (IEM) Information Series published by national Department of Environmental Affairs and Tourism (DEAT). In 2004-2005 he was project manager for an Environmental and Social Impact Assessment (ESIA) conducted for a bauxite mine and alumina refinery in the Komi Republic (Russia), prepared in accordance with World Bank and EU policies, guidelines and standards.

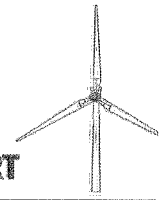
In 2004-2005, he was part of the CSIR team that coordinated the preparation of the series of *Guidelines for involving specialists in EIA processes* prepared for the Western Cape Department of Environmental Affairs and Development Planning (DEADP); and authored the *Guideline for Environmental Management Plans* published by the Western Cape government in 2005.

Over the past 6 years has been closely involved with several environmental studies for industrial and port-related projects in Coega Industrial Development Zone (IDZ), near Port Elizabeth. This included an EIA and EMP for a proposed aluminium smelter, and assistance with environmental permit applications for air, water and waste. He has also conducted environmental assessments for port development, manganese export and rail development at the Coega IDZ and port.

He is currently leading the EIA for a desalination plant in Namibia; an EIA for a wind energy facility near Jeffreys Bay, South Africa; and an EIA for a proposed crude oil refinery at Coega.

Education

1990	B.Sc. Civil Engineering (awarded with Honours)	University of Cape Town
1992	M. Phil. Environmental Science	University of Cape Town



Employment record

January 1992 to June 1992: Completed Masters thesis, working in conjunction with the Environmental Evaluation Unit at the University of Cape Town. The thesis investigated the potential future ecological and socio-economic impacts resulting from the closure of a large diamond mining operation, and developed actions to mitigate these impacts.

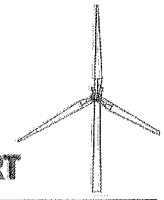
October 1992 to present: Employed by the CSIR in Stellenbosch. Involved in coastal engineering studies; and various forms of environmental assessment and management studies. (A track record of experience is listed below).

PROFESSIONAL INVOLVEMENT IN COMMITTEES:

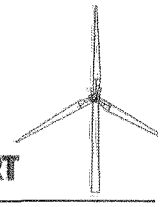
1996/97:	Committee Member of the Western Cape Branch of the International Association for Impact Assessment (IAIA)
1997/98:	Chairperson of the Western Cape Branch of IAIA and member of the national IAIA committee
1998/99:	Committee Member of the Western Cape Branch of IAIA
1996 to present:	Chairperson of the Intaka Island/Blouvlei Environmental Committee at Century City, Cape Town (This committee is tasked with overseeing the management of a wetland in the midst of a new mixed-use urban development)

Experience record

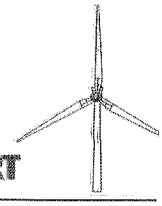
The following table presents an abridged list of projects that Paul Lochner has been involved in, indicating his role in each project:



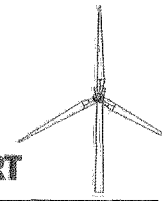
Completion Date	Project description	Role	Client
2009/2010 *(in progress)*	**EIA for the proposed Biotherm wind energy project,** Overberg region, South Africa	Project leader	Biotherm South Africa (Pty) Ltd
2009/2010 *(in progress)*	**Basic Assessment (BA) for monitoring masts for the proposed Biotherm wind energy project,** Overberg region, South Africa	Project leader	Biotherm South Africa (Pty) Ltd
2009/2010 *(in progress)*	**EIA for the proposed InnoWind wind energy project,** Western Cape, South Africa	Project leader	InnoWind South Africa (Pty) Ltd
2009/2010 *(in progress)*	**BA for the proposed InnoWind test turbines and monitoring masts,** Western Cape, South Africa	Project leader	InnoWind South Africa (Pty) Ltd
2009/2010 *(in progress)*	**EIA for the proposed Electrawinds Phase 2 wind energy facility,** Coega IDZ, Eastern Cape	Project leader	Electrawinds N.V. (Belgium)
2009/2010 *(in progress)*	**BA for the national wind Atlas for South Africa**	Project leader	SANERI and SA Wind Energy Programme, Dept of Energy
2009/2010 *(in progress)*	**EIA for the proposed Gecko soda plant,** Otjivalunda and Arandis, Namibia	Project leader	Gecko, Namibia
2009	**BA for the proposed Electrawinds test turbine and monitoring mast,** Coega IDZ, Eastern Cape	Project leader	Electrawinds N.V. (Belgium)
2009	**EIA for the proposed desalination plant** at Swakopmund, Namibia	Project leader	NamWater, Namibia
2009	**EMP for the Operational Phase of the Berg River Dam,** Franschoek, South Africa	Project leader and report co-author	TCTA, South Africa
2009/2010 *(in progress)*	**EIA for the proposed crude oil refinery** at Coega, South Africa	Project leader and lead author	PetroSA, South Africa
2008	**Environmental Risk Review** for proposed LNG/CNG import to Mossel Bay, South Africa	Project leader and lead author	PetroSA, South Africa
2008	**Review of the Business Plan** for catchment management for the Berg Water Dam Project, Franschoek, South Africa	Project reviewer and co-author	TCTA, South Africa
2007 – 2008 *(in progress)*	**EIA for proposed Jacobsbaai Tortoise Reserve eco-development**, Saldanha, Western Cape	Project Leader and co-author	Jacobsbaai Tortoise Reserve (Pty) Ltd
2007 – 2008 *(in progress)*	**Independent reviewer** for the EIA proposed Amanzi lifestyle development, Port Elizabeth	Independent reviewer appointed to advise EAP	Public Process Consultants and Pam Golding
2007 – 2008 *(in progress)*	**EIA for proposed Kouga wind energy and pumped storage scheme**, Eastern Cape	Project Leader and co-author	Genesis Eco-Energy



Completion Date	Project description	Role	Client
2007	**Review of EIA for the proposed Hanglip Eco-Development**, Plettenberg Bay, Western Cape	Co-author of review of EIA, undertaken on behalf of DEADP	Dept of Environmental Affairs & Development Planning, Western Cape
2006-2007 *(in progress)*	**Environmental Impact Assessment for the proposed Coega LNG-to-Power Project** at the Port of Ngqura, Coega IDZ	Project Leader and co-author	Eskom and iGas
2006-2007 *(in progress)*	**Guideline** for Scoping, Environmental Impact Assessment and Environmental Management Plans for mining in South Africa	Project leader and co-author	Dept of Minerals and Energy (DME), South Africa
2006	**Environmental Impact Assessment (EIA)** for the extension of the Port of Ngqura, Eastern Cape	Project Leader and co-author	Transnet
2006	**Integrating Sustainability Into Strategy: Handbook** (Version 1)	Project Leader and co-author	CSIR (STEP research report)
2005	**Technology Review** for the proposed aluminium smelter at Coega, South Africa	Project Leader and lead author	Alcan, Canada
2005	**Environmental and Social Impact Assessment (ESIA) report** for the proposed alumina refinery near Sosnogorsk, Komi Republic, Russia	Project manager and co-author	Komi Aluminium, Russia, IFC, EBRD
2005	**Guideline for Environmental Management Plans (EMPs)** for the Western Cape province, including conducting a training course for provincial government	Author	Dept of Environmental Affairs & Development Planning, Western Cape
2005	**Guideline for the review of specialist studies** undertaken as part of environmental assessments	Member of Steering Committee and project facilitator	Dept of Environmental Affairs & Development Planning, Western Cape
2004	**Review of Strategic Management Plan** for Table Mountain National Park (2001-2004)	Reviewer and co-author	South African National Parks
2004	**Strategic Needs Assessment Process** for mainstreaming sustainable development into business operations	Researcher and co-author	CSIR (internal research)
2004	**Environmental Monitoring Committees** booklet in the IEM Information Series for DEAT	Contributing author	Department of Environmental Affairs and Tourism (DEAT)
2004	**Overview of Integrated Environmental Management** (IEM) booklet in the IEM Information Series	Lead author and researcher	DEAT
2003	**Environmental Screening Study** for gas power station, South Africa	Project Manager and lead author	Eskom, iGas and Shell
2003	**Environmental Management Programme** (EMP) Framework for the proposed Coega Aluminium Smelter; and assistance with preparing permit and	Project Manager and lead author	Pechiney, France



Completion Date	Project description	Role	Client
	licence applications		
2003	**Environmental Management Plan** for the Operational Phase of the wetlands and canals at Century City, Cape Town	Project leader and lead author	Century City Property Owners' Association
2002	**Environmental Impact Assessment** for the proposed Pechiney aluminium smelter at Coega, South Africa	Project Manager and lead author	Pechiney, France
2002 - 2003	**Research project:** Ecological impact of large-scale groundwater abstraction on the Table Mountain Group aquifer	Project Manager	Water Research Commission
2002	**Environmental Management Plan** for the Eskom Wind Energy Demonstration Facility in the Western Cape	Co-author	Eskom
2001-2002	**Environmental Impact Assessment** for the Eskom Wind Energy Demonstration Facility in the Western Cape	Quality control & co-author	Eskom
2001	**Environmental Due Diligence** study of four strategic oil storage facilities in South Africa	Project manager and co-author	SFF Association
2000	**Cape Action Plan for the Environment**: a biodiversity Strategy and Action Plan for the Cape Floral Kingdom - legal, institutional, policy, financial and socio-economic component	Project manager and contributing writer	World Wide Fund for Nature (WWF): South Africa
1999	**Environmental Management Plan** for the establishment phase of the wetlands and canals at Century City, Cape Town	Project manager and lead author	Monex Development Company
1999	**Environmental Management Programme** for the Thesen Islands development, Knysna	Process design and Co-author	Chris Mulder Associates Inc; Thesen and Co.
1999	***Management Plan** for the coastal zone between the Eerste and Lourens River, False Bay, South Africa*	Project manager and lead author	Heartland Properties and Somchem (a Division of Denel)
1998	**Environmental Assessment** of the Mozal Matola Terminal Development proposed for the Port of Matola, Maputo, Mozambique	Project manager and author.	*SNC-Lavalin-EMS*
1998	**Strategic Environmental Assessment (SEA)** for the Somchem industrial complex at Krantzkop, South Africa	Project manager and co-author	Somchem, a Division of Denel
1997	**Strategic Environmental Assessment (SEA)** for the proposed Industrial Development Zone and Harbour at Coega, Port Elizabeth, South Africa	SEA project manager and report writer	Coega IDZ Initiative Section 21 Company
1996	**Environmental Impact Assessment** of Development Scenarios for Thesen Island,	Project manager and	Thesen and Co.



Completion Date	Project description	Role	Client
	Knysna, South Africa	report writer	
1996	**Environmental Impact Assessment** of the Management Options for the Blouvlei wetlands, Cape Town	Project manager and report writer	Ilco Homes Ltd (now Monex Ltd)
1995	**Environmental Impact Assessment** for the Saldanha Steel Project, South Africa	Report writing and management of specialist studies	Saldanha Steel Project
1994	**Environmental Impact Assessment** for the upgrading of resort facilities on Frégate Island, Seychelles	Member of the project management team, co-author, process facilitator	Schneid Israelite and Partners
1994	**Environmental Impact Assessment** for exploration drilling in offshore Area 2815, Namibia	Project manager and co-author	Chevron Overseas (Namibia) Limited
1994	**Management Plan** for the Rietvlei Wetland Reserve, Cape Town	Project manager and lead author	Southern African Nature Foundation (now WWF-SA)
1993	**Beach management plan** for Stilbaai beachfront and dunes, South Africa	Project manager and lead author	Stilbaai Municipality
1993	**Beach and dune management plan for Sedgefield** for the beach east of the mouth of the Swartvlei estuary	Project manager and lead author	Nel and De Kock Planners, George
1993	**Coastal Stability analysis and beach management plan** for the Table View coastline north of Blaauwberg Road, Cape Town	Project manager and lead author	Milnerton Municipality

Publication record

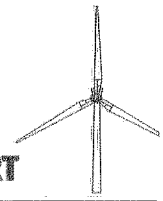
A comprehensive list of publications, book chapters and contract reports is available upon request, with a summary provided below.

Publications in journals, peer reviewed conference proceedings and CSIR internal research reports:

Lochner P, Munster F and Burns M, 2006. Integrating Sustainability into Strategy (ISIS): a process to inform sustainability strategies and frameworks, *In:* IAIA South Africa Annual Conference proceedings, South Africa.

Rossouw N and Lochner P, 2006. Environmental Monitoring Committees (EMCs): purpose, function and structure. *In:* IAIA South Africa Annual Conference proceedings, South Africa.

Munster F and Lochner P, 2006, Integrating Sustainability Into Strategy: Handbook (Version 1) – describing a process to inform sustainability strategies, frameworks and reports, *CSIR Report ENV-*



S-I 2005-001, ISBN 0-7988-5560-6, Stellenbosch.

Van Zyl H, de Wit M, Munster F, Lochner P, Gerber G, 2005. Economics in Environmental Impact Assessment: demystifying the theory and practice, *In:* Conference Proceedings of the IAIA South Africa 2005 Annual National Conference. South Africa.

Lochner P, Weaver A, Gelderblom C, Peart R, Sandwith T and Fowkes S, 2003. Aligning the diverse: the development of a biodiversity conservation strategy for the Cape Floristic Region. *Biological Conservation Vol. 112, ISSN:* 0006-3207.

Lochner P, Münster F, Msutu M, Wren S, 2003. The role of stakeholder engagement in the EIA for the Coega Aluminium Smelter. *In:* Conference Proceedings of the IAIA South Africa 2003 Annual National Conference. ISBN 1-919891-04-8. South Africa.

Lochner P, Brooks W, Pesch P & Münster M. 2003, Stakeholder engagement process in the EIA of an aluminium smelter, Published in *Light Metals* 2003 (Ed. Paul Crepeau), Published by TMS (the Minerals, Metals & Materials Society), ISBN Number 0-87339-531-X, USA.

Rossouw N, Audouin M, Lochner P, Heather-Clark S and Wiseman K, 2000. Development of strategic environmental assessment in South Africa. *Impact Assessment and Project Appraisal.* Vol 18, no. 3, pp 217-223. United Kingdom.

Lochner P and Fowkes S, 2000. Building partnerships for the conservation of the biodiversity of the Cape Floral Kingdom: experiences and lessons learnt from the Cape Action Plan for the Environment. IAIA-SA Conference Proceedings 2000. South Africa.

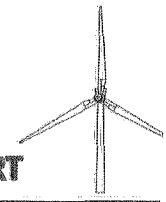
Lochner P and Rossouw N, 1997. The development of an Environmental Management Plan for incorporating a wetland into a large mixed use development: the Century City example. IAIA-SA Conference Proceedings 1997. South Africa.

Language capability

	Speaking	*Reading*	*Writing*
English	Excellent	Excellent	Excellent
Afrikaans	Average	Average	Average

Paul Lochner

27th May 2010



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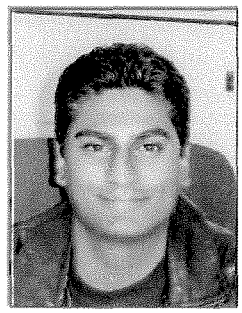


Curriculum Vitae

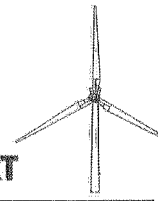
Ismail Banoo

Name of firm	CSIR
Name of staff	Ismail Banoo
Profession	Environmental Assessment and Management
Position in firm	Senior Environmental Assessment Practitioner
Nationality	South African

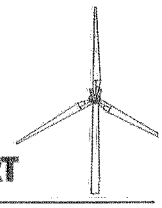
Ismail Banoo is a Senior Environmental Assessment Practitioner and Manager of the CSIR Environmental Management Services team based in Durban, South Africa.

Ismail's involvement in several industrial and port related Environmental Impact Assessments (EIAs) has afforded him an in-depth understanding of the sustainability issues facing development in Africa. He has been involved in private sector and development agency funded projects in Botswana, Mozambique and Angola. All of these projects involved interaction with a wide variety of stakeholders and key to these interactions has been managing and facilitating public participation processes and effective stakeholder engagement.

With over 10 years experience in the environmental assessment and management field, Ismail has participated in various international conferences and workshops. He has also facilitated numerous EIA/SEA training courses for universities as well as the private and public sector in South Africa and other African countries.



Fields of Competence	▪ Environmental impact assessments ▪ Strategic environmental assessments ▪ Environmental management capacity building ▪ EIA project management ▪ Environmental policy analysis and governance ▪ Environmental management systems and auditing ▪ Experience in management of integrated product development and integration of multidisciplinary teams. ▪ Facilitation and strategy development
Professional Affiliations & Registrations	▪ International Association for Impact Assessment. ▪ International Association for Impact Assessment (South African Affiliate). ▪ Certified Environmental Assessment Practitioner in South Africa – (EAPSA Certified).
Education	▪ BA, University of Durban Westville, South Africa, 1998 ▪ BA Honours University of Durban Westville, South Africa, 2000 ▪ MA (Environmental Science), University of Durban Westville, South Africa, 2002 ▪ Basic Environmental Assessment and Management Course, University of Free State, South Africa. 2002 ▪ Basic and Intermediate Project Management Course, CSIR, Innovation Leadership and Learning Academy, 2003 ▪ Advanced Project Management Course II, CSIR Innovation Leadership and Learning Academy, 2004 ▪ UNIDO International Cleaner Production Training Course, National Cleaner Production Centre, 2005
Languages	▪ English ▪ Afrikaans, basic ▪ Zulu, basic ▪ Urdu, basic
Key Industry Sectors	▪ Ports and harbour developments ▪ Large industrial and infrastructure developments ▪ Corporates ▪ Municipalities
Awards	▪ National Research Foundation (SA), 2000 – 2002, Awarded research scholarship for undertaking Masters Degree ▪ CSIR 2006 – Young Researchers Establishment Fund, awarded an internal research scholarship for undertaking research on integrating sustainability imperatives into strategic decision making for sustainable business operations in South Africa.



Recent Key Project Experience

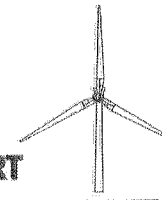
2009

EIA for a Proposed Wellfield Development Project in Botswana
Project Leader
The client is conducting a detailed feasibility study and EIA for the Mmamabula Energy Project (MEP), a combined coal mine and power plant development in Botswana. In addition to these activities there are also a number of ancillary projects which are required to support the MEP. One such project includes the investigation of groundwater reserves located within close proximity to the MEP referred to as the Bonwapitse Proposed Wellfield Area (PWA) as a potential sustainable source of water for the construction and operational phases of the MEP. This project is the subject of the EIA that has been conducted to international as well as Botswana regulatory standards.

Durban International Airport (DIA) Environmental Due Dilligence Assessment
Project Leader
The DIA has been identified by Transnet as a possible site for the development of a new port, largely in order to increase the capacity of the existing Port of Durban. The client wished to investigate the potential environmental liability associated with purchasing the DIA site and subsequently constructing a new port. The study focused on reviewing all existing information followed by an analysis of the key environmental sensitivities in the vicinity of the site.

Environmental and Social Evaluation of Eastern Port Rail Corridor Proposed Port Layout Options
Project Leader
As part of the Ports and Rail Corridor Project, Transnet are investigating future port layout options that reflect the economic demand expected over the next 30 years. Various criteria where being evaluated. Core to these criteria were various environmental and social criteria. The study undertaken was to analyse and rate the environmental and social criteria for each port. The report included the outcome of this process for the ports within the Eastern Port and Rail Corridor (EPRC) which include the Port of Durban and Port of Richards Bay.

Environmental Review Eastern Port and Rail Corridor
Project Manager
The scope of this study was to review previous Environmental Impact Assessments (EIAs) and associated Records of Decision (RODs), Strategic Environmental Assessments (SEAs) and other planning documents to identify environmental and social drivers and assess their impact on future port planning, development and operations. Associated with the above was the need to consult with key stakeholders on the environmental and social issues that they may consider important for future port planning, development and operation. The final report was collated with incorporating these key imperatives of the study.



EIA for Proposed Grass Roots Crude Oil Refinery in Lobito, Angola
Project Manager
The client is proposing to build a new refinery with a refining capacity of 200,000 barrels per day. The primary goal of the project is to add value to heavy and acidic Angolan crude by refining it to produce high quality transportation fuels.The EIA is currently on-going and is being conducted with support from other international technical partners and local Angolan consultants including the Angola Research Institute (A-IP) and Holisticos.

I was responsible for all project management requirements on the project. This included all specialist investigation co-ordination as well as public consultation activities. I was also part of the social team (in-conjunction with local partners) who were involved in a comprehensive social impact assessment for all components of the project.

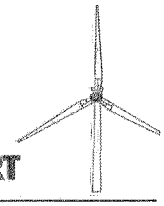
Environmental and Social Evaluation of Long Term Coal Supply Rail Routing Options
Project Manager
The scope of this study is to conduct a desktop environmental and social baseline study for a number alternative rail routing options in the greater Gauteng and Mpumalanga provinces. The proposed project area encompass the municipalities of Eastvaal District Municipality, Nkangala District Municipality, Seme Municipality, Lekwa Municipality and Gert Sibande District municipality, and will intend to transport coal to, Grootvlei, Kendal, Majuba, Tutuka and Camden power stations respectively.

The objective of the study is to identify and map key resource sensitivities in order to support spatial planning for the development of railway corridors for transportation of coal on a long term basis. I am the project manager on the project with overall responsibility for the completion of the project.

Environmental Impact Assessment for Block 15 (Kizombo Satelites Project) - Esso Exploration Angola Ltd.
Project Reviewer
The project involved the undertaking an Environmental Impact Assessment for EEAL's Plan Satellite Fields Sub-sea tiebacks to existing oil and gas production facilities in offshore Angola (Block 15).

2008

State of Environment Report for the Nkangala District Municipality
Project Leader
Principal author of a specialist report on Integrated Waste Management Planning for the Nkangala district. Project involved addressing key issues raised by stakeholders and maximising resource use through improved waste stream management.



EIA for the Expansion of the Port of Ngqura – Port Elizabeth – South Africa
Project Manager
The client is proposing to expand the existing quay wall as well as construct an admin craft building in order to complete the final phases of the pre-feasibility studies as part of the Port of Ngqura development. The completion of these components will facilitate the operation of the Port of Ngqura by 2007/8.

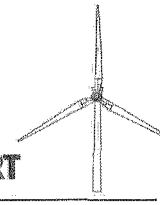
2007

National Cleaner Production Strategy
Project Leader
The Department of Environmental Affairs and Tourisms Branch for Environmental Quality Protection embarked on developing a national strategy and implementation plan for Cleaner Production. The strategy was prepared for DEAT as part of the South African implementation of the Johannesburg Plan of Implementation (JPOI), with particular reference to the implementation of recommendations as contained in Chapter 3 on sustainable consumption and production. The key emphasis of the strategy was on the cleaner production aspect. Involvement was as a Principle Drafter and overall Project Leader and Manager of the project.

Environmental Due Diligence Assessment for 18 pots expansion project at BHP Billiton –Hillside Smelter
Project Manager
The client is investigating the development of new technology for aluminium smelting by adding 18 additional pots to existing operations at the plant. The project involved evaluating the key environmental parameters associated with the proposed expansion and included the development of an integrated environmental report to be submitted to the authorities for approval.

Science of Climate Change
Researcher
The project involved undertaking a detailed literature review of climate change for the Municipality. Assisted with developing and writing up the scenarios for climate change for the city. The project also identified a series of additional parameters which formed part of the scenario development process.

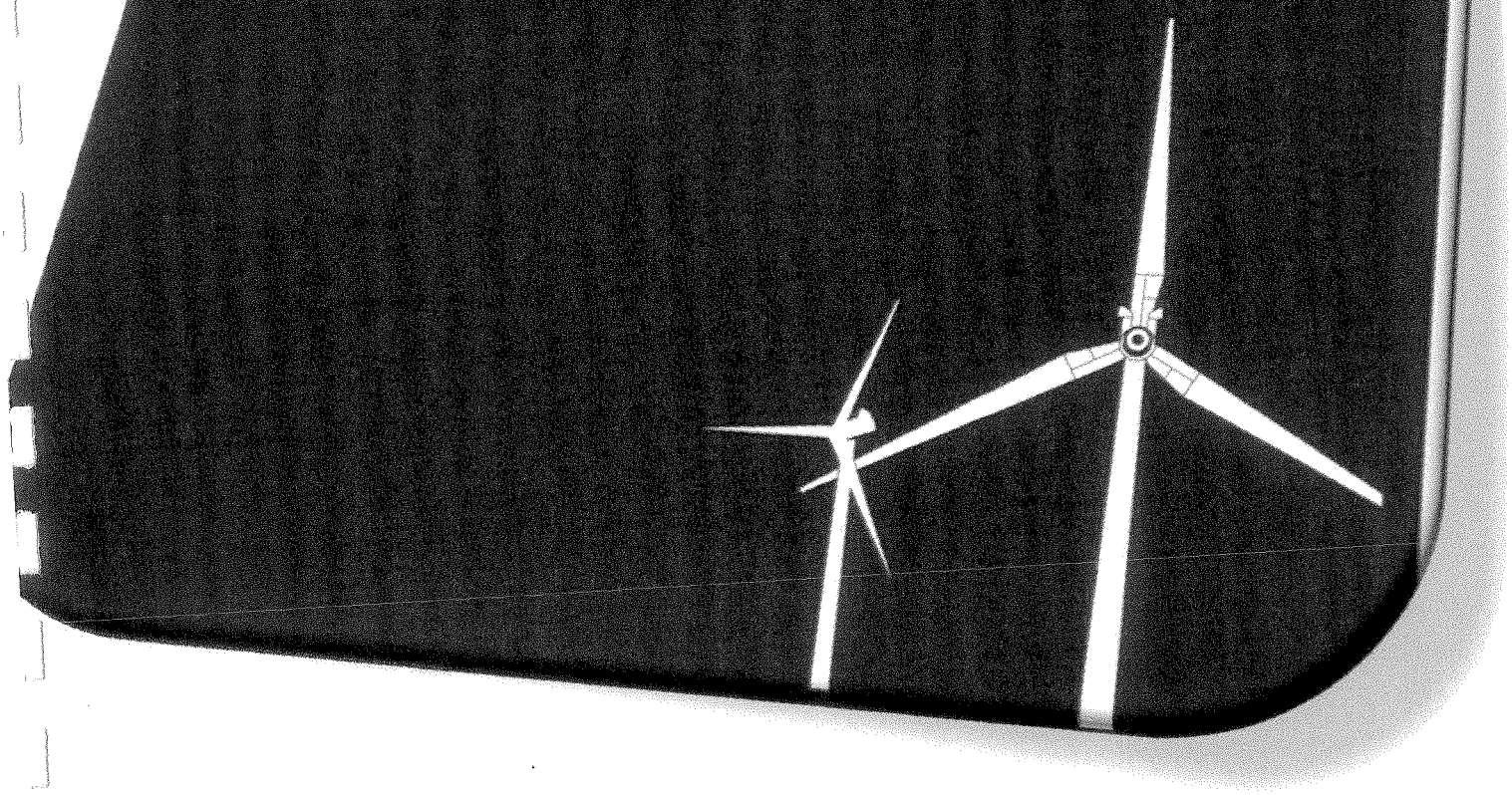
Environmental Site Suitability Study –Proposed Manganese Smelter
Project Leader
The client wished to establish a ferro-alloy manganese smelter within Southern Africa. Project investigated four industrial sites and evaluated the suitability of each site for the proposed development project. Key findings include the capacities and constraints associated with the project.

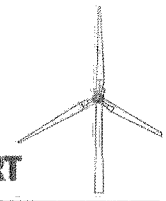


Courses/Presentations/ Training Events	**2010** **University of Kwa-Zulu Natal – Durban Campus** ***Guest Lecturer*** Lectured on topics pertaining to EIA application to second and third year students in the Environmental Science Department for the first semester environmental management module. **2009** **University of Kwa-Zulu Natal – Durban Campus** **Client: Department of Agriculture and Environmental Affairs (DAEA)** ***Course presenter/Overall Co-ordinator*** Presented a two day environmental assessment and management course to DAEA (KZN Provincial environmental authority). **Department of Economic Affairs, Environment and Tourism** ***Course Co-ordinator and Lead Presenter*** Presented an intensive course to the environmental impact assessment directorate in the Eastern Cape Region. The content covered IEM and environmental assessment and management topics **IQPC (South African Branch)** ***Team Leader/ Chief Presenter*** Presented a one day workshop on a Step-by-Step guide to completing an effective Environmental Impact Assessment. **2008** **University of Durban Westville, Centre for Development Management** ***Course Presenter*** Presented a one day course on environmental management and local government – The role of and objectives of Agenda 21 in local development planning **University of Kwa-Zulu Natal – Pietermaritzburg Campus, Centre for Environment and Development** ***Course Presenter*** Presented a five day course for Masters students on EIA and IEM as part of university of curriculum. **University of Kwa-Zulu Natal – Durban Campus, Department of Geography and Environmental Studies** ***Lecturer*** Lectured on IEM topics to Honours and Masters students as part of the Environmental Management Semester Module (2005 – 2006)

APPENDIX B

DEA's Acceptance Letter for the Final Scoping Report and Plan of Study for EIA

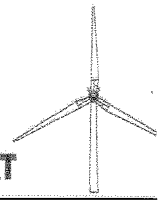




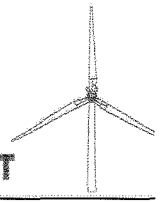
A copy of the Acceptance Letter for the Final Scoping Report and Plan of Study for EIA is available on request from CSIR

APPENDIX C

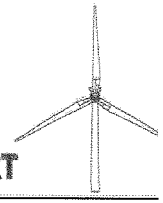
Database of registered I&AP's



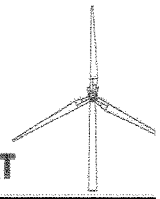
Title	First Name	Surname	Company/Organisation	Position	Interest
Ms	Carolyn	Ah Shene-Verdoorn	Birdlife EC	Policy and Advocacy Manager	Environmental NGO
Mr	Fred	Allibone	Sea Ark	Project Manager	IDZ Tenant
Mr	Ismail	Banoo	EAP Manager	CSIR	EAP
Mr	Patrick	Barrett	Discovery Health	Service Executive	NMBLP Tenant
Mr	Lars	Beaujean	Hella	Managing Director	NMBLP Tenant
Ms	Aphiwe	Bewana	Marine Intern	SANParks	SANParks
Ms	Viwe	Biyana	Coega Development Corporation	Project Manager SHEQ	CDC
Mr	Eugene	Blignaut	MSC	Regional Manager	NMBLP Tenant
Ms	Marisa	Bloem	DWA: Port Elizabeth	Water Use Authorization Section	Water Authority
Ms	Portia	Cacela	Branch Committee		Civil Society
Mr	Len	Chandler	Cerebos	Manager	IDZ Tenant
Mr	Willie	Claasen	EC Biomass	CEO	IDZ Tenant
Mr	Daniel	Classens	Inergy		NMBLP Tenant
Mr	Jacques	Coetzee	Group Antolin	Plant Manager	NMBLP Tenant
Dr	Mike	Cohen	CEN IEM Unit	Environmental Consultant	Environment
Mr	Len	Cowley	PE Cold Storage	Manager	IDZ Tenant
Mr	Patrick	Cull	The Herald	Assistant Editor	Media
Ms	Rene	de Klerk	HMG JV	Ngqura Env Manager	Ngqura Port
Mr	Hein	De Vrey	Rehau		NMBLP Tenant
Mr	Fikile	Desi	Nelson Mandela Bay Municipality	Former Ward 56 Councillor	Former Ward Councillor
Mr	Louis	Dewavrin	Innowind		Business
Mr	Vincent	Diergaardt	PPC		Adjacent Landowner
Mr	John	Drinkwater	Cerebos	Manager	IDZ Tenant
Mr	Kiki	Dyimi	SANCO Region	Environment and Tourism Sub Committee	Civil Society



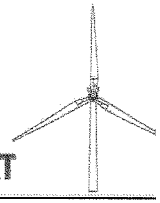
Title	First Name	Surname	Company/Organisation	Position	Interest
Ms	Ellen	Ed	4PL	Receptionist	NMBLP Tenant
Mr	George	Efstratiou	PE Cold Storage	Director	IDZ Tenant
Mr	Nceba	Faku	ANC Region	Regional Charperson	Civil Society
Mr	Tyrone	Ferndale	NMBM		Local Authority
Ms	Lizna	Fourie	DWAF, East London	Permit officer	National Dept. for NWA, 1998
Cllr	Friday	Frans	Motherwell Councillors Forum	Secretary	Cllrs. Forum
Mr	Wilbert	Gajjar	Flextech Manufacturing	General Manager	NMBLP Tenant
Ms	Noxolo	Galela	Eskom Transmission	Property Rights Asset Management	Eskom
Ms	Mariagrazia	Galimberti	SAHRA	APM Impact Assessor	Authority
Cllr	Nondikho	Gana	Nelson Mandela Bay Municipality	Ward 60 Councillor	Councillor
Mr	John	Geeringh	DWEA		Coega ELC / DEA
Mr	Danie	Gerber	UTI Sun Couriers	Branch Manager	IDZ Tenant
Mr	Anton	Gericke	Ulrica & Associates		NMBLP Tenant
Mrs	Yolanda	Gericke	Ulrica & Associates	Business Development Officer	NMBLP Tenant
Mr	Riaan	Goosen	Group Antolin	CEO	NMBLP Tenant
Mr	Jeff	Govender	DEDEA	Regional Manager	Coega ELC / DEDEAT
Mr	Lushen	Govender	GMSA	Facilities Area Manager	IDZ Tenant
Mr	Morgan	Griffiths	EIA Manager	WESSA	Environmental NGO
Ms	Lené	Grobbelaar	DWEA	Assistant Director: Parastatals	National Authority
Mr	Chase	Grundlingh	Inergy	PA	NMBLP Tenant
Mr	Ernest	Grunewald	Dedisa Substation	Senior Consultant	Land and Rights
Mr	Howard	Hawke	ATNS	Senior Manager	ATNS
Mr	Iqbal	Hoosen	SANRAL - Southern Region	Project Manager	National Roads
Mr	Matthys	Horack	ATNS Company	ATM & AIS Specialist	Civil Aviation



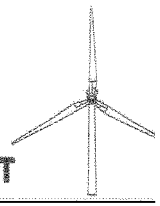
Title	First Name	Surname	Company/Organisation	Position	Interest
Mr	Menno	Jannsen	Electrawinds		Applicant
Mr	Zukile	Jodwana	SACP District	Secretary	Civil Society
Mr	Norman	Johnson	Addo Elephant National Park	Park Manager	Adjacent Landowner
Mr	Mike	Kaizer	SANRAL		Roads Agency
Mr	Jan	Kaschula	ATNS		ATNS
Mr	Marius	Keyser	EC Dept. of Roads and Transport	District Roads Engineer	Provincial Authority
Mr	Vien	Kooverji	Dept of Water Affairs	Manager	Coega ELC / DWA
Mr	Themba	Koza	CDC	Executive Manager	Coega ELC / CDC
Cllr	Linda Yolanda	Kwitsana	NMBM	Councillor Ward 56	Ward Cllr
Mr	Gideon	Labschagne	MSC		NMBLP Tenant
Mr	Gordon	Lake	Owner	LW Lake and Sons Tankatara	Adjacent Landowner
Mr	Peter	Lake	Owner	LW Lake and Sons Tankatara	Adjacent Landowner
Mr	Marc	Larter	Dynamic Commodities	Financial Manager	IDZ Tenant
Ms	Vanessa	Lessing	PPC	Environmental Manager	Business
Dr	Danny	Liebenberg	NMBM	Noise Control Officer	Local Authority
Mr	Paul	Lochner	EAP Leader	CSIR	EAP Manager
Prof	SS	Long	Dept of Civil Engineering	Nelson Mandela Metropolitan University	Education
Mr	Robbie	Louw	Promethium Carbon		Carbon Credits
Ms	Thanduxolo	Lungile	SAHRA		Provincial Authority
Mr	T	Mafana	Nelson Mandela Bay Municipality	Former Ward 60 Councillor	Former Ward Councillor
Mr	Malibongwe	Mafuduko	Ward 60	ANCY Youth League	Civil Society
Ms	N	Magopeni	Nelson Mandela Bay Municipality	Former Ward 55 Councillor	Former Ward Councillor
Mr	Dennis	Martin	Summit Projects	Manageer	Business
Dr	Paul	Martin	CDC	ECO	CDC



Title	First Name	Surname	Company/Organisation	Position	Interest
Ms	Thilivhali	Meregi	DEA MCM	Oceanographer: land-based sources of marine pollution	Coega ELC / MCM
Ms	Lungiswa	Mgxwati	WQM	DWA	Coega ELC / DWA
Ms	Jill	Miller	NMBM	Environmental Sub Directorate/ CETT Committee	Local authority
Mr	Kevin	Minkoff	Innowind	Project Manager	Wind Farms
Mr	Johan	Minnaar	ATNS Company	Manager ATS	ATNS
Mr	James	Mitchell	Faurecia	Health and Safety Officer	NMBLP Tenant
Mr	Luvuyo	Mkontwana	CDC	Manager: Business Development	CDC
Mr	Joram	Mkosana	NMBM	Environmental Manager	Coega ELC / NMBM
Mr	Sicelo	Mnyaka	Nelson Mandela Bay Municipality	Former Ward 59 Councillor	Former Ward Councillor
Mr	Lungile	Motsisi	Eskom Transmission	Investigations and Audit Manager	Eskom
Mr	Elliot	Motsoahole	Environmental Manager	TNPA	Coega ELC / TNPA
Cllr	Patricia	Ndlovu	ANC Region	Public Health and Environment	Civil Society
Mr	Peter	Neilson	NMBM	Electrical	Local Authority
Ms	Kithi	Ngesi	NMBM	Environmental Manager	Coega ELC / NMBM
Ms	Nontando	Nikani	Ward 60 Councillor's Assistant		Ward Cllr's Assistant
Mr	Hermann	Oelsner	President	African Wind Energy Association	NGO
Mr	Eric	Offerman	Algoa Brick	Managing Director	Adjacent Landowner
Dr	Ane	Oosthuizen	SANParks	National Marine Coordinator	National Parks
Mr	Andre	Otto	Dept of Minerals and Energy Room F508	Project Manager SA Wind Energy	National Government
Mr	Mongameli	Peter	SANGOCO Region	Deputy Secretary	Civil Society
Mr	Wayne	Poultan	Bosun Brick	Regional Manager	IDZ Tenant
Mr	Prince	Radzuma	DEAT/MCM		National Authority
Mr	Pieter	Retief	DWAF		Provincial Authoridy
Mr	Guy	Routledge	Kuehne & Nagal	Warehouse Manager	NMBLP Tenant



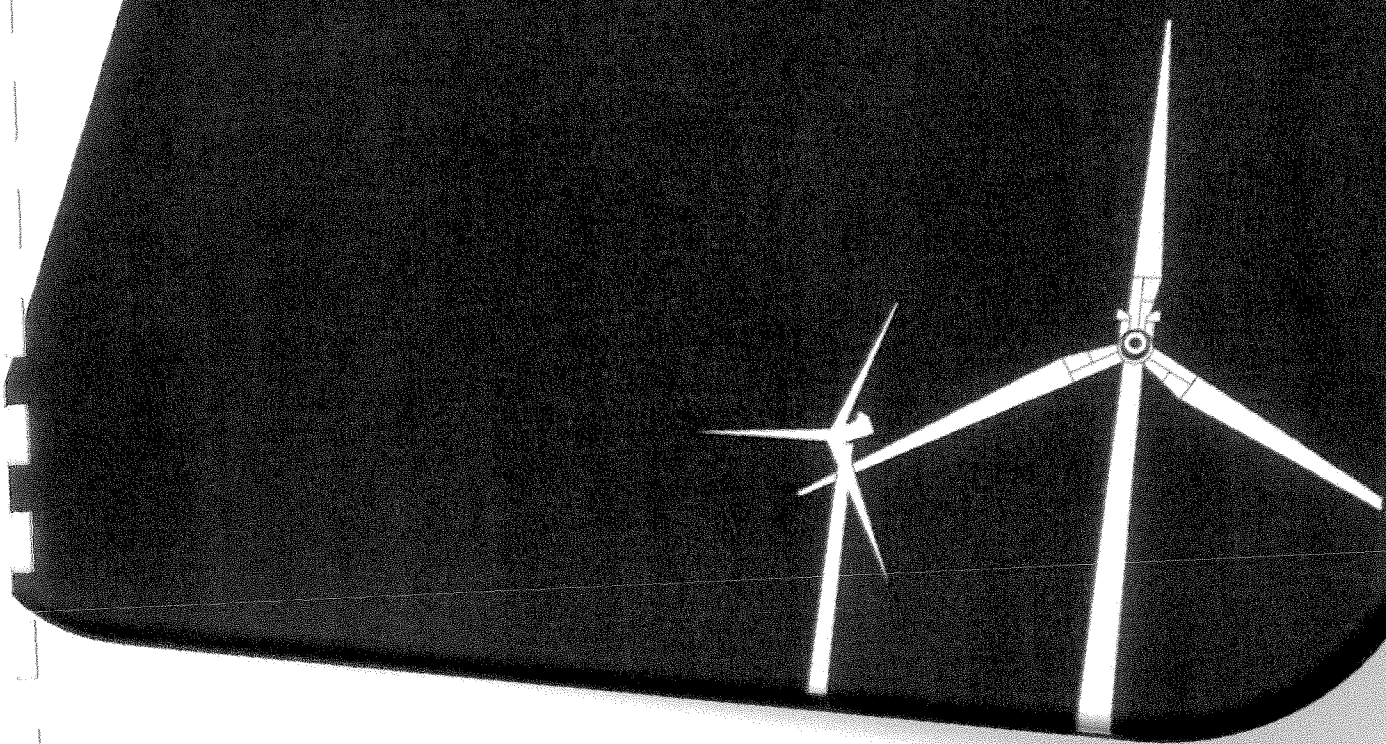
Title	First Name	Surname	Company/Organisation	Position	Interest
Mr	Marcus	Schmidt	Benteler	Facility Co-ordinator	NMBLP Tenant
Mr	Stephen	Schutte	Africoast		Business
Mr	Thomas	Siggenauer	Rehau	CEO	NMBLP Tenant
Mr	Kobus	Slabbert	NMBM	Air Quality	Local Authority
Mr	Mark	Snyman	NTI		IDZ Tenant
Mrs	Gillian	Solomon	Acoustex	HR Manager	IDZ Tenant
Mr	Mike	Spearpoint	Zwartkops Trust	Chairperson	Environmental NGO
Mr	Chris	Steyn	ATNS	Project Manager	ATNS
Mr	Johan	Steyn	ABSA		IDZ Tenant
Ms	Lizell	Stroh	SA Civil Aviation Authority	Obstacle Specialist	Civil Aviation
Mr	Andries	Struwig	DEDEA	Asst. Director: IEM	Coega ELC / DEDEAT
Ms	Rochelle	Swartz	CDC		Coega
Ms	Megan	Taplin	Addo Elephant National Park	Marketing & Communications Manager	Adjacent Landowner
Mr	Peter	Taylor	Inergy	Plant Manager	NMBLP Tenant
Mr	Vuyo	Tele	ATNS		PE Airport
Ms	Linah	Tshikororo	DEAT/MCM		National Authority
Mr	Mulalo	Tshikotshi	Pollution Manager	DEA: Ocean and Coast	Coega ELC/ DEA Ocean and Coast
Mr	Mlamli	Tsotsi	COPE Region	Head of communication	Civil Society
Mr	Emil	Unger	Electrawinds	Project Development Africa	
Ms	Ilse	van de Watt	4PL	Branch Manager	NMBLP Tenant
Mr	Jaco	van Deventer	Faurecia	Project and Engineering	NMBLP Tenant
Mr	JA	van Eeden	Palmtree Power	CEO	Palmtree Power
Mr	Bernerd	Venter	PPC	General Manager	Business
Ms	Shinaine	von Buchenroder	Flextech Manufacturing	Manager	NMBLP Tenant



Title	First Name	Surname	Company/Organisation	Position	Interest
Ms	Andrea	von Holdt	CDC	Project Manager (EIA)	Coega ELC / CDC
Mr	TG	Vusani	Former NMBM Councillor	Councillor Ward 53	Ward Cllr
Mr	Leon	Wait	Cape Concentrates		IDZ Tenant
Ms	Deirdre	Watkins		DMR	Coega ELC / DMR
Mrs	Helouise	Weitz	UDDI	PA	NMBLP Tenant
Mr	Brett	Williams	Digistics	DC Manager	IDZ Tenant
Mr	Ross	Zietsman	Birdlife EC	Chairperson	Environmental NGO
Mr	Bheki	Zondo	Discovery Health		NMBLP Tenant
Mr	Hugh	Laue	Zwartkops Trust	Chairperson	Environmental NGO
Mrs	Nanna	Gouws	SA National Roads Agency	Regional Manager	National Roads Agency
Ms	Corinn-Del	del Klopper	MPC Recruitment	Business Development Officer	Business

APPENDIX D

Correspondence sent to I&AP's prior to the release of the Draft EIA Report



Copy of Letter 3 sent to I&APs for the Final Scoping Report

PO Box 27688 Greenacres 6057
120 Diaz Road Adcockvale, PE 6001
Phone 041 374 8426 Fax 041 373 2002
Email sandy@publicprocess.co.za
Ck 97/32984/23 VAT 4460168273

8 September 2011

«Title» «First_Name» «Surname»
«Company_Organisation»
«Address_1»
«Adress_2»
«Adress_3»
«Address_4»
«City»
«Code»

Dear «Title» «Surname»

RE: Final Scoping Report, Proposed Universal Wind, Wind Energy Project in Zone 12 of the Coega Industrial Development Zone, Nelson Mandela Bay Municipality (DEA Ref no: 12/12/20/2106)

As a registered interested and affected party on the database for the above project you are hereby notified of the submission of the Final Scoping Report to the National Department of Environmental Affairs for decision making. (DEA reference no: 12/12/20/2106). All comments on the Final Scoping report are to be submitted directly to the National Department of Environmental Affairs, as indicated in the table below and a copy provided to the Public Participation Consultant, contact details above, by no later than the **30 September 2011**.

For Attention:	Ms. Babalwa Xalipi
Postal Address	National Department of Environmental Affairs Private Bag X447 Pretoria 0001
Phone	Tel: (012) 395 1771
Fax	Fax: (012) 320 7539
Email	Bxalipi@environment.gov.za
Please ensure that the project reference number is reflected on all correspondence:	
DEA Reference no:	**12/12/20/2106**

Report Availability

Copies of the Final Scoping Report are available for public viewing at the **Govan Mbeki Avenue Main Library** as well as the **Motherwell Library** and can be downloaded from the website **www.publicprocess.co.za**

The next stage in the EIA process will entail the release of the Draft Environmental Impact Assessment and EMPr (Draft EIA and EMPr) for a 40 day review period. As a registered interested and affected party on the database for this project you will receive written notification of the review period and any public meetings scheduled to be held during this period.

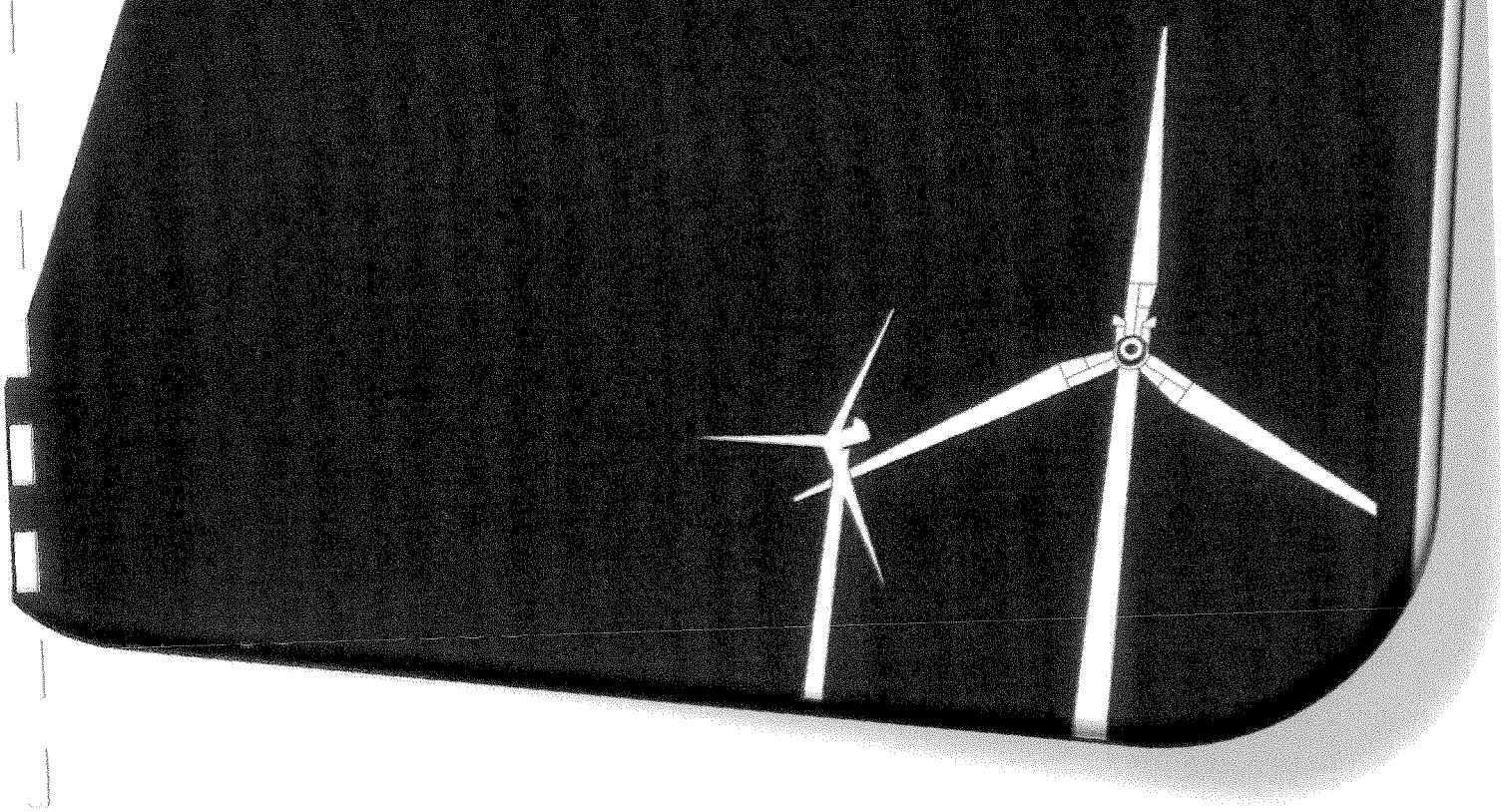
We thank you for providing us with your input to date and look forward to your participation in the next stage of the process.

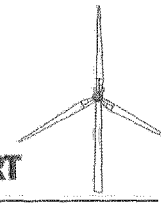
Yours sincerely

SANDY WREN

APPENDIX E

Copies of comments received from I&AP's on the Final Scoping Report





Copies of comments received from I&APs after the submission of the Final Scoping Report and prior to the release of the Draft EIA

From:	Bloem Marisa [BloemM@dwa.gov.za]
Sent:	14 July 2011 09:56 AM
To:	sandy@publicprocess.co.za
Cc:	Ntshebe Lorna
Subject:	Request an extension to provide comments
Follow Up Flag:	Follow up
Flag Status:	Flagged

Hi Sandy

Due the following projects not reaching our Technical Units in time we would like to request an extension to provide you with the necessary comments.

Reference to the following projects:

Notice of Final Environment Impact Assessment Report (EIA) and Environmental Management Programme (EMP), Jeffrey's Bay Wind Project (DEA Ref no: 12/12/20/1718)

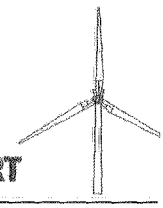
Notice of Scoping and Environmental Impact Assessment Process, for the Proposed Universal Wind, Wind Energy Project in the Coega Industrial Development Zone,
Nelson Mandela Bay Municipality.

Our technical unit will submit the comments by the 22nd of July if extension is granted.

Kind Regards

Marisa Bloem
Department of Water Affairs: Port Elizabeth
Water Use Authorization Section
Private Bag X6041
6000

Tel: 041 586 4884 (Extension 2205)
Mobile: 083 232 9822
Fax2Email: 086 560 5042
bloemm@dwa.gov.za



From:	Sandy Wren [sandy@publicprocess.co.za]
Sent:	14 July 2011 11:47 AM
To:	'Bloem Marisa'
Cc	'Ntshebe Lorna'; 'Paul Lochner'; 'Sarah Watson'; 'Ismail Banoo'
Subject:	RE: Request an extension to provide comments

Hi Marisa

As per our telephonic discussion of today the following has reference:

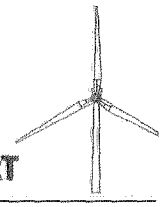
Jeffreys Bay Wind Energy
The EIA process for this project is complete and the environmental authorisation has been issued, therefore comments submitted will at this stage not be incorporated into the EIA. However, kindly submit any comments that you have on the project directly to myself and I will forward them to the applicant so that they are aware of any requirements that your Department may have with regards to the project.

Universal Wind Energy
We are working together with the CSIR on this project. The final Scoping Report has been submitted to National Environmental Affairs. Any comments that your Department submits will therefore be incorporated into the Draft and Final EIA for the project.

If you have any further queries please don't hesitate to contact me.

Regards

Sandy Wren
Public Process Consultants
PO Box 27688, Greenacres, 6057
120 Diaz Road, Adcockvale, PE, 6001
Phone: 041 374 8426
Fax: 041 373 2002
Cell: 082 4909 828
www.publicprocess.co.za



From: "Bloem Marisa" <BloemM@dwa.gov.za>
To: SWatson@csir.co.za; IBanoo@csir.co.za
CC: NtshebeL@dwa.gov.za; JacobsJ2@dwa.gov.za; TshatshuP@dwa.gov.za; FourieL4@dwa.gov.za
Date: 21/07/2011 12:05
Subject: Universal Wind Energy Project

Good Afternoon

Please see comments from our technical unit regarding this project.

RE: DRAFT SCOPING REPORT: ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED UNIVERSAL WIND ENERGY PROJECT IN ZONE 12 OF THE COEGA INDUSTRIAL DEVELOPMENT ZONE, NELSON MANDELA BAY METROPOLITAN MUNICIPALITY.

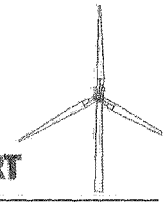
This office has evaluated the Draft Scoping Report dated April 2011 with the DEA reference number **12/12/20/2106** for the above-mentioned proposed project.

After evaluation of this Report this office has the following comments:

- Any proposed development which may take place within the extent of a watercourse i.e. within 1:100 year floodline or riparian habitat, whichever is the greater, constitutes a section 21 water use in terms of Chapter 4 of the National Water Act, 1998 (Act No. 36 of 1998) (the Act).
- In terms of the Act, if any of the proposed wind turbines as well as the hard standing areas will be constructed within the extent of a watercourse as defined above, a water use authorisation will be required in accordance with section 21 (c) for impeding and diverting the flow of water in a watercourse and section 21 (i) for altering of the bed, banks or characteristics of watercourse.
- If there are any watercourses that will be traversed by the cables to be installed underground, a water use authorisation in terms of Section 21 (c) & (i) will also be required.
- If the new access roads will cross any watercourse, a water use authorisation in terms of Section 21 (c) & (i) will also be required.
- Removal of vegetation within a watercourse constitutes a water use in terms of Section 21 (i) of the Act and requires authorisation.

Additional information requirements

- A wetland specialist should be appointed to determine whether the proposed wind turbines and associated infrastructure will not traverse any wetlands. Therefore, wetlands, if any, must be delineated and a technical report reflecting such should be submitted to this department.



Please note that developments that fall within a 500 metre radius from a boundary of any wetland will require a water use licence in terms of Section 21 (c) & (i) of the Act;

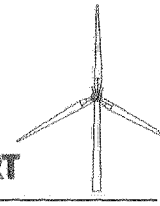
- Clear and detailed layout plan indicating the location of the proposed development activities and proposed infrastructure in relation to the 1:100 year floodline or riparian habitat, whichever is the greatest;

- Details regarding the proposed development's impact on the water resources in the vicinity including alternatives and mitigation measures; and

- Description of the affected watercourse/s, if any.

Marisa Bloem
Department of Water Affairs: Port Elizabeth
Water Use Authorization Section
Private Bag X6041
6000

Tel: 041 586 4884 (Extension 2205)
Mobile: 083 232 9822
Fax2Email: 086 560 5042
bloemm@dwa.gov.za



From: Sandy Wren [sandy@publicprocess.co.za]
Sent: 12 September 2011 08:59 AM
To: 'Sarah Watson'
Cc: 'Ismail Banoo'; 'Paul Martin'
Subject: FW: Comment on Final Scoping Rpt, Universal Wind

Hi Sarah

As per our discussion this morning below is the comment received from Paul Martin. I spoke to Paul this morning and we agreed that we will bring these comments into the release of the Draft EIA report.

Paul also asked can Jamie pay particular attention to the impacts associated with the installation of infrastructure for the turbines (roads and cabling) as this ultimately has a greater impact than the turbine footprints.

Thanks

Sandy Wren
Public Process Consultants
PO Box 27688, Greenacres, 6057
120 Diaz Road, Adcockvale, PE, 6001
Phone: 041 374 8426
Fax: 041 373 2002
Cell: 082 4909 828
www.publicprocess.co.za

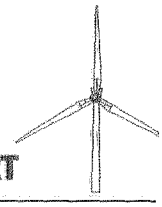
-----Original Message-----
From: Paul Martin [mailto:pmartin@axxess.co.za]
Sent: 09 September 2011 06:02 PM
To: Sandy J Wren
Subject: Comment on Final Scoping Rpt, Universal Wind

Sandy,

Thanks for the CD with the Universal Wind Coega Z12, Final Scoping Rpt.

One comment:
The connection to the grid is planned at Dedisa Sub-station. Why not the Brak River sub-station that is situated very close to the wind farm? Or is this only for Transnet? The impacts and security risks would be very much less (see below). What will be the capacity of the connecting line (e.g. 11kV, 22kV?).

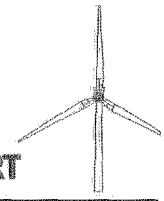
Another alternative is to connect to the Grassridge sub-station (this may avoid the OSMP area referred to below) - the EIAs need to assess this option & a Brak River SS connection option.



The ESKOM powerline servitude to Dedisa crosses core Coega OSMP area. To minimise impacts ESKOM strung this using helicopters and tracks to the 400kV pylons were carefully planned to minimise impacts - much effort was spent on this section of the ESKOM servitude. It would not make sense for this good work to be undone by a poorly designed connection from the wind farm to the grid and trenching is not an option through the OSMP area. Ideally the connection to Dedisa should avoid core portions of the OSMP altogether (i.e. by following the as yet not finalised alignment of the Ring Rd extension).

Please make the EIA practitioners aware of this aspect of the project.

Dr Paul Martin
PO Box 61029
Bluewater Bay 6212
Tel: 041 4665698
Cell: 0732524111
email: pmartin@axxess.co.za



From: Corrin-Del Klopper [corrin@mpc.co.za]
Sent: 13 September 2011 09:45 AM
To: sandy@publicprocess.co.za
Subject: MPC RECRUITMENT
Attachments: Staffing Solutions!.htm; 2011 New corporate brochure e-format.pdf

Dear Sandy,

Thank you for all your assistance this morning. I will give Mark a call at Engineering Advice. It is so important that these young kids study the right thing. Some people study for years but end up with a degree without a job prospect.

Please do add us to the project list for Universal Wind – we are very strong in technical/engineering placements.

I have also attached some details from our company for you to view. Do give us a call when next you are looking for staff.

Kind regards,

Corrin-Del Klopper
Regional Business Development Officer
MPC Recruitment Group - PE (previously Staff Unlimited Recruitment)
MPC Recruitment is a Certified Level 2 BBBEE Service Provider
DURBAN : JOHANNESBURG : CAPE TOWN : PRETORIA : NELSPRUIT: PORT ELIZABETH
t: 041 367 4666
f: 086 562 4068
w: www.mpc.co.za
a: 11 Botha Street, Mount Pleasant, Port Elizabeth

MPC is a BBBEE Level 2 Service Provider, and APSO accredited

From: Sarah Watson [mailto:SWatson@csir.co.za]
Sent: 15 September 2011 05:17 PM
To: Sandy Wren
Subject: Fwd: FW: Message from KMBT_C203

Hi Sandy

Attached please find a letter which we received from SANRAL in connection with the Universal Wind EIA. The letter makes mention of the fact that none of SANRAL's comments were made mention of. Had we received comments from SANRAL previously regarding the project?

Please could you confirm receipt of this letter with SANRAL and respond to them.

Kind regards
Sarah

>>> "Nanna Gouws (SR)" <GouwsJ@nra.co.za> 15/09/2011 16:17 >>>

Dear Sir

Comments for your attention.

Kind Regards

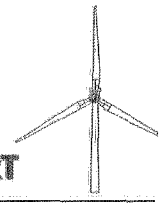
Mrs Nanna Gouws

THE SOUTH AFRICAN NATIONAL ROADS AGENCY

Reg.No. 1998/009584/06

Statutory Control Officer Southern Region
Tel: +27 41 398 3226
Fax: +27 41 398 3211

SANRAL Southern Region Offices
SANRAL House, Southern Life Gardens, Block C
70 Second Avenue, Newton Park, Port Elizabeth
P.O. Box 27230, Greenacres, 6057
www.nra.co.za
SANRAL Fraud Hotline: 0800204558



THE SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LTD

Reg. no 1998/009844/06

SANRAL is an Agent of the Ministry of Transport

Southern Region

Delivery Address: SANRAL House, Southern Life Gardens, 70 Second Avenue, Newton Park, Port Elizabeth
Postal Address: P O Box 27230, Greenacres, South Africa, 6057
Tel +27 (0) 41 398 3300 Fax +27 (0) 41 398 3211 / 3222

Our Ref:	11151(#437827v6)	Your Ref:	
Date:	15 September 2011	Fax Number:	+27 (0) 41 398 3211
Enquiries:	Mrs J Gouws	Direct Line:	+27 (0) 41 398 3226
Email:	gouwsj@nra.co.za	Website:	www.nra.co.za

CSIR Project Leader
CSIR
P O Box 17001
Congella
DURBAN
4013

Attention : Mr Ismail Baroo

Dear Mr Baroo

EIA FOR THE PROPOSED UNIVERSAL WIND ENERGY PROJECT IN ZONE 12 OF THE COEGA IDZ (Department of Environmental Affairs EIA reference: 12/12/20/2106)

Your letter dated September 2011 in this regard refers.

This is to confirm that the South African National Roads Agency SOC Limited (SANRAL) as and interested and affected party take note of your Final Scoping Report.

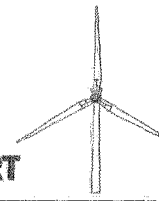
It is noted that none of our comments which were forwarded to you are incorporated in your report.

Our main comment with regard to the erection of the wind turbines is the following:

These turbines can be erected without SANRAL's comments or approval if they are erected 500 metres, measured from the national road reserve fence and 500 metres from any point of an intersection. If this requirement cannot be met then application will have to be submitted to SANRAL for consideration and approval.

Yours faithfully

Mrs J Gouws
For : M S Peterson Regional Manager: Southern Region



From:	Sandy Wren [sandy@publicprocess.co.za]
Sent:	16 September 2011 09:10 AM
To:	'Nanna Gouws (SR)'
Cc:	'Sarah Watson'
Subject:	FW: FW: Message from KMBT_C203
Attachments:	SKMBT_C20311091515531.pdf

Hi Nanna

As per our discussion this morning with regards to the above comments received from SANRAL, this is to confirm that SANRAL have not yet submitted comments on the Scoping Process for Universal Winds. As per our discussion we will ensure that the comments submitted by SANRAL will be incorporated into the Draft EIA for Universal Wind.

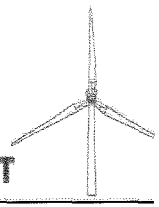
Should you require any additional information please don't hesitate to contact me.

Regards

Sandy Wren
Public Process Consultants
PO Box 27688, Greenacres, 6057
120 Diaz Road, Adcockvale, PE, 6001
Phone: 041 374 8426
Fax: 041 373 2002
Cell: 082 4909 828
www.publicprocess.co.za

APPENDIX F

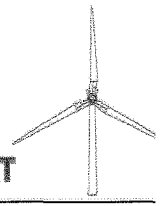
Comments and Response Trail



Comments Received from I&APs after the submission of the Final Scoping Report and prior to the review of the Draft EIA.

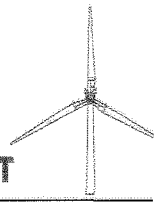
1. Potential wetland impacts

	Issue	*Commentator*	Date	Response
1.1	Due the following projects not reaching our Technical Units in time we would like to request an extension to provide you with the necessary comments. Notice of Scoping and Environmental Impact Assessment Process, for the Proposed Universal Wind, Wind Energy Project in the Coega Industrial Development Zone, Nelson Mandela Bay Municipality. Our technical unit will submit the comments by the 22nd of July if extension is granted.	*Marisa Bloem, Dept of Water Affairs, PE*	14Jul2011, Email	A response was emailed to Ms Bloem on 14 July 2011, providing a status update on the project and indicting that all comments received will be incorporated into the Draft and Final EIA. Ms Bloem is on the database of registered interested and affected parties and will be provided with notification of the comment period on the Draft EIA.
1.2	Any proposed development which may take place within the extent of a watercourse i.e. within 1:100 year floodline or riparian habitat, whichever is the greater, constitutes a section 21 water use in terms of Chapter 4 of the National Water Act, 1998 (Act No. 36 of 1998) (the Act). In terms of the Act, if any of the proposed wind turbines as well as the hard standing areas will be constructed within the extent of a watercourse as defined above, a water use authorisation will be required in accordance with section 21 (c) for impeding and diverting the flow of water in a watercourse and section 21 (i) for altering of the bed, banks or characteristics of watercourse.	*Marisa Bloem, Dept of Water Affairs, PE*	21Jul2011, Email	Comment noted. No wind turbines or associated infrastructure have been proposed within a watercourse. A number of wind turbines and associated infrastructure (i.e. access roads) occur within 500 m of a water course, and the developer, Universal Wind is therefore in the process of obtaining a water use license from the Department of Water Affairs for the proposed project.



2. Potential Vegetation Impacts

	Issue	*Commentator*	Date	Response
2.1	The vegetation specialist assessment should pay particular attention to the impacts associated with the installation of infrastructure for the turbines (roads and cabling) as this ultimately has a greater impact than the turbine footprints.	Paul Martin, Private	12Sep2011, telephonic	A terrestrial ecology impact assessment was conducted for the project, and has been included as Chapter 5 of the EIA Report. This assessment addresses the potential impact of the proposed project and its associated infrastructure on terrestrial fauna and flora.
2.2	Another alternative is to connect to the Grassridge sub-station (this may avoid the OSMP area) - the EIAs need to assess this option & a Brak River SS connection option.	Paul Martin, Private	9Sep2011, Email	Such alternatives were investigated by Universal Wind as part of the pre-feasibility and planning process. The decision to make use of the Dedisa substation in particular, relates to the opportunity to feed directly into and supplement the *local* electricity supply. This is due to the fact that the Dedisa substation is managed by the Nelson Mandela Bay Metropole. An additional opportunity does exist which involves making use of a new substation proposed for construction by the NMBM in Zone 6 of the IDZ.
2.3	The ESKOM powerline servitude to Dedisa crosses core Coega OSMP area. To minimise impacts ESKOM strung this using helicopters and tracks to the 400kV pylons were carefully planned to minimise impacts - much effort was spent on this section of the ESKOM servitude. It would not make sense for this good work to be undone by a poorly designed connection from the wind farm to the grid and trenching is not an option through the OSMP area. Ideally the connection to Dedisa should avoid core portions of the OSMP altogether (i.e. by following the as yet not finalised alignment of the Ring Rd extension).	Paul Martin, Private	9Sep2011, Email	Comment noted. The crossing of the Coega OSMP remains a potential cable routing alternative, but is not the only routing alternative. Should any crossing of the Coega OSMP occur, this would be via aboveground cabling. No trenching of the OSMP has been proposed, nor is it recommended. Furthermore the possible crossing would occur at the narrowest point of the OSMP in order to reduce the extent of any associated negative impacts. Universal Wind will investigate the possibility of utilizing the Ring Road extension with the Coega Development Corporation as part of the site development planning process.

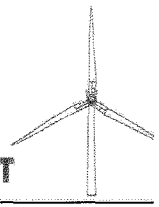


3. Potential Traffic Related Impacts

	Issue	*Commentator*	Date	Response
3.1	It is noted that none of our comments which were forwarded to you are incorporated in your report. Our main comment with regard to the erection of the wind turbines is the following: These turbines can be erected without SANRAL's comments or approval if they are erected 500 metres, measured from the national road reserve fence and 500 metres from any point on an intersection. If this requirement cannot be met then application will have to be submitted to SANRAL for consideration and approval.	Nanna Gouws, SA National Roads Agency	15Sept2011, Letter & Email	Ms Gouws was contacted telephonically on the 16 September 2011 and confirmed that SANRAL had not yet submitted comments on the Scoping process; this was confirmed in an email to SANRAL on the same date. It was agreed with Ms Gouws that the comments submitted would be attached to the Draft EIA. No turbines are proposed within a 500 m distance of any national road reserve fence or intersection. Furthermore, constraints mapping allowed for a 200 m buffer of all public roads.

4. Project detail

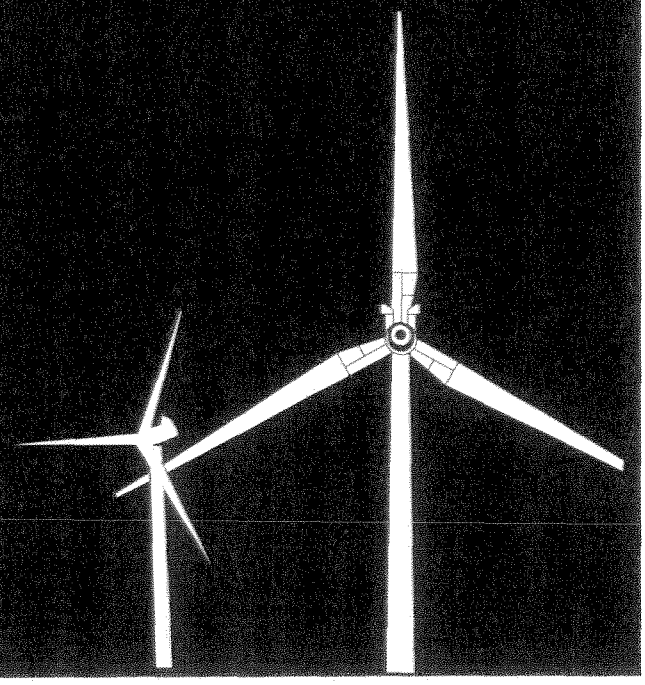
	Issue	*Commentator*	Date	Response
4.1	The connection to the grid is planned at Dedisa Sub-station. Why not the Brak River sub-station that is situated very close to the wind farm? Or is this only for Transnet? The impacts and security risks would be very much less (see below). What will be the capacity of the connecting line (e.g. 11kV, 22kV?).	Paul Martin, Private	9Sep2011, Email	The decision to make use of the Dedisa substation in particular, relates to the opportunity to feed directly into and supplement the *local* electricity supply. This is due to the fact that the Dedisa substation is managed by the Nelson Mandela Bay Metropole. The Brak River sub-station is owned and managed by Transnet and is therefore not a feasible option. However an additional opportunity does exist which involves making use of a new substation proposed for construction by the NMBM in Zone 6 of the IDZ. The capacity of the connecting line will be dependent on the final turbine technology selected for implementation, but it will most likely have a capacity of 11kV.



5. EIA and Public Participation

	Issue	*Commentator*	Date	Response
5.1	Please do add us to the project list for Universal Wind.	Corrin-Del Klopper, MPC Recruitment Group	13Sept2011, email	This I&AP has been added to the project database.

PART B: Environmental Management Plan



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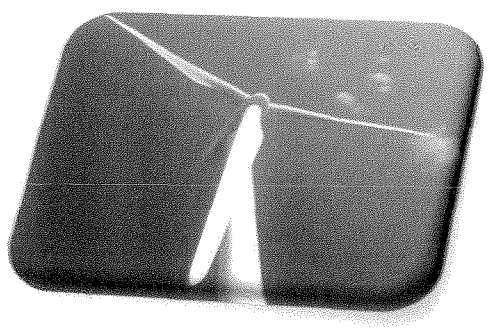
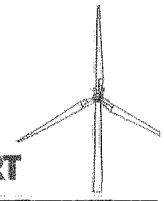




1. INTRODUCTION

This Environmental Management Plan (EMP) is prepared as part of the requirements of the EIA Regulations promulgated under the National Environmental Management Act (Act 107 of 1998). The EMP is to be submitted to the national Department of Environmental Affairs (DEA) as part of the application for environmental authorisation for the proposed Universal Wind project at Coega (DEA EIA reference no. 12/12/20/2106).

This draft EMP is made available for public comment, as part of the Draft EIA Report. Following the incorporation of comments from stakeholders, this EMP is intended as a "living" document and should continue to be updated regularly by Universal Wind.

A detailed description of the proposed Universal Wind project at Coega is contained in Chapter 2 of the EIA Report; and a description of the affected environment is provided in Chapter 3 of the EIA Report.

For a summary of the relevant experience of the Project Leader of Universal Wind project, Paul Lochner (certified EAP for South Africa), the reader is referred to Mr Lochner's CV in the Appendices of the EIA Report.

2. APPROACH TO PREPARING THE EMP

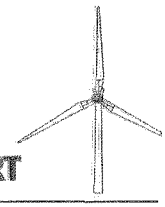
The Environmental Management Plan is divided into four phases of the project cycle:

- Detailed design phase, including micro-siting of turbines (section 4)
- Construction phase (section 5)
- Operations phase (section 6)
- Decommissioning phase (section 7).

The EMP is based largely on the findings and recommendations of the EIA process. However, the EMP is considered a "live" document and must be updated with additional information or actions during the design, construction and operations phases.

The EMP follows an approach of identifying an over-arching goal and objectives, accompanied by management actions that are aimed at achieving these objectives. The management actions are presented in a table format in order to show the links between the goal and associated objectives, actions, responsibilities, monitoring requirements and targets. The management plans for the design, construction, operation and decommissioning phases consist of the following components:

- **Goal**: Over-arching environmental goal proposed for the Universal Wind project at Coega.



- **Objectives**: The objectives necessary in order to meet the goal; these take into account the findings of the environmental impact assessment specialist studies.
- **Management actions**: The actions needed to achieve the objectives, taking into consideration factors such as responsibility, methods, frequency, resources required and prioritisation.
- **Monitoring**: The key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting.
- **Criteria/targets**: The criteria or targets that indicate the efficacy of the management plan. The targets should be readily measurable, understandable to the layperson, cost-effective to monitor, and meet legal requirements.
- **Remedial actions**: Where necessary, actions to be undertaken if the targets are not being met; or if there is a catastrophic event.

Goal for environmental management:

The overall goal for environmental management for the Universal Wind project at Coega is to construct and operate the project in a manner that:

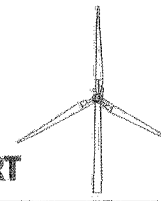
- Minimises the ecological footprint of the project on the local environment
- Minimises impacts on birds, bats and other fauna using the site
- Facilitates harmonious co-existence between the project and other land uses in the area, such as industrial developments
- Contributes to the environmental baseline and understanding of environmental impacts of wind farms in a South African context through providing monitoring records from the construction and operation phases, especially with regard to potential impacts on birds and bats.

3. ROLES AND RESPONSIBILITIES

For the purposes of the EMP, the generic roles that need to be defined are those of the:

- Project Developer
- Environmental Control Officer (ECO)
- Construction Manager
- Operations Manager.

Note: The specific titles for these functions will vary from project to project. The intent of this section is to give a generic outline of what these roles typically require.



1. PROJECT DEVELOPER

The Project Developer (i.e. Universal Wind) is the 'owner' of the project and as such is responsible for ensuring that the conditions of the environmental authorisation issued in terms of NEMA (should the project receive such authorisation) are fully satisfied, as well as ensuring that any other necessary permits or licenses are obtained and complied with. It is expected that the Project Developer will appoint the Construction Manager and the Operations Manager.

2. ENVIRONMENTAL CONTROL OFFICER

The Environmental Control Officer (ECO) will be responsible for overseeing the implementation of the EMP during the construction and operations phases, and for monitoring environmental impacts, record-keeping and updating of the EMP as and when necessary. As well as the conditions of the EMP, the ECO needs to monitor compliance with the conditions of the Environmental Authorisation issued to Universal Wind.

During *construction*, the Environmental Control Officer will be responsible for the following:

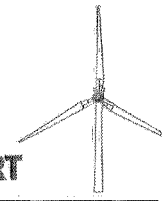
- Meeting on site with the Construction Manager prior to the commencement of construction activities to confirm the construction procedure and designated activity zones;
- Weekly or bi-weekly (i.e. every two weeks) monitoring of site activities during construction to ensure adherence to the specifications contained in the EMP, using a monitoring checklist that is to be prepared by the ECO at the start of the construction phase;
- Preparation of the monitoring report based on the weekly or bi-weekly site visit;
- Reporting of any non-conformances within 48 hours of identification of such non-conformance to the CDC and IDZ's ECO;
- Submitting monthly reports to CDC, copied to the IDZ's ECO. Furthermore, any concerns arising from construction of the project are to be reported on at the quarterly meetings of the Coega Environmental Monitoring Committee, if such concerns arise.
- Conducting an environmental inspection on completion of the construction period and 'signing off' the construction process with the Construction Manager.

During *operation*, the Environmental Control Officer will be responsible for:

- Overseeing the implementation of the EMP for the operation phase;
- Ensure that the necessary environmental monitoring takes place as specified in the EMP;
- Update the EMP and ensure that records are kept of all monitoring activities and results.

During *decommissioning*, the Environmental Control Officer will be responsible for:

- Overseeing the implementation of the EMP for the decommissioning phase;



- Conducting an environmental inspection on completion of decommissioning and 'signing off' the site rehabilitation process.

At the time of preparing this draft EMP, the ECO appointment is still to be made by the proponent. The appointment is dependent upon the project proceeding to the construction phase.

3. LEAD CONTRACTOR

The lead contractor will be responsible for the following:

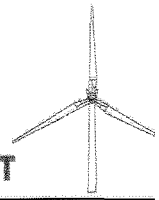
- Overall construction programme, project delivery and quality control for the construction for the wind project.
- Overseeing compliance with the Health, Safety and Environmental Responsibilities specific to the project management related to project construction.
- Promoting total job safety and environmental awareness by employees, contractors and sub-contractors and stress to all employees and contractors and sub-contractors the importance that the project proponent attaches to safety and the environment.
- Ensuring that safe, environmentally acceptable working methods and practices are implemented and that sufficient plant and equipment is made available properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely.
- Meeting on site with the Environmental Control Officer prior to the commencement of construction activities to confirm the construction procedure and designated activity zones;
- Ensuring that all appointed contractors and sub-contractors are aware of this Environmental Management Plan and their responsibilities in relation to the plan;
- Ensuring that all appointed contractors and sub-contractors repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in the Environmental Management Plan, to the satisfaction of the Environmental Control Officer.

At the time of preparing this draft EMP, the appointment of a lead contractor has not been made and will depend on the project proceeding to the construction phase.

4. OPERATIONS MANAGER

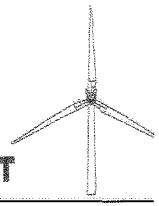
The Operations Manager will be responsible for the following:

- Operation of the wind energy facility.
- Required maintenance of the turbines.
- Ensuring that the specified environmental monitoring programmes during operations are undertaken effectively and that the findings are analysed and applied.

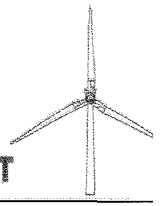


4. MANAGEMENT PLAN FOR DESIGN PHASE

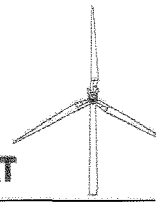
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
1. Turbine selection, design and layout to minimise impact on the visual character of the area.	Non uniform turbines, larger clusters of turbines, and haphazard layout in the landscape give rise to a strong visual impact and negative public response.	a) The 20 turbines selected by Universal Wind should have uniform design, speed, colour, height, and rotor diameter. *Responsibility: Project Developer, Universal Wind*	Ensure that turbine design and layout is uniform. *Responsibility: Project Developer, Universal Wind*	Uniform and harmonious layout for the wind farm.	None identified.
2. Minimise noise emissions through selection of appropriate modern turbine technology.	Use of older technology turbines could generate higher noise levels.	a) Use modern wind turbines to ensure minimum noise emissions. *Responsibility: Project Developer, Universal Wind*	Confirm that that noise emissions for actual selected turbines are comparable to or better than examples of turbines used in the noise impact study for the EIA. *Responsibility: Project Developer, Universal Wind*	Predicted noise from the turbines at the identified Noise Sensitive Areas to be less than the 45 dBA presented in SANS 10103:2008 for rural areas.	None identified.
3. Locate turbines to minimize loss of habitat within the designated areas for ecosystem processes.	Fragmentation and loss of pristine habitat important for ecosystem processes.	a) Refine the final layout of turbines on each site during the detailed design phase, to minimise the footprint on valuable habitat in the designated conservation areas / corridors. b) Sites 1, 2, 6, 12-14 & 16-19 are situated within or directly adjacent to NMB CAP designated Critical Biodiversity areas. Recommended mitigation measures (including fauna and flora search and rescue) to be implemented and construction footprints to be kept to minimum requirements. Post construction rehabilitation should be prioritised at these sites, outside of	Confirm final project layout with the Coega ECO and the botanical specialist on the Universal Wind team, taking into consideration recommendations in the EIA Report for the Open Space System, NMB CAP designated Critical Biodiversity areas, Bontveld Vegetation and protection of species of special concern (SSC). *Responsibility: Project*	Minimize loss of habitat within the designated areas for ecosystem processes.	None identified.



Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		permanent hard standing areas. c) Turbine sites and the proposed road network are predominantly within intact Grassridge Bontveld, and can be regarded as having a *moderate vulnerability status*. In these areas, proposed disturbance or developments should preferably take place on sites that have undergone disturbance, rather than on undisturbed sites. *Responsibility: Project Developer, Universal Wind*	*Developer, Universal Wind*		
4. Design of turbines and power lines to minimise risk of collisions for birds.	Turbine rotors inconspicuous to birds. Birds encouraged to perch on turbine towers. Above ground power lines cross bird flight paths.	a) Turbine blades and towers to be white to maximize conspicuousness to flying birds. b) Plan power lines between turbines to be underground (except possibly where lines cross Coega OSMP) and minimise above-ground connection to the sub-station only. c) Conduct a pre-construction bird monitoring survey over one year to start building a knowledge base of actual impacts on birds at local wind facilities. The site would need to be investigated further to determine the locations of suitable vantage points. d) Results of the pre-construction survey to be recorded in a report. The results will determine the need and scope for post construction monitoring. If the results of the pre-construction monitoring indicates a low risk situation both in terms of collision and displacement, the need for post-construction monitoring will be re-evaluated. *Responsibility: Project Developer,*	Review final design to confirm that turbine design colour is white; and that the extent of above ground power lines has been minimised. Review the findings of the pre-construction bird survey. *Responsibility: Project Developer, Universal Wind*	Design of turbines to minimise impacts on birds.	None identified.

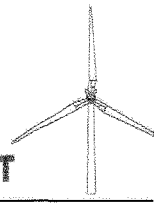


Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		Universal Wind			
5. Manage turbines to minimise the risk of collision or barotrauma for bats.		a) Develop and conduct a pre-construction bat monitoring programme to better understand bat occurrences in the study area, and thereby to inform the management actions to minimise impacts on bats. *Responsibility: Project Developer, Universal Wind*	Conduct pre-construction bat monitoring to develop a baseline that can be used to inform management actions during the operations phase (see Appendix Appendix 7.1 for a Proposal For Bat Pre-Construction Survey And Post-Construction Monitoring) *Responsibility: Project Developer, Universal Wind*	Universal Wind to report on pre-construction bat monitoring at their site over one year (four seasons) to assist in developing a baseline for bats in the local area.	None identified.

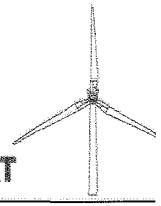


5. MANAGEMENT PLAN FOR CONSTRUCTION PHASE

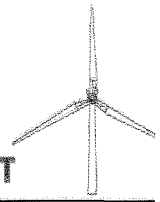
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
5.1 Minimising the project impact on flora and fauna (in particular designated areas for protecting ecosystem processes)					
1. Minimise loss of vegetation cover from construction of the access roads to the turbine sites	Design of roads leads to unnecessary clearing of natural habitat.	a) Access roads to the turbine sites must as far as possible make use of existing tracks and servitudes, and additional road lengths to be minimised. b) Access roads to the turbines must avoid any ephemeral pans, if present. This is unlikely to be an issue, but must be considered in access road planning. The impact of access roads will be greater where they traverse habitats on exposed outcrops and small thicket clumps (microhabitats). *Responsibility: Construction Manager*	Ensure layout (design) and construction of the roads minimises the impact on natural habitat. Ensure that plant species of special concern (SSCs) are removed before clearing. *Responsibility: ECO*	Road layout does not pose a risk to the natural environment. Removal and relocation of all SSC(species of special concern)	None identified.
2. Minimise direct loss of habitat from turbine footprints	Construction impacts are not properly managed. "No go" areas for construction are not enforced	a) The construction site must be clearly demarcated prior to the commencement of construction. Due to strong winds on site, CDC propose that orange "snow-netting" with wire weaved through be used. b) Contractors and construction workers must be clearly informed of the "no-go" areas on site (i.e. outside demarcated areas) and held accountable for any infringements that may occur. c) A suitable control measure (such as a fine	Final siting of footprints should be undertaken by the Universal Wind ECO and CDC ECO in consultation with respective specialists to minimise any unnecessary loss.	In the final layout, sensitive micro-siting of the turbine footprints lead to negligible impact on the designated conservation networks and areas.	None identified.



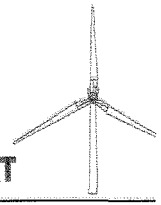
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		system) must be implemented to discourage infringement by contractors on the "no-go" areas. d) Activities including but not restricted to the following must not be permitted in designated no go areas: Dumping of any material during and after construction; Turning of vehicles; or Trampling and urination by construction workers. e) Any additional project footprint (e.g. for construction and lay-down areas) should be sited in areas approved in consultation with the ECO of the Coega IDZ, and preferably in areas where habitat is already transformed. *Responsibility: Construction Manager*			
3. Protection of plant and animal species of special concern	Loss of species of special concern (SCC) through poor on-site management during construction.	a) Species of Special Concern (SCC) and protected plant species (Table 5.3.3 in the EIA Report) must be removed from the sites prior to development taking place, so far as possible. A suitable timeframe must be allowed before construction commences to undertake the plant rescue and relocation. b) Relocation of SSC, where unavoidable, must be into adjacent areas (preferably into disturbed areas of the Open Space System, as identified together with CDC) or to the CDC nursery (or another suitable nursery). Plants that are not necessarily SSC but which can be used during rehabilitation should be identified and stored appropriately in the approved nursery, or on-site for use after	If SSC have to be moved or relocated, the relevant permits must have been obtained from DEDEA, as per the requirements of the Provincial Nature Conservation Ordinance of 1974.	Zero or close to zero loss of readily identifiable species of special concern on the project site species.	None identified.



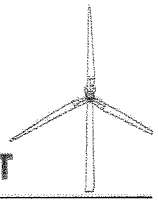
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		construction. *Responsibility: ECO*			
4. Remove and store all topsoil from areas to be excavated; and use this topsoil in later rehabilitation of disturbed areas, e.g. the lay-down area, construction yard, trenches for electrical cables, foundation areas, and the access roads.	Excessive and unnecessary clearing on natural habitat. Top soil is mixed with other material (e.g. rock and rubble) and cannot be replaced as part of the rehabilitation programme.	a) Demarcate the areas to be cleared at each turbine location (e.g. with snow netting), and do not allow vehicles and construction activities to extend outside of these demarcated areas. b) Excavated topsoil (top 20 cm, if this exists) to be stockpiled in the demarcated areas. c) Excavated/disturbed areas on site and adjacent to the site (apart from on-site Borrow pits, which are subject of a separate application and approval) have topsoil replaced to a depth of at least 10 cm during the rehabilitation phase of the construction period (provided such soil is available from on-site stockpiles). This applies to the underground electrical cable route, road verges, area around turbine concrete foundation (to enable grazing to the edge of the foundation), parts of lay-down area where topsoil was disturbed, and the rehabilitation along on the edges of the access roads. *Responsibility (a) and (b): Construction Manager and contractors and sub-contractors*	Ensure that topsoil is stored as specified until replaced. Ensure that excavated / disturbed areas have topsoil replaced to a depth of at least 10 cm, (provided material is available). *Responsibility: ECO*	All topsoil is stored and replaced without loss. All topsoil is replaced in excavated / disturbed areas as part of the rehabilitation programme.	None identified.
5. Minimise the risk of invasion by alien plant species into the disturbed	Alien plant species may pose a threat to the re-establishment of indigenous	a) A long term alien management plan to eradicate and control invasive plant species must be implemented by Universal Wind	An alien plant management programme must be developed, funded and implemented affectively within	Removal of all alien species within the construction area	None identified.



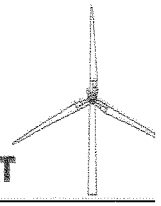
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
areas	species.	within their lease areas. b) Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but should be temporarily stored in a demarcated area (in consultation with the relevant botanical specialist). c) Cleared vegetation must be either removed from site or burned in-situ in the temporary storage area. d) Any seed bearing material should be removed from the drainage area to prevent the spread of seed. e) Chopped brushwood can be used to stabilise steep areas that may be susceptible to erosion during clearing activities. f) Kikuyu grass must NOT be utilised during redressing of verges, turbine footprints and other landscaped areas within the site. *Responsibility: Construction Manager*	the Universal Wind lease area. A suitable revegetation or rehabilitation plan must be implemented after alien vegetation clearing. *Responsibility: ECO*		
6. Ensure that all disturbed areas are rehabilitated using indigenous species	Disturbed areas are not rehabilitated. Use of alien species for rehabilitation (e.g. grasses).	a) Disturbed areas will be rehabilitated with the placement of in situ material (top soil, where available) and the planting with indigenous species. b) If the project disturbs areas outside the Universal Wind lease area, then maintenance in these areas must be applied for 12 months. *Responsibility: Construction*	Visual check to ensure that rehabilitation has been undertaken for all accessible disturbed areas. *Responsibility: ECO*	Disturbed areas are rehabilitated immediately after the construction phase & adequately maintained.	None identified.



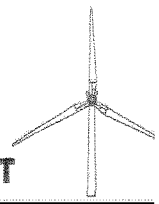
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		Manager			
7. Minimise the impact of construction on fauna on the turbine sites and in the wider IDZ	Construction impacts are not properly managed.	a) Remove tortoises from the turbine sites and new access roads before the start of site clearing construction and relocate these to the Coega Open Space System. *Responsibility: ECO* b) A speed limit of 60 km/h needs to be implemented on the access roads to the site and a 40 km/h speed limit on the construction sites and for the cranes. c) A professional reptile remover (with the necessary permits) should be contacted to remove dangerous reptiles (e.g. poisonous snakes) when in conflict with the workers. *Responsibility: Construction Manager*	Rescue operations must be conducted based on recommendations from a suitably qualified herpatologist.		
8. Ensure that the storage and operation of construction equipment and activities of personnel are contained within the designated work areas	Dumping or damage of the environment by construction equipment outside of demarcated construction areas.	a) Before construction commences, a site map is to be prepared by the Universal Wind ECO in consultation with the Contractor, showing designated work areas, locations of temporary toilets, no-go areas, eating & cooking areas, smoking areas, concrete mixing areas (if any), fuel storage areas, vehicle routes and laydown areas. b) Before construction commences, mark the designated work areas on each site using poles and hazard tape or snow netting. c) If possible, establish laydown areas in areas that are already degraded (e.g. through grazing). *Responsibility (a), (b) and (c): ECO.*	Construction Manager to ensure that all contractors and sub-contractors and other operators on site are briefed at the start of their contract on environmental controls and no-go areas. ECO to monitor compliance with the EMP during the construction phase, on weekly or bi-weekly basis, using a report card.	Zero disturbance outside of designated work areas.	The ECO is to be notified within 24 hours if a disturbance incident occurs; penalties to be levied on defaulting contractors and sub-contractors.



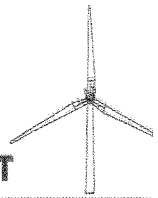
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		in consultation with Construction Manager d) Educate workers on the need to stay on paths and established tracks wherever practical. e) Construction equipment is not be operated outside the designated work area f) Activities of personnel are restricted to the designated work areas, unless under supervision by the ECO g) A penalty system is included in contractors and sub-contractors' agreements, clearly documenting the penalties applicable for disturbance outside of demarcated areas. *Responsibility (d) to (h): ECO to identify transgressions; Construction Manager to levy penalties*			
9. Avoid soil erosion within and in the vicinity of the construction area.	Disturbed areas are left un-rehabilitated for a long period, leading to erosion, especially if on steep slopes.	a) Uncontaminated waste water and excess run off must not be concentrated but allowed to dissipate and seep slowly into the soil in a manner which inhibits soil erosion. *Responsibility: Construction Manager*	Weekly or bi-weekly visual inspection *Responsibility: ECO*	Minimal erosion inside the construction area and surroundings.	ECO to inform the Construction Manager if erosion occurs and investigate options to mitigate the damage.
10. Effective rehabilitation of the turbine sites and new access roads after construction	Erosion can occur and alien vegetation can spread rapidly if areas have been poorly rehabilitated.	a) Implement an effective rehabilitation programme for the areas leased by Universal Wind, in accordance with the guidelines provided by the botanical specialist in Appendix B.1 of the EMP. *Responsibility: ECO or Construction Manager*	Audit of rehabilitation by the appointed botanist after construction.	Long-term successful rehabilitation.	Additional rehabilitation would be required.



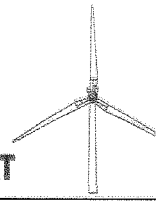
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
5.2 Avoiding any project impact on heritage (palaeontological, archaeological and historical features)					
1. Identify and protect palaeontological features that may occur on the turbine sites.	Damage to or destruction of palaeontological features (e.g. fossils) that may occur on the turbine sites.	a) If construction involves substantial new excavations into the Sundays River Formation then the Universal Wind ECO should be alerted to the possibility of buried fossil heritage. The excavations should be examined by a professional palaeontologist while they are still fresh so that any fossil material or interesting sedimentological features can be recorded and sampled. All major bedrock excavations should be examined at intervals for fossil material by the Universal Wind ECO. b) If any substantial fossil remains are found or exposed, these should be safeguarded, preferably in situ, while SAHRA is contacted by the Universal Wind ECO and a qualified palaeontologist is contracted to record and sample the occurrence. Mitigation in the form of fossil recording and collection will have a positive impact on our appreciation of local fossil heritage. c) ECO to be present on site during major excavation and trenching. d) ECO to provide training for contractors and sub-contractors on site to assist them in identifying potential features of palaeontological value. *Responsibility: ECO*	Appoint a suitably qualifies palaeontologist to oversee excavations into the Sundays River Formation. Contact the identified palaeontologist and archaeologist if any heritage features (or suspected features) are uncovered. *Responsibility: ECO*	No damage to any significant palaeontological or archaeological features on site. Examination, documentation and/or removal of artefacts by an archaeologist or palaeontologist.	ECO to inform the palaeontologist or archaeologist if any damages occur to features on site, and investigate options for mitigating damage.
2. Identify and protect archaeological features	Irreversible damage to archaeological features that	a) Consult an archaeologist on the approach to vegetation clearing for turbine sites and	Monitoring to be conducted by an archaeologist prior to		If archaeological features are



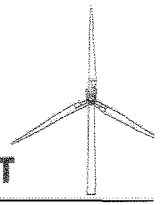
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
that may occur on the turbine sites.	may occur on the turbine sites.	access roads in Zone 12. b) Vegetation to be cleared to gain access to the sites. Site visibility is difficult over much of Zone 12 due to dense thicket vegetation, and SAHRA require that an archaeologist is present on site during both vegetation clearing and all earth moving activities (M. Galimberti, SAHRA, letter dated 7 June 2011). d) Archaeological survey to be conducted at the sites, any archaeological features recorded and the subsequent mitigation of sites conducted. f) An archaeologist must be informed if any features/sites are found accidentally. g) ECO to provide training for contractors and sub-contractors on site to assist them in identifying potential features of archaeological value. *Responsibility: ECO*	construction (when site has been cleared for access); and at regular stages during construction if necessary		uncovered unexpectedly during construct, stop construction and consult an archaeologist or SAHRA.
5.3 Prevention of soil and groundwater contamination					
8. Prevent the spillage of fuel, oil or grease on site and remedy this should it occur	Contamination of soil and risk of damage to vegetation and/or fauna through spillage of fuels and oils	a) Construction equipment is checked daily (by Contractor) to ensure that no fuel spillage takes place from construction vehicles or machinery, and monitored weekly by the Universal Wind ECO. b) Spilled fuel, oil or grease is retrieved where possible, and contaminated soil removed, cleaned and replaced. Contaminated soil to	Check daily that no spills have taken place *Responsibility: Construction Manager*	Zero spillage of fuel, oil or grease on site	Rapid removal, cleaning and replacement of any soil contaminated by fuel, oil or grease.



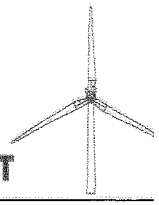
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		be collected by the Contractor (under observation of ECO) and disposed of at a waste site designated for this purpose. c) Portable bioremediation kit (to remedy chemical spills) is to be held on site and used as required. d) Bunded containment to be provided below and around any fuel storage containers. *Responsibility (a), (b) & (c): Civil contractors and sub-contractors*			
9. Prevent spillage of cement, sand and stone into soil and vegetation beyond the defined area for concrete mixing and batching	Contamination of soil (change in pH) and risk of damage to vegetation and/or fauna through spillage of concrete	a) Concrete mixing area (if any) is defined in the site map. If any concrete mixing takes placed on site, this is be done on board or plastic sheeting, which is to be removed from the site once concreting is completed; or in areas to be covered by further construction. b) Sand, stone and cement are stored in demarcated areas, and are covered or sealed to prevent wind erosion and resultant deposition of dust on the surrounding indigenous vegetation. c) Any excess sand, stone and cement must be removed from site at the completion of the construction period *Responsibility (a) to (c): Civil contractors and sub-contractors.*	Check daily that sand, stone and cement are stored and handled as instructed *Responsibility: ECO*	Minimum spillage of cement into the environment; zero spillage beyond the site	None identified.
5.4 Effective management of civil contractors and sub-contractors					
10. Ensure disciplined operation of sub-contractors	Contractors and sub-contractors are not aware of the requirements of the EMP,	a) The terms of this EMP and the potential conditions in the environmental authorisation (from DEA) will be included in all tender	Check compliance with specified conditions on a weekly or bi-weekly basis,	Complete compliance with specified conditions	Significant fines to be imposed by ECO for



Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
	leading to unnecessary impacts on the surrounding environment.	documentation and contractors and sub-contractors contracts. b) Contractors and sub-contractors will not be permitted to remain on the site overnight c) Contractors and sub-contractors will use the chemical toilet situated in a designated area of the site; no personal hygiene (e.g. washing) will be permitted outside the designated area d) Cooking will take place in a designated area shown on the site map and no firewood or kindling may be gathered from the site or surrounds e) All litter will be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area; particular attention needs to be paid to food waste f) No one other than the ECO or personnel authorised by the ECO, will disturb or pick plants outside the demarcated construction area g) No one other than the ECO or personnel authorised by the ECO, will disturb animals on the site (no trapping, shooting etc.) h) Animals disturbed during construction activities should not be harmed but should be allowed to move off to an undisturbed area of the site i) Feral dogs and cats should not be fed or encouraged to visit the site *Responsibility: Construction*	using a report card, and allocate fines when necessary. *Responsibility: ECO*		infringements.

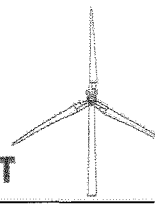


Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		Manager j) Fines system to be established clearly documenting the penalties to be applied for contravening the above requirements. This fines system must be established before construction commenced and included in sub-contracts. *Responsibility: ECO*			
5.5 Minimisation of Visual impacts					
12. Minimise contrast with surrounding environment and visibility of the turbines and masts to humans	A non-specified turbine colour (i.e. a bright colour) could result in increased visual impact on local residents and passers by.	a) Ensure that the turbines are painted a non-reflective white colour (as required in the Civil Aviation legislation) *Responsibility: Universal Wind*	Ensure that the specified paint colour is included in the purchasing specifications and complied with during construction. *Responsibility: Universal Wind*	Any departure from the specified colour should be corrected before operation commences.	None required.
5.6 Satisfy human safety and aviation requirements					
13. Ensure adequate earthing and lightning protection for the turbines	Risk to the turbines or mast(s) and surrounding environment from lightning and/or inadequate earthing.	a) Ensure proper bonding is carried out inside the turbines; a copper ring is attached below the soil surface to earth down conductors and earthing rods. *Responsibility: Construction Manager*	Ensure that earthing and lightning protection are installed and functional before construction is completed. *Responsibility: Construction Manager*	Earthing and lightning protection fully functional.	None required
14. Ensure that the facility complies with Civil Aviation Authority requirements for turbine and mast visibility to	Risk to aircraft.	a) Mount aviation warning lights on turbine hub and the wind monitoring mast(s), and/or such measures required by the Civil Aviation Authority.	Ensure that aviation warning lights or other measures are functional before construction is completed.	Aviation warning lights or other measures are functional at all times.	None required

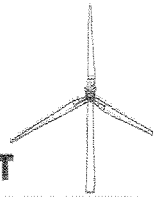


Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
aircraft, i.e. red pulsating light on the turbine tower and wind monitoring mast(s)		*Responsibility: Universal Wind*	*Responsibility: Universal Wind*		
15. Colour of turbines to be conspicuous to minimize aircraft collision risks and comply with the Civil Aviation Regulations of 1997.1	Turbine rotors inconspicuous to aircraft.	a) Turbine blades to be white to be conspicuous to aircraft pilots. *Responsibility: Operations Manager, Universal Wind*	Verify that the turbine blades are white. *Responsibility: ECO*	Turbine design maximizes conspicuousness to aircrafts.	None identified.
5.7 Minimise impacts on birds and bats					
16. Minimize the risk of birds and bats colliding with powerlines and turbines.	Bird attracted by perching opportunities on power lines, towers and turbines, leading to entanglement and bird deaths. Priority bird species are exposed to risk of electrocution by or entanglement in power lines.	a) Power line connections between the turbines to be underground, except where crossing the Coega OSMP (if necessary). b) Minimise the length of above-ground power line required to connect the wind farm to the sub-station on the grid. c) For above ground power lines, consult with a bird specialist to determine the need for fitting bird anti-collision markers to these power lines. *Responsibility: Construction Manager*	Minimise the extent of above-ground power lines. Ensure that anti-collision markers are fitted to the guy wires and power line prior commissioning of the wind farm. *Responsibility: ECO*	No collisions by birds during construction phase	If bird carcasses found, these must be collected and sent for analysis by an appropriate institution.

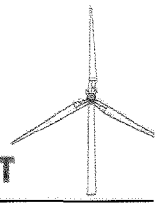
[1] According to the Aviation Act, 1962, Thirteenth Amendment of the Civil Aviation Regulations (CAR's), 1997: "Wind turbines shall be painted bright white to provide maximum daytime conspicuousness. The colours grey, blue and darker shades of white should be avoided altogether. If such colours have been used, the wind turbines shall be supplemented with daytime lighting, as required." Camouflage, even if it were effective as a mitigatory measure (see Gipe 1995 and Stanton 1996), can therefore not be used.



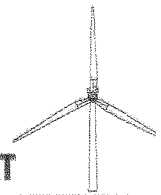
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
5.8 Minimise the risk of fire as a result of the construction activities					
17. Prevent veld fires as a result of workers smoking and/or making fires for heating or cooking purpose.	Workers smoking/ starting fires (i.e. cooking, heating purposes) in undesignated areas	a) Designate smoking areas as well as areas for cooking, where the fire hazard could be regarded as insignificant. b) Educate workers on the dangers of open and/or unattended fires. *Responsibility: Construction Manager*	Adhoc checks to ensure workers are smoking/starting fires only in designated areas *Responsibility: ECO*	Zero veld fires due to smoking/cooking or heating	None identified.
5.9 On-site waste management					
18. Avoid any storage of solid, liquid or hazardous waste on site and prevent waste spillages.	Solid and liquid wastes (i.e. wastewater from construction and painting activities) disposed of on the site could cause environmental problems (e.g. pollution / change in soil pH)	a) All construction waste (concrete, steel, rubbles etc.) to be removed from the site. b) Other non-hazardous solid waste (e.g. packaging material) to be disposed of at a licensed landfill. c) All liquid waste (used oil, paints, lubricating compounds and grease) to be packaged and disposed of by appropriate means. d) Adequate containers for the cleaning of equipment and materials (paint, solvent) must be provided as to avoid spillages. e) Waste water from construction and painting activities must be collected in a designated container and disposed off at a suitable disposal point off site. *Responsibility: Construction Manager*	Waste removal and disposal to be monitored throughout construction *Responsibility: ECO*	No waste storage or disposal on site; all waste disposed of as specified in the Record of Decision and relevant regulations.	The ECO to be notified within 24 hours of any waste spillage incidents on site (e.g. fuel spillage). ECO and Construction Manager to ensure necessary clean-up actions taken.



Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
19. Ensure that wastes are managed in an environmentally friendly manner	Wastes burned/buried on site. Dispersal of waste on site. Wastes remaining on site after the construction phase.	a) A refuse control system will be established for the construction period to efficiently separate and remove all forms of solid waste from the site for recycling, or disposal at a licensed disposal site. b) Under no circumstances is any solid waste to be burned or buried on or in the vicinity of the site. c) Waste collection points must be sealed/enclosed to eliminate the risk of wind scatter and scavenging by wildlife. d) All waste products resulting from electrical installations along the road will be entirely removed from the site. *Responsibility: ECO*	Waste removal and disposal to be monitored daily throughout construction *Responsibility: ECO*	Recycling of wastes where possible Zero impact of construction wastes on the environment	None identified.
5.10 Construction noise					
20. Minimise noise from construction	Vehicles, earth moving and terracing of sites, construction of access roads and hard standing areas.	a) Noise monitoring to be conducted at day and night at three stages during the construction period. An accredited noise specialist to be appointed by the project developer (Universal Wind) prior to the start of construction. *Responsibility: Project Developer, Universal Wind*	Three times during the estimated 12 month construction period, i.e. at 3 months, 6 months, and 9 months. At each time, conduct monitoring at six representative turbine sites, once by day and once by night.	SANS 10103:2008 maximum limit for ambient noise for industrial areas of 75 dB(A), however sensitive noise receptors are situated within rural areas and therefore a maximum limit of 45 dB(A) is applicable.	None identified.
5.11 Overall compliance with the conditions of the environmental authorisation					

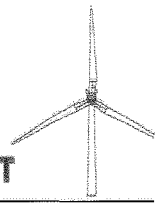


Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
21. Handover the site to the project operator at the end of the construction phase, in a form that satisfies all requirements of the Environmental Authorisation for the construction phase.	Environmental conditions of approval (issued by DEA) for the construction phase are not satisfied, leading to the project operation being delayed.	a) Audit the implementation of the EMP requirements for the construction phase. *Responsibility: ECO*	Audit report on compliance with actions & monitoring requirements in the Construction Phase EMP *Responsibility: ECO*	Full compliance with the EMP specifications & Environmental Authorisation requirements for construction phase	None identified.

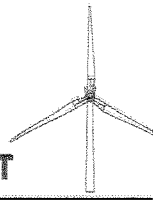


6. MANAGEMENT PLAN FOR OPERATIONS PHASE

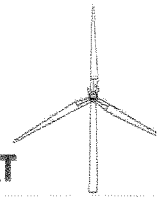
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
1. Minimise the impact of the wind turbines on birds, caused by collisions or entanglement with structures.	Poor visibility of turbines to flying birds	a) Prepare a bird monitoring programme for the operations phase (including targets based on international norms as well as local monitoring data). b) Conduct monthly bird carcass searches at a representative sample of turbines to ascertain the extent of bird kills and potential causes, with any carcasses found being sent to an appropriate institution for analysis (if possible). It is suggested this programme be conducted for an experimental period of 2 years, and thereafter decision be taken if it is worthwhile to continue the programme. *Responsibility: Operations Manager to appoint environmental consultant*	Analyse monitoring results and compile annual monitoring report. Ensure that the report is made publicly available so that a database of bird monitoring impacts relevant to South African wind farms can be developed. *Responsibility: Operations Manager to appoint environmental consultant*	Zero bird strikes at turbine sites. This target can be revised based on monitoring data. The database on the effects of the Universal Wind turbines on South African species of birds contributes to the national database.	None identified.
2. Minimise the impact of the wind turbines on bat mortality	Bats fly and forage in close proximity to the rotor blades. Bats are attracted to turbines.	a) Conduct carcass bat searches at a representative sample of turbines to determine the level of bat mortality around wind turbines. This is especially important during the periods April to May and August to September when bats are migrating between summer and winter roosts. Carcass searches should be made early in the morning to minimize the effect of scavengers (which remove carcasses). Carcasses should be frozen and sent to a bat specialist for identification purposes. It is	Prepare bat monitoring report after 2 years, and then re-evaluate the monitoring programme. Based on the bat monitoring and carcass counts, determine whether operational management actions need to be applied to minimise impacts on bats.	Create a database of bat mortalities occurring on the wind farm site. Thereby contribute information on the bat species occurring in the area and the impact of wind farms on bats.	None identified.



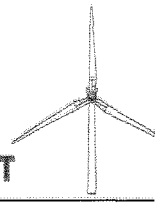
Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
		suggested this programme be conducted for an experimental period of 2 years, and thereafter decision be taken if it is worthwhile to continue the programme. b) Prepare and conduct a monitoring programme to identify which bat species occur on the site, for an experimental period of 2 years. Thereafter, decide if it is worthwhile to continue the programme. A body such as a University could be appointed to conduct the monitoring. c) Depending on the outcome of bat monitoring and mortality counts during operations, consider the need to implement one or more of the following operational management actions to minimise the impact of the turbine rotation of the blades on bats: • Switch turbines off for 1 to 2 hours in the evening just after sunset and in the morning just before sunset, when bats are most active. • Increase the cut-in speed for turbines to reduce bat fatality on calm evenings • Change blade angles to reduce rotor speeds. Note that these actions are not economically viable for the project. *Responsibility: Operations Manager to appoint a bat specialist*	*Responsibility: Operations Manager to appoint environmental consultant*		
3. Minimise visual impacts of the permanent structure and ancillary	Spare parts and ancillary equipment stored in highly visible areas	a) No permanent outside storage of equipment, spare parts or other ancillary materials should be visible. Keep these off-site where possible, or limited to low visibility sites. b) The site should be kept in a clean and well-	Annual monitoring by an environmental consultant.	Wind project has a clean and harmonious presence in the landscape.	None identified.



Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
equipment		maintained condition. c) The exterior of any visible surface of the turbines should be cleaned, repainted, repaired or replaced if it rusts, corrodes or otherwise visibly deteriorates. d) All fencing should be kept in a clean and repaired condition. e) All fugitive waste or debris should be collected and removed from the site and properly disposed. f) Lighting should be designed to minimise light pollution without compromising safety. Investigate using motion sensitive lights for security lighting. Turbines are to be lit according to Civil Aviation regulations. Actions that may enhance the positive visual aspects of the development: a) Maintenance of the turbines is important. A spinning rotor is perceived as being useful. If a rotor is stationary when the wind is blowing it is seen as not fulfilling its purpose and a negative impression is created. b) Signs near wind turbines should be avoided unless they serve to inform the public about wind turbines and their function. Advertising billboards should be avoided. c) An information kiosk (provided that the kiosk and parking area is located in a low visibility area) and trails along the wind farm can enhance the project by educating the public about the need and benefits of wind power. *Responsibility: Operations Manager*			

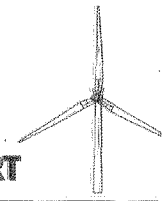


Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
4. Minimise noise impacts during operations		a) Conduct noise monitoring during the first year of operation of the turbines to confirm that the actual noise complies with the predicted noise levels in the EIA. *Responsibility: Operations Manager* b) Ensure that all future industrial buildings developed close to the turbines consider noise attenuation of the buildings during their design phase. *Responsibility: CDC*	Noise monitoring by a qualified noise specialist four times during the first year of operation, i.e. in every three months to obtain results during summer, autumn, winter and spring conditions.	SANS 10103:2008 maximum limit for ambient noise for industrial areas of 75 dB(A), however sensitive noise receptors are situated within rural areas and therefore a maximum limit of 45 dB(A) is applicable.	None identified.



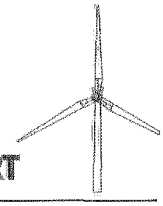
7. MANAGEMENT PLAN FOR DECOMMISSIONING

Objectives	Risk Sources	Actions	Monitoring	Targets	Remedial actions
1. Return the leased area of the turbines to its original state.	Insufficient funds to finance decommissioning and the rehabilitation necessary.	a) Develop a closure and rehabilitation plan that satisfies best practice requirements for wind farms and for habitat management. This plan should include the removal of wind farm infrastructure, with the exception of the below ground foundations. *Responsibility: Operations Manager*	Audit the implementation of the closure and rehabilitation plan *Responsibility: Operations Manager*	Site returned in a condition that enables future development of the Coega IDZ and does not foreclose other potential options.	None identified.



APPENDIX TO EMP

Appendix B1: Specification Guideline for Rehabilitation



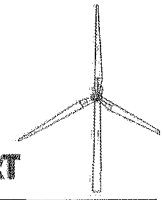
APPENDIX B.1: SPECIFICATION GUIDELINE FOR REHABILITATION

1. Vegetation clearing and fauna and flora relocation

i) Once the site layout has been determined the botanist should be consulted and in association with the horticulturalist devise a plant relocation and vegetation clearing plan.
ii) Areas to be cleared of vegetation should be clearly demarcated before clearing commences.
iii) Faunal search and rescue should be conducted before vegetation clearing takes place.
iv) Areas should only be stripped of vegetation as and when required, especially grasses, to minimize erosion risk.
v) Once demarcated the area to be cleared of vegetation should be surveyed by the vegetation clearing team under the supervision of the botanist and horticulturalist to identify and mark species suitable for rescue.
vi) Plants to be rescued should include both species of special concern requiring removal for relocation as well as species that would be suitable for use in rehabilitation.
vii) Depending on growth form this material should be appropriately removed from its locality and stored in the nursery holding areas or immediately relocated where it may be required elsewhere immediately.
viii) Small trees and shrubs (<1 m in height) can often be rescued and planted temporarily in potting bags for later use.
ix) Arboreal species (orchids) should be collected attached to the substrate (i.e. branch) they are growing on and stored (hung) in a moist, lightly shaded nursery area for later relocation.
x) Wherever possibly any seed material should be collected immediately and stored for later use, particularly species that occur in low numbers.
xi) Before any earthmoving activities are commenced any ripe grass seed should be collected (using a sickle or similar implement), dried and stored for use during regressing.
xii) Comprehensive notes should be kept as to the identification, habitat, and any potential biophysical requirements of plants, and any species of special concern removed for relocation should have a GPS locality recorded.
xiii) Grass sods can also be collected for immediate use in any areas requiring revegetation.

1.1 Topsoil

1. Sufficient topsoil must be stored for later use during decommissioning, particularly from outcrop areas.
2. Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
3. All available topsoil shall be removed after consultation with the Botanist and horticulturalist prior to commencement of any operations.
4. The removed topsoil shall be stored on high ground within the footprint outside the 1:50 flood level within demarcated areas.



5. Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
6. The stockpiled topsoil shall be protected from being blown away or being eroded. The application of a suitable grass seed/runner mix will facilitate this and reduce the minimise weeds.

3.2 Road Construction

1. Should a portion of the access road be newly constructed the following must be adhered to:
    a) The route shall be selected that a minimum disturbance to natural vegetation under guidance of the ECO and botanical specialist;
    b) Water courses and steep gradients shall be avoided as far as practical;
    c) Adequate drainage and erosion protection in the form of cut-off berms or trenches shall be provided where necessary.
2. No other routes shall be used by vehicles or personnel for the purpose of gaining access to the site.
3. Newly constructed access roads shall be adequately maintained so as to minimise dust, erosion or undue surface damage.
4. The liberation of dust into the surrounding environment shall be effectively controlled by the use of inter alia, water spraying and /or other dust-allaying agents. The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.
5. The access roads to the site must be strictly maintained during the operation process. Sections of the access road that erodes during the construction phase shall be suitably rehabilitated upon completion of the project.

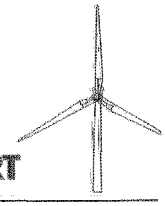
3.3 Operating Procedures in the Study Area

- Grass and vegetation of the immediate environment, or adapted grass / vegetation will be re-established on completion of construction activities, where applicable.
- No firewood to be collected on site and the lighting of fires must be prohibited.
- Cognisance is to be taken of the potential for endangered species occurring in the area and appropriate measures must be implemented.

3.4 Excavations and Disturbed Areas

Whenever any excavation is undertaken, the following procedures shall be adhered to:

1. Topsoil shall be handled as described in this EMP.
2. The construction site will not be left in any way to deteriorate into an unacceptable state.



3. Once overburden, rocks and coarse natural material have been placed in the waste pile, they will be profiled with acceptable contours (including erosion control measures), and the previous stored topsoil shall be returned to its original depth over the area.
4. The area shall be fertilised if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally occurring flora.

2. Rehabilitation

2.1 Rehabilitation Objective

The overall objective of the rehabilitation plan is to minimize adverse environmental impacts whilst maximizing the future utilization of the property. Additional broad rehabilitation strategies / objectives include the following:

1. Rehabilitating the disturbed areas to take place concurrently within prescribed framework established in the EMP.
   - All infrastructure, equipment, plant and other items used during construction will be removed from the site
   - Waste material of any description, including scrap, rubble and tyres, will be removed entirely from the site and disposed of at a recognised landfill facility. It will not be permitted to be buried or burned on site.
   - Final rehabilitation shall be completed within a specified period.

2.2 Rehabilitation Plan

The overall revegetation plan will be as follows:

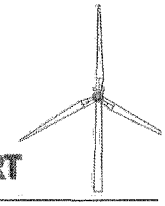
1. Ameliorate the aesthetic impact of the site
2. Stabilise disturbed soil and rock faces
3. Minimize surface erosion and consequent siltation of natural water course located on site
4. Control wind-blown dust problems
5. Enhance the physical properties of the soil
6. Re-establish nutrient cycling
7. Re-establish a stable ecological system

Every effort must be made to avoid unnecessary disturbance of the surrounding natural vegetation during construction operations.

2.3 Drainage and Erosion Control

To control the drainage and erosion at site the following procedures will be adopted:

1. Areas where construction is completed should be rehabilitated immediately.
2. All existing disturbed areas will be revegetated to control erosion and sedimentation



3. Existing vegetation will be retained as far as possible to minimize erosion problems.

2.4 Visual Impacts Amelioration

The overall visual impact of the proposed activity will be minimised by the following mitigating measures:

1. Re-topsoiling and vegetating all disturbed areas

Topsoil and Subsoil Replacement

Topsoil and subsoil will be stripped separately from the area under construction. The topsoil and subsoil removed will be stockpiled separately and only used in rehabilitation work towards the end of the operation.

The vegetative cover will be stripped with the thin topsoil layer to provide organic matter to the relayed material and to ensure that the seed store contained in the topsoil is not diminished. Reseeding may be required should the stockpiles stand for too long and be considered barren from a seed bank point of view. Stockpiles should ideally be stored for no longer than a year.

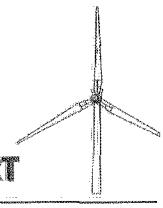
The topsoil and overburden will be keyed into the reprofiled surfaces to ensure that they are not eroded or washed away. The topsoiled surface will be left fairly rough to enhance seedling establishment, reduce water run-off and increase filtration.

3. Materials

To revegetate an area as accurately as possible to its original flora, plant species used should be those that occur naturally in the nearest site with a similar soil type and aspect. A suitably qualified botanist should be consulted with in this regard.

3.1 Shrubs and trees

1. Indigenous plants shall be obtained either from the site prior to clearing or from an area in close proximity to and of the same vegetation type as the site, as indicated by the Botanist.
2. Seedlings and young plants of the abovementioned plants should be collected and placed in bags to be stored in the on-site nursery before construction commences to be used during revegetation in consultation with an appointed horticulturalist, the ECO and a botanist.
3. Nursery plants shall be grown from locally obtained seed unless approved by the Botanist.
4. Plants shall be obtained from their natural habitat.
5. The Horticulturalist shall ensure that each plant is handled and packed in the approved manner for that species or variety, and that all necessary precautions are



taken to ensure that the plants arrive on Site in a proper condition for successful growth.

6. Trucks used for transporting plants shall be equipped with covers to protect the plants from windburn. Containers shall be in a good condition. Plants shall be protected from wind during the transportation thereof.
7. No plants or plants with exposed roots shall be subjected to prolonged exposure to drying winds and sun, or subjected to water logging or force-feeding at any time after purchase.
8. The Horticulturalist shall ensure that the plants are in a good condition and free from plant diseases and pests. The Horticulturalist shall immediately remove plants containing any diseases and/ or pests from the Site.
9. All plants supplied by the Horticulturalist shall be healthy, well formed, and well rooted. Roots shall not show any evidence of having been restricted or deformed at any time. The potting materials used shall be weed free.
10. There shall be sufficient topsoil around each plant to prevent desiccation of the root system. Where plants are stored on site prior to planting they shall be maintained to ensure that the root systems remain moist.

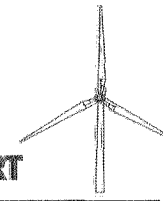
3.2 Grass

Sods and runners

1. Grass sods shall be clean of invasive plants or weeds.
2. Sods shall be obtained from a source approved by the Botanist. Sods rejected by the Botanist shall be removed from the site immediately.
3. Grass shall have been grown specifically for sod purposes, mown regularly and cared for to provide an approved uniformity to the satisfaction of the Botanist. It shall be harvested by special machines manufactured for this purpose to ensure an even depth of cut with sufficient root material and soil.
4. Sods shall be delivered in healthy conditions and be free from weeds and disease.
5. Sods shall be obtained from an approved nursery. Nursery sods shall have been maintained regularly to the required quality. Nursery grass sods shall have at least a 30 mm layer of topsoil.
6. Sods shall be obtained directly from the surrounding area and shall contain at least a 50 mm topsoil layer and the roots shall be minimally disturbed. They shall be obtained from the near vicinity of the site from an area selected by the Botanist. The soil shall be compatible with that removed from the area to be revegetated and shall not have been compacted by heavy machinery.
7. Runners shall be of an approved quality and free from disease or weeds.

Indigenous vegetation sods

1. Sods of indigenous vegetation (e.g., rushes, sedges and grass) shall be obtained from areas approved by the Botanist, within or near the site.
2. The Horticulturalist shall identify suitable sods, as directed by the Botanist.
3. Sods rejected by the Botanist shall be removed from the site immediately.



4. Indigenous vegetation sods shall be clean of weeds or invasive plants in specified areas before planting.

Seed

1. The seed mix quantities and purity levels shall be specified by the horticulturalist and approved by the Botanist.
2. Seed shall be utilised for the cultivation of material for revegetation.
3. Seed shall be utilised for direct sowing.
4. Seed must be pre-dried then stored under cool, dry, insect free conditions until required either for cultivation in the nursery or in the rehabilitation process. Only viable, ripe seed shall be used.
5. A record of stock relevant to the project that is held in the nursery shall be provided to the Botanist on a monthly basis.

Harvested seed

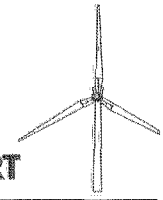
1. Indigenous seed shall be harvested in an areas which are free of alien/ invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites, as indicated by the Botanist.
2. Following harvesting, the seed shall be dried under cool airy conditions. The seed shall be insect free and shall be stored in containers under cool conditions that are free of rodents or insects. No wet, mouldy or otherwise damaged seed is acceptable.
3. Seed harvested by hand from selected species, should be treated and stored separately.
4. Seed gathered by vacuum harvester, or other approved mass collection method, from suitable shrubs or from the plant litter surrounding the shrubs shall be kept apart from individually harvested seed .
5. Harvested seed obtained by means of vacuum harvesting, shall be free of excessive quantities of organic and/ or substrate material.

3.3 Mulch

Mulch shall be utilised as follows depending on local and seasonal availability of material .

Brush-cut mulch

1. The stockpiled vegetation from the clearing operations shall be reduced to mulch.
2. Indigenous plant material shall be kept separate from alien material. The vegetative material, shall be reduced by either mechanically means (chipper) or by hand-axing to sticks no longer than 100 mm. The chipped material shall be mixed with the topsoil at a ratio not exceeding 1:1.
3. Mulch shall be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants.
4. No harvesting of vegetation outside the area to be disturbed by construction activities shall occur.



5. Mulch shall be harvested from areas in close proximity to the site, as approved by the Botanist. Any collection of indigenous material from nearby area that will not be subject to complete denudation shall only be done in mature vegetation in areas identified by the Botanist.
6. Harvesting shall be performed in a chequer board fashion, cutting the indigenous vegetation down to ±100 mm above the ground, in 2 m wide strips, leaving 2 m gaps of undisturbed vegetation in between.
7. The Horticulturalist shall take every effort to ensure the retention of as much seed as possible in mulches made from indigenous vegetation. Mulches shall be collected in such a manner as to restrict the loss of seed.
8. Brush-cut mulch shall be stored for as short a period as possible, and seed released from stockpiles shall be collected for use in the rehabilitation process.
9. Fynbos vegetation cleared from the site prior to construction activities, that is suitable for mulching, shall be stockpiled for later use. The Horticulturalist shall ensure that no alien species are used to make indigenous vegetation brush cut mulch without the approval of the Botanist.
10. Natural topsoil shall be mixed with fynbos.

Wood chips

1. Wood chips (including bark) shall be utilised as mulch during revegetation and rehabilitation of the site.
2. The chips shall be no longer than 50 mm in length or breadth and shall be free of seed. The Botanist shall approve the source of chips.
3. The wood shall be chipped during winter
4. Chips shall not be made from wood treated with preservatives.
5. Half-composted chips shall be utilised in preference to non-composted chips
6. Indigenous seed shall always be added to wood chip mulches.

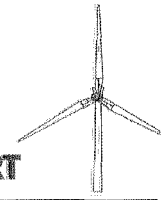
Compost

1. Compost shall be utilised as mulch during revegetation and rehabilitation of the site.
2. The compost shall be well decayed, friable and free from weed seeds, dust or any other undesirable materials.
3. Seed free, half-composted material, such as mulled-bark, shall be used as an additive to extend indigenous mulch. No more than 50% compost shall be used under these circumstances.

3.4 Slope stabilizers and anti-erosion measures

Stabilisation cylinders

1. Stabilisation cylinders shall consist of cylindrical capsules approximately 125 mm in diameter by 1.5 m in length.
2. Stabilisation cylinders shall be manufactured from biodegradable material such as hessian or of extruded biodegradable plastic netting. The plastic material shall be



sufficiently robust to last for a period of not less than 3 years and not more than 10 years before disintegrating under normal service conditions.

3. Stabilisation cylinders shall be filled with shredded or partly compressed pine chips or similar material. Only material passing through a 31 mm sieve with round holes and retained on a 5 mm sieve with square holes shall be used. Splinters and flat chips are not acceptable.
4. A seed approved by the Botanist shall be included in the cylinders.
5. Cylinders shall be anchored in position using biodegradable material.
6. Cylinders shall not be used to stabilise any rock faces.

Biodegradable netting / matting

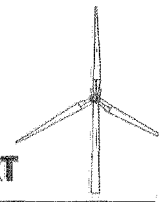
1. Biodegradable netting/matting shall be made from jute, sisal, coir or similar material.
2. A 1 m^2 sample of the geofabric, geogrid or nylon (biodegradable) fabric shall be submitted to the Botanist for approval prior to procurement.
3. The netting/matting shall be sufficiently robust to last for a period of not less than 5 years under normal service conditions.
4. Holes in the netting/matting shall have a minimum size of 400 mm^2 and a maximum size of 900 mm^2 and be made from at least 4-6 mm thick cord.

Logs

1. For slopes of less than 1:3, the Site shall be stabilised by means of "geojute" (if available) and continuous rows of logs, secured to the slope with timber pegs, parallel to the contour. Logs shall be untreated pine (or gum) poles of not less than 150 mm with a taper of not more than 75 mm over its length. Timber pegs to be treated and not less than 400 mm in length. Timber pegs must be longer if thicker logs than the minimum are used.
2. Logs shall be secured to the slope in such a manner that they will not become dislodged during construction and/ or planting. Logs to be secured to the slope by means of a minimum of two pegs driven into the soil not less than 250 mm deep. For logs longer than 3 m, additional pegs shall be required. Log ends to be butt-jointed and plugged with wood chips or similar to prevent water from washing through at the joint. Logs shall be placed at 2 m intervals with a bottom row parallel to the edge of the road. Logging of the slope to start at the top of the slope to prevent the stretching of the "geojute".

3.5 Soil stabilizers

1. Soil stabilisers shall consist of an organic or inorganic material to bind soil particles together and shall be a proven product able to suppress dust and form an encrustation.
2. Soil stabilisers shall be of such a quality that grass and indigenous seeds may germinate and penetrate the crust. Samples of the proposed material shall be supplied to the Botanist before any of the material is delivered to the Site.



Topsoil and subsoil

1. All soil imported to act as bedding material shall be free of alien plant seeds, and their use shall be restricted to 500 mm below the soil surface.

Boulders and rocks

1. Boulders or rocks used in rehabilitation shall come from comparable geomorphological units to those that they are being utilised to rehabilitate.
2. Where possible, boulders and rocks utilised during rehabilitation, shall be collected from the Site and stockpiled prior to the commencement of construction activities on Site.

4. Facilities

4.1 Seed store

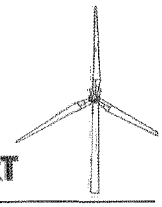
1. Facilities should be available to store seed, collected or required on-site, in *rodent-* and *insect-free*, *cool* (7 - 10 °C), *dry*, conditions.

4.2 Site-specific nursery

1. The CDC Nursery should be utilised for removal of necessary flora.
2. A record of stock relevant to the project that is held in the nursery shall be provided to the Botanist on a monthly basis.

4.3 Irrigation

1. The design and layout of the irrigation shall be indicated on a plan and approved by the Botanist and horticulturalist prior to its installation.



5. Construction

5.1 Preparation of ground surfaces

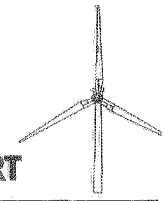
1. Prior to the application of topsoil, the ground surface shall be ripped or scarified with a mechanical ripper to a depth of approximately 150 mm.
2. Prior to the application of topsoil, the ground surface shall be ripped or scarified by hand tilling to a depth of approximately 150 mm. {*this specification shall be used on small sites*}
3. Compacted soil shall be ripped to a depth of greater than 250 mm. The ripped area shall be hand-trimmed.
4. The subsoil shall be thoroughly tilled to a depth of at least 100 mm by means of a plough, disc, harrow or any other approved method until the condition of the soil is acceptable, as approved by the Botanist.
5. Were tilling is difficult, the Horticulturalist shall use rotary tillage machinery until no clods or lumps larger than 40 mm in size remain, and the mixing of soil is acceptable to the Botanist.
6. In road cuttings, a weed-free gravel / sand / organic mix shall be utilised as a sub-surface layer.
7. Topsoil shall be applied.
8. Subsequent to the addition of the sub-soil, topsoil shall be spread evenly over the ripped or tilled surface to a depth of 75-150 mm on flat ground or to a minimum depth of 75 mm on slopes of 1:3 or steeper or as specified in this specification.
9. The final prepared surface shall not be smooth but furrowed to follow the natural contours of the land, with scattered rocks of varying sizes according to the natural condition of the area.
10. Where sodding is required slight scarification shall be carried out to contain the sods. The soil shall be uniformly moist to a depth of 150 mm prior to planting or seeding. If this condition is not met by rainfall, the Horticulturalist, as directed by the Botanist, shall carry out irrigation.
11. In artificial wetland areas, topsoil shall be removed to a depth of approximately 200 mm, the wetlands excavated, and topsoil replaced. Wetland areas are then to be selectively composted, as determined by the Botanist, and permanent irrigation systems installed where necessary.
12. Prior to any site clearance, the wetland areas, along with 10 m buffer zones, as indicated on the Revegetation Plan are to be effectively fenced off to prevent any damage to wetland material on sites prior to transplanting.

5.2 Soil stabilization

Various options can be utilized for soil stabilization, based on material availability and

Straw stabilisation

1. Straw shall be utilised as a binding material in areas with deep sand, where possible.



2. Baled straw shall be placed on the cleared area, opened and spread evenly by hand or machine at a coverage rate of 1 bale per 10 m^2 over the area to be stabilised. It shall then immediately be rotovated into the upper 100 mm layer of soil. This operation shall not be attempted when the wind strength is such as to remove the straw before it can be rotovated into the sand.

Mulch stabilisation

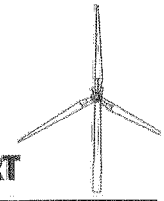
1. Mulch shall be applied by hand to achieve a layer of uniform thickness. The mulch shall then be lightly worked into the topsoil layer so that it mixes with the soil and serves to bind it.
2. The mulch shall be spread at a coverage rate of 100 kg per 250 m^2 or 4 t/ha.
3. Where brush-cut material is to be utilised as mulch, this material shall be evenly spread across the area to a uniform depth of 25 mm. The mulch shall then immediately be rotovated into the upper 100 mm layer of soil. This operation shall not be attempted when the wind strength is such as to remove the mulch before it can be rotovated in.
4. In very rocky areas a layer of mulch shall be added prior to adding the top-material. The mulch must then be worked into the top-material to bind it.
5. Alien vegetation mulch shall be in a non-seed bearing state and shall be chipped prior to application. The preparation of alien vegetation mulch shall be done at source.
6. The Horticulturalist shall cut bush to a height of 400 mm above ground level from designated areas. This vegetation shall then be passed through the chipping machine as above, and be stockpiled for later use as mulch.
7. If the area is exposed to strong wind the mulch stockpile shall be covered with a fine nylon net with 100 mm × 100 mm openings.

Compost stabilisation

1. The soil shall be stabilised by placing and lightly compacting a 75 mm layer of compost over the designated areas or by working a 75 mm layer of compost into the ground to a depth of 150 mm.

Stabilisation of steep slopes

1. The Horticulturalist shall take measures to protect all areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible. The Horticulturalist shall take any other measures that may be necessary to prevent surface water from being concentrated in streams and from scouring the slopes, banks or other areas.
2. If runnels or erosion channels develop, they shall be back-filled and compacted, and the areas restored to a proper condition. The Horticulturalist shall not allow erosion to develop on a large scale before effecting repairs.
3. Where artificial slope stabilisers are used, these shall be applied to the slope, preferably before topsoiling, but according to the detailed construction plan and as specified in this specification.
4. Near vertical slopes (1:1 to 1:2) shall be stabilised using hard structures following specifications.

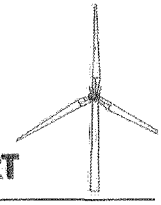


5. Where the slopes are 1.3 to 1:6 they shall be logged or otherwise stepped (using stabilisation cylinders or similar) in order to prevent soil erosion. Logs/ cylinders must be laid in continuous lines following the contours and spaced vertically 0.8-1.2 m apart, depending on the steepness of the slope. These logs/ cylinders must be secured by means of steel pegs and wire in rocky areas, and treated wooden pegs in other areas.
6. In areas where slopes are less than 1:6, horizontal grooves, shallow steps or ledges parallel to contours shall be made on the cut slopes. They shall be made at random to appear natural.
7. In areas where slopes are less than 1:6 these slopes shall be stabilised by using logs in parallel rows, or stabilisation cylinders fastened randomly into position or using biodegradable netting. These structures shall hold the top-material on the slopes and serve as erosion prevention structures.
8. Shallow slopes shall be stabilised using commercial available and approved anti-erosion compounds.

5.3 Slope modification and stabilization

Cut slopes adjacent to roads

1. Cut and fill slopes shall be shaped and trimmed to approximate the natural condition and contours as closely as possible and be undulating. Levels, incongruous to the surrounding landscape, shall be reshaped using a grader and other earthmoving equipment.
2. All cut and fill slopes shall be left as rough as possible, and shall contain ledges to facilitate the accumulation of topsoil. The ledges shall be dug at random to appear natural. Furthermore, the Horticulturalist shall ensure that any embedded rocks that will not pose a danger to traffic, remain on the slopes.
3. Boulders / rocks, collected on the site before disturbance, shall be scattered at a predetermined density approved by the Botanist.
4. Any eroded areas deeper than 50 mm shall be either trimmed down by back cutting the slope face or repaired to the satisfaction of the Botanist with boulders and soil or any other approved method.
5. Catchwater drains shall be installed above the cut slopes.
6. Where cut slopes are greater than 4 m in height, the Horticulturalist shall construct berms at regular intervals.
7. Natural water flow paths shall be identified and subsurface drains (using riprap or superfluous rock material) or surface drains and chutes {*use water speed control structures where necessary*}, preferably using cemented natural rock, shall be constructed along the flow paths.
8. Near vertical slopes (1:1 to 1:2) shall be stabilised using natural rock wall structures constructed using conventional building methods or in forms with slurry forced between the structures. All structures shall have a 'natural' look and facilities for plants to grow in.
9. Near vertical slopes (1:1 to 1:2) shall be stabilised using stacked precast concrete blocks. All structures shall have a 'natural' look and facilities for plants to grow in.



10. All areas where the slopes are 1.3 to 1:6 shall be logged or otherwise stepped (using stabilisation cylinders or similar) in order to prevent soil erosion. Logs/ cylinders shall be laid in continuous lines following the contours and spaced vertically 0.8-1.2 m apart, depending on the steepness of the slope. These logs/ cylinders shall be secured by means of steel pegs and wire in rocky areas, and treated wooden pegs in other areas.
11. In areas where slopes are less than 1:6 horizontal groves and shallow steps and ledges parallel to contours shall be made on the cut slopes. They shall be made at random to appear natural.
12. In areas where slopes are less than 1:6 horizontal, these slopes shall be stabilised by using logs in parallel rows, or stabilisation cylinders fastened randomly into position shall be utilised. These structures shall hold the top-material on the slopes and serve as erosion prevention structures.

Blasted areas

1. Blasted areas shall be finished so as to be as rough as possible to facilitate establishment of vegetation, where revegation will be implemented.

Trees and shrubs

1. One third of the fertiliser shall be scattered at the bottom of the hole, one third dug into the topsoil to be replaced in the hole and the remainder watered into the soil at surface level.

Basic regrassing

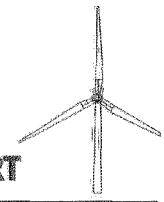
1. 2:3:2 fertiliser shall be applied with the seed mix, at the rate of 400 kg/ha. Super phosphate shall be applied post germination at the rate of 200 kg/ha

5.4 Timing of planting

1. Reseeding shall occur in late Winter (July to September).
2. Replanting shall occur during April / June.
3. Wetland preparation shall occur during Autumn and planting shall occur during early Winter after the first rains (May to June). If planting occurs in a dry late Autumn (end March) or early Winter (April to June) season it shall be necessary to irrigate plants to ensure their successful establishment.
4. Plant material shall be planted into the ground within a maximum period of 5 days after delivery to the Site, unless otherwise specified by the Botanist.

Planting guidelines

Planting shall be carried out as follows:



Reseeding

1. Where broadcast seeding is carried out, the seed shall be sown evenly over the designated area.
2. In confined areas the seed shall be covered by means of rakes or other approved hand tools. Broadcast seeding shall not be done under windy conditions.
3. Drill seeding shall be done in rows not more than 0.25 m apart. The seeding shall be done with an approved grain drill with fine seed attachment or a combination grass planter and land packer or pulveriser. A combine grain and fertiliser drill may be used where appropriate, as directed by the Botanist.
4. Reseeding shall only occur during a period approved by the Botanist.
5. The Horticulturalist shall demonstrate to the Botanist in a trial section that the application of the materials required can be made at the rates specified in this specification.

Basis regrassing

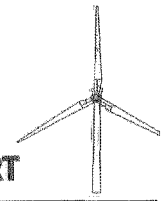
1. Grass seed shall be applied at a rate that should be calculated by the horticulturalist and botanist based on field trials and seed availability.

Planting of grass runners

1. The runners shall be planted within 30 hours of being harvested. Storage in the interim period shall be in aerated bags under cool dry conditions. The runners shall be planted at even spacing, by hand or mechanically at a rate of at least 70 grain bags of runners per hectare.
2. Only fresh runners, that are in good condition and have not dried out, shall be accepted. These runners shall be planted in trenches not less than 50 mm deep with leafy ends, and not roots, exposed.
3. The runners shall be well watered after planting and rolled with a light agricultural roller when the soil has dried sufficiently, as directed by the Botanist.

Sodding

1. Prior to sodding, the area shall be re-inoculated with microbes contained within natural sods. Sods of sedges or grasses shall be collected, as directed by the Botanist, and replanted in shallow hollows for this purpose.
2. Re-inoculation shall occur during or immediately after a rain event. Inoculation sods shall be watered lightly after placement.
3. Revegetation sods shall be planted in strips to reduce erosion.
4. Sodding shall take place on moist, rock free topsoil that has been scarified.
5. Sods, once harvested or delivered from a nursery, shall not be allowed to dry out and shall be planted within 30 hours of being removed from the soil or growing medium. If necessary, they shall be lightly watered prior to planting.
6. Sods shall be planted so they abut tightly against one another. The first row shall be in a straight line with subsequent rows planted so that the joints are staggered. Any gaps shall either be planted with a sod reduced to the gap size or filled with topsoil.
7. Where grass sods are planted on slopes steeper than 1:2, wooden stakes of 500 mm diameter shall be used to anchor the sods in position.



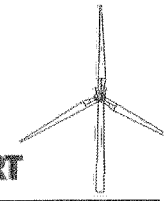
8. In the absence of rain, sods shall be well watered after planting and not be allowed to deteriorate through a lack of moisture.
9. Where grass sods are planted in the floodplain, wooden stakes of 500 mm in diameter shall be used to anchor the sods in position.

Planting trees, shrubs and herbs

1. Where planting is not direct, the plants must be brought to an approved holding area in the intended planting area where they shall be suitably maintained. The Horticulturalist, as directed by the Botanist, shall provide sufficient shade and water. The operation of relocation from the nursery to the planting site must occur on the same day so as to minimise losses through death and to maintain or improve their condition at delivery.
2. During transplanting of indigenous plants care shall be taken to ensure that they are not exposed to the sun. The roots as well as the leaves shall be covered with wet hessian to limit transpiration during transportation and storage. Plants shall be kept in this state for as short a time as is reasonably possible.
3. Planting shall occur as specified in this specification or planting/ landscaping plan.

Planting guidelines

1. The size of holes shall be sufficiently large to ensure that the entire root system is well covered with topsoil, without having to be compressed. The soil around the roots of the plants being transplanted shall not be disturbed. Topsoil and subsoil from the hole shall be stored nearby to be replaced to the same depth intervals from which it was originally removed.
2. Individual spacing between trees shall be 2-3 m and clumps shall consist of 6-12 trees. The trees in the clumps shall be planted in staggered rows of 5 trees per 6 m^2 with low to medium tall shrubs planted between the clumps. The clumps shall be spaced at about 8-12 m distance.
3. In the case of transplanted trees up to 3 m tall, the hole size shall be 2 500 mm $\times$ 2 500 mm in width and 1 800 mm deep
4. Shrubs shall be planted 1-2 m apart around the trees and in the intervening areas between the clumps or as circumstances dictate.
5. Plugs of herbs shall be planted at densities of up to 12 per 1 m^2.
6. Bulbous plants shall be planted as features in selected areas and shall be protected from moles and baboons using rock linings to the holes and surface soil.
7. Before the placement of the plant specimens into prepared holes, the holes shall be watered substantially.
8. One to two handfuls of bone meal shall be added to the hole before planting.
9. Plants shall be carefully transplanted into holes.
10. Plant holes shall be back-filled using a mixture of two-thirds loamy to sandy topsoil to one-third compost. Where the natural soil is very clayey or heavy, sand shall be added at a ratio of one-third soil, one-third compost and one-third sand. The soil and compost / sand additives shall be well mixed to the satisfaction of the Botanist.
11. The topsoil shall be replaced at the same depth intervals at which it was excavated. The soil shall be lightly compacted and well watered.



12. Care shall be taken to keep root damage to a minimum when transplanting seedlings. Where plants have a taproot this shall not be cut. Excess foliage, flowers and side branches shall be pruned as directed by the Botanist.
13. Coarsely chipped bark from pine trees shall be supplied and placed in a 75 mm deep layer at the bases of the trees following planting.
14. Large rocks shall be placed around the base of planted trees in fire-prone environments.
15. Plants planted at the waters edge in wetlands and rivers shall be planted as follows:
    a. Wetland material harvested from existing wetland areas shall be transplanted directly to the newly created wetland area, along with as much soil, and surrounding material as possible.
    b. Indigenous shrubs and small trees shall be planted 3 m apart
    c. Palmiet shall be planted 1- 2 m apart
    d. Bulrushes, reeds, sedges and herbs shall be planted in sods 0.4-0.5 m apart or as circumstances dictate.
16. Plants shall be watered immediately after transplanting to ensure that the soil is wet around the plants. If necessary additional soil must be added after initial watering to fill any subsidence back up to ground level.

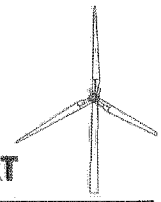
5.5 Traffic on revegetated areas

All revegetated areas shall be clearly demarcated and all not traffic (vehicular or otherwise) excluded.

5.6 Establishment

Irrigation

1. The Horticulturalist shall be responsible for maintaining the desired level of moisture necessary to maintain vigorous and healthy growth. The quantity of water applied at one time shall be sufficient to penetrate the soil to a minimum depth of 800 mm, where appropriate, and at a rate that will prevent saturation of the soil.
2. Water used for the irrigation of revegetated areas shall be free of chlorine and other pollutants that will have a detrimental effect on the plants.
3. All seeded, planted or sodded grass areas and all shrubs or trees planted shall be irrigated regularly at the specified intervals.
4. Grassed areas shall require irrigation coverage of 100% and a permanent watering programme. The watering programme shall be modifiable to accommodate natural climatic variations.
5. Revegetated areas shall require irrigation coverage of 100% and a modifiable watering programme.
6. Were an irrigation system is required, the Horticulturalist shall be responsible for its installation and maintenance.



7. In the event of a delay between the planting programme and installation of the irrigation system, a water truck shall be utilised for watering, according to a programme approved by the Botanist.
8. Every effort shall be made to reduce irrigation overspray onto natural patches.
9. The Horticulturalist shall water the planted areas as necessary, using a suitable fine spray which shall not disturb the vegetation and which will not cause any erosion.
10. The Horticulturalist shall supply all water required and shall provide all pipework, pumps, irrigation equipment and other plant necessary. All this infrastructure and its positioning shall be approved by the Botanist.

Fertilising

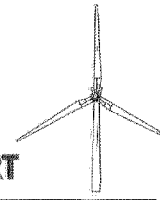
1. The ECO shall strictly control the use of fertilisers.
2. Care shall be exercised strict control when using such materials near sensitive natural areas, so as to avoided contamination of these areas.
3. The ECO shall manage the fertilisation programme for different areas of planting.
4. Additional fertiliser shall be applied at the intervals specified with due regard to favourable climatic conditions and the state of growth of the vegetation. Application shall be by hand or approved mechanical spreader and shall provide uniform distribution.
5. Fertilisers shall be suitably sealed and stored in a location approved by the Botanist.

Weeding and mowing

1. All woody alien or invasive species must be controlled and removed.
2. Where seedlings occur sparsely, they should be removed manually.
3. Where dense stands of seedlings are present a suitable foliar spray (with a wetting agent and a blue dye to indicate area applied) shall be utilised.
4. Larger individuals of alien/ invasive species shall be controlled by cutting or loping and treating the cut stumps with herbicide to prevent regrowth.
5. Alien/ invasive plants and weeds shall not be stockpiled, they should be removed from the site and dumped at an approved site or burned.
6. If, during the establishment period, any noxious or excessive weed growth occurs or other undesirable vegetation threatens to smother the planted species in the seeded or planted areas, such vegetation shall be removed.
7. The grass in specified grassed areas or on road verges shall be mowed at intervals ordered by the Botanist/ECO. Grass cuttings shall be collected and disposed of as directed by the Botanist/ECO. The grass shall be mown at regular intervals to stimulate lateral growth. The first cutting shall take place when the grass is 50 mm high and thereafter the height shall be maintained at between 30 and 50 mm.
8. If during the establishment period, non-indigenous weeds or other non-indigenous plants are present in the planted areas, such vegetation shall be removed by hand.

Disease and pest control

i) All plant materials should be inspected at least once a month to locate any diseased or insect pest infestation and appropriate measures implemented.



Pruning

1. All plant material shall be kept free from dead wood, broken branches, dead flower heads or otherwise harmful or objectionable branches or twigs. All other pruning shall be done only as directed by the Botanist.
2. All pruning wounds greater than 12 mm diameter shall be painted with an approved tree wound paint.
3. Secateurs and other cutting equipment shall be kept sterilised to avoid spreading fungal infestations.

Tree establishment

1. Trees that die or become unhealthy from any cause or appear to be in a badly impaired condition shall be promptly removed and replaced, or as soon as the weather permits, as directed by the Botanist. All replacements shall be trees of the same kind and quality as those originally planted.

Erosion control

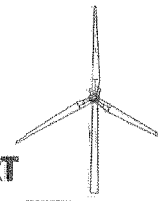
1. In the case of surface wash-away or wind erosion, the Horticulturalist shall implement remedial measures, as approved by Botanist, as soon as possible.
2. Appropriate erosion control/ soil stabilisation measures shall be implemented.

6. Monitoring and Reporting

1. Adequate management, maintenance and monitoring will be carried out annually by the applicant to ensure successful rehabilitation of the property until a closure certificate is obtained.
2. To minimise adverse environmental impacts associated with operations it is intended to adopt a progressive rehabilitation programme, which will entail carrying out the proposed rehabilitation procedures concurrently with construction activities.

6.1 Inspecting and Monitoring

1. Regular monitoring of all the environmental management measures and components shall be carried out to ensure that the provisions of this programme are adhered to.
2. Ongoing and regular reporting of the progress of implementation of this programme will be done. An environmental audit shall be carried out by an independent consultant on an annual/biannual basis.
3. Inspections and monitoring shall be carried out on both the implementation of the programme and the impact on plant life.



6.2 Responsibility for establishing an acceptable cover

1. Where only indigenous seed, harvested from the site, has been used, acceptable cover shall mean that:
    a. Not less than 80% of the area seeded shall be covered with acceptable plants; and
    b. There shall be no bare patches greater than 800 mm in maximum dimension through the area, except where large rocks or boulders occur.
2. Where commercial grass seed is used, acceptable cover shall mean that:
    a. Not less than 75% of the area seeded shall be covered with grass; and
    b. There shall be no bare patches greater than 500 mm in maximum dimension.
3. In the case of grass sodding, acceptable cover shall mean that the full area shall be covered with live grass at the end of any period not less than three months after sodding. Where this cover is not achieved, plant additional grass and tend it in a similar manner to the original planting until the acceptable cover is achieved.