• Fence off the construction site where possible to avoid illegal trespassing. Close off any excavation areas to prevent access.
• Designate a suitable area for cooking fires within the fenced area of the site camp.
• Display ‘danger’ warning signs and ‘no public access’ signs at all potential accesses and paths.
• Lock away dangerous plant, equipment and material when not supervised or in use.
• Appoint a Health and Safety Officer on site and implement an approved safety plan for the duration of the project.
• The contact details of the Health and Safety Officer should be made available to the surrounding property owners and Ward Councillors to enable them to lodge complaints when problems with regards to community and/or environmental health arise.
• Heavy vehicles to keep headlights switched on at all times to improve visibility.
• A speed limit of 40km/h must be maintained by all vehicles on site.
• Inspect vehicles on a regular basis and impose penalties for reckless driving.
• Ensure good visibility at the accesses to the site.
• Jobseekers should not be allowed to gather at the entrance to the construction site.

No-go option
• No additional pressure would be placed on Municipal and Provincial emergency and health services.

Significance Statement
Although the actual occurrence of this impact is unknown, a standard environmental principle is applied and rated as a moderate negative. With mitigation the overall severity of the impact could be reduced.

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<tr>
<th>Impact</th>
<th>Effect</th>
<th>Risk or Likelihood</th>
<th>Overall Significance</th>
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<td>Temporal Scale</td>
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<td>Severity of Impact</td>
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<tr>
<td>With Mitigation</td>
<td></td>
<td></td>
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</tbody>
</table>

Impact 15: Security impacts

Cause and Comment
The perception exists that criminal activities increase in areas where construction projects take place. The appointment of local construction workers often aids in mitigating potential security issues.

General security on site should also receive attention as cables and other valuable material could attract criminals with negative economic consequences for the developer. Electric fencing, CCTV cameras, 24-hour security guards, random security checks throughout the site and access control to the site are some of the safety measures that could be implemented to eradicate potential crime on site and in the area.

Mitigation Measures
• Keep the local SAPS and Ward Councillors informed about the construction progress and time-lines to ensure that they would be able to adequately deal with any type of disruptive behaviour.
• The use of local labour will minimize safety and security concerns to a large extent. Only appoint workers with valid SA identification documents who have no criminal records.
• The gathering of jobseekers at the construction site should not be allowed. Establish a Labour desk at suitable localities within communities and appoint workers through the structures as discussed previously.
• Provide workers with identity tags and prohibit the access of unauthorized people to the construction site.
• Workers should not be allowed to remain in and around the construction site when they are off duty. Transport workers to their places of residence after each shift.
• No informal traders to be allowed on or near the site.
• Implement safety and security measures, such as electrical fencing, 24-hour security guards, CCTV cameras, random security checks and access control.

No-go option
• No significant change to the local current crime and safety statistics is foreseen.

Significance Statement
The severity and probability of security impacts actually occurring is uncertain and a standard environmental principle of moderate severity is thus applied. The overall significance is low.

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<tr>
<th>Impact</th>
<th>Effect</th>
<th>Risk or Likelihood</th>
<th>Overall Significance</th>
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<tr>
<td>With Mitigation</td>
<td>Short Term</td>
<td>Study Area</td>
<td>Slight</td>
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Impact 16: Intrusion impacts

Cause and Comment
Intrusion impacts refer to noise, visual and light pollution, aesthetic impacts and dust/air pollution during the construction phase, as a result of emissions, movement of construction vehicles, earthworks and general construction activities. Although short-term in nature, the severity of the impact would increase if sensitive receptors are located in close proximity to the construction area. From a social perspective sensitive receptors would include residential houses, farming activities, schools and other social infrastructure and businesses in close proximity to the site or access routes.

No intensive farming activities would be affected. At this stage it would seem that noise, dust and air pollution would affect farm houses located along the gravel access road that leads to the construction site from the R75, and could also impact on the health of construction workers.

Sufficient air / dust pollution control holds various advantages for the developer, surrounding communities and the environment. Negative impacts associated with air/dust pollution include health problems for residents and workers (respiratory diseases, eye, nose and throat irritations), air and water pollution, visibility problems, damaged or dirty properties and belongings, unsafe work conditions, increased costs associated with the loss of materials and additional work involved. Construction of the wind turbines would be visible from the R75 and from farms in the project vicinity. Intrusion impacts are discussed in greater detail as part of the EIA Report and the Visual Impact Assessment.
Mitigation Measures

• Generally construction activities should not take place before 8am and after 5pm and not on Sundays and public holidays unless an agreement is made between landowner and developer. A list of construction activities that may occur outside of these times has been added to the EMPr. Any additional activities must be authorised by the ECO prior to initiation of the activity.
• Make the contact details of the Contractor and procedures to lodge complaints available to the local communities. This information must be displayed in a public area such as on a signboard at the junction of the R75 and access road.
• Ensure that all construction machinery has the required silencers, if required.
• Use low sulphur diesel and exhaust filtration measures on site, whenever possible, to reduce emissions of particles.
• Vehicles carrying dusty or light materials should be securely covered with a tarpaulin before leaving the site.
• All dust-generating activities and dirt roads should be damped down, especially during dry weather. Temporarily cover earthworks if possible and minimize drop heights to control the fall of materials.
• Avoid the use of long-term stockpiles on site wherever possible unless it performs the function of visual or noise screening.
• Always keep stockpiles away from the site boundary, sensitive receptors, watercourses and surface drains.
• Take into account the predominant wind direction when siting stockpiles to reduce the likelihood of affecting sensitive receptors.
• Erect fences or use windbreaks such as hedges and earth-banks of similar height and size to the stockpile to act as wind barriers.
• Service all fans and filters regularly to ensure they are properly maintained.
• No vehicles or plant will be left idling unnecessarily.
• Vehicles and plant should be well maintained. Should any emissions of dark smoke occur (except during start up) then the relevant machinery should be stopped immediately and any problem rectified before being used.
• Engines and exhaust systems should be regularly serviced according to manufacturer’s recommendations and maintained to meet statutory limits/opacity tests. Machinery should be serviced at the service provider and not on site unless there is a designated service area that is bunded and equipped with spill kits.
• Agree a procedure to notify the Municipalities and emergency services, so that immediate and appropriate measures can be put in place to rectify any problem.
• Set up 24-hour phone hotlines or ensure that the local community is familiar with procedures to lodge complaints about high dust levels. Consider circulating summaries of monitoring results to the local community.
• Keep a log book at the entrance to the construction site where community members can lodge complaints, if necessary.

Significance Statement
Rating of these impacts fall outside the scope of this SIA report and are contained in the respective specialist reports dealing with these study requirements.

10.3 Operational Phase Impacts

10.3.1 General
**ISSUE 1: AIR QUALITY AND CLIMATE CHANGE**

**Impact 1.1: The WEF will contribute towards a reduction in the need for fossil fuels resulting in an improved air quality and contributing toward the mitigation of climate change**

*Cause and comment*

The electricity generated by the development will displace some of that produced by fossil fuel based forms of electricity generation. The scheme, over its lifetime, will therefore avoid the production of a significant amount of CO$_2$, SO$_2$ and NO$_2$ that would otherwise be emitted to the atmosphere.

*Mitigation measures*

- Enhance this impact by promoting the use of renewable energy locally.

**Significance Statement**

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<th>Impact</th>
<th>Effect</th>
<th>Risk or Likelihood</th>
<th>Overall Significance</th>
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<tr>
<td>With mitigation</td>
<td>Long Term</td>
<td>International</td>
<td>Beneficial</td>
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**10.3.2 Ecological**

**Impact 8: Invasion of alien species**

*Cause and Comment*

As with all building operations, the introduction of alien and invader species is inevitable; with environmental disturbance comes the influx of aliens. Alien invasive species such as prickly pear, which is already prevalent in some areas of the thicket vegetation found within this project area is likely to increase if mitigation measures are not implemented. Alien invasive species have negative impacts on the biodiversity as they compete with natural vegetation and reduce water availability. Studies show that almost all seven terrestrial biomes in South Africa have alien invasive species. Due to the disturbance of the proposed Dassieridge WEF, it is important that eradication of these species and proper management strategies are put in place to ensure the control of these species.

*Mitigation Measures*

Mitigation measures include the following:

- Eradication of the already established alien invasive species on site (This should be done during all phases of the project);
- Active management of alien species throughout both the construction and operation phases to prevent their spread into areas where they have not already been established;
- A rehabilitation plan must be designed and implemented;
- During the rehabilitation of the area, measures should be put in place to prevent accidental or unintended introduction of alien species from occurring; and
• An Alien Invasive Control Programme must be implemented.

**Significance Statement**
The introduction of alien invasive species will definitely occur and will have a **Severe**, Permanent impact. The environmental significance of this unmitigated impact will be **HIGH NEGATIVE**. This will be reduced to **LOW POSITIVE** if mitigation measures are implemented since existing alien species will be removed.

**No-Go Option:**
If no development was to occur on the site the overall impact would be **LOW NEGATIVE** since the existing alien invasive species will continue to increase in numbers in the project area due to the current land-use.

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<th>Risk or Likelihood</th>
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<tr>
<td>With Mitigation</td>
<td>Long Term, Localised, Mod. Beneficial</td>
<td>Probable</td>
<td><strong>LOW +</strong></td>
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<tr>
<td><strong>No-Go</strong></td>
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<tr>
<td>Without Mitigation</td>
<td>Permanent, Study Area, Slight</td>
<td>Probable</td>
<td><strong>LOW -</strong></td>
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### 10.3.3 Agricultural

**Impact 1: Increase in erosion potential**

**Cause and Comment**
An increase in hard surfaces (concrete foundations and roads) will increase stormwater run-off and potentially lead to an increase in soil erosion.

**Mitigation Measures**
• All run-off water must be collected, channelled and disposed of in an appropriate manner.
• Pre-development run-off must be at least the same as post-development run-off.
• Anti-erosion features must be installed where required.
• Ensure that all cleared and impacted land is rehabilitated and re-vegetated.

**Significance Statement**
Impacts associated with erosion from increased stormwater run-off during the operational phase is definite over the next 20 years. The extent of the impact is likely to be limited to the study area but may be severe. The overall significance of the impact will be reduced from high negative to low negative after mitigation.
### Impact 2: Establishment of renewable energy infrastructure on agricultural land

**Cause and Comment**
Loss of up to 35 ha of moderate to low potential agricultural land as a result of new WEF infrastructure development.

**Mitigation Measures**
- Do not fence off any WEF infrastructure. This will allow maximum grazing and movement of game within the site.

**Significance Statement**
Loss of land currently utilised as agricultural land is definite. The extent of the impact is likely to occur over a long period (20 years) but will be localised to the immediate study area. Mitigation will not change the overall significance of the impact but will reduce the cumulative impact.

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<th>Impact</th>
<th>Temporal Scale</th>
<th>Spatial Scale</th>
<th>Severity of Impact</th>
<th>Risk or Likelihood</th>
<th>Overall Significance</th>
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<tbody>
<tr>
<td>Without Mitigation</td>
<td>Long Term</td>
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<td>Slight</td>
<td>Definite</td>
<td>MODERATE -</td>
</tr>
<tr>
<td>With Mitigation</td>
<td>Long Term</td>
<td>Localised</td>
<td>Slight</td>
<td>Definite</td>
<td>MODERATE -</td>
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</table>

**Cause and Comment**
The gradual reduction of available agricultural land as a consequence of an increase in renewable energy development in the local area.

**Mitigation Measures**
- Avoid developing on moderate potential agricultural land.
- If unavoidable, ensure that all development footprints are kept at a minimum.

**Significance Statement**

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<tr>
<th>Impact</th>
<th>Temporal Scale</th>
<th>Spatial Scale</th>
<th>Severity of Impact</th>
<th>Risk or Likelihood</th>
<th>Overall Significance</th>
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<tbody>
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<tr>
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<td>Regional</td>
<td>Moderate</td>
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<td>MODERATE -</td>
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#### 10.3.4 Avifauna

**Impact 1: Bird collision & electrocution on overhead power lines**

**Cause and comment**
The presence of the wind turbines and overhead power lines may result in bird collision and electrocution.

**Mitigation measures**
• Bury all ‘on site’ cabling underground. On powerlines to grid, mark relevant sections of the line with anti-collision marking devices on the earth wire to increase the visibility of the line and reduce likelihood of collisions.
• Bird friendly pole/pylon designs should be used to prevent electrocutions.

Significance Statement
Collision and electrocution of birds on overhead power lines on site, and connecting to the grid is anticipated to be of HIGH significance. Both of these impacts can be mitigated successfully in our opinion to reduce the significance to LOW. In both cases the first and foremost approach to mitigation should be the selection of the shortest possible length of new overhead power line to be constructed, and the optimal route for this line. In the case of bird collision, all power line linking turbines to the on-site substation must be buried underground. To mitigate for collision of the relevant species, it is recommended that the earth wires on the spans identified as high risk be fitted with the best available (at the time of construction) Eskom approved anti bird collision line marking device. This should preferably be a dynamic device, i.e. one that moves as it is believed that these are more effective in reducing collisions, especially for bustards, which are one of the key species (Denham’s Bustard) in this area. It is recommended that a durable device be used as this area is clearly prone to a lot of strong wind and dynamic devices may be susceptible to mechanical failure. At the time of writing to this author's knowledge the best available flapper type devices are made by Eberhardt Martin (EBM) and Preformed Line Products. It will be either Dassiesridge Wind Power or Eskom’s responsibility to ensure that these line marking devices remain in working order for the full lifespan of the power line, as we cannot afford to have significant numbers of bird collisions on this new line. It is important that these devices are installed as soon as the conductors are strung, not only once the line is commissioned, as the conductors and earth wires pose a collision risk as soon as they are strung. The devices should be installed alternating a light and a dark colour to provide contrast against dark and light backgrounds respectively. This will make the overhead cables more visible to birds flying in the area. Eskom Distribution has a guideline for this work and this should be followed. Note that 100% of the length of each span needs to be marked (i.e. right up to each tower/ployon) and not the middle 60% as some guidelines recommend. This is based on a finding by Shaw (2013) that collisions still occur close to the towers or pylons. It is also recommended that the stay wires on the met masts on site be installed with these devices as soon as possible.

In the case of bird electrocution, all power lines linking turbines to the on-site substation must be buried underground. The grid connection power line must be built on an Eskom approved bird-friendly pole structure which provides ample clearance between phases and phase-earth to allow large birds to perch on them in safety.

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<th>Effect</th>
<th>Severity of Impact</th>
<th>Risk or Likelihood</th>
<th>Overall Significance</th>
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<tr>
<td>Mitigation</td>
<td>Permanent</td>
<td>Study Area</td>
<td>Slight</td>
<td>Unlikely</td>
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Impact 2: Bird collision with turbine blades

Cause and comment
The presence of the wind turbines (and subsequently turbine blades) may result in bird collision.
Mitigation measures
This is extremely difficult to mitigate for post construction. Sensitivity mapping and pre-construction monitoring should inform the final turbine layout in order to proactively mitigate for this. If key species are found to collide in significant numbers post construction then mitigation options will need to be implemented. These could include options such as: “restriction of turbine operation” if strong patterns in collision risk are evident; “turbine shutdown on demand” based on actual collision risk detected by automated systems or human observers; “habitat management” where it can be shown that this could pay a role in influencing collision risk, and not have detrimental secondary effects; “deployment of audible deterrents” to deter particular at risk birds from site; and any others identified by the relevant specialist conducting operational phase bird monitoring.

Significance Statement
Collision of birds with turbines is judged to be of LOW significance pre mitigation, as the bird species most at risk are common species, and the flight activity recorded was generally low. In addition, the more important Red List species have been recorded flying seldom and at lower heights than the rotor zone. The only specific mitigation in this regard is to adhere to the sensitivity map presented in the Avifaunal Impact Report.

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<th>Severity of Impact</th>
<th>Risk or Likelihood</th>
<th>Overall Significance</th>
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<td>Long Term</td>
<td>Localised</td>
<td>Moderate</td>
<td>May Occur</td>
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10.3.5 Bats

Impact 1: Bat mortalities during foraging by turbine blades

Cause and Comment
Bats are thought to perceive turbines as possible roosting spaces or foraging areas due to the presence of concentrated pockets of insects within the wing path (Horn et al. 2008). The presence of lights on wind turbines have also been identified as possible causes for increased bat fatalities as a result of higher insect densities attracted to the flashing lights (Johnson et al. 2003). Clearings around wind turbines may also improve conditions for insects, thereby attracting bats to the area and the “swishing sound” of the turbine blades could confuse bats (Kunz et al. 2007). Whatever the reason for bat mortalities around wind turbines, the facts indicate that this is a very serious and concerning problem.

Mitigation Measures
- It is essential that an effective mitigation measure, such as curtailment, be implemented to lessen bat mortalities. In the process of curtailment, the turbine is kept stationary at a lower wind speeds and is allowed to rotate in response to a specific wind velocity.
- In theory, there is a negative correlation between bat activity and wind speed, thus, by increasing the turning speed of the blades, the movement of air around the blades will increase, resulting in decreased bat activity.

Significance Statement
10.3.6 Visual

**Impact 1: Impact of introducing highly visible wind turbines into a rural landscape**

*Cause and comment*

Highly visible wind turbines will be introduced into a landscape which has a low sensitivity to the proposed development (the rural sense of place of the landscape is unlikely to be altered by the turbines).

*Mitigation measures*

There are no mitigation measures that will change the significance of the landscape impact other than to plant shielding vegetation around affected residences. A reduction in wind turbine numbers is unlikely to have an appreciable effect since even a few wind turbines will still have high visibility.

*Significance Statement*

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<th>Impact</th>
<th>Effect</th>
<th>Temporal Scale</th>
<th>Spatial Scale</th>
<th>Severity of Impact</th>
<th>Risk or Likelihood</th>
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**Impact 2: Intrusion of large wind turbines on the existing views of sensitive visual receptors**

*Cause and comment*

Wind turbines are very tall structures and in this case will be installed in an area which is surrounded by numerous farmsteads. There are a large number of residents that will potentially be affected by the development.

*Mitigation measures*

There are no mitigation measures that can reduce the perception of a negative impact significantly unless the site is avoided. But there are a number of measures that can enhance the positive aspects of the impact. It has been shown that uncluttered sites are preferred for wind farms (Gipe, 1995; Stanton, 1996; Vissering, 2005). Mitigation measures and suggestions may enhance the positive visual aspects of the development:

- 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 (Gipe, 1995).
- Signs near wind turbines should be avoided unless they serve to inform the public about wind turbines and their function. Advertising billboards must be avoided.
- 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. ‘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).

**Significance Statement**

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<th>Risk or Likelihood</th>
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<td>Severe</td>
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### 10.3.7 Noise

**Impact 1: Noise generated by wind turbines**

**Cause and comment**
The effects of low frequency noise include sleep disturbance, nausea, vertigo etc. These effects are unlikely to impact upon residents due to the distance between the wind farm and the nearest communities. Sources of low frequency noise also include wind, train movements and vehicular traffic, which are all sources that are closer to the residential areas.

**Mitigation measures**
All turbines met the minimum 500m horizontal setback distance to the nearest Noise Sensitive Area. The noise impact from the wind turbine generators should be measured during the operational phase, to ensure that the impact is within the recommended rating limits.

**Significance Statement**

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<th>Severity of Impact</th>
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<td>Slight</td>
<td>Unlikely</td>
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### 10.3.8 Social

**Impact 1: Job creation**

**Cause and Comment**
Few permanent employment positions (unskilled, semi- and highly skilled) would emerge during the 25 year operational period of the Dassiesridge WEF. Employment positions could include:
- Technicians, electricians, IT specialists, engineers, administrators (highly skilled);
- Security (semi-skilled); and
- Site maintenance (lower skilled).

In addition to the above a financial manager and supporting staff would be required to implement SED projects and manage related finances. It is highly likely that skilled employees would rather
be sourced from the NMBM area, as the tertiary education levels of the Cacadu DM and SRVM are very low, 8.3% and 3.8% respectively (Section 4.8 of the SIA; Education levels).

Periodically temporary employment may become available for civil works maintenance (roads, crane pads, etc.) and site clearance to minimize potential veld fires, etc. The opportunity for local service providers exists to conclude contracts with the developer to perform duties at the plant.

Mitigation Measures
- Maximize the number of local permanent and temporary employees (from the NMBM, SRVM and Cacadu DM) where possible.
- Through ED contributions do training and capacity building where necessary.

No-go option
- No employment creation and opportunities for skills development would occur.

Significance Statement
Employment opportunities are limited during the operational phase, and would thus be slightly beneficial to the region. However, as employment is definite over the long term it bears a moderate overall significance.

Impact 2: Skills development and capacity building

Cause and Comment
Although limited, skills development and capacity building would result as on-site training is likely. An important outcome of skills development and training is that employees would be in a position to source work on similar plants once their contracts expire. A skilled labour force is more likely to find employment, resulting in economic advantages for the local economy over the long-term.

Mitigation Measures
- Implement measures (bonuses or other financial benefits) for highly skilled staff to minimize the negative impacts associated with a high staff turnover.
- Do training and capacity building wherever necessary.

No-go option:
- No contribution to local employment and skills development.
- No contribution to the local economy.

Significance Statement
Impact 3: Impacts on the local economy

Cause and Comment
During the operational phase it is expected that the local economy would benefit in the following ways:

• The families of employees would benefit economically with an increase in incomes and spending power;
• A possible increase in municipal rates and taxes, as the land would be rezoned from “Agriculture” to “Special Use for Agriculture and Renewable Energy Infrastructure”, resulting in higher levels of rateable income;
• Local communities would benefit economically through shareholding and community upliftment and Social Development projects; and
• The establishment of local downstream industries and services that would support the WEF’s operations (to a lesser extent).

Mitigation Measures
• Maximize the number of local permanent and temporary employees (from the NMBM, SRVM and Cacadu DM) where possible.
• Do training and capacity building wherever necessary.
• Assist and guide the local community with regards to the needs of the WEF plant and the types of supporting industries and services required for its successful operation. Enterprise Development funding is available to assist the local SMME’s with skills training and capacity building, etc.

No-go option
• No economic benefits in terms of salaries, ED and SED contributions and community projects would accrue to the local communities.
• No skills development and capacity building opportunities for local SMME and other supporting industries.
• No economic benefits for the local Municipalities.

Significance Statement
The local economy would experience definite positive impacts over the long term. However, the Rand-value for rates and taxes, net incomes and shareholding dividends is not known at this stage. Without mitigation an overall moderate significance rating is applied. A slight severity has been assigned as standard environmental principle. Confidence in the overall significance is low.
Impact 4: Community projects, ED and SED contributions

Cause and Comment
It is recommended that the project proponent embarks on a holistic, strategic approach for the Enterprise Development and (ED) and Socio-economic Development (SED) components of the project to avoid fragmented community projects in the region.

Problems that have been experienced in this regard at similar projects include:
• The main driving force behind processes for approved renewable energy projects would be National Government. Local and district Municipalities are informed of progress and developments, but not sufficiently involved and actively engaged in processes from the onset.
• Appropriate structures are not put into place to manage Socio-economic development projects, distribute funds and monitor progress.
• A lack in communication often results in unrealistic expectations that are being created at community level.
• DoE defines the beneficiary communities as those within a 50 km radius from the project site. Large portions of the affected Municipality are thus often excluded from project benefits and conflict is exacerbated when a project affects more than one Municipality.

At this stage it would seem that the beneficiary communities would be Uitenhage (NMBM) and Addo (SRVM) and could also include Kirkwood (SRVM).

To ensure a holistic approach that includes all three the Municipalities it is recommended that a forum or similar structure be established. The forum would:
• Consist of representatives of the NMBM, CDM and SRVM’s and their relevant Directorates for Economic Development;
• Identify major “renewable energy development nodes” where wind energy projects are taking place, such as Blue Crane, Oyster Bay, Grassridge, etc. and co-ordinate projects in a holistic manner;
• Prioritise projects identified in the IDP’s and LED programmes;
• Formulate a strategy to achieve long-term sustainable goals that would include large economic development projects in the major “renewable energy development nodes” that would contribute to the region’s economic growth; and
• Identify short-term food security and local community development projects.

The idea would thus be to collaborate and embark on larger income-generating projects within the “renewable energy development nodes” that would benefit the broader region, instead of implementing scattered small-scale projects.

The advantage of such an approach would be greater sustainability and potential for long-term income generation, employment creation and skills development. Localised short and medium-term projects, such as community infrastructure developments, training programmes, food security projects, and so forth could also be implemented but the main focus should be holistic.

Mitigation Measures
• Establish a PSC or similar structure consist of representatives of the NMBM, CDM and SRVM's and their relevant Directorates for Economic Development as well as DEDEAT
• The PSC will identify major “renewable energy development nodes” where wind energy projects are taking place, such as Blue Crane, Oyster Bay, Grassridge, etc. and co-ordinate projects in a holistic manner;
• PSC prioritizes projects identified in the IDP's and LED programmes;
• Formulate a strategy to achieve long-term sustainable goals that would include large economic development projects in the major “renewable energy development nodes” that would contribute to the region’s economic growth; and
• In addition to this also identify some short-term food security and local community development projects.

No-go option
• No economic advantages that accrue to local communities.
• No skills development and capacity building would take place.

Significance Statement
The impact is awarded a positive moderate overall significance, however, confidence in the rating is low, as adequate information regarding previous projects, the amount to be allocated towards SED and past experiences for similar projects could not be obtained.

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<tr>
<td>With Mitigation</td>
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<td>Regional</td>
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<tr>
<td>No-Go</td>
<td>Long Term</td>
<td>Regional</td>
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Impact 5: Impacts on land values of farm portions included in the project

Cause and Comment
Construction of the proposed wind farm and infrastructure development would in all likelihood add value to land that is included in the project, as rental incomes would be secured for the duration of the project. A positive economic impact is anticipated for those landowners.

No-go option
• No infrastructure would be erected, no agreements with landowners would be concluded and none of the economic benefits in terms of an increase in land values and rental incomes would manifest.

Significance Statement
Insufficient information is available (monetary values, etc.) and a slight severity is thus applied as standard environmental principle. The impact would have a moderate overall significance, with low confidence.
Impact 6: Impacts on land values for surrounding properties

Cause and Comment
The owner of the farm Prentice Kraal (Portion 2 of the Remainder of Portion 233, Uitenhage) in extent of 500 ha is concerned about the commercial land value of his farm as he purchased the farm approximately 4 years ago with the intention of converting the farm into a game farm for hunting purposes. Substantial additional expenses have been incurred to upgrade infrastructure, fencing, the lodge and the purchase of various wild animals (kudu, bushbuck, impala, duiker, etc.). The current proposed layout of the wind turbines imply that wind turbines would be visible from all vantage points on the farm. The land owner is also concerned about potential noise impacts during the operational phase. As these factors could detract from the wildlife experience it could possibly have a negative impact on the commercial land value of the farm.

A noise impact assessment is done for this EIA and it would be safe to assume that the I&AP will not be impacted from a noise perspective, as the current location of the nearest turbine is 900 m from the property’s border. In terms of visual impacts, the property is already impacted by the Grassridge wind turbines (located 7 km from his farm), as well as the 132 kV Eskom power that runs along the property’s northern border. A visual impact was carried out to assess this potential impact in greater detail.

From a Socio-economic perspective, experience indicates that infrastructure such as Eskom power lines and turbines would not have a negative impact on agricultural property values, although the potential impact on commercial land values would be more complex to determine.

A recent example is Farm No. 68, Bedford district in extent of 919,920 hectares and located in very close proximity to the Cookhouse WEF. The wind turbines have a significant visual impact on Farm No. 68 as well as surrounding farms. Thirty hectares of Farm No. 68, Bedford is under irrigation and 889 hectares is veld (grazing). Construction of the Cookhouse WEF had no impact on the market value of the farm. Farm No. 68 recently sold for R11.5 million (R150 000/ha for irrigated land and R7 800/ha for veld), which is far above market value.

Also, no evidence of negative impacts on surrounding property values due to WEF developments emerged through discussions with land valuers and estate agents in the Jeffrey’s Bay and Oyster Bay areas (major wind energy nodes)

Mitigation Measures
• Apart from mitigation measures that would address possible visual impacts, no mitigation measures are proposed.

No-go option
• Market values of surrounding properties would be determined in accordance with standard valuation practices and would not be influenced by visual impacts of large-scale developments such as the Dassiesridge WEF.

Significance Statement
Although a negative impact on agricultural land values is not expected and a possible negative impact on commercial land values may occur, the impacts are rated as a moderate negative. Confidence in the rating is low.

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<td>No-Go</td>
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Impact 7: Impacts on aviation

**Cause and Comment**

For the last number of years the owner of Sutherland Transport, situated in Perseverance (midway between Despatch and Port Elizabeth), allegedly commutes on a daily basis by helicopter between his business and farm, located halfway between Kirkwood and Addo. According to the I&AP the flight route is the shortest and most economical and is flown under 2 000 feet above sea level. The I&AP further states that within this airspace no flight plan needs to be filed. (Section 10.3 of the SIA contains relevant flight logs dated 03/09/14 up until 21/2/15).

The I&AP claims that the proposed Dassiesridge WEF will affect the flight route, with the following consequences:

- The construction of the wind turbines would increase the flight height to more than 2 000 feet and a flight plan would need to be lodged on a daily basis;
- A flight plan would require additional time, administration and costs and is not practical as the route is being flown on average two times per day and intermittently more than twice per day;
- Another alternative would be to fly around the Dassiesridge WEF and the extra time, insurance costs, maintenance and other running costs of the helicopter would amount to an extra cost of approximately R675 000 per year (refer to the I&AP comments contained in the detail EIA Report); and
- At this stage it would seem that the construction of the Grassridge WEF would also affect an alternative route that the I&AP could have used should Dassiesridge WEF be constructed. According to the I&AP, he was not consulted during the Grassridge WEF EIA process; and
- The I&AP indicated their inclination to instate legal action should their concerns not be considered and addressed.

The professional opinion of an Obstacle Specialist of the South African Civil Aviation Authority was obtained with regards to private aviation. The Specialist’s findings, based on the positioning of the turbines and the comment and flight logs provided by the helicopter operator, are that:

- No information has been made available to confirm that the I&APs flight path crosses the Dassiesridge site; and
- TMA is 2 500 feet and there is adequate clearance below the controlled airspace for the pilot to fly over the wind turbines, should he wish to do so. No daily flight plan would thus be required.

**Mitigation Measures**

- No mitigation is required
No-go option
- Should the project not proceed, the developer would lose substantial development costs (Feasibility studies, EIA, Specialist, Engineering study costs, etc.) that have already been expended to ensure the successful implementation of the project.

Significance Statement
The flight path for this I&AP is not affected (unlikely risk) and the overall significance on private aviation is thus low.

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<td>Study Area</td>
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Impact 8: Potential impacts on incomes: Rental incomes

Cause and Comment
For the duration of the operational phase landowners that are directly involved in the project, albeit a small number of landowners, would benefit financially. Long-term lease agreements are put in place and a positive economic impact is experienced in this regard.

No-go option
- No rental and other financial income would accrue to accommodation establishment owners.

Significance Statement
Although definite, the impact is slightly beneficial as a limited number of land owners would benefit. The impact has an overall moderate significance, with low confidence as details of the rental agreements are unknown at this stage.

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<td>No-Go</td>
<td>Long Term</td>
<td>Local</td>
<td>Slight</td>
<td>Unlikely</td>
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Impact 9: Potential impacts on incomes: Gaming / hunting industry

Cause and Comment
The possible impact wind turbine structures could have on income potential from an economic point of view is something that could be debated as different role players may have different opinions and views. The following information was obtained, and emphasise the diversity of opinions:
It is the concern of the land owner of Portion 2 of the Remainder of Portion 233, Registration Division of Uitenhage that he would not be able to successfully operate his farm as a commercial hunting operation as wind turbines would have a negative visual and potential noise impact from almost all the vantage points on his farm. In his opinion this would detract from the wildlife experience for overseas and local hunters. The I&AP has made significant investments in terms of infrastructure development and the purchase of wild animals. He is dependent on incomes derived from hunting to service his bond. However, commercial hunting is envisaged for the future and not operated to its full potential yet. Therefore impacts on potential future revenues/losses cannot be determined at this stage. Also, existing infrastructure (the 132 kV Eskom power line along the northern boundary, the unused railway line that runs along the border of the property and the Grassridge wind turbines) already have a visual impact and the potential negative impact that the Dassiesridge turbines could have on commercial hunting on this farm is thus questionable.

One of the property owners directly involved in the project hosts an approximate hundred (100) local and international hunters per year. Approximately 700 to 800 animals are being hunted annually. Even though wind turbines would be erected on these farms, he is not concerned that there would be a significant impact on his commercial hunting operations. An agricultural farm located adjacent to the Cookhouse WEF is in the process of being converted from livestock to a game farm, even though the farm is impacted visually by the turbines.

Hunting/game farms near Cookhouse, such as Highdale, have wind turbines on the property with no significant impact on the industry.

The conclusion can thus be drawn that there is a potential of economic impacts on current activities (especially the hunting industry) and potential future eco-tourism opportunities, but it is highly unlikely that these activities would cease as a result of the facility.

**Mitigation Measures**
- Open and direct consultation with concerned and affected land owners.
- Structures and ancillary infrastructure be appropriately planned and placed and maintained in neat and appealing way.

**No-go option**
- Gaming / hunting industry would operate unhindered.
- Loss of foreign direct investment and the associated job creation, SED & ED contributions.
- Less power generated in the area to increase supply and grid stability.

**Significance Statement**
The overall significance of this impact could be rated as moderate (standard environmental principle is applied), although views and opinions of role-players are diverse and monetary values cannot be determined. Confidence in this rating is low.

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<tr>
<td>No-Go</td>
<td>Long Term</td>
<td>Study Area</td>
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</table>
Impact 10: Impacts on leisure and tourism activities

Cause and Comment
The Cacadu DM identified the Sunday’s River Valley/surrounds of the Addo Elephant National Park as one of its tourism development nodes (Cacadu IDP). The area is well provided with B&B’s and Guesthouses. The Addo National Park is located approximately 10 km from the site and the Springs Local Authority National Park approximately 8 km to the north.

‘Addo to Eden’ is trying to establish wildlife corridors and are in the process talking to landowners in the Jansenville area to link significant protected areas to prevent “wildlife islands”. A hiking trail across Springbok Vlakte also exists and a bicycle adventure route is planned. This area is 30 km to the north-west of the study area and no negative visual or other significant impact on leisure/tourism for this activity is expected.

The Dassiesridge WEF is thus located in the “gateway” to this tourism area and would be observed by tourist/motorists travelling along the R75.

If authorised the facility could be promoted and regarded as an attraction and landmark for the region as it will be impossible to hide.

Mitigation Measures

- If authorised the facility could be promoted and regarded as an attraction and landmark for the region as it will be impossible to hide.
- Structures and ancillary infrastructure be appropriately planned and placed and maintained in neat and appealing way.

No-go option
- Tourism would not be affected in a positive or negative way.

Significance Statement
The overall significance of the impact is rated as low, albeit positive should it be regarded as a tourist attraction. Confidence in the rating is low.

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<th>Impact</th>
<th>Temporal Scale</th>
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<td>Region</td>
<td>Slight</td>
<td>May Occur</td>
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Impact 11: Impacts on infrastructure and services

Cause and Comment
No existing infrastructure would be removed, damaged or impacted on during the operational phase. Impacts on road infrastructure would be insignificant as the WEF is designed to operate continuously, with low maintenance and with only a small workforce.

Significance Statement
### Impact 12: Impacts on the ‘sense of place’

**Cause and Comment**

Extensive dust, traffic and security issues as a result of the wind energy facility during the operational phase are highly unlikely and should not impact on the community’s ‘sense of place’. Although potential noise impacts have been raised as a concern, the proximity for residences to the turbines makes the impact highly unlikely and the assessment and rating thereof falls outside the scope of this report.

Visual impacts have the potential to affect the local ‘sense of place’ and could thus impact on game farming, hunting and similar eco-tourism related land uses if ‘sense of place’ is altered to such an extent that it affects the numbers of visitors / tourists to the area or impacts the quality of life for locals.

It should be noted that existing structures such as Eskom power lines and pylons, a railway line, roads, and windmills already have a visual impact on the study area. Over time communities often become “desensitised” towards these “man-made” structures and structures could even be regarded as iconic (e.g. windmills in the Karoo). It is therefore possible that negative impacts of the wind turbines and associated infrastructure on the community’s ‘sense of place’ could decline over time.

Furthermore, although some of the turbines would be visible from the R75 and from a few farm residences, there are no sensitive receptors or residential areas in close proximity to the site. The impact on the community’s ‘sense of place’ can therefore not be regarded as severe.

Through discussions with landowners and I&APs it became clear that people in the district in general have become accustomed to wind turbines and would “tolerate” these structures as they recognize the advantages of renewable clean energy for the country as a whole.

**Mitigation Measures**

- Structures and ancillary infrastructure be appropriately planned and placed and maintained in neat and appealing way to minimize negative visual impacts.
- Implement all mitigation measures as proposed in the Specialist Visual Impact Assessment Report.
- Maintain access roads to the site and implement measures to suppress dust on gravel roads.
- Do site clearance of alien vegetation regularly and implement measures to minimize the possibility of veld fires.
- Strict access control to the wind turbines to restrict unlawful trespassing and curb safety and security issues for local land owners.
- Ensure that residents and landowners are aware of the procedures to lodge complaints and make the details of the EMC / Operations Manager available to the public. Respond and attend to issues and complaints diligently.

**No-go option**
No visual impacts and no negative impacts on the community’s ‘sense of place’.

**Significance Statement**
A moderate overall significance is assigned to impacts on the ‘sense of place’, as visual impacts have the potential to affect the surrounding landowners’ perception of their living environment and also incomes derived from the gaming / hunting industry negatively.

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<th>Impact</th>
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<th>Effect Spatial Scale</th>
<th>Severity of Impact</th>
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<td>Unlikely</td>
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**Impact 13: Electricity supply and the environment**

**Cause and Comment**
Even though the cost-competitiveness of renewable energy sources still holds many challenges, the proposed Dassiesridge WEF would have a positive impact on a regional and national level:
- Wind energy is renewable and sustainable and cannot be depleted, as is the case with fossil fuels;
- Wind energy facilities generally require less maintenance with lower operational costs;
- Renewable energy has minimal impact on the environment and produces little or no waste products, such as carbon dioxide and other chemical pollutants; and
- Renewable energy projects can bring economic benefits for the country, e.g. in the form of new ‘green’ jobs.

**No-go option**
- Coal-fired power stations would remain South Africa’s primary source of electricity generation with numerous environmental disadvantages.

**Significance Statement**

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<th>Severity of Impact</th>
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**10.4 Decommissioning Phase Impacts**

**10.4.1 Social**

**Impact 1: Job creation**

**Cause and Comment**
Temporary workers would be required to do the dissembling and/or replacement of components and skilled employees (project managers, technicians, etc.) would also be required. The number of employment positions is unknown as this is new technology and none of the existing plants have as yet been decommissioned. However, it could be expected that suitable workers will be available as a large number of people would have gained relevant skills over the 25 year operational period of the Dassiesridge WEF and similar plants in the region.

**Significance Statement**
At this stage it is expected that the same number of workers (800) would be used for decommissioning as was employed during the construction period. A positive impact of moderate significance is anticipated over the short term.

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### Impact 2: Impacts on living and movement patterns

**Cause and Comment**
Negative impacts on traffic movement patterns would be inevitable as large construction vehicles would be required to move new and old components to and from the site.

**Significance Statement**
Although traffic volumes on the R75 and R335 and road conditions at the time of decommissioning are unknown at this stage, the impact could be regarded as severe due to the high number of trucks and abnormal loads that would be transported. An impact with an overall negative moderate significance is likely.

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<td>Decommissioning phase</td>
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### Impact 3: Impacts associated with a change in land use

**Cause and Comment**
Two scenarios that are at this stage foreseen are:
- The land would be rehabilitated and rezoned to Agriculture, in which case it could be used for livestock grazing and/or game farming purposes; or
- New technology would enable the proponent to extend the operational phase and applications would be lodged to extend rezoning Consents and / or Long-term lease agreements with landowners and authorities.

**Significance Statement**
Regardless of the preferred land uses post the decommissioning phase, no severe impact is anticipated, provided that the land is rehabilitated to its natural state.
Impact 4: Safety and security concerns

Cause and Comment
The decommissioning phase would increase the influx of people, which could increase the likelihood of safety and security issues.

Significance Statement

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Impact 5: Intrusion impacts

Dust / air pollution, visual impacts and other nuisance factors not unlike those experienced during the construction phase is possible and could be mitigated in a similar way. Refer to Section 10.2 of this report.

10.5 Cumulative Impacts

Cumulative impact refers to the combined effects of numerous single developments combined. The purpose of cumulative impact assessment is to ensure the full range of consequences of actions is considered. Cumulative impacts can occur over different temporal and spatial scales by interacting, combining and compounding so that the overall effect often exceeds the simple sum of previous effects.

As per the NEMA regulations, cumulative impact means “the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.”

The Dassiesridge WEF is proposed to be located on a number of properties, one of which is contiguous with the border of the properties on which the Grassridge Wind Energy Facility is located and on which the proposed Grassridge II (PPC Properties as per Figure 10-1) is set to be located. The Grassridge WEF, operated by Grassridge Wind Power, consists of 20 turbines. The proposed Grassridge II WEF will consist of approximately eight turbines.

The cumulative impacts of the three bordering Wind Energy Facilities has been assessed by the various specialists in the sections 10.5.1 to 10.5.7.

Figure 10-1: Wind Energy Facilities (WEFs) which surround the Dassiesridge WEF
10.5.1 General

Impact 1: Increased power input to the grid

*Cause and Comment*
The local municipal area is faced with the problem of load shedding and the resultant distribution disruptions. This highlights the need to save and conserve energy. The addition of approximately 48 MW of renewable energy into the existing grid will result in the alleviation of a portion of the burden on the municipality to provide electricity (especially during winter when the energy demand is higher) to its residents.

**Cumulative Impact**

<table>
<thead>
<tr>
<th>Impact</th>
<th>Temporal Scale</th>
<th>Spatial Scale</th>
<th>Severity of Impact</th>
<th>Risk or Likelihood</th>
<th>Overall Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without Mitigation</td>
<td>Long Term</td>
<td>Regional</td>
<td>Beneficial</td>
<td>Definite</td>
<td>HIGH +</td>
</tr>
<tr>
<td>With Mitigation</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Impact 2: Increased traffic during the construction phase

*Cause and Comment*
Heavy construction vehicles will be utilising the existing road network during the construction phase of the development which may result in traffic congestion and damage to existing roads. However this impact will be of short term duration as no additional traffic will be required during the operational phase other than for maintenance purposes.

### Cumulative Impact

<table>
<thead>
<tr>
<th>Impact</th>
<th>Effect</th>
<th>Severity of Impact</th>
<th>Risk or Likelihood</th>
<th>Overall Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without Mitigation</td>
<td>Short Term</td>
<td>Study Area</td>
<td>Slight - Moderate</td>
<td>Definite</td>
</tr>
<tr>
<td>With Mitigation</td>
<td>Short Term</td>
<td>Study Area</td>
<td>Slight - Moderate</td>
<td>Definite</td>
</tr>
</tbody>
</table>

### 10.5.2 Ecological

Sadler (1996) defines cumulative impacts as the “the net result of environmental impact from a number of projects and activities”. The impact of the proposed WEF may not be significant or be a serious threat to the environment, but a large number of projects in one area, or occurring in the same vegetation type may have significant impacts (DEAT, 2004). This section attempts to identify the cumulative impacts associated with Wind farm projects taking place in similar vegetation type in this area. Even though the possible extent of the cumulative impacts cannot be determined due to not knowing the number of projects that will be accepted, it is still important to try and identify the negative and positive impacts which may arise in the long term and this includes looking at this project in conjunction with other projects. For this reason the cumulative impacts associated with the existing Grassridge and proposed Grassridge 2 WEFs adjacent to the site have been assessed.

### Impact 1: Loss of Coega Bontveld vegetation

**Cause and Comment**

This vegetation type is already listed as threatened by activities such as mining in the area. Additional developments within this vegetation type will have further impacts on this vegetation. Given the limited distribution of this vegetation type, the unmitigated cumulative impacts associated with the neighbouring Grassridge WEF and PPC mine are likely to be high. However, since Coega Bontveld is comprised of a mosaic of vegetation (bushclumps, succulent patches and grassland) mitigation measures that avoid areas of high sensitivity (Bushclumps and succulent patches) will reduce the impacts the WEF is likely to have. As mentioned previously, the turbine infrastructure associated with the WEF will only impact 0.6% of the Coega Bontveld on the property or of the total vegetation type.

### Impact 2: Loss of Sunday Valley thicket vegetation

**Cause and Comment**

Even though the proposed project (Dassiesridge WEF) may not result in significant losses of this vegetation type, the cumulative impacts associated with this project and other WEFs (eg Grassridge WEF) in the area must be assessed. The SRV biodiversity Sector Plan states that the removal of large expenses of this vegetation has been identified as one of the factors which may encourage global climate change due to the increase in CO₂ input into the atmosphere. The Thicket vegetation acts as a carbon sink by fixing carbon in plants and storing it in the soil through the process of decomposition. *Portulacaria afra* (*Spekboom*) is a common species in the Thicket vegetation, and studies have shown it is able to store large quantities of carbon. This vegetation...
type has a wider distribution than Coega Bontveld and the cumulative impacts on this vegetation type are likely to be moderate.

Impact 3: Loss of SCC

Cause and Comment
The proposed project (Dassiesridge) will have an impact on SCC found to occur in both the Coega Bontveld and the Thicket vegetation. SCC are species which need to be conserved as they are threatened by various factors. Various factors are used to determine if a species is classified as a SCC and these include habitat destruction, habitat loss and the harvesting or poaching of species. Anthropogenic activities such as urban settlement and development are some of the causes which result in the above factors. Due to the Coega bontveld and Thicket vegetation having a number of SCC associated with them and the Coega bontveld having a restricted distribution, the cumulative impact of the Loss of SCC needs to be assessed.

Cumulative Impacts
The extent of the loss of SCC can only be predicted and therefore a precautionary approach has been adopted. The cumulative impact associated with the Dassiesridge WEF and the Grassridge and Grassridge 2 WEFs nearby is likely to be high.

10.5.3 Avifaunal

Cause and Comment
The proposed Dassieridge Wind Energy Facility is situated in an area of the country where several such projects are either under assessment or already under construction. To our knowledge, the following projects exist and are relevant:

- Grassridge Wind Energy Facility. This is situated immediately south of the Eastern half of the Dassieridge site and is already under construction.
- Bayview Wind Energy Facility. This project is currently conducting Environmental Impact Assessment. It is situated approximately 8 kilometres east of the Dassieridge boundary.

In such areas, where multiple facilities may be built, it is important to consider the overall or cumulative impact of these facilities on birds. Consideration of each project in isolation may not adequately judge the effect that projects will have on avifauna when combined.

The International Finance Corporation (IFC) recognises Cumulative Impact Assessment (CIA) and management as essential in risk management. However CIA is also “One of the biggest risk management challenges currently facing project developers in emerging markets…”. Challenges include: a lack of basic baseline data, uncertainty associated with anticipated developments, limited government capacity, and absence of strategic regional, sectoral, or integrated resource planning schemes. Considerable debate exists as to whether CIA should be incorporated into good practice of Environmental and Social Impact Assessment, or whether it requires a separate stand-alone process. As a minimum, according to the IFC, developers should assess whether their projects could contribute to cumulative impacts or be impacted upon by other projects. The IFC recommend that developers conduct a Rapid Cumulative Impact Assessment (RCIA) either as part of the EIA or separately. This RCIA should follow 6 steps: 1 & 2 – scoping; 3 - baseline determination; 4 - assessment of the contribution of the development under evaluation to the predicted cumulative impacts; 5 - evaluation of the significance of predicted cumulative impacts to the viability or sustainability of the affected environmental components; 6 - design and implementation of mitigation measures to manage the development’s contribution to the cumulative

Additional challenges specific to the Dassieridge area and avifauna include:

- The difficulty in defining which projects to include in a CIA. Not all the projects in the area have obtained environmental authorisation, or authorisation from the Department of Energy, so may never materialise. The question is which projects should be considered then, only those authorised, or those successful bidders, or those that have reached financial close.
- The difficulty in defining the spatial extent of a CIA, bearing in mind that some of the relevant bird species move hundreds of kilometres across the landscape and could theoretically be affected by developments within this entire range.

**Cumulative Impacts**
The IFC step wise approach is useful to follow for this study, and has been elaborated on below:

**Step 1 & 2:** The Dassieridge study has achieved these through the scoping of issues and identification of aspects worthy of attention. It is assumed that these aspects will be similar on the other project sites in similar topography and vegetation. In particular, we have obtained reports from bird monitoring at the closest site, Grassridge. Studies at Grassridge identified the following bird species as being particularly important: Blue Crane, Denham’s Bustard, Secretarybird, and Black Harrier. Flight activity of threatened species such as Blue Crane and Denham’s Bustard was relatively low, and most recorded flight was below rotor height. Similarly to Dassiesridge, species recorded flying the most were common, including Southern Pale Chanting Goshawk, Rock Kestrel and Black-shouldered Kite. No sensitive species were found breeding on site.

**Step 3:**
Although baseline information has been obtained on the relevant bird species for the Dassieridge site, obtaining relevant, detailed data on baseline conditions on all the other facilities in the general area is not possible at this stage as the pre-construction bird monitoring reports from these projects are not in the public domain. This information is not readily available publicly, so assumptions need to be made about which species will be affected by these other facilities. As described above, some information has been obtained from the Grassridge site, and mention is made earlier in this report of post construction monitoring results from the single wind turbine near Coega (Doty & Martin, 2013).

**Step 4:** requires a judgment of the contribution that the Dassiesridge site makes to the predicted cumulative impacts. In our opinion, with respect to the key species listed as most important for this area, the Dassiesridge site makes a contribution to impacts in the area, on account of its size, and available open habitat on site (which is attractive to key Red List bird species).

**Step 5:** The overall cumulative effect of wind energy facilities on birds in this area, is likely to be of LOW - MEDIUM significance prior to mitigation in our opinion.
Step 6: It is recommended that each project within this broader area ensures that no effort is spared in mitigating impacts on avifauna. It is hoped that if each project provides sufficient mitigation, the overall cumulative impact can be reduced. There are strong grounds for a strategic cumulative avifaunal impact assessment to be conducted for the greater Coega-Addo area as soon as possible. It is recommended that the Department of Environmental Affairs implement such a study.

10.5.4 Heritage

Cause and Comment
Cumulative effects can be defined as impacts which combine from different projects, resulting in significant change, which is larger than the sum of the individual impacts. Cumulative Effects Assessment (CEA) is, in South Africa, an emerging process in the field of Integrated Environmental Management (IEM). It aims to provide direction in the decision making process from a holistic point of view – through the understanding of impacts on past, present and future generations by broadening the spatial and temporal focus of Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA). It focusses on the consideration of long term changes, not only as the result of a single action or development, but the combined effects of many actions over time, and on the environment in order to guide the decision making process through an understanding of local, regional and global linkages (DEAT 2004). The concept of a tiered context analysis to guide the planning and decision making process is not new. Possibly in its simplest form, albeit from the field of architecture, Alvar Aalto (1873 – 1950) explained: ‘Always design a thing by considering it in its next larger context – a chair in a room, a room in a house, a house in an environment, an environment in a city plan.’

CEA can be done as a stand-alone assessment or can be incorporated in the SEA through inclusion in the EIA, with the latter approach being preferred as a result of the more applied methodology inherent therein (DEAT 2004). When CEA principles are included in the EIA level, individual aspects thereof can already be addressed on specialist assessment level. DEAT (2004) prescribes a 2-tiered context for basic analysis, namely:

- Project based; and
- Regional based.

The principles of CEA are not lost on the South African heritage compliance arena, albeit in large limited to the project based level. The SAHRA (2007) guidelines state that: ‘The legislation (NHRA 1999) require that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance be protected. Thus any assessment should make provision for the protection of ALL these heritage components, including archaeology, shipwrecks, battlefields, graves and structures over 60 years, living heritage and the collection of oral histories, historical settlements, landscapes, geological sites and palaeontological sites and objects.’ It continues: ‘Where possible archaeological and palaeontological sites should be saved, but where this is not possible, the loss of information about our heritage resources can be mitigated against or minimized through a process of excavation (or sampling) and dating of a representative sample of the evidence from the site. This allows us to record at least part of the history of the place.’ And ‘When a Phase 1 is part of an EIA, wider issues such as public consultation and assessment of the spatial and visual impacts of the development may be undertaken as part of the general study and may not be required from the archaeologist. If however the Phase 1 forms a major component of an HIA it will be necessary to ensure that the study addresses such issues and complies with Section 38 of the National Heritage Resources Act.’
The above describes the basic process of the SAHRA Heritage Impact Assessment (HIA), including the archaeological (AIA) and palaeontological (PIA) components thereof: Firstly as the type of sites that are protected and needs to be recorded during Phase 1 assessment, their documentation and associated relevant recommendations, either conservation or (Phase 2) mitigation and if the assessment formed a major part of the HIA for inclusion in an EIA, the need to assess the findings in a wider project based context. In practice this is often done by the cumulative description of identified impacts on the immediate receiving cultural environment: An archaeological and cultural heritage description of the impact of development on the cultural landscape and viewscape is a first tier cumulative context description; an interpretation of impact on a project based level.

**Cumulative Impacts**

Specialist input on a regional based level was requested with specific reference to proposed Wind Farm developments in the wider region: With a focus on the Grassridge WEF, situated immediately adjacent to the Dassiesridge WEF study site, south towards Port Elizabeth and the Jeffrey’s Bay / Humansdorp area, to Jansenville in the west, Somerset-East / Bedford in the north and Grahamstown in the east. Many of the proposed developments are still in a Scoping phase, some in a construction phase and with a selected few having been completed.

During the Grassridge Phase 1 AIA, and best describing the immediate greater receiving archaeological and cultural environment of the Dassiesridge WEF, Booth (2012) identified only 3 low density Middle Stone Age (MSA) lithic surface scatters, with additional Stone Age occurrences identified along access roads travelled. Recommendations included archaeological monitoring at the time of vegetation clearing and during excavation activities (very similar to the recommendations contained in this report for the Dassiesridge WEF), but with findings of the recommended archaeological monitoring not available for purposes of this report. Similarities between the recorded Low Significance Stone Age deposits at both Grassridge and at the Dassiesridge WEF supports a low cumulative impact of the proposed Dassiesridge WEF on a project based level, whilst also providing a platform for discussion and comparison with archaeological and cultural heritage findings of Wind Farm developments on a regional level. In addition the identification of 2 Colonial Period sites at the Dassiesridge WEF, both of which will be conserved and considering development time frames, including indirect recording on possible unforeseen or natural impact, ensuring reporting on the conservation thereof for a minimum 20 year period, adding a valuable though low level Colonial Period layer to the existing heritage record of the area.

Though the Phase 1 AIA report for the Coega IDZ WEF was not available for interpretation, Binneman’s (2010c) survey of the greater Coega IDZ provides for a fair interpretation of the area: A number of Earlier (ESA), MSA and Later Stone Age (LSA) sites and occurrences characterized the area with a wealth of LSA shell midden sites clustered in IDZ Zones 1, 7 and 10, along the Coega (Koega) River and the coastline and situated within the general 5km sensitive coastal zone of archaeological shell midden sites. The report highlights the change in archaeological sensitivity, type sites and paleo landscape use across the various geographic zones of the IDZ.

Along the south coast LSA shell midden sites were again identified within the 5km sensitive coastal zone: At the MetroWind WEF study site a number of shell middens were recorded during the Phase 1 AIA (Binneman & Booth 2010). Phase 2 mitigation and monitoring greatly served to further interpretation of the surface identified middens: Pre-pottery and pottery phased hunter-gatherer (San) associated middens were identified with later phased middens intersecting ephemeral pastoralist (Khoe) middens, further describing the past cultural complexity of the area;

the result of scientific mitigation and analysis (Nilssen & Van Ryneveld 2012), emphasizing not only the contribution, but also the responsibility of development towards our non-renewable heritage where development may or will impact thereon.

Further along the south coast, despite proximity to the said 5km sensitive coastal zone, recorded shell middens seem to elude CRM documentation despite their known existence in accordance with publicized sites. One significant ESA, MSA and LSA site was recorded in the Central Cluster study site of the Red Cap Kouga WEF (Van Ryneveld 2010), with further reports on low density ESA and MSA occurrences recorded in the Ubuntu, Oyster Bay and Tsitsikamma assessments (Binneman 2011a, 2011b, 2011c). Limited Phase 2 monitoring and mitigation serves to clarify, at least in part, subsurface uncertainties pertaining to the Stone Age record: Adding to our interpretation of technology and typology, but more importantly that of palaeo landscape use and post-depositional processes along the south coast of the Eastern Cape (Van Ryneveld 2012b, 2013). Again the Stone Age record is overlain by a low impact, general Low Significance Colonial Period layer, directly associated with continuing landscape use, and complimented by identified Grave and Cemetery sites (Van Ryneveld 2010, 2013).

No archaeological reports are available on SAHRIS for Wind Farm developments proposed to the west of the Dassiesridge WEF, near Jansenville or further north towards Pearston.

To the north of the Dassiesridge WEF, a desktop assessment by Booth (2011a) describes the range of heritage sites that may be expected in the area. Field assessment at the Golden Valley study site (Hart 2010) confirmed the general presence of widely scattered low density MSA lithic surface material, while an ESA and a LSA site, notable for the presence of ceramics at the site, were identified. The Colonial Period landscape is characterized by ample farmstead and associated farming infrastructural remains, but with the significance thereof greatly diminished by contemporary cultural overlay, the result of continuing cultural tradition, albeit unfortunately not with the necessary cognizance to heritage resources impacted on. The 2-tiered Stone Age / Colonial Period cultural landscape identified at the Golden Valley WEF is echoed by findings of the Amakhala-Emoyeni WEF: Here Halket et al. (2010) again recorded Pre-colonial Stone Age deposits associated with a Colonial Period layer, primarily comprising of farmstead remains. At the Cookhouse WEF Booth (2011b) reported on MSA and LSA lithic scatters, with LSA lithics associated with surface finds designating a Colonial Period date, but without a confirmed Colonial Period layer at the site.

Towards the east of the Dassiesridge WEF study site, field assessment at the Peddie WEF (Booth 2011c) identified low density scatters of MSA surface deposits and at Waainek (Anderson 2009) isolated MSA and LSA lithic incidents were reported on, defining the direct impact of these Wind Farm developments on the recorded tangible archaeological and cultural heritage.

When considering specialist input for purposes of CEA it is, first and foremost, the location of the development that needs to be considered, with evaluation of layered specialist concerns describing and defining aspects to guide the decision making process.

• With reference to the project based cumulative impact on archaeological and cultural heritage resources for the Dassiesridge WEF, recorded low density MSA and LSA Stone Age occurrences and the 2 identified Colonial Period sites provide for a notably low cumulative impact on heritage resources. The described low project based cumulative impact is supported by the correspondingly low heritage impact of the adjacent Grassridge WEF, where construction is currently underway.
• Considering the more regional based impact on archaeological and cultural heritage resources, the locality of the Dassiesridge WEF study site, being situated more than 20km from the coastline, remain paramount; implying that no sensitive coastal archaeological resources, so often associated with intangible heritage aspects and associated cultural landscapes and viewscapes cannot be affected. The general 2-tiered Stone Age / Colonial Period landscape identified at the Dassiesridge WEF is, excluding more coastal based Wind Farms, repeated at study sites towards the east and importantly the Spitskop / Middleton / Amakhala / Golden Valley / Cookhouse WEF complex towards the north: A large WEF complex of low cumulative project and regional based significance. The very similar cultural environment at the Grassridge / Dassiesridge WEF complex will provide for an equally low cumulative project and regional based development, not only confirming the locale’s ideality, but also pointing towards the feasibility of future expansion of the Grassridge / Dassieridge WEF complex.

10.5.5 Paleontological

Cumulative Impacts
The fossil heritage impact significance of the existing Grassridge WEF, immediately to the southeast of the proposed Dassiesridge WEF, was assessed as low in a previous study by Almond (2011). Impacts in Grassridge WEF area mainly concern poorly-fossiliferous, recrystallized marine limestones of the Alexandria Formation similar to those underlying the main development footprint for the Dassiesridge WEF. The limestones and sparse associated fossils are of widespread occurrence within the broader Port Elizabeth – Uitenhage region (cf Almond 2010). It is concluded that the cumulative impacts of the two adjacent wind energy facilities is LOW.

10.5.6 Visual

Cumulative Impacts
The impact of the additional turbines at Dassiesridge greatly increases the cumulative visual impact on the surrounding communities and visual receptors. The visual impact will therefore increase for individuals who are directly affected by the additional turbines within close proximity to their residences. However, the overall impact of the additional Dassiesridge WEF is not as high as introducing a WEF to an area which is pristine as the surrounding road users and visual receptors have generally been desensitised to the presence of these structures.

10.5.7 Social

Impact 1: Influx of jobseekers and the impact of temporary construction workers

Cause and Comment
A 20-month construction period is foreseen and approximately 100 to 300 workers would intermittently be on site per month. An estimated 80 - 90% of these jobs would be allocated to unskilled and semi-skilled positions. Large-scale unemployment levels in the Metro (37%), District (25%) and local Municipality (15%) (Refer Section 4.9) could result in high numbers of people seeking employment if the project is a successful bidder and becomes public knowledge. It could further be anticipated that ‘outsiders’ from the wider area and other Provinces would also attempt to find employment at the construction site and mitigation measures would be required in this regard, as the Department of Energy (DoE) sets high standards in terms of local content, which includes local employment.

Cumulative Impacts
• Locals from the Motherwell area are mainly employed at the construction site of the Grassridge WEF and locals from Uitenhage, Addo and possible Kirkwood would be employed at Dassiesridge WEF. By the time Dassiesridge WEF is constructed (if approved), construction of Grassridge WEF will be complete and it is thus not anticipated that the construction periods of the two WEF’s would coincide.
• It is not known whether ‘outsiders’ were attracted by potential employment at other WEF’s in and around the area (as locals were employed) and subsequently the cumulative impact of ‘outsiders’ on the local community (conflict, etc.) and the Municipality (infrastructure, social services, etc.) cannot be determined. If labour is managed pro-actively by the various IPP’s the cumulative impact is expected to be negligible.

Impact 2: Employment opportunities and employment equity

Cause and Comment
The construction period of the wind energy facility is labour intensive with positive socio-economic consequences. Although not certain at this stage, approximately 800 employment opportunities would become available over the short-term (20-month construction period). At the peak of construction an estimated 300 people would be on site. Employment is not constant and will start slow, reach a peak and then slow down again towards the end of the construction period.
Unskilled workers do not necessarily require previous work experience and would be employed to do basic labour such as site clearing, digging of trenches, erecting fences, laying foundations, etc. Unskilled workers will be sourced from the nearby towns of Uitenhage, Addo and possibly Kirkwood and socio-economic benefits during the construction phase would thus relay to the local area. Unskilled workers would amount to approximately 560 to 640 of the total labour force.
Semi-skilled workers include machine operators, drivers, rehabilitation workers, etc. It is also expected that most of these positions be filled by residents of the NMBM, SRVM or the wider Cacadu district. Community members with skills obtained from similar construction projects such as Grassridge and Cookhouse WEF’s could also be sourced. The Contractor and Sub-contractors’ tender documents would need to reflect the worker requirements and should be enforced through the CLOs and Compliance Officer. Eighty to 120 positions would be filled by semi-skilled workers.
Skilled professionals would include Land Surveyors, Project Managers, Assistant Project Managers, Engineers, an Environmental Control Officer and so forth. Wind energy facilities are new technology in South Africa and require specialised skills, which is not always readily available in South Africa. A portion of the skilled labour force would thus consist of foreigners and/or expatriates (80 to 120 skilled employment opportunities).

However, the number of foreigners employed would in all likelihood decrease as skills are being transferred to South Africans through completed renewable energy projects in the country. Recruitment of a ‘local’ skilled workforce would in all likelihood be done in the NMBM area where higher tertiary education levels (30.5%) occur. DoE requires a minimum of 30% skilled Black people during the construction phase, which could increase at a later stage.

Although policies with regards to the employment of disabled people, the youth and women have not been formulated at this stage, it is recommended that the recruitment policy takes employment equity of minority groups into consideration (wherever possible) to increase the potential employment advantages of the proposed project. This would not always be possible, as the construction phase comprises strenuous physical labour.

Cumulative Impacts
• An increase in employment, social and economic advantages for individuals and families
through the implementation of various renewable energy projects in the NMBM, Cacadu district and SRVM.

**Impact 3: Skills development and capacity building**

*Cause and Comment*
Skills development and capacity building for workers, whether through training or hands-on experience would be a positive outcome of the construction phase. However, due to the relative short length of the construction phase it is doubtful that comprehensive skills training programmes could be undertaken.

The majority of the workforce would be unskilled labour that does manual labour and activities which requires minimal previous work experience or training (digging of trenches, site clearing, etc.). However, experience gained at the construction site could, to a certain extent, be advantages for these workers once they seek employment at other construction sites.

Semi-skilled labour would require previous work experience and/or a certain level of training as pre-requisite of employment. Skills development and capacity building for the anticipated 10 - 15% of the workforce would thus be valuable and significant and in addition to technical training, could include Fire Marshall training, First Aid Training, etc.

Skilled workers would fill specialist positions and a higher / tertiary education would be essential. Even as such, renewable energy technology is new technology in South Africa and on-site training and skills transfer, especially for South Africans, is likely.

*Cumulative Impacts*
- Collective skills development and capacity building will enhance the employability of the local labour force with positive economic advantages for the NMBM, SRVM, Cacadu DM and Eastern Cape Province.

**Impact 4: Local procurement**

*Cause and Comment*
Local procurement would be more focused on the procurement of general construction materials and goods, infrastructure elements and the wind farm components by the Coega Development Corporation (CDC) and other industries in Port Elizabeth and the broader South Africa, as many of the high-technology components (complex turbine parts) would be imported. The DoE prescribes a minimum of 40% local content (labour, material and goods), aiming for 65%. This would have positive impacts on the local economy.

Currently it is not known how the local content of this project would be calculated, as procurement and local labour figures cannot accurately be determined at this stage.

*Cumulative Impacts*
- Increasing local procurement, technology development and skills development through the various wind energy and related renewable energy projects would manifest in positive cumulative impacts for the local and regional economies.
Impact 5: Skills development of supporting industries / local SMMEs

Cause and Comment
Supporting industries refer to small business enterprises and services that would be required to fulfil needs or requirements that develop as a result of the construction activities and would thus fall under the ‘Enterp
3e
rise Development’ (ED) and ‘Socio-economic Development’ (SED) component of the project. This could include catering, laundry services, suppliers of protective clothing, transport and so forth.

An indirect objective and positive spin-off of the Dassiesridge WEF construction period would therefore be the establishment and support for local small businesses, and thus contributing to economic growth within the Municipalities. However, SMME development is a challenge in most peri-urban and rural areas as exposure to an economic growth climate has usually been absent.

Even though skills development and training for SMMEs is not directly the responsibility of the project proponent, there are a number of measures that could be implemented in advance to enhance the development and growth of PDIs and local small service providers. This would include:

• Identify the needs, services and small business requirements necessary for all stages of the construction period;
• Draw up a strategy and policy to ensure the involvement / shareholding of upcoming local businesses or PDIs that tender;
• Meet with the affected Municipalities, Councillors, the local business forums, community representatives and other relevant structures to provide a list of the required services and convey the tender policies to them;
• Appoint a Compliance Officer (CO) and establish a Community Liaison Office (CLO) to ensure compliance of SMMEs, PDIs and other individuals that tender; and
• Award the tenders well in advance to ensure that the SMMEs are prepared, trained, registered and well-equipped once construction commences.

The above strategy would thus aim to give preference to small upcoming businesses or PDIs. Where the necessary skills, expertise or capital lack, established local businesses could be contracted, but would be required to involve and train upcoming businesses or PDIs (thus forming a partnership), thereby contributing to skills development of small business.

Cumulative Impacts
• Establishment of various SMMEs and enterprises that enter the small business market and are able and willing to compete in the local economy.
• Improved development of local small businesses, job creation, skills development, economic spin-offs and thus positive impacts on the local economy.

Impact 6: Impacts on the Local Economy

Cause and Comment
Positive impacts for the local economy associated with the construction phase would include:

• Employment of locals and an increase in salary earners;
• Contracts with SMME’s and local service providers (catering, transport, etc.) where possible;
• Local procurement of material and goods, if possible;
• Increase in spending power and expenditure on groceries, goods and services, which would be advantages for local merchants, food suppliers and informal traders; and
• Accommodation of foreigners in local establishments and other spin-offs.

Local procurement would be more focused on the procurement of general construction materials and goods as the majority of technology requirements would be imported. The site is located in relative close proximity to a number of industrial zones in the NMBM where manufacturing of components, material and goods could be produced to the benefit of the local economy.

Cumulative Impacts
• Enhanced local economic opportunities, job creation and other economic spin-offs.

Impact 7: Attitude formation, interest group activity, community mobilisation

Cause and Comment
No interest group activity or community mobilisation for, or against, the proposed project has been observed. However, the following should be noted:
• Two distressed I&AP’s have obtained legal representation and legal action could be implemented should their grievances not be addressed. These relate to aviation issues and potential economic impacts in the operational phase.
• A lack in communication, unrealistic expectations and other employment issues resulted in labour tension and riots during the initial construction phases of the Cookhouse WEF. The Cookhouse project affects two local and two district Municipalities and animosity amongst locals developed as some of the locals were, in their opinion, “excluded” from the benefits of the project. As the Dassiesridge WEF affects two Municipalities, i.e. NMBM and the SRVM, implementation of pro-active mitigation and management measures would be essential to ensure that labour unrests do not also occur. Involve the Municipalities from the onset of the project in decision making processes.
• The DoE defines the beneficiary community as those communities located within a 50 km radius of the project. As experience from the construction of the Cookhouse WEF has illustrated, this requirement has the potential to create conflict, as portions of the affected Municipalities would be excluded from receiving socio-economic benefits.
• Although not a regular occurrence, some violent incidents between local and foreign seasonal workers have in the past occurred in the SRVM and Cacadu district and again emphasise the importance of a local workforce.

Cumulative Impacts
• Community mobilization and negative interest group activities could increase should a portion of the local community feel that they are repeatedly being excluded from renewable energy projects and the associated socio-economic benefits.
• Aviation issues would may accumulate with the construction of both the Grassridge and Dassiesridge WEF’s, as the grieved party may not be able to fly around the Dassiesridge WEF with, amongst others, financial implications. The exact flight paths have not been accurately provided and as such this may not be at impact.

Impact 8: Impacts on the Nelson Mandela Bay Metropolitan Municipality, Cacadu District and Sundays River Valley Local Municipality

Cause and Comment
The proposed construction project would hold economic advantages for the affected Municipalities in terms of employment, skills development, small business development and so forth.

However, a project of this nature also poses various challenges for Municipalities. This includes possible shortfalls in capacity and management experience, bureaucratic procedures that hamper progress, financial constraints, possible exploitation and even corruption opportunities.

Specific impacts on the NMBM, Cacadu DM and SRVM as a result of the construction phase of the Dassiesridge WEF would include:

• Challenges between the three Municipal entities to co-operate, identify the beneficiary communities and ensure that the socio-economic benefits of the project reaches the target communities;
• An increase in responsibility to do a skills analysis, compile a database of an available local workforce, identify local service providers and provide relevant training;
• Issuing of zoning permits timeously;
• Representation on the Environmental Monitoring Committee (EMC) to do environmental monitoring of the construction site, representation on a Project Steering Committee (PSC) and any other structures, which requires extra time and capacity; and
• Legal responsibilities in terms of actions against land owners, the developer or any other parties that contravene Municipal bylaws.

Council should, on a regular basis, be informed about expected timelines and any issues arising. It is advisable for the developer to establish a Project Steering Committee (PSC) for the duration of the construction period. Members of the PSC (developer, Contractor, Municipalities, community representatives, etc.) would meet on a quarterly basis to discuss issues that may arise during the course of the construction period. Contact details of the PSC could also be made available to the general public if community members or landowners want to lodge complaints.

The significance of negative impacts on the LM could thus be addressed through proper communication, but should commence well in advance of the actual construction period starting.

**Cumulative Impacts**

• Simultaneous construction of Grassridge and Dassiesridge WEF would increase the NMBM's responsibilities and duties. However, this is not anticipated, as construction should not overlap.
• Simultaneous construction of various renewable energy projects in the district could increase duties and capacity requirements for SRVM and Cacadu DM.
• Experience obtained from the construction of renewable energy projects would increase capacity building and skills development within the affected Municipalities.

**Impact 9: Health risks**

**Cause and Comment**
Inadequate management of the construction process could result in health issues for workers and surrounding landowners/community members. Although the site is not located in close proximity to a residential area or farm houses and there are no open water bodies that could be subject to contamination, health issues could impact on workers on site and appropriate mitigation and management is thus required. Health issues could manifest through:

• Dust generation and air pollution resulting in respiratory diseases.
• Poor management of the construction process resulting in pollution problems (e.g. insufficient sanitation facilities, littering and refuse), flies rodents and pests and possible contamination of water sources.
• Unsafe and insufficient drinking water.
• An increase in HIV/AIDS and other STDs due to prostitution activities and temporary sexual relationships with local women, unwanted pregnancies that place further pressure on Basic Health Care Services.
• Dehydration and sunburn, as extreme temperatures could be experienced during summer months.

Management measures would include portable ablution facilities at the construction office area and at the turbine positions and a Health and Safety Officer that monitor health standards.

**Cumulative Impacts**
• The simultaneous construction and mismanagement of various WEF’s would impact and place pressure on Municipal Health Services.

**Impact 10: Construction related and road accidents**

**Cause and Comment**
An impact on local emergency, disaster management and health services (fire, ambulance, police services, etc.) could be experienced in the case of construction related accidents and road accidents. To reduce the likelihood of construction related accidents, it is required of the main Contractor to adhere to the requirements of the Quality Management Guidelines, Environmental Management Systems Requirements and the Occupational Health and Safety Act. Protocols and procedures to manage fire, medical emergencies and vehicle and construction accidents would have to be implemented. Disaster management, medical and emergency services in the nearby towns, such as Addo, Kirkwood, Uitenhage and the broader NMBM area deems to be sufficient to cope with construction related and road accidents, if they occur.

Unauthorized access to the construction site could also pose safety concerns for humans and the fencing of construction areas should be done where appropriate to minimise accidents, trespassing and theft.

**Cumulative Impacts**
• The simultaneous construction of various renewable energy plants would place pressure on local health and emergency services.

**Impact 11: Job creation**

**Cause and Comment**
Few permanent employment positions (unskilled, semi- and highly skilled) would emerge during the 25 year operational period of the Dassiesridge WEF. Employment positions could include:
• Technicians, electricians, IT specialists, engineers, administrators (highly skilled);
• Security (semi-skilled); and
• Site maintenance (lower skilled).

In addition to the above a financial manager and supporting staff would be required to implement SED projects and manage related finances. It is highly likely that skilled employees would rather be sourced from the NMBM area, as the tertiary education levels of the Cacadu DM and SRVM are
very low, 8.3% and 3.8% respectively (Section 4.8; Education levels).

Periodically temporary employment may become available for civil works maintenance (roads, crane pads, etc.) and site clearance to minimize potential veld fires, etc. The opportunity for local service providers exists to conclude contracts with the developer to perform duties at the plant.

**Cumulative Impacts**
- Employment, training and capacity building of employees at the various WEF’s would enhance skills of the local and regional workforce.
- The various WEF’s in the region would have a positive cumulative impact on the local economy through employment creation.

**Impact 12: Skills development and capacity building**

**Cause and Comment**
Although limited, skills development and capacity building would result as on-site training is likely. An important outcome of skills development and training is that employees would be in a position to source work on similar plants once their contracts expire. A skilled labour force is more likely to find employment, resulting in economic advantages for the local economy over the long-term.

**Cumulative Impacts**
- Employment, training and capacity building of employees at the various WEF’s would enhance skills of the local and regional workforce.

**Impact 13: Impacts on the local economy**

**Cause and Comment**
During the operational phase it is expected that the local economy would benefit in the following ways:
- The families of employees would benefit economically with an increase in incomes and spending power;
- A possible increase in municipal rates and taxes, as the land would be rezoned from “Agriculture” to “Special Use for Agriculture and Renewable Energy Infrastructure”, resulting in higher levels of rateable income;
- Local communities would benefit economically through shareholding and community upliftment and Social Development projects; and
- The establishment of local downstream industries and services that would support the WEF’s operations (to a lesser extent).

**Cumulative Impacts**
- Positive impacts on the local economy would be enhanced with the implementation of additional renewable energy projects in the municipal and district areas.

**Impact 14: Community projects, ED and SED contributions**

**Cause and Comment**
It is recommended that the project proponent embarks on a holistic, strategic approach for the Enterprise Development and (ED) and Socio-economic Development (SED) components of the project to avoid fragmented community projects in the region.
Problems that have been experienced in his regard at similar projects include:

- The main driving force behind processes for approved renewable energy projects would be National Government. Local and district Municipalities are informed of progress and developments, but not sufficiently involved and actively engaged in processes from the onset.
- Appropriate structures are not put into place to manage Socio-economic development projects, distribute funds and monitor progress.
- A lack in communication often results in unrealistic expectations that are being created at community level.
- DoE defines the beneficiary communities as those within a 50 km radius from the project site. Large portions of the affected Municipality are thus often excluded from project benefits and conflict is exacerbated when a project affects more than one Municipality.

At this stage it would seem that the beneficiary communities would be Uitenhage (NMBM) and Addo (SRVM) and could also include Kirkwood (SRVM).

To ensure a holistic approach that includes all three the Municipalities it is recommended that a forum or similar structure be established. The forum would:

- Consist of representatives of the NMBM, CDM and SRVM’s and their relevant Directorates for Economic Development;
- Identify major “renewable energy development nodes” where wind energy projects are taking place, such as Blue Crane, Oyster Bay, Grassridge, etc. and co-ordinate projects in a holistic manner;
- Prioritise projects identified in the IDP’s and LED programmes;
- Formulate a strategy to achieve long-term sustainable goals that would include large economic development projects in the major “renewable energy development nodes” that would contribute to the region’s economic growth; and
- Identify short-term food security and local community development projects.

The idea would thus be to collaborate and embark on larger income-generating projects within the “renewable energy development nodes” that would benefit the broader region, instead of implementing scattered small-scale projects.

The advantage of such an approach would be greater sustainability and potential for long-term income generation, employment creation and skills development. Localised short and medium-term projects, such as community infrastructure developments, training programmes, food security projects, and so forth could also be implemented but the main focus should be holistic.

**Cumulative Impacts**

- The collaboration of more renewable energy projects would increase the economic power within the “renewable energy development nodes” and ED and SED projects would be able to compete in the broader economy of the region and country.
- Short-term development and community projects would enhance local food security and employment creation.

**Impact 15: Impacts on aviation**

**Cause and Comment**

For the last number of years the owner of Sutherland Transport, situated in Perseverance (midway between Despatch and Port Elizabeth), allegedly commutes on a daily basis by helicopter between
his business and farm, located halfway between Kirkwood and Addo. According to the I&AP the flight route is the shortest and most economical and is flown under 2 000 feet above sea level. The I&AP further states that within this airspace no flight plan needs to be filed. (Section 10.3 of the SIA contains relevant flight logs dated 03/09/14 up until 21/2/15). The I&AP claims that the proposed Dassiesridge WEF will affect the flight route, with the following consequences:

- The construction of the wind turbines would increase the flight height to more than 2 000 feet and a flight plan would need to be lodged on a daily basis;
- A flight plan would require additional time, administration and costs and is not practical as the route is being flown on average two times per day and intermittently more than twice per day;
- Another alternative would be to fly around the Dassiesridge WEF and the extra time, insurance costs, maintenance and other running costs of the helicopter would amount to an extra cost of approximately R675 000 per year (refer to the I&AP comments contained in the detail EIA Report);
- At this stage it would seem that the Grassridge WEF would also affect an alternative route that the I&AP could have used should Dassiesridge WEF be constructed. According to the I&AP, he was not consulted during the Grassridge WEF EIA process; and
- The I&AP indicated their inclination to instate legal action should their concerns not be considered and addressed.

The professional opinion of an Obstacle Specialist of the South African Civil Aviation Authority was obtained with regards to private aviation. The Specialist’s findings, based on the positioning of the turbines and the comment and flight logs provided by the helicopter operator, are that:

- The flight paths provided by the I&AP do not cross the Dassiesridge site; and
- TMA is 2 500 feet and there is adequate clearance below the controlled airspace for the pilot to fly over the wind turbines, should he wish to do so. No daily flight plan would thus be required.

**Cumulative Impacts**

- It is unlikely that the neighbouring Grassridge WEF will affect the flight path, as there is adequate clearance below the controlled airspace for the pilot to fly over the wind turbines.

**Impact 16: Potential impacts on incomes: Gaming / hunting industry**

**Cause and Comment**

The possible impact wind turbine structures could have on income potential from an economic point of view is something that could be debated as different role players may have different opinions and views. The following information was obtained, and emphasise the diversity of opinions:

- It is the concern of the land owner of Portion 2 of the Remainder of Portion 233, Registration Division of Uitenhage that he would not be able to successfully operate his farm as a commercial hunting operation as wind turbines would have a negative visual and potential noise impact from almost all the vantage points on his farm. In his opinion this would detract from the wildlife experience for overseas and local hunters. The I&AP has made significant investments in terms of infrastructure development and the purchase of wild animals. He is dependent on incomes derived from hunting to service his bond. However, commercial hunting is envisaged for the future and not operated to its full potential yet. Therefore impacts on potential future revenues/losses cannot be determined at this stage. Also, existing infrastructure (the 132 kV Eskom power line along the northern boundary, the railway line that runs through the property and the Grassridge wind turbines) already have a visual impact and
the potential negative impact that the Dassiesridge turbines could have on commercial hunting on this farm is thus questionable.

- One of the property owners directly involved in the project hosts an approximate hundred (100) local and international hunters per year. Approximately 700 to 800 animals are being hunted annually. Even though wind turbines would be erected on these farms, he is not concerned that there would be a significant impact on his commercial hunting operations.
- An agricultural farm located adjacent to the Cookhouse WEF is in the process of being converted from livestock to a game farm, even though the farm is impacted visually by the turbines.
- Hunting/game farms near Cookhouse, such as Highdale, have wind turbines on the property with no significant impact on the industry.

The conclusion can thus be drawn that there is a potential of economic impacts on current activities (especially the hunting industry) and potential future eco-tourism opportunities, but it is highly unlikely that these activities would cease as a result of the facility.

**Cumulative Impacts**

- From a regional point of view it would be more appropriate to concentrate various wind energy facilities in close proximity to each other to create nodes where potential negative impacts are concentrated and not dispersed.

**Impact 17: Impacts on leisure and tourism activities**

**Cause and Comment**

The Cacadu DM identified the Sunday’s River Valley/surrounds of the Addo Elephant National Park as one of its tourism development nodes (Cacadu IDP). The area is well provided with B&B’s and Guesthouses. The Addo National Park is located approximately 10 km from the site and the Springs Local Authority National Park approximately 8 km to the north.

‘Addo to Eden’ is trying to establish wildlife corridors and are in the process talking to landowners in the Jansenville area to link significant protected areas to prevent “wildlife islands”. A hiking trail across Springbok Vlakte also exists and a bicycle adventure route is planned. This area is 30 km to the north-west of the study area and no negative visual or other significant impact on leisure/tourism for this activity is expected.

The Dassiesridge WEF is thus located in the “gateway” to this tourism area and would be observed by tourist/motorists travelling along the R75. No direct impact is anticipated on nature reserves, tourism facilities or protected areas as their proximity to the facility is not pertinent.

As it would not be possible to hide the facility, the aim should rather be to promote and regard it as an attraction and landmark for the region.

**Cumulative Impacts**

- From a regional point of view it is to the benefit of the tourism and leisure industry to concentrate various wind energy facilities in close proximity to each other to create nodes and minimize potential negative impacts on tourism and leisure opportunities.

**Impact 18: Impacts on the ‘sense of place’**

**Cause and Comment**

Extensive dust, traffic and security issues as a result of the wind energy facility during the
operational phase are highly unlikely and should not impact on the community’s ‘sense of place’. Although potential noise impacts have been raised as a concern, the proximity for residences to the turbines makes the impact highly unlikely and the assessment and rating thereof falls outside the scope of this report.

Visual impacts have the potential to affect the local ‘sense of place’ and could thus impact on game farming, hunting and similar eco-tourism related land uses if ‘sense of place’ is altered to such an extent that it affects the numbers of visitors / tourists to the area or impacts the quality of life for locals. Assessment of visual impacts is done as part of the detail EIA of this project and falls outside the scope of the SIA.

It should be noted that existing structures such as Eskom power lines and pylons, a railway line, roads, and windmills already have a visual impact on the study area. Over time communities often become “desensitised” towards these “man-made” structures and structures could even be regarded as iconic (e.g. windmills in the Karoo). It is therefore possible that negative impacts of the wind turbines and associated infrastructure on the community’s ‘sense of place’ could decline over time.

Furthermore, although some of the turbines would be visible from the R75 and from a few farm residences, there are no sensitive receptors or residential areas in close proximity to the site. The impact on the community’s ‘sense of place’ can therefore not be regarded as severe. Through discussions with landowners and I&APs it became clear that people in the district in general have become accustomed to wind turbines and would “tolerate” these structures as they recognize the advantages of renewable clean energy for the country as a whole.

Cumulative Impacts
- The establishment of WEF nodes (such as Blue Crane, Cookhouse, Grassridge, Tsitsikama, etc.) is favourable as dispersed facilities would scatter and increase impacts on the ‘sense of place’ over a larger area, and would thus intensify the impact.

Impact 19: Electricity supply and the environment

Cause and Comment
Even though the cost-competitiveness of renewable energy sources still holds many challenges, the proposed Dassiesridge WEF would have a positive impact on a regional and national level:
- Wind energy is renewable and sustainable and cannot be depleted, as is the case with fossil fuels;
- Wind energy facilities generally requires less maintenance with lower operational costs;
- Renewable energy has minimal impact on the environment and produces little or no waste products, such as carbon dioxide and other chemical pollutants; and
- Renewable energy projects can bring economic benefits for the country, e.g. in the form of new ‘green’ jobs.

Cumulative Impacts
- Eskom’s intention to purchase 3 750 MW of electricity from renewable energy projects over the next few years, would contribute significantly to environmental advantages.
11 DASSIESRIDGE WEF SENSITIVITY ANALYSIS

A site development sensitivity map (Figure 11.1) was developed based on specialist and general site information gathered, and the site was classified into areas of GO (unrestricted development), GO-BUT (conditional development) and NO-GO (no development).

- **NO-GO** areas included areas of high sensitivity indicated by the bird and bat specialists, identified heritage sites and buffers around existing infrastructure (including a 500 m buffer around all noise sensitive areas).

- **GO-BUT** areas are areas where construction is conditional on the fulfilment of one or other aspect-specific requirement. For example, all construction on the Heritage GO-BUT area will require sign-off by a palaeontologist in order to ensure that no fossils (if found) are damaged or destroyed. Other GO-BUT areas included areas of moderate sensitivity identified by the bird and bat specialist and ecologically sensitive areas such as watercourses, wetlands and thicket vegetation.

- **GO** areas are areas where construction may take place without hindrance.

In response to the site development sensitivity analysis conducted on the draft layout (Alternative 1), Dassiesridge Wind Power revised their project layout and provided a final layout (Alternative 2) (Figure 11-1 to Figure 11-3). Figure 11-1 to Figure 11-3 represents the Dassiesridge WEF layout changes in response to site sensitivities – 11-1 Draft Layout (Alternative 1), 11-2 Final Layout (Alternative 2), 11-3 Comparative Layouts.
Figure 11-2: Dassiesridge WEF layout changes in response to site sensitivities - Final Layout (Alternative 2).

Figure 11-3: Dassiesridge WEF layout changes in response to site sensitivities -
11.1 Ecological Sensitivity

Ecologically sensitive areas have been categorised as GO-BUT areas (Figure 11-4 and 11-5). This is based on the requirement for:

- Water use licenses for all construction within 50m of a watercourse and within 500m of a wetland;
- Plant removal/destruction permits if protected plant or tree species are identified;
- Strict compliance with EMPr conditions and additional management plans, such as:
  - Rehabilitation Plans
  - Alien Vegetation Eradication Plan
  - Plant Search and Rescue Plan
  - Stormwater Management Plan; and
- An ECO to be closely involved in the preconstruction phase and ensure that the construction areas are clearly demarcated and no activity takes place outside of the demarcated areas.

Turbines have been moved out of the ecologically sensitive areas.

Figure 11-4: Dassiesridge WEF Ecological Sensitivity – DRAFT Layout
The Ecological Impact Assessment identified protected plants AND trees within the site boundaries. In order to construct within the ecological GO-BUT areas, permits will need to be obtained from the Department of Economic Development, Environmental Affairs and Tourism (Eastern Cape) for the removal of plant species protected by the Provincial Nature Conservation Ordinance, and a separate permit will need to be obtained from the Department of Agriculture, Forestry and Fisheries for the removal of protected tree species. The exact requirements for these permits will be determined based on the micrositing exercise prior to construction. It is thus NOT necessary to obtain these permits at this stage.

11.2 Avifaunal Sensitivity

Important habitats have been classified as GO-BUT areas to conserve and protect possible movement of birds on site (Figure 11-6). Turbines have been moved out of the GO-BUT area (Figure 11-7) as per recommendations by the avifaunal specialist.
Figure 11-6: Dassiesridge WEF Avifaunal Sensitivity – DRAFT Layout

Figure 11-7: Dassiesridge WEF Avifaunal Sensitivity – FINAL Layout
11.3 Bat Sensitivity

The bat specialist identified high sensitivity areas as those deemed critical for resident bat populations and those capable of supporting elevated levels of bat activity and greater bat diversity than other areas. These areas are categorised as NO-GO areas for development (Figure 11-8 and 11-9).

Moderate sensitivity areas were identified as having good foraging habitat and potential roosting sites for bats. These areas were categorised as GO-BUT areas. The turbines within these areas must be prioritised during operational monitoring, and may be subjected to additional mitigation if bat mortalities are found to be unacceptably high. The turbines which occur on the boundary areas of the NO-GO areas will be subject to mitigation measures specified in the GO-BUT areas.

Turbines have been removed from the NO-GO areas, and have also been relocated out of the GO-BUT areas as per the bat specialists’ recommendations.

![Figure 11-8: Dassiesridge WEF Bat Sensitivity – DRAFT Layout](image-url)
11.4 Palaeontological Sensitivity

Significant impacts on fossil heritage are only anticipated in two small portions of the Dassiesridge WEF study area (Figure 11-10 and 11-11) and as a result have been classified as GO-BUT areas.

- a sector of the access road from the R75 that runs in a low-lying area underlain by the Voorstehoek Formation (Grassridge 187);
- Wind turbine positions and associated access roads in the eastern portion of Farm 3/190 that may impact fossil oyster beds in the basal Alexandria Formation as well as fossil wood and marine shells in the Kirkwood and Sundays River Formations respectively.

The rest of the site has a very low palaeontological significance and has therefore been classified as GO areas (Figure 11-10 and 11-11).

A palaeontologist or a suitably trained ECO must visit construction areas located in the GO-BUT areas prior to pouring of any concrete for the foundations. The purpose of these visits will be to examine all exposed rock for potential fossils. If fossils are identified in the rock material, construction on that particular excavation shall cease until a permit is acquired from ECPHRA for the removal of the fossil, and such removal has been completed to the satisfaction of ECPHRA.
11.5 Overall Site Development Sensitivity (turbine sites)

Figure 11-12 indicates the overall sensitivity of the site in terms of development according to the draft layout (Alternative 1). This sensitivity map combined with the information in Table 11-1 informed the new final layout (Alternative 2) which appears in Figure 11-13.

![Overall Site Sensitivity - DRAFT Layout](image)

**Figure 11-12: Dassiesridge WEF Overall Sensitivity – DRAFT Layout (Alternative 1)**

Table 11-1 summarises the position of each of the draft layout turbines in order to inform the final layout.

**Table 11-1. Assessment of the Draft Layout against the Go, GO-BUT and NO-GO criteria**

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<th>NO-GO</th>
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</tr>
</tbody>
</table>

Table 11-1 assesses the draft layout (Alternatives 1) against the GO, GO-BUT and NO-GO criteria. Both Figure 11-12 and Table 11-1 show that 33% of the turbines in the draft layout (Alternative 1) are in unacceptable locations and would need to be moved. The turbines in the final layout (Alternative 2) are all within the GO areas due to the final layout having been designed around the sensitive areas identified during this process (Figure 11-13).

Figure 11-13: Dassiesridge WEF Overall Sensitivity – FINAL Layout (Alternative 2)

11.6 Overall Site Development Sensitivity (powerline)
The five powerline alternatives have been assessed by all of the specialists and the EAP. None of the powerline alternatives have been classified as NO-GO as the sensitivity of the five alternatives is considered LOW in terms of the ecological, avifaunal, paleontological and heritage assessments.

The following table summarises the five powerline alternatives in terms of their overall length, the length of existing powerline servitudes which will be incorporated and their sensitivity as stated by the various specialists.

The preferred powerline alternative for the proposed Dassiesridge WEF is **powerline alternative 3**. The motivation for the use of powerline alternative 3 as the preferred powerline has been incorporated in the table (Table 11-2).

Figure 11-14 illustrates the various powerline alternative routes. It should be noted (as stated in Table 11-2) that powerline alternative 4 and powerline alternative 5 follow the exact same route and are illustrated as one single line in Figure 11-14.
## Table 11-2: Summary of the powerline alternatives sensitivity analysis

<table>
<thead>
<tr>
<th>Powerline Description</th>
<th>Powerline Alternative 1</th>
<th>Powerline Alternative 2</th>
<th>Powerline Alternative 3</th>
<th>Powerline Alternative 4</th>
<th>Powerline Alternative 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>One substation will be constructed on the site and a loop-in, loop-out line used to connect to the existing 132kV Skilpad line on the Western part of the site.</td>
<td>One substation will be constructed on the site and a loop-in, loop-out line used to connect to the existing 132kV Skilpad line on the Western part of the site.</td>
<td>One substation will be built on site and will connect via a new 132kV powerline at Olifantskop substation.</td>
<td>Two substations will be built; one on the eastern part of the project site and one on Grassridge and a loop in-loop out line used to connect to the existing Nootgedacht (132kV) line.</td>
<td>This option will be the same as option 4 but instead of connecting with the Nootgedacht line it will connect with the 400 kV Cookhouse line.</td>
</tr>
<tr>
<td>Total Overhead Powerline Length</td>
<td>± 0.4km</td>
<td>± 1km</td>
<td>± 16km</td>
<td>± 19km</td>
<td>± 19km</td>
</tr>
<tr>
<td>Length of section of proposed alternative which runs parallel to existing powerlines</td>
<td>± 0km</td>
<td>± 0km</td>
<td>± 15km</td>
<td>± 18km</td>
<td>± 18km</td>
</tr>
<tr>
<td>Length of section of proposed alternative which does not run parallel to existing powerlines</td>
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<td>± 1km</td>
</tr>
<tr>
<td>Preferred Powerline Alternative</td>
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<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>

**Agriculture & Soils Specialist Comment**
Alternative 1 is considered as the preferred powerline alternative. This consideration is based on the fact that alternative 1 will have the smallest impact on soils and agricultural land. None of the other powerline alternatives (A2, A3, A4 and A5) are considered “fatally flawed”.

**Avifaunal Specialist Comment**
The preferred option for connecting this facility to the grid is Alternative 1, which requires the shortest length of new overhead 132kV powerline to be built. All five of the grid connection options are however acceptable.

**Bat Specialist Comment**
Not Applicable

**Ecological Specialist Comment**
The preferred option for connecting this facility to the grid is Alternative 1, which requires the shortest length of new overhead 132kV powerline to be built. All five of the grid connection options are considered ecologically acceptable.

**Heritage Specialist Comment**
All powerline alternatives are considered acceptable as none of the alternatives are located in archeologically sensitive areas.
<table>
<thead>
<tr>
<th>Noise Specialist Comment</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palaeontology Specialist Comment</td>
<td>All powerline alternatives are considered acceptable as none of the alternatives are located in paleontologically sensitive areas.</td>
</tr>
<tr>
<td>Social Specialist Comment</td>
<td>All powerline alternatives are considered socially acceptable.</td>
</tr>
<tr>
<td>Visual Specialist Comment</td>
<td>All powerline alternatives are considered visually acceptable due to the fact that the majority of the length of the various alternatives will run parallel to existing powerline infrastructure.</td>
</tr>
</tbody>
</table>

### EAP Comment

Three of the specialists concluded that Powerline Alternative 1 would be the preferred option based on the length of the powerline. However, all specialists concluded that all Powerline Alternatives are considered acceptable, with none of the specialists fatally flawed any of the proposed Alternatives.

Alternative 3 is considered the preferred alternative based on the assessment of capacity and distribution of electricity performed by the developer, in consultation with Eskom. **Alternative 3** is therefore considered to be the overall preferred alternative as the connecting powerline for the proposed Dassiesridge WEF. Alternative 3 requires the construction of approximately 16km of new powerline infrastructure. Approximately 1km of alternative 3 would be located in an area void of existing powerline infrastructure (as is the case with the remaining alternative options), approximately 15km of the proposed Alternative 3 powerline would be constructed parallel to the existing Skilpad Powerline Servitude (Eskom).
Figure 11-14: Illustration of powerline alternative routes for the proposed Dassiesridge WEF
11.7 Overall Site Development Sensitivity (ancillary infrastructure)

In most cases, the electrical cabling connecting turbines to the on-site substation will be buried under the access roads. The specialist input which is considered for this section includes Avifauna (collision with powerline); Ecological (clearing of vegetation); Palaeontology (excavations) and Watercourses (water crossings). **Turbines have been moved out of the avifaunal, ecological and paleontological GO-BUT areas, where possible. No turbines occur in the NO-GO area as per the final recommended layout (Alternative 2)** Water crossings which require Water Use Licence Applications will be submitted to the Department of Water and Sanitation (DWS) should the Dassiesridge WEF be granted preferred bidder status.

The proposed ancillary infrastructure layout for Alternative 2 is indicated in Figure 11-16. Figure 11-16 illustrates the movement of ancillary infrastructure from Alternative 1 (Figure 11-15) where possible.

![Figure 11-15: Dassiesridge WEF Ancillary Sensitivity – DRAFT Layout (Alternative 1)](image-url)
Figure 11-16: Dassiesridge WEF Ancillary Sensitivity – FINAL Layout (Alternative 2)
12 CONCLUSIONS AND RECOMMENDATIONS

In terms of Section 31(2) of the EIA Regulations (2010), an Environmental Impact Assessment Report must contain all the information necessary for the competent authority to consider the application and to reach a decision contemplated in regulation 35, and must include—

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

(o) An environmental impact statement which contains—

(i) A summary of the key findings of the environmental impact assessment; and

(ii) A comparative assessment of the positive and negative implications of the proposed activity and identified alternatives.

In line with the above-mentioned legislative requirement, this Chapter of the Draft EIR provides a summary of the findings of the proposed Dassiesridge WEF EIA and a comparative assessment of the positive and negative implications of the proposed project and identified alternatives. In addition, this Chapter provides the EAP’s opinion as to whether the activity should or should not be authorised as well as the reason(s) for the opinion.

12.1 Description of Proposed Activity

Dassiesridge Wind Power (Pty) Ltd. is proposing to construct a Wind Energy Facility (WEF) to be developed near Uitenhage. The WEF will host a maximum of 47 wind turbines, each generating between 1.5 – 4 megawatts (MW) of power, with total combined potential power output of approximately 140MW. The final number of turbines which will be constructed will decrease from the assessed number of turbines (60) to a maximum of 47 turbines as per the recommendations made in this report and the associated specialist reports. In other words, 13 turbines will be excluded from the final layout.

12.2 Assumptions, Uncertainties and Gaps

12.2.1 Assumptions

The following assumptions have been made during the EIA process:

- The layouts provided are preliminary, and will undergo further more detailed micro-siting in response to the recommendations contained in this report.
- Further specialist inputs into the micro-siting process will be sought.

12.2.2 Gaps

No detailed engineering input was provided in this phase of the development. It is general engineering practice that the detailed design phase of a project is generally only initiated once environmental authorisation for a project (based on what is submitted as preliminary design) is secured. In particular, for a renewable energy facility, detailed engineering design is only initiated if the project is confirmed as a preferred bidder in the DoE REIPPPP programme. In this regard, the EIR considered industrial norms. This has also provided the EIA process an opportunity to guide the Planning and Design proactively rather than reactively. The Environmental Management Programme (EMPr) should therefore be viewed as a dynamic evolving document that can be adapted to specific needs and design conditions.
If the project is authorized by the Department of Environmental Affairs (DEA), Dassiesridge Wind Power will be required to provide DEA with final layout plans. These plans should be informed by the EIA and any other post-authorization studies or surveys, such as geotechnical investigations. The final layout requirement will further serve to demonstrate to DEA how the relevant environmental standards and management specifications contained in the EMPr, as informed by the site specific environmental context and potential impacts thereon identified in the EIA process, as well as the relevant conditions of authorisation will be incorporated in the detailed design process.

12.3 Environmental Cost/Benefit Analysis

It is important to note that cost/benefit analyses can take many forms and that there is no prescribed methodology for conducting such an analysis. The approach is generally limited by the difficulty in attaching economic values to environmental impacts (costs) or benefits and the availability of relevant quantitative information. Most environmental cost/benefit analyses therefore adopt a qualitative approach, where one simply identifies the types of costs and benefits associated with a particular activity and then apply a simple ranking system to assist in reaching an overall conclusion.

We therefore suggest that the current EIA impact assessment provides a sound basis for conducting an environmental cost/benefit analysis for the Dassiesridge WEF, where the full range of positive and negative impacts is integral to the process.

Table 12-1 provides an overall summary of the negative (cost) and positive (benefit) environmental impacts associated with the proposed Dassiesridge WEF.

Overall, the summary Table 12-1 indicates that there are numerous potential negative impacts (environmental costs) associated with the Dassiesridge WEF. However, the vast majority of these costs can be reduced to an acceptable level by implementing appropriate mitigation measures.

There are a number of significant positive impacts (benefits) associated with the Dassiesridge WEF. These relate primarily to indirect benefits relating to climate change mitigation and resource (energy) conservation and to economic benefits for the surrounding communities.

Table 12.1 Summary of negative (costs) and positive (benefits) environmental impacts associated with the Dassiesridge WEF for all phases of proposed development (+ = beneficial impact)

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<th>PRE-MITIGATION</th>
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<tr>
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<tr>
<td>Construction</td>
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12.4 Consideration of Alternatives

The following alternatives were assessed as part of the EIR:

Incremental alternatives in terms of layout of individual turbines within the site
CES strongly recommends that if all conditions described in Chapter 10 are adhered to, and that specialist input is sought during any micrositing exercise, the final layout (ALTERNATIVE 2) would be most suitable for the site.

Powerline Alternatives
CES recommends that if all the conditions described in Chapter 10 and in the associated EMPr are adhered to then Powerline Alternative 3 would be suitable and environmentally acceptable as the preferred powerline route for the proposed Dassiesridge WEF.

The NO-GO or no development option
The No go option would mean abandoning the proposed development with the following implications:
• None of the negative environmental impacts identified would materialise.
• The greater Nelson Mandela Bay area will continue to rely on fossil fuel-generated electricity supplied by Eskom.
• Increases in the demand for electricity as the surrounding area grows will increase the amount of fossil fuels required to generate this electricity.
• Loss of potential income for communities the proportional benefits from the community trust.
• None of the positive environmental impacts (e.g. replacement of fossil fuel electricity with renewable energy, and climate change mitigation) would materialise.

12.5 Opinion of the EAP

The proposed Dassiesridge Wind Energy Facility is consistent with National renewable energy and climate change policy. It is the professional opinion of CES and specialists that:
• The vast majority of environmental impacts identified can be adequately mitigated to reduce the impacts to an acceptable level, provided mitigation measures recommended in this report are implemented and maintained throughout the life of the project.

• **Layout Alternative 2** and the associated layout of ancillary infrastructure should be approved. If any changes to these layouts are made, the input of the relevant specialists must be obtained and incorporated into any changes.

• **Powerline Alternative 3** should be approved. Specialist input must be obtained should the powerline be deviated from the route specified in this report.

• A detailed operational environmental management plan must be drawn up prior to operation, incorporating the recommendations of the bird and bat specialists in terms of additional operational phase monitoring.

• The information in the report is sufficient to allow DEA to make an informed decision.

**It is the opinion of EOH Coastal & Environmental Services that NO FATAL FLAWS are associated with the proposed Dassiesridge Wind Energy Facility.**

### 12.6 Recommendations of the EAP

It is the recommendation of CES that the proposed development should be approved provided that appropriate mitigation measures are implemented and that the Environmental Management Programme is implemented, maintained and adapted to incorporate relevant legislation, standard requirements and audit reporting, throughout the life of the development.

The mitigation measures for all impacts identified in the EIA are provided in the Environmental Management Programme.

The Environmental Management Programme must be used by the engineers during the detailed Planning & Design Phase, by the contractors during the Construction and Decommissioning phases and by Dassiesridge Wind Power during the Operation Phase.

Inclusions, additions and adaptations of the EMP, as well as all final plan drawings and maps must be submitted to both DEA and DEDEAT for final approval.