Description of Archaeological Resources

Archaeological resources were found to be widespread in the study area but with the southern part being surprisingly sparse (Figure 6-16). Many low densities and/or small LSA occurrences were noted, often in association with dolerite outcrops. These generally had stone artefacts and ostrich eggshell fragments with the artefacts being of cryptocrystalline silica (CCS) and hornfels. Figure 6-16 A shows an example of finds at one of the better LSA artefact scatters seen during the survey. Figure 6-16 B shows an example of a dolerite outcrop that had a widespread scatter of LSA material over it. Ostrich eggshell fragments were abundant with only a few stone artefacts seen.

An unusual find was a single grinding groove on a dolerite outcrop alongside an ephemeral watercourse. Such finds are common around water sources in northern Bushmanland and occur occasionally in the Kamiesberg. The last precolonial archaeological feature requiring discussion is the many background scatter artefacts that occur throughout the site. The density of such artefacts varies across the study area but is always far too low to merit any collection or further study. Figure 6-17 D shows a number of these artefacts from an area close to a watercourse where they were denser than usual, while Figure 6-18 D shows a range of BGS artefacts from across the study area. As is evident, they are well weathered indicating a relatively great age. They are almost certainly all from the MSA.

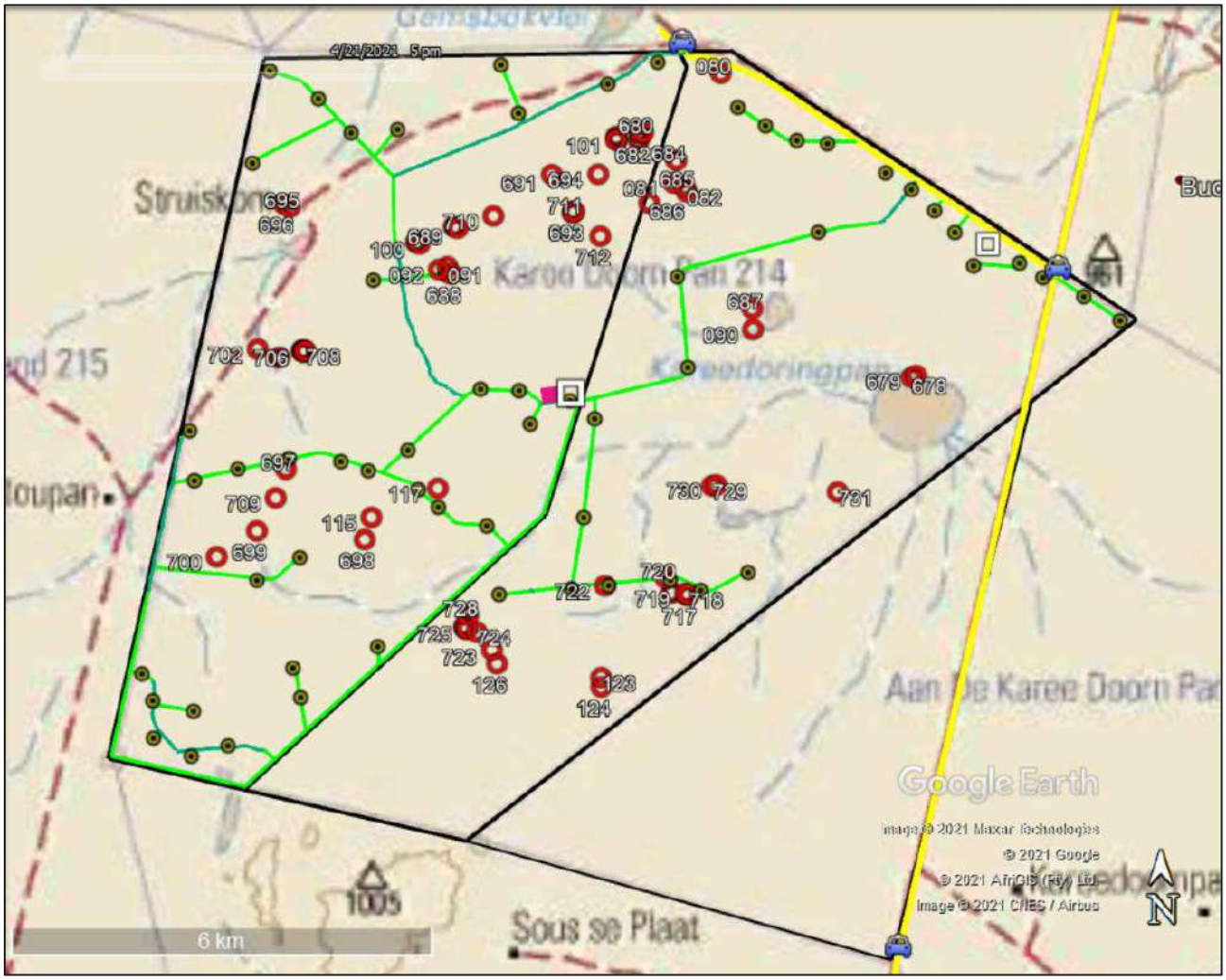


Figure 6-16: Map of the entire Kokerboom 3 study area showing the locations of all finds (red numbered symbols) relative to the proposed infrastructure (circles with central dots = turbines, dark and light green lines = existing and proposed roads respectively, yellow lines = public roads, small pink rectangle = substation and O&M building, white squares = laydown areas, not to scale, blue cars = potential access points). Areas in the north and centre are enlarged below.

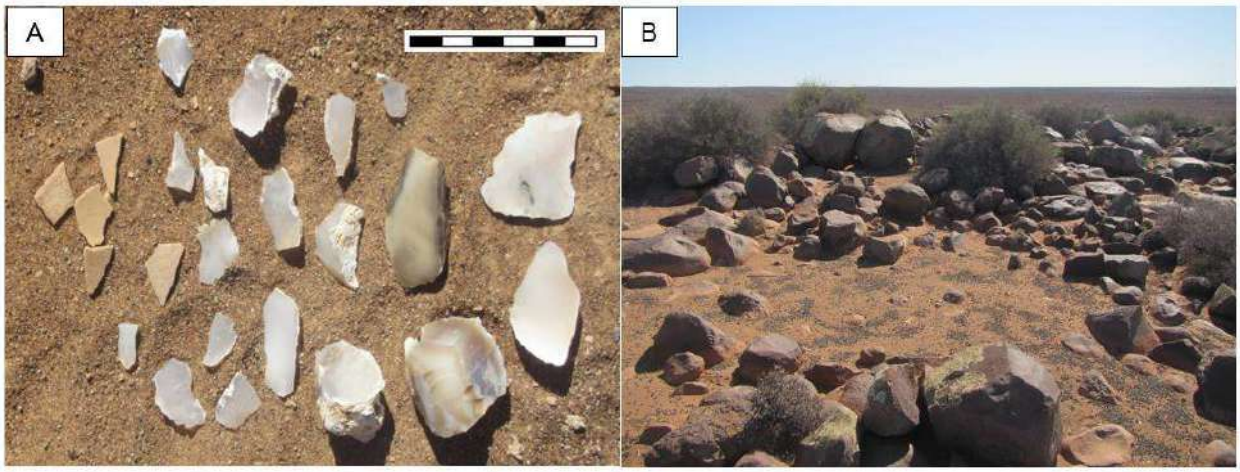


Figure 6-17 : A:LSA artefacts and ostrich eggshell fragments from the northern margin of the large pan in the north eastern part of the study area (waypoint, 679) scale in cm; B: A dolerite outcrop at waypoint 693 with a probably natural sandy hollow in it. There was a widespread scatter of ostrich eggshell and CCS artefacts on the outcrop.

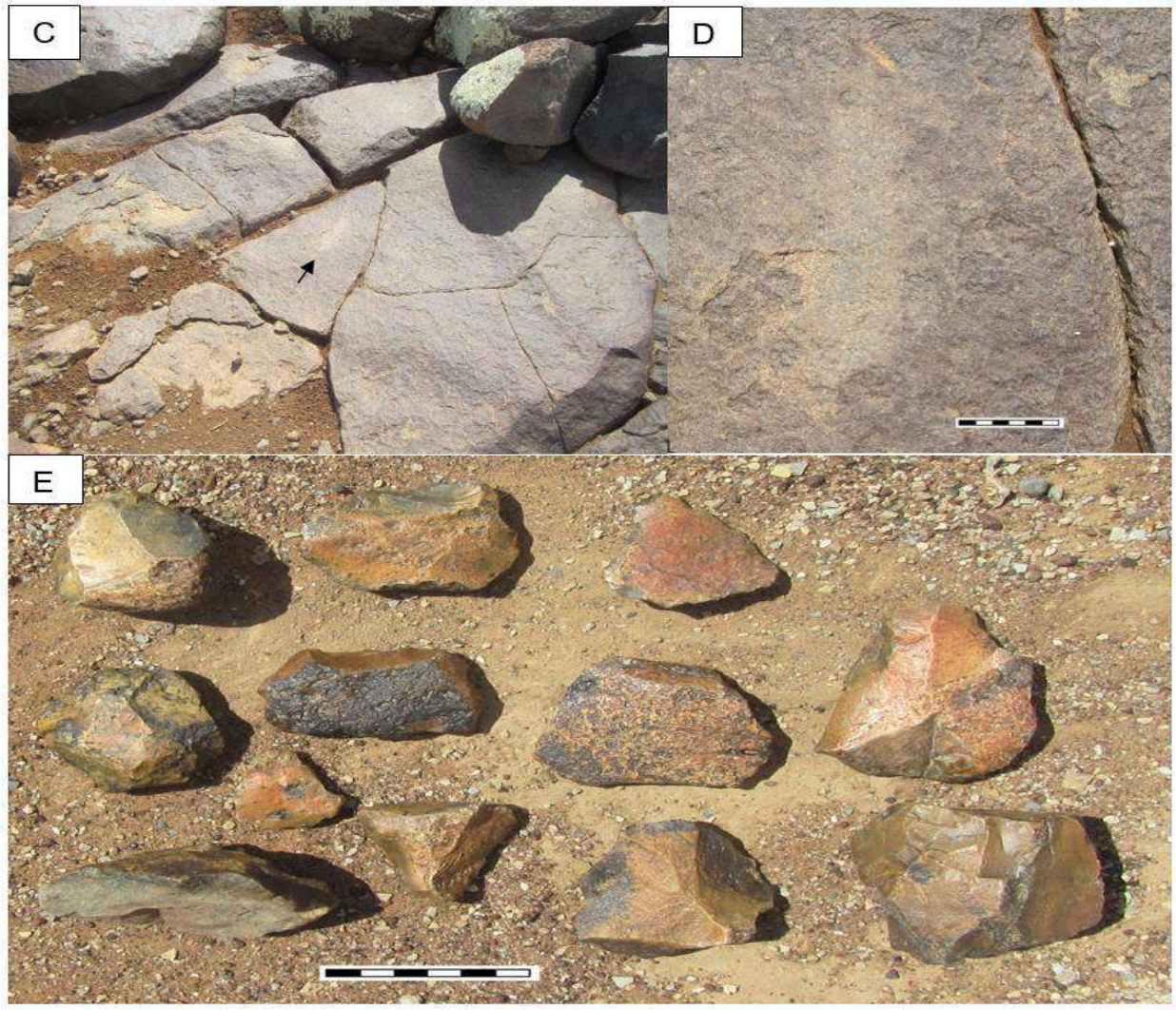


Figure 6-18: C: A dolerite outcrop at waypoint 710 with a single shallow grinding groove on it; D: Close up of the grinding groove at waypoint 710. scale in cm; E: Background scatter artefacts at waypoint 115. Scale in cm.

Description of Heritage Resources

A light scattering of historical artefacts was noted along the northern margin of the large pan in the eastern part of the study area (Figure 6-19). They may well represent an area where camp was set up after heavy rains and before the first house was built on the farm. At the farm complex, which was built overlooking a pan, there is a ruined house built from sun-dried mudbricks on a stone plinth (Figure 6-20 and Figure 6-21). A *muurkas* is evident and some windows and doors preserve wooden frames. While the roof beams were likely removed for reuse elsewhere, the presence of bamboo, much mud in the interior of the ruin and a flat-topped central wall suggest that the structure was very likely a brakdak. This complex was an ash and artefact dump located 60 m northwest of the ruined cottage. The artefacts include a wide variety of materials dating from the last decades of the 19th century as well as some 20th century materials. The former include transfer and hand-painted refined white earthenwares as well as glass from wine and possibly mineral water bottles and some iron fragments.

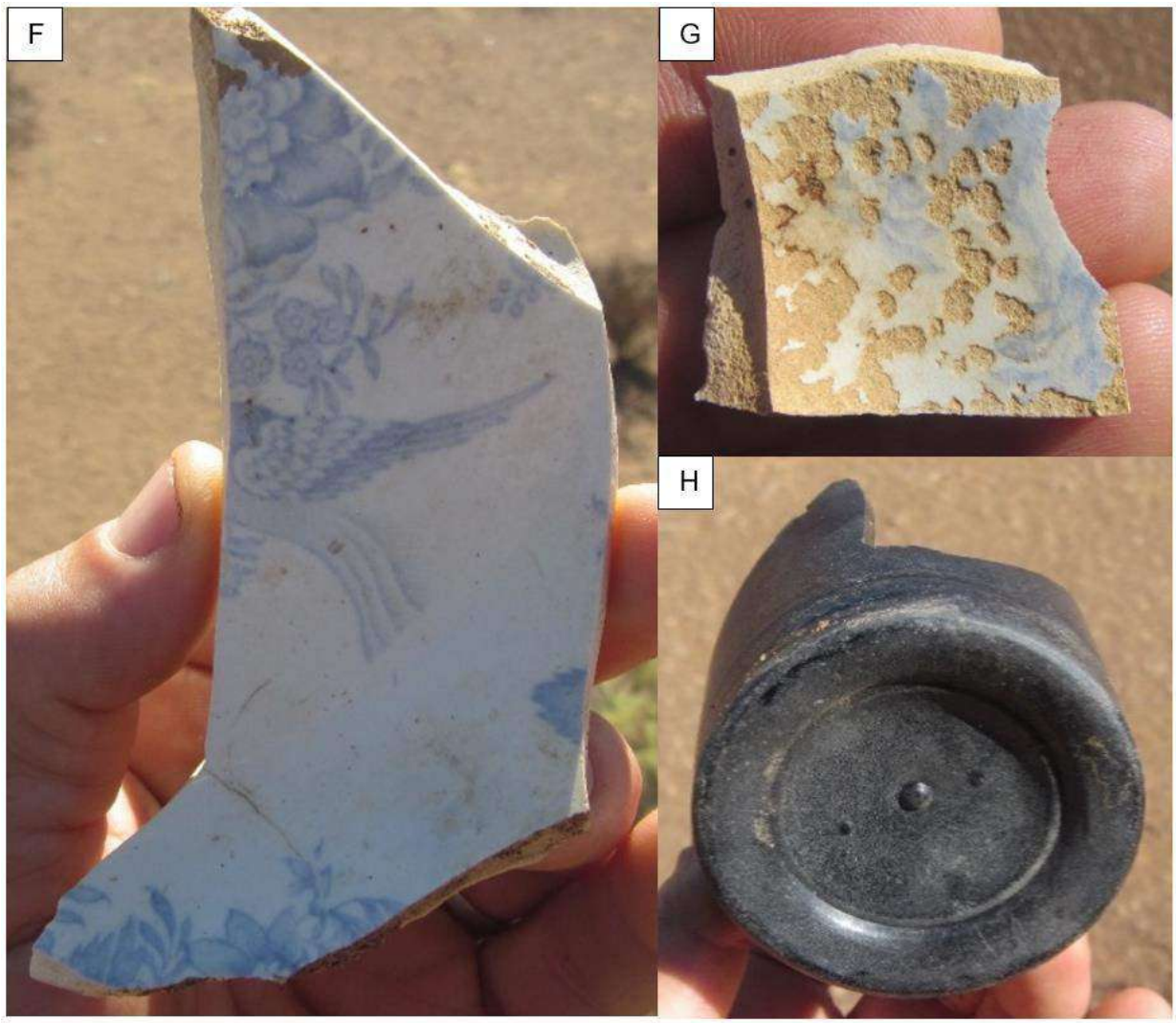


Figure 6-19:Historical artefacts from the northern margin of the large pan in the eastern part of the study area (near waypoint 679).F: They are transfer printed refined white earthenware; G: a coarse porcelain fragment with the glaze being sun-damaged; H: wine bottle base.

Figure 6-20:The front facade of the ruined farmhouse at waypoint 695 in the north western part of the study area; J: The interior of the ruined farmhouse at waypoint in the north western part of the study area; K, L, M: Historical materials from the ash dump at the farm complex (waypoint 696) in the north western part of the study area.

Historical Aspects and Built Environment

A single built heritage structure was located in the study area (Figure 6-21: N). This was an outbuilding at the farm complex at waypoint 695 (refer to specialist report in Appendix D6). Although heavily plastered, the building appears to have been built from stone. A stone plinth is visible below the plaster. Nearby a water reservoir and wind pump are very likely older than 60 years of age but the reservoir has been plastered internally with modern grey cement (Figure 6-21: O). An abandoned piece of farm equipment also stands in the werf and is very likely a heritage object (Figure 6-21: P).

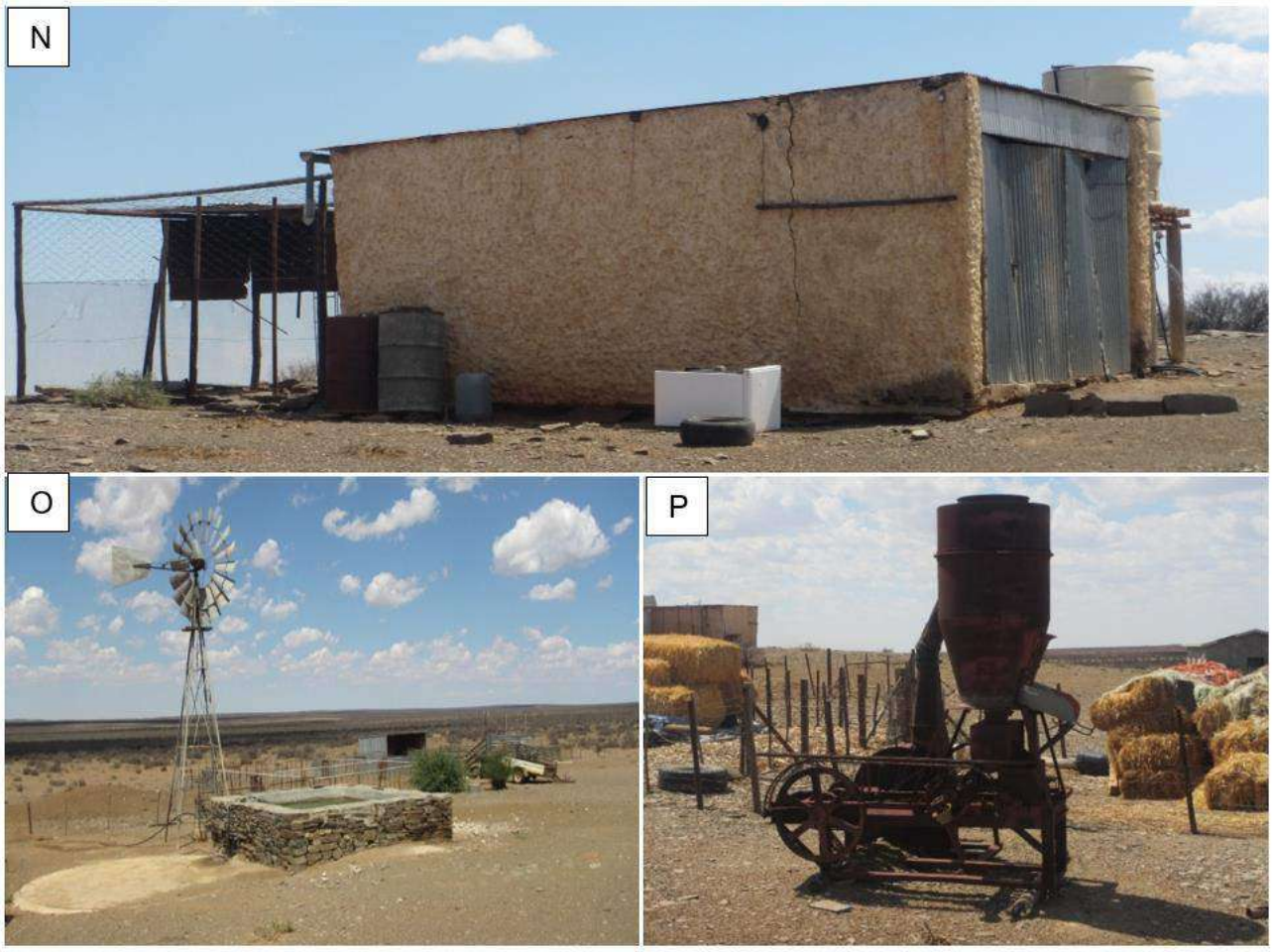


Figure 6-21:N: The farm outbuilding at waypoint 695 in the north western corner of the study corner; O: Reservoir and wind pump at the farm complex at waypoint 695 in the north western part of the study area; P: An old piece of farm equipment at the farm complex at waypoint 695 in the north western part of the study area.

Graves

No graves were seen in the study area and, due to the generally rocky substrate, the chance of finding graves is very limited.

Cultural Landscape

The site has a very weakly developed cultural landscape since the majority of anthropogenic interventions relate to farm tracks and fences. The landscape is largely a natural one (although it does still have cultural significance for its aesthetic value), but has now been compromised by two neighbouring wind farm developments, the Helios Substation and associated power lines which create a new 'cultural' layer on the landscape.

Palaeontological Heritage

The Kokerboom 3 Wind Farm project area is underlain by several formations of potentially fossiliferous Late Palaeozoic sediments of the Ecca Group (Karoo Supergroup) that are extensively intruded by unfossiliferous igneous rocks of the Early Jurassic Karoo Dolerite Suite. The Ecca Group rocks (Prince Albert, Whitehill and Tierberg Formations) are very poorly exposed and deeply-weathered near-surface. They have also been locally baked (thermally metamorphosed) by nearby dolerite intrusions and occasionally secondarily mineralised. The only fossils recorded within these rocks comprise low-diversity trace fossil assemblages that

occur widely within the Loeriesfontein region and are therefore not of unique scientific interest. No fossil vertebrate or plant remains were recorded during the field assessments.

The Karoo dolerites that crop out over portions of the Kokerboom 3 Wind Farm study area are also poorly exposed, deeply-weathered for the most part and, in addition, do not contain fossils. Several unmapped, small-scale occurrences of Karoo-age or post-Karoo breccia pipes and igneous intrusions were encountered during fieldwork. Some of the associated sandy sediments contain simple invertebrate trace fossils of uncertain age and stratigraphic position (but probably within the Prince Albert Formation). Similar traces have previously been recorded from similar settings elsewhere within the Loeriesfontein region; they are not considered to be of great scientific significance.

Potential Impacts

The potential impacts associated with the study area are discussed below. Mitigation measures are also provided.

Construction Impacts

The following potential construction phase agricultural impacts have been identified by the specialist:

- **Impacts to archaeological resources**: Impacts to archaeological resources are expected to be negative because the sites may be damaged or destroyed and scientific data would be lost. Because the archaeological sites only have local cultural significance, the **extent** of the impacts would be local. The **magnitude** of impacts is likely to be low because the layout has avoided known culturally significant sites. It should be noted, however, that one site graded GPA and requiring mitigation if it is to be disturbed, lies some 20 m from the edge of a turbine foundation (turbine #25). Because damage to archaeological sites is completely irreversible, the impacts are considered to be long term impacts. It is probable that at least some impacts will occur, but these are likely to be to isolated artefacts attributable to the background scatter. The overall significance rating of these potential impacts calculates to **low negative** pre mitigation and **very low** post mitigation. The following mitigation measures are proposed:
    - A pre-construction survey is required to determine whether any further significant archaeological sites occur and that potentially require mitigation.
    - The spatial extent of the site at waypoint 722 which entails a huge scatter of ostrich eggshell fragments and some CCS and hornfels artefacts on the side of a dolerite soil hill. as well as some burnt ostrich eggshell fragments should also be physically mapped with markers placed on site to assist with its identification by the Environmental Control Officer (ECO), and treated as a no-go area. If it is deemed to be too close to safely protect then mitigation will be required.
    - Any required mitigation would involve controlled excavation and collection of archaeological material.
    - Mitigation of the artefact scatters would involve establishing a grid of metre squares and collecting all archaeological material in each square. Material would be scraped up from each square, sieved and sorted to extract the artefacts and other archaeological materials. These finds would be analysed and described in a report and the material would be stored in perpetuity in the provincial museum, in this instance the McGregor Museum, Kimberly. Because of the process that needs to be followed, it is recommended that mitigation, if needed, should be commissioned at least six months in advance of construction.
- **Impacts to the cultural heritage**: Impacts to the cultural landscape would relate to the presence of very tall industrial-type structures in a landscape that is otherwise gently undulating and distinctly rural and/or natural in character. They would be negative impacts because of the general incompatibility between wind turbines and the natural landscape. Because the cultural landscape is relatively weakly developed, it has been accorded low cultural significance and hence the extent of the impacts would

be local. The magnitude of impacts is likely to be low because the area is so remote and there are two operational wind farms adjacent to the site. Damage to the landscape is reversible with rehabilitation but the impacts are considered to be long term impacts because the facility is likely to operate for many years. If the facility is constructed, then the probability is definite because the existence of the turbines will be inescapable.

- **Impacts to a palaeontological resources:** Given the general low palaeo sensitivity of the project area as well as the anticipated low to very low impact significance of the proposed wind farm development, no further specialist palaeontological studies, monitoring or mitigation are recommended for the project, *pending* the potential discovery of significant new fossil remains (*e.g.* vertebrate bones and teeth, horn cores, petrified wood) before or during the construction phase. A Chance Fossil Finds protocol has been appended to this report which must be included in the EMPr**.**

Operational Phase

The following potential operational phase agricultural impacts have been identified by the specialist:

- **Impacts to the cultural heritage**: Impacts to the cultural landscape would relate to the presence of very tall industrial-type structures in a landscape that is otherwise gently undulating and distinctly rural and/or natural in character. They would be negative impacts because of the general incompatibility between wind turbines and the natural landscape. Because the cultural landscape is relatively weakly developed, it has been accorded low cultural significance and hence the extent of the impacts would be local. The magnitude of impacts is likely to be low because the area is so remote and there are two operational wind farms adjacent to the site. Damage to the landscape is reversible with rehabilitation but the impacts are considered to be long term impacts because the facility is likely to operate for many years. If the facility is constructed, then the probability is definite because the existence of the turbines will be inescapable. The overall significance rating of these potential impacts calculates to **low pre and post mitigation**. No mitigation measures are possible due to the size of the turbines. They cannot be screened or placed in such a way as to be less visible from surrounding roads and structures.

Decommissioning Phase

The following potential decommissioning phase agricultural impacts have been identified by the specialist:

- **Impacts to the cultural heritage**: Impacts to cultural resources would occur during the construction phase only, so long as all operation and decommissioning activities take place within the authorised footprint. They would be negative impacts because the sites may be damaged or destroyed and scientific data would be lost. The overall significance rating of these potential impacts calculates to low negative without mitigation.

No-Go Alternatives

With implementation of the No-Go alternative the site would remain in its present state, no heritage resources would be directly impacted and natural degradation through erosion, weathering (rain and wind) and trampling (by animals and vehicles) would continue to occur. These negative impacts are extremely minor and would be of very low significance.

Cumulative Impacts

Although some archaeological sites are likely to be (or have been) lost during the construction of other facilities (two wind energy facilities already occur, while other renewable energy facilities have been authorised nearby), cumulative impacts are deemed to be of low significance in this case because the broader landscape is extensive and is likely to hold many similar archaeological sites. Also, the individual significance of each site is such that it does not extend beyond the local area. The Kokerboom 3 wind farm layout avoids all known significant heritage sites and will thus make a negligible contribution to cumulative impacts.

Although the construction of other facilities will also affect the cultural landscape (two wind energy facilities already exist, and other renewable energy facilities have been authorised nearby), it is deemed preferable to

cluster the renewable energy developments such that the impacts are kept to one area. Further away the cultural and natural landscape would no longer be affected. Cumulative impacts are deemed to be of low significance in this case because the landscape is not highly sensitive and is rather more natural than cultural.

Conclusions and Recommendations

Due to the fact that anthropogenic modification of the landscape is relatively sparse, it is not seen as being a cultural landscape of high significance. The existing Helios MTS and associated powerlines have already introduced an element of electrical infrastructure into the landscape. Furthermore, the construction of Khobab and Loeriesfontein Wind Farms on the neighbouring properties has set a precedent for this type of development in the area.

This study has found that there are a limited number of significant heritage resources present on the site. Besides the landscape itself, which is of relatively low significance and has already been compromised by the other wind energy facilities, the only other heritage resources of concern are the archaeological sites. Because they were identified early on in the project, they have been avoided by the layout developed for the final assessment. Although it is very likely that some isolated artefacts attributable to background scatter and other sites of low significance may be disturbed, the chances of highly significant sites falling within the footprint are considered to be low. As such, no significant impacts to heritage resources are expected.

There are no specific areas within the current layout that require avoidance but it will be important to ensure that the site at waypoint 722 is properly cordoned off and protected throughout the construction phase. The same will be required during decommissioning unless a decision was made to effect archaeological mitigation prior to construction.

Because the layout has been designed to avoid all known significant heritage resources on the site, it is proposed that the project be allowed to proceed. However, the following conditions should be included as part of the authorisation should one be issued:

- The final layout must be examined in the field by an archaeologist prior to construction with recommendations made for mitigation as required.
- The site at waypoint 722 must be examined and its extent physically marked on site during the pre-construction survey to enable proper cordoning off by the ECO. However, if the site extends too close to the construction footprint then mitigation will be required prior to construction of in the vicinity of this feature; and

If any archaeological material or human burials are uncovered during the course of development, then the find should be protected from further disturbance and work in the immediate area should be halted if necessary. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution

The Environmental Control Officer (ECO) responsible for the WEF developments should be made aware of the potential occurrence of scientifically important fossil remains within the development footprint. During the construction phase all major clearance operations (e.g. for new access roads, turbine placements) and deeper (more than 1 m) excavations should be monitored for fossil remains on an on-going basis. Should substantial fossil remains - such as vertebrate bones and teeth, or petrified logs of fossil wood - be encountered at surface or exposed during construction, the finds should be safeguarded, preferably *in situ,* and SAHRA should be notified so that appropriate action (i.e. recording, sampling or collection of fossils, recording of relevant geological data) can be taken by a professional palaeontologist at the developer's expense. The palaeontologist concerned with any mitigation work will need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (e.g. museum or university collection). All palaeontological specialist work would have to conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies developed by SAHRA (2013). SAHRA's contact details and further information regarding the procedure to be followed in the event of "chance finds" will be included with the EIR and associated EMPr.

The palaeontologist concerned with any mitigation work will need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (e.g. museum or university collection). All palaeontological specialist work would have to conform to international best practice for palaeontological fieldwork and the study (e.g. data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies developed by SAHRA (2013).

6.8 Socio-economic Aspects

This section provides a summary of the social report, the full Impact Assessment Report compiled by Barbour & Van der Merwe (2020) is available in Annexure D7.

The socio-economic aspects of the project need to be considered in an EIA process as the population and communities affected by this project will contribute to whether this project is a success or failure. It is important to consider the socio-economic environment in which the project is located, in accordance with the legal and planning framework.

Baseline Description

The proposed Kokerboom 3 Wind Farm is located within the Namakwa DM of the Northern Cape Province. Namakwa DM is bordered by the Siyanda and Pixley ka Seme DMs to the northeast and east, respectively. To the south, the Western Cape Districts of the West Coast, Boland and Central Karoo are found.

The Hantam LM is one of six municipalities in the Namakwa DM. Hantam LM was named after a Khoi name that means "*mountains where the bulbs grow*" after the Hantam Mountains in the area. The administrative centre of the municipality is in the town of Calvinia. Refer to Figure 6-22: below. In this section baseline information relating to Hantam Locality Municipality is provided, as the project will physically be located within these boundaries.The project site is located in the Northern Cape Province, which is the largest province in South Africa and covers an area of 361 830 km^2 and constitutes approximately 30% of South Africa. The province is divided into five district municipalities, namely the Frances Baard, John Taolo Gaetswe, Namakwa, Pixley ka Seme and ZF Mgcawu District Municipalities.

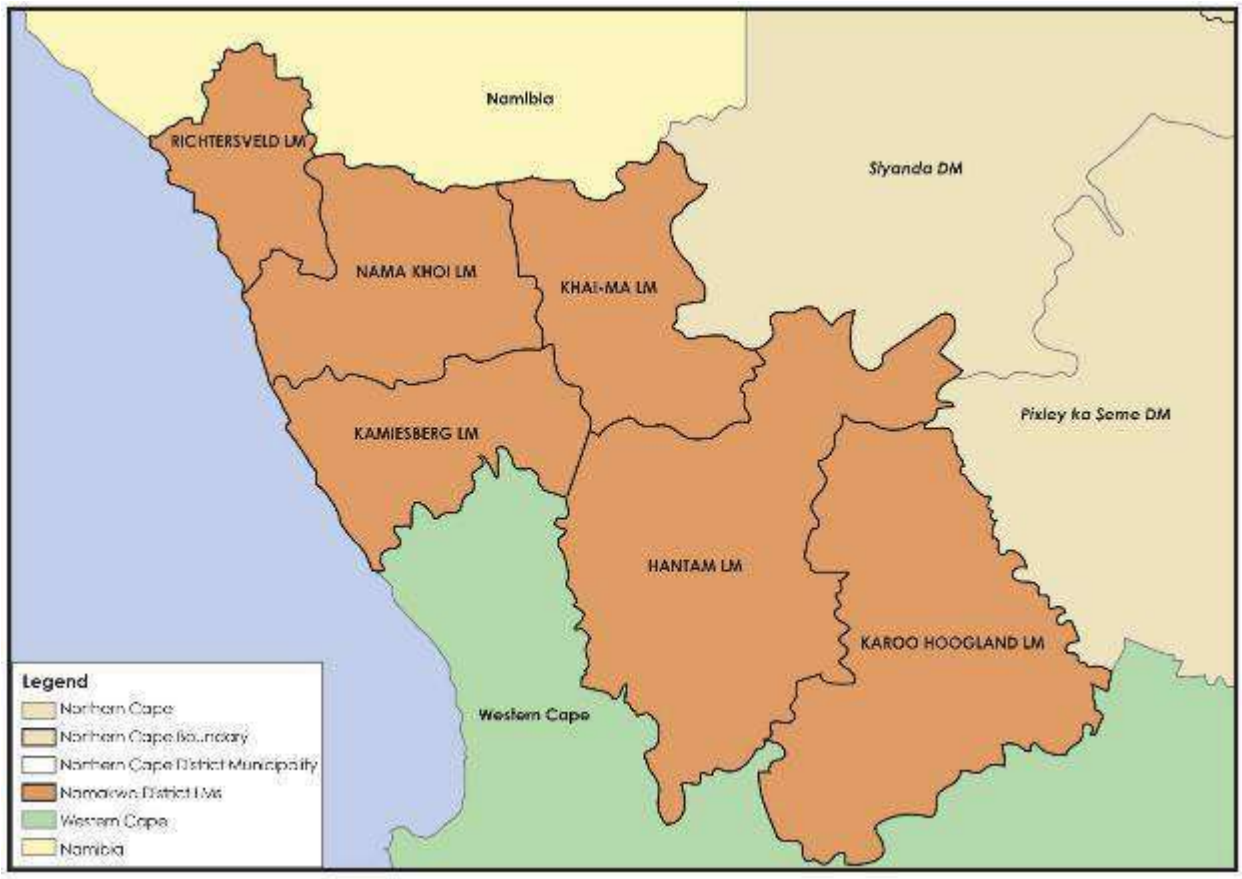


Figure 6-22:| Location of the Hantam LM within the Namaqua DM (source: Barbour, T. 2020)

Land use

Ninety six percent (96%) of the land is used for stock farming, including beef cattle and sheep or goats, as well as game farming in the Northern Cape. Food production and processing for the local and export market is also growing significantly. The wind farm itself is primarily used for agriculture in the form of sheep farming. Other land uses within the surrounding area include the Eskom Helios substation, which is located adjacent to the Granaatboskolk (Nuwepos) Road, approximately 7.5 km south-east of the Kokerboom 3 site. The operational Khobab and Loeriesfontein Wind Farms connect to Helios via 132kV overhead powerlines. Sishen-Saldanha railway line is located 4.3 km to the east of Kokerboom 3. Three large salt pans, Konnes se Pan, Dwaggas Salt Pan and Commissioner's Salt Pan, are located 15-25 km to the north and north east of the Kokerboom 3 site.

Kokerboom 3 is one of a number of Renewable Energy Facilities (REF) currently proposed or under construction in the study area. These include two existing WEFs. Three proposed ones, as well as one Solar PV facility. The five WEF facilities are contiguous, a number which would be increased to six with the addition of Kokerboom 3. Kokerboom 2 is proposed adjacent to the west of Kokerboom 3 on two properties, namely Springbokpan and Springboktand farms. Kokerboom 1 is proposed on Klein Rooiberg and Leeubergfontein adjacent to the south and south-west of Kokerboom 2, approximately 4.7 km south of Kokerboom 3. The Khobab and Loeriesfontein WEFs were approved in the Third REIPPP Bid round and are currently operational. At least two other REFs have also been proposed in the study area. These include the Dwarsrug WEF and the Orlight Solar PV facilities located 5.5 km to the east and 16.8 km to the south-east of the Kokerboom 3 site, respectively. Both projects have been granted environmental authorisations.

Demographics

The Hantam LM had a population of 21 505 in 2017, which is a decrease from the 2011 population (21 685). The number of households in the Hantam LM was estimated at 6 196 in 2017, with an average household size of 3.5. A large percentage (82.2%) of the population in the HLM is coloured, followed by whites (12.1%) and black africans (4.4%). (Census, 2011). This is contrasted with the information provided by the municipal 2017 IDP, coloured (83.4%), followed by whites (11.7%) and black africans (4.9%). The dominant language within the municipality is Afrikaans (93.1%), followed by the other languages spoken including English (1%) and Xhosa (0.6%). (Census, 2011).

The dependency ratio has increased from 59.5 (2011) to 62 (2017). The increase represents a deterioration in local socio-economic conditions. indicating that there are a increasing number of people dependent the economically active 15-64 age group. The age dependency ratio is the ratio of dependents, people younger than 15 or older than 64, to the working, age population, those ages 15-64. The dependency ratio for the HLM was essentially the same as the ratio for the Northern Cape as whole, 55.7 in 2011. The dependency ratio for the HLM in 2011 was also higher than the national average of 52.7.

Employment and Sectors

HLM unemployment rate has decreased for the ten-year period between 2001 and 2011 period from 19.8%, a drop of 7.9%. the unemployment rate in 2017 was 10.3%. The decrease in the unemployment rate is a direct result of the renewable energy sector growth within the region, specifically the town of Loeriesfontein.

Mining and agriculture forms the backbone of the greater Namakwa District, with diamond and copper mining being the primary commodities being extracted. Mining activities have since declined in the last two decades, leading to massive layoffs and disinvestment in the DM. Another key sector is agriculture and agri-processing, especially within the Northern Cape Province. Approximately 2% percent of the province is used for crop farming, mainly irrigation in the Orange River Valley and Vaalharts Irrigation Scheme.

Agriculture and small-scale salt mining are traditionally the key economic activities in the study area. The key - and essentially only - agricultural resource in the study area is grazing. The resource is almost exclusively used for sheep farming.

Educational Levels

The education levels in the HLM improved for the period 2001 to 2011, with the percentage of the population over 20 years of age with no schooling decreasing from a high 26.8 % to 15.3 %. While there has been a significant improvement the figure for the HLM was higher than the provincial average of 11.3 %. The percentage of the population over the age of 20 with matric also increased in the HLM, from 14.9% to 18.8% in the HLM. Despite these increases the figure are significantly lower than the provincial (27.7%) and national (28.4%) averages. Low education levels, specifically higher education, therefore, remains a challenge in the HLM.

Availability of Municipal Services

Access to basic services has both improved and deteriorated in the municipal area. The number of households with electricity for lighting deteriorated negligibly from 76.3% of all households in 2011 to 76.2% in 2017, but down from 80.9% in 2016. The proportion of households with flush toilets connected to the sewerage system, however, has improved substantially from 53.4% in 2011 to 75.5% in 2017, but again, down from 78.3% in 2016. The provision of piped water inside dwellings has deteriorated very slightly from 59.8% of all households receiving the service in 2011 compared to 58.8% of households in 2017. Refuse removal available to households has improved somewhat from 72% in 2011 to 72.6% in 2017.

Potential Impacts

A number of impacts are associated with the construction of the WEF and are discussed below.

Construction Phase Impacts

The following potential construction phase impacts have been identified by the specialist:

- **Creation of local employment a, training and business opportunities** (positive): the construction phase period will provide employment opportunities to the local community, mostly in the low and semi skilled level. The majority of these employment opportunities are likely to be accrued by the historically disadvantaged. Approx 25% of the operational employment opportunities would be for low- or semi-skilled people. The remainder of the positions are likely to be highly skilled, and its unlikely that these skills will be available in the local community (i.e. only a portion (up to 25%) of all positions will be available for local HDIsThe anticipated wage bill for the project is in the region of R50 million, which will be spread throughout the 18 month construction phase and will be distributed between the low level, semi-skilled and professional employees. A certain percentage will be reserved for local businesses (i.e. the construction period will result in the growth of the hospitality industry, which will benefit from the provision of accommodation and meals for professionals). The overall significance rating of these potential impacts calculates to medium positive pre mitigation and high positive post mitigation. The following mitigation measures are proposed:
    - Where reasonable and practical the proponent should appoint local contractors and implement a ‘locals first’ policy, especially for semi and low-skilled job categories. Due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
    - Where feasible, efforts should be made to employ suitably qualified and experienced local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.
    - Before the construction phase commences the proponent should meet with representatives from the HLM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.
    - The local authorities and relevant community representatives should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.
    - The need to implement a training and skills development programme for local workers should be investigated prior to the initiation of the construction phase. The aim of the programme would be to maximise local employment opportunities

- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.
- The proponent should liaise with the HLM with regard to the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work.
- Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information.
- The HLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.

- **Impact of construction workers on local communities** (negative): The presence of construction workers poses a potential risk to family structures and social networks in the town of Loeriesfontein and potentially Calvinia, Niewoudtville and other nearby towns. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour including: An increase in alcohol and drug abuse, an increase in crime level, the loss of girlfriends and/or wives to construction workers, an increase in teenage and unwanted pregnancies, an increase in prostitution and an increase in sexually transmitted diseases (STDs) including HIV. The overall significance rating of these potential impacts calculates to medium negative pre mitigation and low negative post mitigation. The following mitigation measures are proposed:
  - Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.
  - The proponent should consider the need for establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from the HLM, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community and farm workers associated with construction workers.
  - The proponent and the contractor(s) should, in consultation with representatives from the MF where applicable, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed and/or appropriate disciplinary action taken. All dismissals must comply with the South African labour legislation.
  - The proponent and contractor(s) should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase.
  - No workers should be permitted to trespass onto adjacent properties. Failure to adhere to this should be made a dismissible offence.
  - In the event of workers being accommodated in Loeriesfontein or other remote location, the contractor should provide transport to and from the site on a daily basis for workers. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site.
  - Where necessary and feasible, the contractors should make the necessary arrangements to enable workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks.
  - The need and feasibility of establishing accommodation on site should be assessed by the proponent.

- If accommodation on site is not required and/ or feasible it is recommended that no construction workers, with the exception of security personnel, be permitted to stay over-night on the site. However, some staff may be accommodated in houses located on local farms in the area, by prior agreement with the landowners concerned.

- **Influx of job seekers** (negative): Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become "economically stranded" in the area or decide to stay on irrespective of finding a job or not. The influx of job seekers to the area and their families can also place pressure on the existing services in the area, specifically low-income housing. In addition to the pressure on local services, the influx of construction workers and job seekers can result in competition for scarce employment opportunities. Further secondary impacts include increase in crime levels, especially property crime, as a result of the increased number of unemployed people. These impacts can result in increased tensions and conflicts between local residents and job seekers from outside the area. The overall significance rating of these potential impacts calculates to low negative pre and post mitigation. The following mitigation measures are proposed:
  - The proponent should implement a "locals first" policy as far as possible, specifically with regard to unskilled and low skilled opportunities.
  - The proponent should implement a policy that no employment will be available at the gate.
- **Risk to safety, livestock and farm infrastructure** (negative): The presence of and movement of construction workers on and off the site may pose a potential safety threat to local famer's and farm workers in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged or stock theft linked either directly or indirectly to the presence of farm workers on the site. The overall significance rating of these potential impacts calculates to medium negative pre mitigation and low negative post mitigation. The following mitigation measures are proposed:
  - The proponent shall be responsible for the repair/rectification or compensation of any damages to farm property etc. during the construction phase proven to be associated with the construction activities for the WEF, if evidence can be provided. The contractor may be liable for such compensation costs, as per the contract between the proponent and the contractor/s. The relevant agreement/s should be signed before the construction phase commences.
  - Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties.
  - The proponent should consider the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This forum/committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site.
  - The proponent should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent and the contractors. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below).
  - The Environmental Management Programme (EMPr) should outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.
  - Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.

- It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site. However, it is recognised that there may be a need to establish accommodation on site. If this is the case then the movement of workers should be contained to the construction camp area.

- **Increased risk of grass fires** (negative): The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could in turn pose a threat to grazing and livestock in the area. Due to low biomass, the veld is not very fire prone. However, should a fire occur, it would deprive the affected owners of their primary grazing resource. Given the low carrying capacity of the veld any loss of valuable grazing land would impact on farming livelihoods. Farm infrastructure, such as fences and water pipes, may also be damaged or destroyed. The risk of grass fires is higher during windy conditions in the area, specifically during the dry, summer months from December to March. The overall significance rating of these potential impacts calculates to medium negative pre mitigation and low medium post mitigation. The following mitigation measures are proposed:
  - The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase proven to be associated with the construction activities for the WEF will be compensated for, if evidence can be provided. The contractor may be liable for such compensation costs, as per the contract between the proponent and the contractor/s. In addition, the landowners should be encouraged to join the local Fire Protection Association.
  - Contractor/s should ensure that no open fires are allowed on the site.
  - Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced.
  - Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard, special care should be taken during the high risk dry, windy summer months.
  - Contractor should provide adequate fire-fighting equipment on-site.
  - Contractor should provide fire-fighting training to selected construction staff.
  - As per the conditions of the Code of Conduct, in the event of a fire proven to be caused by construction workers and or construction activities, the appointed contractors should compensate farmers for any damage caused to their farms..

- **Impacts associated with movement of heavy vehicles and on-site construction related activities**: The movement of heavy construction vehicles during the construction phase has the potential to damage local farm roads and create dust and safety impacts for other road users in the area. The starting point of the route for the transportation of imported equipment, such as blades and nacelles, is the port at either Saldanha or Coega (20km north of Port Elizabeth). Both Coega and Saldanha have been used for importing WEF components in the past and have been successfully transported to Loeriesfontein during the construction of the now-operational Khobab and Loeriesfontein Wind Farms. Of the two options, Coega is the preferred port. The route for imported components that are transported via abnormal vehicles is a route length of approximately 1000km to the site.The route from Coega will initially use the R75 northwards to Graaff-Reinet and then the N9/R61 to Beaufort West; at which point it continues on the N1 until the R63 North-easterly passing through Victoria West, Carnavon, passed Calvinia until the R355 into Loeriesfontein then on Granaatboskolk Road (DR2972) to the site. It is suggested that the transporting contractor executes a detailed study before transporting any of the components, to confirm the preferred and alternative routes for each type of load configuration based on the Port of origin.

- . The following mitigation measures are proposed:

- Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.
- The contractor must ensure that damage caused by construction related traffic to the Nuwepos Road and local farm roads is repaired on a regular basis throughout the construction phase. The costs associated with the repair must be borne by the contractor.
- All vehicles must be road-worthy and drivers must be licensed and made aware of the potential road safety issues and need for strict speed limits.
- The Contractor should liaise with the affected farmers regarding timing and location of construction activities so they can make alternative arrangements for their sheep.
- The Contractor should ensure that workers are informed that no waste can be thrown out of the windows while being transported to and from the site. Workers who throw waste out windows should be fined.
- The Contractor should be required to collect waste along the access road on a weekly basis;
- Waste generated during the construction phase should be transported to the local landfill site or other appropriate recycling/disposal facility.

- **Impacts associated with loss of grazing resources** (negative): The activities associated with the construction phase have the potential to result in the loss of land available for grazing and other agricultural activities. The key construction phase related issues are linked to the movement of heavy construction vehicles on the site, establishment of laydown areas, construction roads and trenching in cultivated areas. All of these activities have the potential to impact on grazing resources, which, in turn, could impact on sheep farming activities. The overall significance rating of these potential impacts calculates to medium negative pre mitigation and low negative post mitigation. The following mitigation measures are proposed:

  - The final location (micro-siting) of wind turbines, access roads, laydown areas etc. should be discussed with and confirmed with the locally affected landowners before being finalised.
  - The footprint areas for the establishment of individual wind turbines should be clearly demarcated prior to commencement of construction activities. All construction related activities should be confined to the demarcated area and minimised where possible.
  - An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase.
  - All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase, unless required for operational activities (e.g. access roads). The rehabilitation plan should be informed by input from an appropriately qualified professional, with experience in arid regions.
  - The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed.
  - The implementation of the Rehabilitation Programme should be monitored by the ECO.

Operational Phase

The following potential construction phase impacts have been identified by the specialist:

- **Implementation of clean, renewable energy infrastructure** (positive): The establishment of renewable energy infrastructure, such as the proposed WEF, should be viewed, firstly within the

context of the South Africa's current reliance on coal powered energy to meet the majority of its energy needs, and secondly, within the context of the success of the REIPPPP. The overview of the IPPPP (March 2019) indicates that the REIPPPP has attracted R41.8 billion in foreign investment and financing in the seven bid windows (BW1 – BW4, 1S2 and 2S2). This is more than double the inward FDI attracted into South Africa during 2015 (R22.6 billion). In terms of local equity shareholding, 52% (R31.5 billion) of the total equity shareholding (R61.0 billion) was held by South African's across BW1 to BW4, 1S2 and 2S2. This equates to substantially more than the 40% requirement. Foreign equity amounts to R 29.5 billion and contributes 48% to total equity. As far as B-BBEE is concerned, Black South Africans own, on average, 33% of projects that have reached financial close, which is slightly above the 30% target. The overall significance rating of these potential impacts calculates to medium negative pre mitigation and medium positive post mitigation. The following mitigation measures are proposed:

  - Use the project to promote and increase the contribution of renewable energy to the national energy supply.
  - Where possible and feasible, implement a training and skills development programme for locals during the first 5 years of the operational phase (unless sufficient suitably trained individuals are already available in the local area). The aim of the programme should be to maximise the number of South African's employed during the operational phase of the project.

- **Creation of employment and business opportunities and support for local economic development** (positive): The employment opportunities associated with the operational phase will be limited to in the region of 20-25 full-time employees over a 20-year period. Approximately 25% of the operational employment opportunities would be for low- or semi-skilled people. The remainder of the positions are likely to be highly skilled, and it's unlikely that these skills will be available in the local community (i.e. only a portion (up to 25%) of all positions will be available for local HDIs. Of this total approximately 10 will be highly skilled, 8 semi-skilled and 2 low skilled positions. The annual wage bill for the operational phase would be ~ R 5 million. The majority of semi-skilled and low-skilled employment opportunities associated with the operational phase are likely to benefit HD members of the community.
- However, given that the wind energy sector in South Africa is relatively new, the skilled positions may need to be filled by people from other parts of South Africa or even overseas. The overall significance rating of these potential impacts calculates to low positive pre mitigation and medium positive post mitigation. The following mitigation measures are proposed:
  - Where possible and feasible, the proponent should implement a training and skills development programme for locals during the first 5 years of the operational phase (unless sufficient suitably skilled persons are already available in the local area). The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project.
  - The proponent, in consultation with the HLM, should investigate the options for the establishment of a Community Development Trust.
- **Generate income for affected landowner** (positive): The proponent has entered into rental agreements with the affected landowners for the use of the land for the establishment of the proposed WEF. In terms of the rental agreement the affected landowner(s) will be paid an annual amount dependent upon the number of wind turbines located on the property. The overall significance rating of these potential impacts calculates to medium positive pre mitigation and medium positive post mitigation. The following mitigation measures are proposed:
  - The relevant lease agreements between the proponent and the landowners must be put in place and signed off prior to commencement.

- **Benefits associated with the establishment of a community trust or other Community Benefit Structure** (positive): An important focus of the REIPPPP is to ensure that the build programme secures sustainable value for the country and enables local communities to benefit directly from the investments attracted into the area. In this regard IPPs are required to contribute a percentage of projected revenues accrued over the 20-year project operational life toward SED initiatives. These contributions are linked to Community Trusts and accrue over the 20-year project operation life and are used to invest in housing and infrastructure as well as healthcare, education and skills development. Further direct investments in local economic development (LED) and socio-economic development (SED) initiatives may be made in addition to or instead of the creation of a Communty Trust. The overall significance rating of these potential impacts calculates to medium positive pre mitigation and high positive post mitigation. The following mitigation measures are proposed:
    - The HLM should be consulted as to the structure and identification of potential beneficiaries of the Trust. The key departments in the HLM that should be consulted include the Municipal Managers Office, IDP Manager and LED Manager.
    - Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community.
    - Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the Community Trust from the WEF.
- **Impact on sense of place and rural characters of the landscape** (negative): The wind turbines and power lines associated with the proposed WEF will have a visual impact on the landscape and remote, undeveloped sense of place of the area. As indicated below, from a purely visual context and in terms of the change to the current landscape this impact is likely to be negative. concerned about the potential visual impacts associated with the proposed WEF. The majority of the farms in the area are also un-occupied. In addition, the visual integrity of the area has to some extent been impacted by the existing Helios substation and the associated transmission lines in the area. The areas remote, undeveloped sense of place has also been impacted by the electrified Sishen-Saldanha railway line. In addition, two WEFs, namely the Loeriesfontein and Khobab WEF, are operational immediately adjacent to the site. The overall significance rating of these potential impacts calculates to medium negative pre mitigation and medium negative post mitigation. The following mitigation measures are proposed:
    - Mitigation measures proposed in the visual assessment will need to be implemented.

Decommissioning phase impacts

- **Loss of jobs or income** (negative). Impacts associated with decommissioning phase include the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant authorities. The overall significance rating of these potential impacts calculates to medium negative pre mitigation and very low negative post mitigation. The following mitigation measures are proposed:
    - There will also be short-term job creation for the duration of the decommissioning phase (~12-18 months), for the workers employed for to undertake the decommissioning and rehabilitation work.
    - The proponent should ensure that retrenchment packages are provided for all staff retrenched when the WEF is decommissioned.
    - All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning, unless agreed otherwise with the land owner (e.g. the land owner may wish to retain certain roads).

- The proponent should establish an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas, or otherwise make financial provision for decommissioning costs. The Trust Fund (if created) should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20 year operational life of the facility, or funded via other feasible and reliable mechanisms. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure. Alternatively, the funds from the sale of the WEF as scrap metal should be allocated to the rehabilitation of the site.

Cumulative Impacts

- The existing two wind farms in the area, and the large Eskom Substation, are likely to increase the potential for the area to be established as a renewable energy node. Further authorisation of the wind farm could reinforce this effect to some degree. The potential is moderated by the remoteness of the locality, where existing dry-land sheep farming can continue to take place amongst the turbines, and also due to there being no landscape based eco-tourism in the vicinity. However, the potential impact of wind energy facilities on the landscape is an issue that does need to be considered, specifically given South African's strong attachment to the land and the growing number of wind facility applications. The overall significance rating of these potential impacts calculates to medium negative pre and post mitigation. The following mitigation measures are proposed:
  - The establishment of a number of large renewable energy facilities in the area does have the potential to have a negative cumulative impact on the areas sense of place and the landscape. The environmental authorities should consider the overall cumulative impact on the rural character and the areas sense of place before a final decision is taken regarding the optimal number of such facilities in an area.
- The establishment of the proposed up to 300 MW Kokerboom 3 WEF and the other renewable energy facilities in the study area will place pressure on local services, specifically medical, education and accommodation in the HLM. This pressure will be largely associated with the influx of workers to the area during the construction and to a lesser extent during the operational phases of renewable energy projects proposed in the area. The presence of non-local workers during both the construction and operation phase also has the potential to place pressure on property prices and rentals. As a result, local residents, such as government officials, municipal workers, school teachers, and the police, may no longer be able to buy or afford to rent accommodation in towns such as Loeriesfontein and Niewoudtville. The overall significance rating of these potential impacts calculates to medium negative pre mitigation and low negative post mitigation. The following mitigation measures are proposed:
  - The Northern Cape Provincial Governments, in consultation with the HLM, NDM and the proponents involved in the development renewable energy projects in the HLM, should consider establishing a Development Forum to co-ordinate and manage the development and operation of renewable energy projects in the HLM, with the specific aim of mitigating potential negative impacts and enhancing opportunities. This would include identifying key needs, including capacity of existing services, accommodation and housing and the implementation of an accredited training and skills development programmes aimed at maximising the opportunities for local workers to be employed during the construction and operational phases of the various proposed projects. These issues should be addressed in the Integrated Development Planning process undertaken by the Hantam Local Municipality (HLM) and Namakwa District Municipality (NDM).
- The establishment of the proposed Kokerboom 3 WEF and other renewable energy facilities in the HLM also has the potential to result in significant positive cumulative socio-economic opportunities for the region, which, in turn, will result in a positive social benefit. The positive cumulative impacts include

creation of employment, skills development and training opportunities, and downstream business opportunities during the construction and operational phases of the projects. The overall significance rating of these potential impacts calculates to medium positive pre mitigation and low positive post mitigation. The following mitigation measures are proposed:

- The proposed establishment of suitably sited renewable energy facilities within the HLM should be supported, and use of local labour, services and materials should be promoted where possible.

No-Go Alternative

The No-Development option would represent a lost opportunity for South Africa to supplement is current energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producers of carbon emissions in the world, this would represent a negative social cost. However, at a provincial and national level, it should be noted that the proposed WEF development is not unique. In this regard, a significant number of other renewable energy developments are currently proposed in the Northern Cape and other parts of South Africa. Foregoing the proposed establishment of the proposed WEF would therefore not necessarily compromise the development of renewable energy facilities in the Northern Cape Province and/ or South Africa. However, the socio-economic benefits for the local communities in the HLM would be forgone. This loss should be viewed within the context of the area's low agricultural and tourism potential. The establishment of a WEF would therefore create a unique opportunity for investment in the area. The no-development option would therefore represent a negative socio-economic impact for the local area.

Conclusion and Recommendations

The findings of the SIA indicate that the development of the proposed up to 300 MW Kokerboom 3 WEF will create employment and business opportunities for locals during both the construction and operational phase of the project. The establishment of a Community Trust and/or other direct investments in local ED and SED initiatives will also benefit the local community. The enhancement measures listed in the specialist report should be implemented in order to maximise the potential benefits. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole. The findings of the SIA also indicate that the potential negative social impacts can be effectively mitigated. This is largely due to the low population density. The economic potential of the area is also constrained by the low agricultural and tourism potential. The establishment of a WEF therefore creates a unique opportunity for investment in the area. The study area is therefore an ideal area for the development of a renewable energy facility.

The establishment of the proposed 300 MW Kokerboom 3 WEF is therefore supported by the findings of the SIA, subject to the implementation of the recommended mitigation measures and management actions contained in the report. The final location of wind turbines should be informed by the findings of the other specialist studies, specifically the VIA and agricultural assessment.

6.9 Agricultural Production and Potential (Lanz, 2020)

This section provides a summary of the agricultural statement, the full Agricultural Compliance Statement compiled by Lanz, 2020 is available in Annexure D1.

Baseline Description

Kokerboom 3 WEF is located in a sheep farming agricultural region and this is the only agricultural land use on the site and surrounds.

Wirth an average rainfall of 140 mm, and an evaporation value of 1600 mm, the proposed site is constrained in terms of its possible agricultural productivity (incl. grazing).The agricultural capability of the proposed site is classified as a 7, which is a non-arable land with a low potential for grazing. The limitation is a direct result of extreme aridity, and lack of access to water, as well as shallow, rocky soils. The dominant soil type is shallow, sandy soils on underlying rock or hard pan carbonate. The grazing capacity of the site is low at 45 hectares per large stock unit, which is the lowest in the country.

There is little agricultural infrastructure in the study area, apart from fencing into camps and wind pumps with stock watering points. There are existing wind farms on neighbouring farm portions.

The proposed transformation of this land to the industrial use of generating electricity will result in the disturbance of the ground by the turbines, which will mean the land will be lost to agricultural practices. Therefore, an agricultural and site specialist undertook a site investigation and provided input into the section. The agricultural report is included in Annexure D1.

Site Sensitivity

Agricultural sensitivity, in terms of environmental impact, is a direct function of the capability of the land for agricultural production. This is because a negative impact, or exclusion of agriculture, on land of higher agricultural capability is more detrimental to agriculture than the same impact on land of low agricultural capability.

The screening tool classifies agricultural sensitivity according to two criteria - the cultivation status and the land capability. All cultivated land is classified as high sensitivity (or very high sensitivity). This is because there is a scarcity of arable production land in South Africa, in terms of how much is required for food security.

Uncultivated land is classified by the screening tool in terms of the land capability. Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability classes are suitable as arable land for the production of cultivated crops, while the lower suitability classes are only suitable as non- arable, grazing land, or at the lowest extreme, not even suitable for grazing. In 2017 DAFF released updated and refined land capability mapping across the whole of South Africa. This has greatly improved the accuracy of the land capability rating for any particular piece of land anywhere in the country. The new land capability mapping divides land capability into 15 different categories with 1 being the lowest and 15 being the highest. This land capability data is used by the screening tool.

Kokerboom 3 site sensitivity

The proposed site is identified by the screening tool as being of predominantly low sensitivity for agricultural resources, but it also includes patches of medium sensitivity. The agricultural capability of all land in the study area is severely constrained by the aridity of the climate. The further basis for the agricultural sensitivity classification of land within the site is summarised in Table 6-5.

Table 6-5: Description of different agricultural sensitivity classes that occur in the study area.

Sensitivity category	Cultivation status	Land capability evaluation values	General description
Low	Uncultivated	3 to 5	Constrained by aridity. Also constrained by shallow, sandy soils on underlying rock or hard-pan carbonate.
Medium	Uncultivated	6 to 7	Constrained by aridity. Also constrained by shallow, sandy soils on underlying rock or hard-pan carbonate.

Potential Impacts

The significance of agricultural impacts is a direct function of the degree to which an impact will affect current or future agricultural production of an area, whether it be positive (enhances current and/or future agricultural production) or negative (compromise current and/or future agricultural production). Therefore, no impact on production would result in no agricultural impact. Impacts that degrade the agricultural resource base, pose a threat to production and therefore are within the scope of an agricultural impact assessment.

For agricultural impacts, the exact nature of the different infrastructure within a facility has very little bearing on the significance of impacts. What is of most relevance is simply the occupation of the land, and whether it is being occupied by a turbine or a substation makes no difference. What is of most relevance therefore is simply the total footprint of the facility. The components of the project that can impact on agriculture are; occupation of the land by the total, direct, physical footprint of the proposed project including all its infrastructure and construction activities that may disturb the soil profile and vegetation, for example for levelling, excavations etc.

The significance of all potential agricultural impacts is kept low by two factors:

- The fact that the proposed site is on land of extremely limited agricultural potential that is only viable for low density grazing.
- The footprint of the wind farm (including all associated infrastructure and roads), that results in the exclusion of land from potential grazing, is very small in relation to the surface area of the affected farms. The wind farm infrastructure will only occupy approximately 2% of the surface area, according to the typical surface area requirements of wind farms in South Africa (DEA, 2015).

Therefore, all agricultural impacts, including loss of agricultural land use, erosion and soil degradation will not be widespread and can at worse only affect a very limited proportion (2%) of the surface area. All agricultural activities will be able to continue unaffectedly on all parts of the farms other than the small development footprint for the duration of and after the project.

Construction Impacts

The following potential construction phase agricultural impacts have been identified by the specialist:

- **Loss of agricultural land use (negative)**- Agricultural land directly occupied by the development infrastructure will become unavailable for agricultural use. This impact is relevant only in the construction phase. No mitigation is required.
- **Soil degradation (negative)-** Soil can be degraded by impacts in three different ways: erosion; topsoil loss; and contamination. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard surface areas including roads. Loss of topsoil can result from poor topsoil management during construction related excavations. Hydrocarbon spillages from

construction activities can contaminate soil. Soil degradation will reduce the ability of the soil to support vegetation growth. The following mitigation measures:

- Design an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.
- Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.
- If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.

Decommissioning Impacts

The following potential decommissioning phase agricultural impacts have been identified by the specialist:

- **Soil degradation (negative)-** Soil can be degraded by impacts in three different ways: erosion; topsoil loss; and contamination. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard surface areas including roads. Loss of topsoil can result from poor topsoil management during construction related excavations. Hydrocarbon spillages from construction activities can contaminate soil. Soil degradation will reduce the ability of the soil to support vegetation growth. The following mitigation measures:
  - Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.
  - Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.
  - If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.

Indirect Impacts

The following potential indirect socio-economic impact has been identified by the specialist:

- **Increased financial security for farming operations (positive)-** Reliable income will be generated by the farming enterprises through the lease of the land to the energy facility. This is likely to increase their cash flow and financial security and thereby could improve farming operations. No mitigation measures are expected.

Cumulative impacts

The cumulative assessment for this project is an assessment only of the impacts associated with this project but seen in the context of all surrounding impacts. It is concerned with this project's contribution to the overall impact, within the context of the overall impact. But it is not simply the overall impact itself. The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If

the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of agricultural land, with a consequent decrease in agricultural production. In quantifying the cumulative impact, the area of land taken out of grazing as a result of all the developments proposed within the larger surrounding area (total generation capacity of 2,554 MW) will amount to a total of approximately 1,151 hectares. This is calculated using the industry standards of 2.5 and 0.3 hectares per megawatt for solar and wind energy generation respectively, as per the Department of Environmental Affairs (DEA) Phase 1 Wind and Solar Strategic Environmental Assessment (SEA) (2015). As a proportion of the total area within a 35km radius (approximately 284,800 ha), this amounts to 0.30% of the surface area. That is well within an acceptable limit in terms of loss of low potential agricultural land, of which there is no scarcity in the country. It should also be noted that there are few land uses, other than renewable energy, that are competing for agricultural land use in this area. The cumulative impact from developments, other than renewable energy, is therefore likely to be low.

In order for South Africa to achieve its renewable energy generation goals, agriculturally zoned land will need to be used for renewable energy generation. It is far more preferable to incur a cumulative loss of agricultural land in a region such as the one being assessed, which has no cultivation potential, and low grazing capacity, than to lose agricultural land that has a higher potential, and that is much scarcer, to renewable energy development elsewhere in the country. The limits of acceptable agricultural land loss are far higher in this region than in regions with higher agricultural potential. It should also be noted that there are few land uses, other than renewable energy, that are competing for agricultural land use in this area. The cumulative impact from developments, other than renewable energy, is therefore likely to be low.

Due to all of the considerations discussed above, the cumulative impact of loss of agricultural land use will not have an unacceptable negative impact on the agricultural production capability of the area. The proposed development is therefore acceptable in terms of cumulative impact, and it is therefore recommended that it is approved.

No-Go Alternative

The no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. The one identified potential such impact is that due to continued low rainfall in the area, which is likely to be exacerbated by climate change, agriculture in the area will come under increased pressure in terms of economic viability.

The development offers an additional income source to agriculture, without excluding agriculture from the land. Therefore, the negative agricultural impact of the no-go alternative is more significant than that of the development, and so, purely from an agricultural impact perspective, the proposed development is the preferred alternative between the development and the no-go.

Conclusions and Recommendations

The site has very low agricultural potential because of, predominantly, aridity constraints, but also due to soil constraints. It is totally unsuitable for cultivation, and agricultural land use is limited to low density grazing. The majority of land within the development area is of low agricultural sensitivity, but it includes areas of medium sensitivity. Two potential negative agricultural impacts were identified, loss of agricultural land use and land degradation, but neither is of high significance. One positive agricultural impact was identified, namely increased financial security for farming operations. The recommended mitigation measures are implementation of an effective system of storm water run-off control; maintenance of vegetation cover; and stripping, stockpiling and re-spreading of topsoil.

The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable. This is substantiated by the facts that the amount of agricultural land loss is within the allowable development

limits, and that the proposed development poses a low risk in terms of causing soil degradation. From an agricultural impact point of view, it is recommended that the development be approved.

The deduction of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions. Based on the low sensitivity of the site and low agricultural potential, the site is ideally suited for renewable energy development. A further agricultural study will no form part of the EIR phase.

6.10 Visual Landscape (VRM, 2020)

This section provides a short summary of the visual report, the full Impact Assessment Report compiled by Visual Resource Management Africa cc is available in Annexure D8.

Baseline Description of the Visual Environment

At a regional level, there is some topographic variation, but in essence, the surrounding terrain is described as predominantly flat without key topographic features. The current land use of the proposed properties is agricultural, with low intensity sheep farming carried out in this arid environment.

In terms of the landscape setting, the only identifiable feature within the surrounding area is the Klein Rooiberg hill. Although the isolation of the hill does increase the visual importance of this landmark in the surrounding flat Nama-Karoo landscape, it is located approximately 22 km to the south of the proposed site.

The site land use is low intensity sheep farming carried out in the arid environment, some of the associated man-made modifications include isolated farmsteads, farm tracks, fences and water reservoirs. These features are small in scale in the landscape and do not detract from the sense of place, and only provide a baseline for the study area.

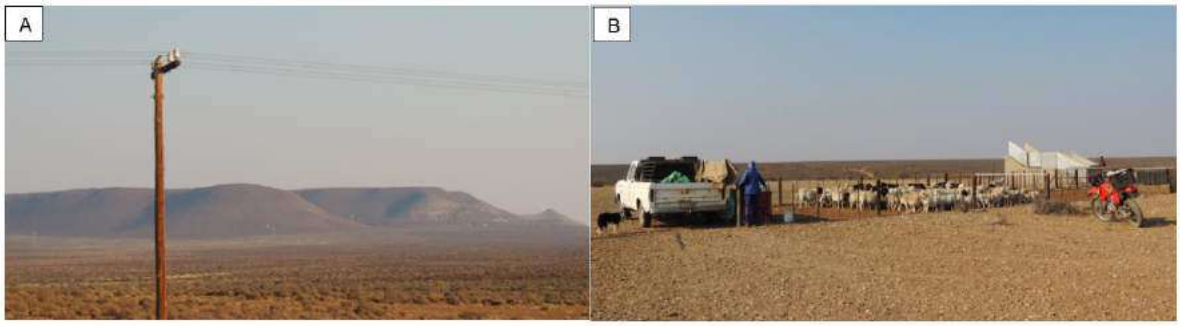
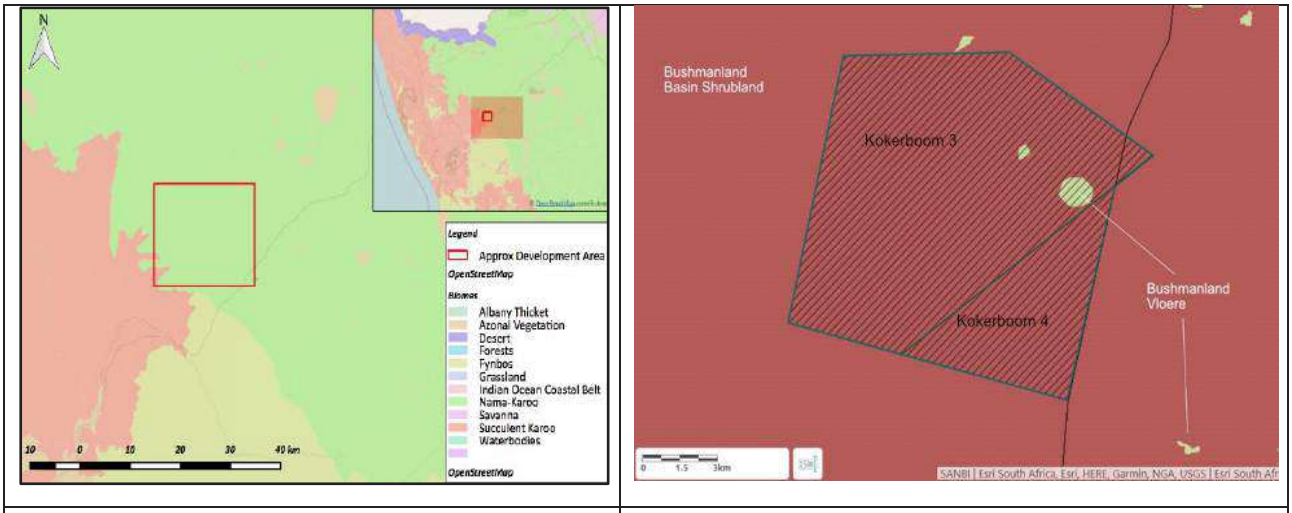


Figure 6-23:| A: Photograph of the Klein Rooiberg hill feature; B: Photograph taken approximately 5 km north of the project area depicting the low intensity sheep farming characteristic of the rural agricultural area

The vegetation type can be described as Bushmanland Basin Shrubland. The vegetation and landscape features are described as slightly irregular plains with dwarf shrubland dominated by a mixture of low sturdy and spiny (and sometimes also succulent) shrubs, white grasses and in years of high rainfall, also by abundant annuals. This is largely influenced by the arid area of low rainfall and high summer temperatures. This results in a uniform broad-brush landscape that has a low visual absorption capacity. Other features include the Eskom Helios Substation, the Sishen-Saldanha railway line, 400 kV distribution line and the Granaatboskolk (Nuwepos) gravel road and numerous farm access roads have introduced a vertical component to the area. The infrastructure associated with the two operational wind farms (Khobab Wind Farm and Loeriesfontein Wind Farm) further reinforce this effect and increase the visual absorption capacity within the foreground/middle ground areas surrounding the sub-station.



C D

Figure 6-24:| C: Vegetation Biome Map; D: BGIS Vegetation Type Map (South African National Biodiversity Institute, 2012).

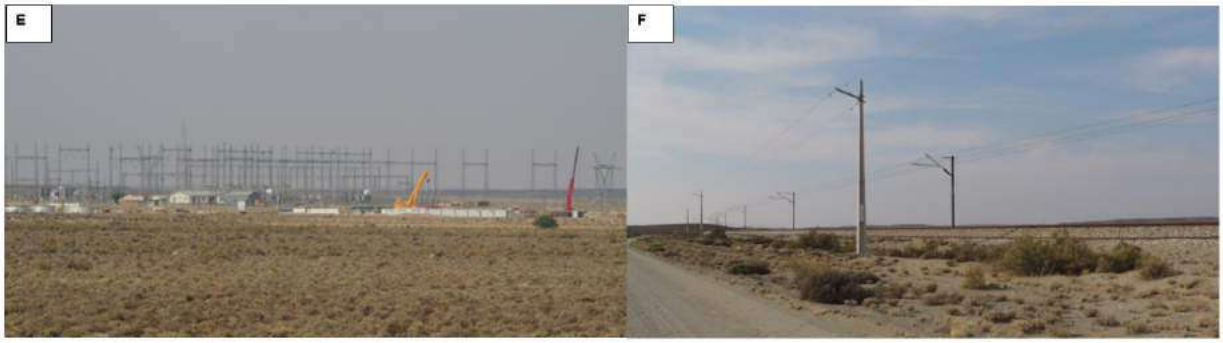


Figure 6-25:| E: Photograph of the Eskom Helios Substation; F: Photograph of the overhead electrical structures and cabling associated with the Sishen-Saldanha railway line.

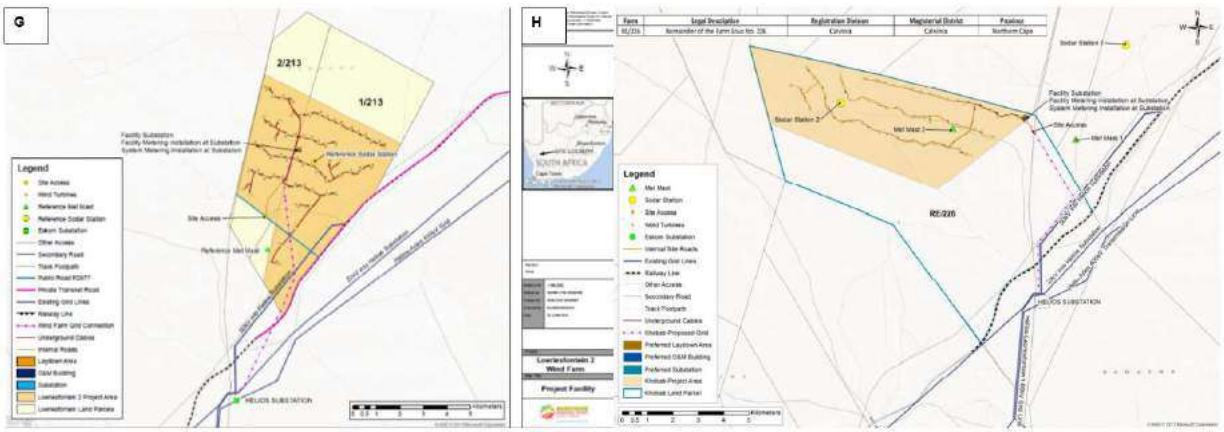


Figure 6-26:| Loeriesfontein 2 WEF; H: Khobab WEF, located to the south east of the proposed development (Mainstream Renewable Power South Africa, 2014).

Project zone of Visual Influence

The visible extent, or viewshed, is defined as "*the outer boundary defining a view catchment area, usually along crests and ridgelines*"[17]. In order to assess the proposed project visibility, a viewshed analysis was

[17] Oberholzer, B. (2005). Guideline for involving visual and aesthetic specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Dev

undertaken by the visual specialist. An indicative height of 240 m was used for the wind turbines which resulted in a probable zone of visual influence carrying 28 km. These viewsheds are only informative as visibility tends to diminish exponentially with distance.

Within the viewsheds, beyond the middle ground buffer, the visibility becomes fragmented due to the undulation of the terrain. Due to the flat nature of the terrain in relation to the height of the proposed landscape modification, the Viewshed is defined as Regional.

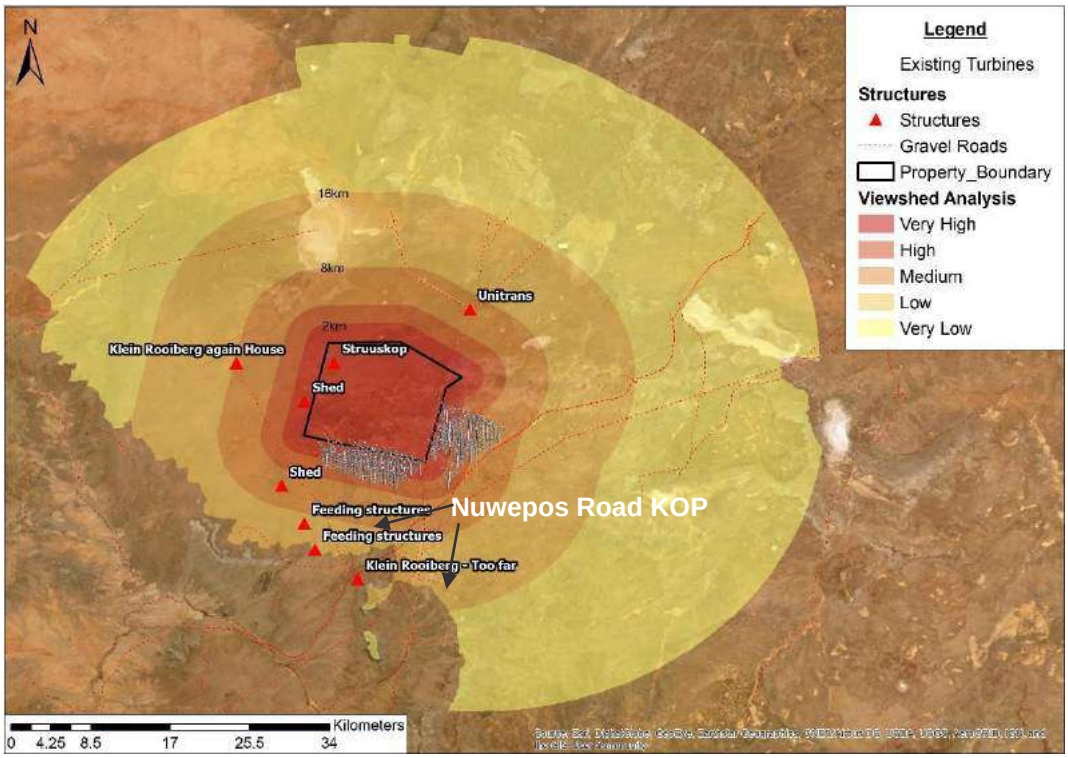


Figure 6-27:| Property assessment area approximate visibility and exposure map generated from a 240 m offset, and the KOP location point.

Development constraints proposed

Based on the analysis of the receiving landscape, in relation to the defined VRM Classes, the following development constraints are proposed.

Table 6-6: Development constraints proposed

Landscape Element	Buffer	Motivation
Rocky outcrop	Site exclusion	Some small rocky outcrops were identified in the site and add value to local landscape. This area would need to be identified by detailed survey and excluded.
Dwelling	1km	A single residential dwelling is located in the western portion of the property and would need to have an exclusion buffer to reduce the potential of flicker effects to residents. (buffer pending SIA comments)
Road	200m	A minor road is located to the east of the site. The buffer precedent set by the existing wind farms should be utilised as an approximate guideline.

Drainage lines	50m	Numerous minor drainage lines were identified on the site. These linear features would need to be excluded. (Buffer subject to surface water specialist findings)
Pan	250m	The main landscape element on site is the pan which range in size. These areas would need to be buffered and excluded from development. (Buffer subject to surface water specialist findings)
Bushmanland Basin Shrubland	None - suitable for wind farming development	The dominant land cover is Bushmanland Basin Shrubland (subject to botanical survey). While the lack of development does add value to the wilderness sense of place, the adjacent wind farms clearly set a precedent for wind farming. No exclusion buffer is provided but it is recommended that a suitable visual distance between the existing wind farm is included. It is also recommended that the linear patterning of the southern wind farm be incorporated as much as possible. However, as the region is remote and strongly defined by wind farming, this is a suggestion.

Potential Impacts

The study area is remote, and the amount of use is rated low. As there are no significant visual resources, and adjacent to two existing wind farms, maintaining landscape integrity is rated low in terms of Public Interest and Adjacent Land Users. The area does not fall within any special zoning areas. Receptor sensitivity to landscape change is thus rated Low. The potential visual impacts are discussed below.

Construction impacts

The following potential construction impacts has been identified by the specialist:

- **Visual intrusion from large and moving wind turbines in the landscape (negative)**: Loss of landscape character from the construction phase of the wind farm that will include the movement of heavy vehicles, dust from moving vehicles, earth moving equipment, excavation of the platforms, construction of the turbines, earthworks and rehabilitation. This will include certain tall equipment such as large cranes used to assemble the wind turbine towers. As this will be a sporadic event, the duration is anticipated to be short term. The size of the equipment and vehicles as well as the nature of the construction works make the impact difficult to mitigate. The impact would likely have a low-negative significance pre and post mitigation. The following mitigation measures are proposed:
    - Dust suppression measures to reduce dust generated by moving vehicles and earth cleared of vegetation.
    - Signage on the Granaatboskolk (Nuwepos) road should be moderated and natural colours used in the signage as much as possible.
    - The buildings should be painted a grey-brown colour (or other colour in keeping with the surrounding landscape) or made of material (e.g. brickwork) in keeping with the colour of the surrounding landscape, to assist in reducing colour contrast.
    - Fencing should be simple and appear transparent from a distance. The fences should be checked monthly for the collection of litter caught on the fence.
    - Soil erosion measures need to be adequately implemented and routinely monitored by the ECO.

Operational impacts

The following potential operational impacts has been identified by the specialist:

- Large turbines with rotating blades operating for a long-term time period. Windblown dust on gravel roads, and potential loss of soil from soil erosion. The impact would likely have a moderate-negative significance pre and post mitigation. The following mitigation measures are proposed:
    - Dust suppression measures to reduce dust generated by moving vehicle.
    - Routing maintenance for soil erosion and strict litter control.
- **Aircrafts warning lights at night (negative)**: The continuous red flashing of the aircraft warning lights at night can be very intrusive to an area which as a rural sense of place and dark skies at night. The impact would likely have a moderate-negative significance pre mitigation and minor-negative post mitigation. The following mitigation measures are proposed:
    - Only place aircraft warning lights on the selected turbines located on the perimeter so as to identify the outside extent of the wind farm, subject to CAA requirements.
- **Landscape change from construction of BESS, Substation and O&M (negative)**: Change of local and surrounds visual resources due to the construction and operation of the proposed (2.5m high) structures, and buildings. The impact would likely have a minor-negative significance pre and post mitigation. The following mitigation measures are proposed:
    - To reduce colour contrast, if permitted by the Original Equipment Manufacturer, the BESS container structure should preferably be painted a light-brown colour so as to blend with the surrounding arid region landscapes.
    - Light spillage reduction management should be implemented.

Decommissioning Impacts

The following potential decommissioning impacts has been identified by the specialist:

- **Visual intrusion from large and moving wind turbines in the landscape (negative)**: Loss of landscape character from this phase of the wind farm that will include the movement of heavy vehicles, dust from moving vehicles, earth moving equipment, earthworks and rehabilitation. This will include certain tall equipment such as large cranes used to disassemble the wind turbine towers. As this will be a sporadic event, the duration is anticipated to be short term. The size of the equipment and vehicles as well as the nature of the construction works make the impact difficult to mitigate. The impact would likely have a minor-negative significance pre and post mitigation. The following mitigation measures are proposed
    - Dust suppression to reduce dust from moving vehicles when required.
    - Removal of all wind turbine infrastructure, structures, cabling. Impacted areas need to be rehabilitated and restored to natural veld grasses.

Cumulative Impacts

The potential for negative Cumulative Effects to result from the construction and operation of the project are likely to be Medium. The wind potential of the area, and the large Eskom Substation, are likely to increase the potential for the area to be established as a renewable energy node which could result in massing effects. The potential is moderated by the remoteness of the locality, where existing dry-land sheep farming can continue to take place amongst the turbines, and also due to there being no landscape based eco-tourism in the vicinity. As the sense of place is already associated with turbines, the main visual impact is likely to be the massing effect from multiple aircraft warning lights at night. Mitigation is possible and should be implemented to reduce cumulative effects from multiple lights at night.

Conclusion and Recommendation

An inventory of the visual resources was undertaken for the site and surrounds. The Scenic Quality was defined as Medium due to the uniformity of the greater landscape and higher visual absorption capacity from the existing Helios Substation and wind farms under construction. Receptor Sensitivity was rated Low due to the remoteness of the locality and the existing precedent for wind farming in the vicinity. The Class IV objective is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the landscape can be high, and these management activities may dominate the view and be the major focus of the viewer's (s') attention, subject to the applicable zoning regulations and rights of the surrounding land uses.

As the visual resources of the area would accommodate the proposed wind farm landscape modification without significantly degrading the greater visual resources, the visual recommendation is that the project is authorised with mitigation for the following reasons:

- The presence of the Eskom Helios Substation which is large and has a strong visual presence in the landscape. There are also existing power lines in the landscape which, in conjunction with the railway line infrastructure, increase the VAC levels as seen from the district road.
- There is an existing precedent for two wind farms in the landscape which, due to their favourable spatial positioning, do not create a walled massing effect as seen from the surrounding receptors. The existing turbines also increase the VAC levels, as the proposed wind farm will be viewed in the background with the existing wind farms in the foreground.
- The larger turbines require a larger spacing which requires a well-spaced layout that accentuate the vastness of the Nama-Karoo landscape.
- The remoteness of the locality significantly reduces the number of receptors and there is no landscape based eco-tourism activities in the immediate area that would be impacted by the proposed wind farm.

6.11 Noise (De Jager, 2020)

This section provides a short summary of the noise impact assessment, the full specialist assessment compiled by Enviro Acoustic Research (EARES) is available in Annexure D9.

Baseline description of the environmental sound character

Land use is mostly wilderness (ecotourism) with agricultural activities. The area surrounding the proposed site consists predominantly of agricultural lands dominated by sheep farming activities. Existing land use activities are not expected to impact on the ambient sound levels. There are no major roads in the vicinity of the proposed Kokerboom 3 WEF, with the local community using the existing gravel roads to access their properties. There may be some increased traffic on the Granaatbos Kolk Road relating to operation of the Loeriesfontein and Khobab WEFs as well as the future construction of other renewable projects in the area.

There is a railway line around 10 km to the south, with a number of trains observed during the day. No trains were observed at night, though there exist insufficient data to conclude that trains only travel during the day.

The only occupied dwelling in the area is located on the farm Struiskom (Karee Doorn Pan 2/214, Mr. Kotze). Mr. Kotze confirmed that this dwelling is only used after the summer rains, with the other structures being either sheds or dams Refer to Figure 6-28 which indicates the Noise Sensitive Development (NSD). .

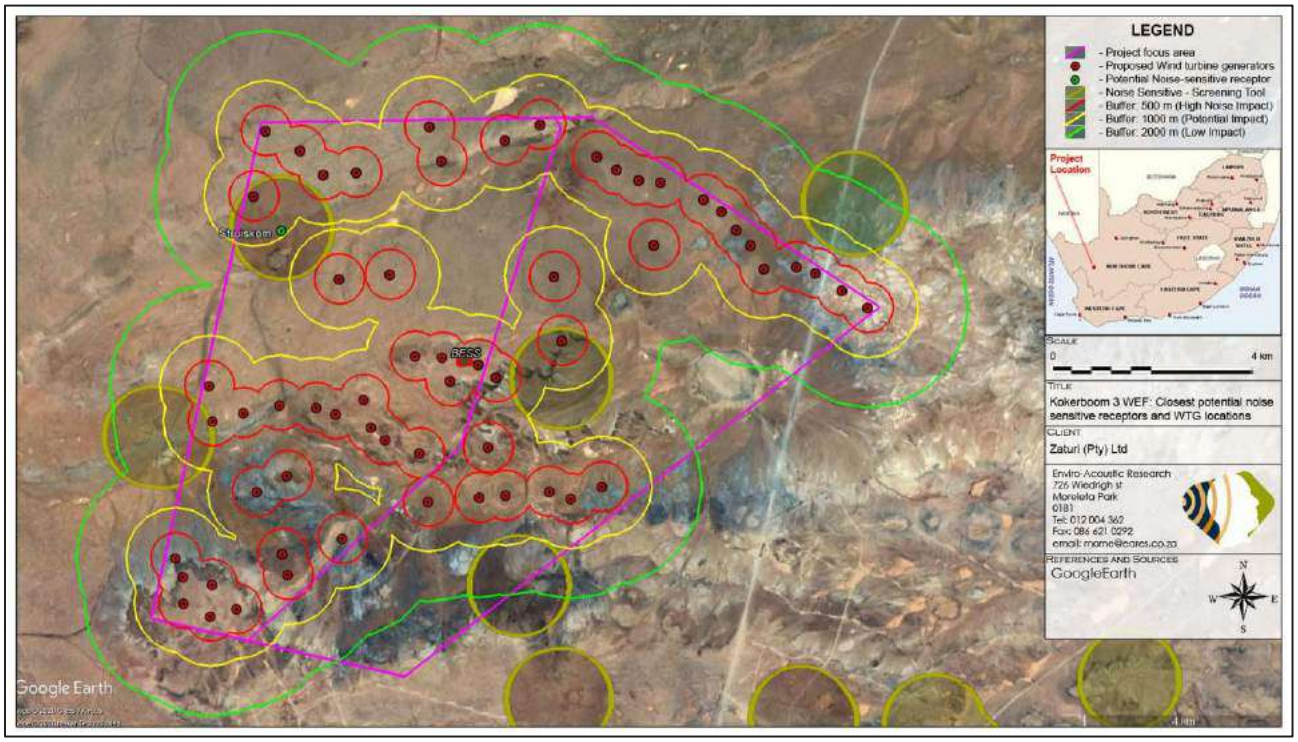


Figure 6-28:|Aerial Image indicating site sensitivity and closest identified Noise-sensitive developments

Potential Impacts

The increase in noise pollution from the operation of heavy machinery, as well as increased traffic during the construction phase of the Kokerboom 3 Wind Farm, can be compared to what is happening at present.

Construction impacts

- Various construction activities taking place simultaneously during the day will increase ambient sound levels due to air-borne noise. Noise levels due to construction activities close to the NSD may be as high as 40 – 45 dBA, depending on the number of simultaneous activities taking place close to this receptor**.**
- Various construction activities taking place simultaneously at night will increase ambient sound levels due to air-borne noise. Noise levels due to construction activities close to the NSD may be as high as 40 – 45 dBA, depending on the number of simultaneous activities taking place close to this receptor. Such an increased noise will be highly audible, potentially disturbing during the very quiet night-time periods.
- Construction of roads during the day may increase ambient sound levels temporary. Construction activities closer than 100 m from the identified NSD could result in noise levels exceeding 55 dBA, higher than the IFC recommended noise limits for residential use. Construction activities closer than 250 m from the identified NSD could result in noise levels exceeding 45 dBA, higher than the zone sound levels for a rural area.
- Various construction vehicles passing close to potential noise-sensitive receptors at may increase ambient sound levels and create disturbing noises.

Operational impacts

Noises during the operation phase are likely to involve the ambient noise of the wind turbines rotating, as well as specific periods of occasional maintenance activities. As the noise generated during the day by a wind farm is often masked by other noises (from a variety of surrounding sources), it is likely that the noise generated in the quieter period would be of more concern. This is usually associated with the 22h00 – 06h00 timeslot. As maintenance activities would not occur during this time, the impact assessment will focus on ambient turbine operation sound levels at night.

- Wind turbines operating simultaneously at night. Increases in ambient sound levels due to air-borne noise from the wind turbines.

Cumulative impacts

- Wind turbines from various WEFs operating simultaneously at night. Increases in ambient sound levels due to air-borne noise from the wind turbines.

Conclusions and Recommendations

The potential noise impact of the proposed Kokerboom 3 WEF was evaluated using a sound propagation model. The development of the Kokerboom 3 WEF will not increase cumulative noises in the area.

No additional work or assessment is required or recommended. Noise has been screened out and will not be further assessed in EIR phase.

The developer however should:

- Investigate any reasonable and valid noise complaint if registered by a receptor staying within 2,000 m from a location where construction or operational activities are taking place or operational wind turbine. A complaints register must be kept on site;

- The developer should minimize night-time construction traffic if the access road is closer than 150 m from the Struiskom dwelling, alternatively, the access road must be relocated further than 150 m from this NSDs (night-time traffic passing this dwelling). (If Struiskom is not occupied at the time of construction, then such limitation will not apply).

6.12 Traffic (Zutari, 2020, peer reviewed by Mr A Schwarz)

This section provides a short summary of the traffic impact assessment, the full specialist assessment compiled by Zutari and peer reviewed by Mr A Schwarz available in Annexure D10.1 and D10.2 respectively.

The traffic volumes associated with Kokerboom 3 WEF will have three distinct patterns, particularly for the construction, operation and de-commissioning stages of the project, as further described below. The primary road of concern is The Granaatboskolk Road that branches from the R357 approximately 1km outside of Loeriesfontein. The R357 is the main road into Loeriesfontein and there is currently not a lot of detailed traffic information regarding the roads in and around the site.

Baseline description of Road Infrastructure

The imported freight will preferably be transported from Coega Port to the site. The preferred freight route from Coega Port, via Graaff-Reinet and Beaufort West, comprises surfaced roads for the majority of the way with only the last 60km on gravel roads. This route is predominantly on National or Provincial Roads, with suitable conditions for the transport of normal freight, or abnormal loads with permits. No toll fees are required on this route; however, abnormal permits will be required for the transport of the transformers and turbine components, irrespective of the final route determined by the logistics contractor.

The traffic through all phases of the project would result in approximately 50 total daily trips and less than 25 vehicle trips per day during the peak periods and would have almost no noticeable impact on the existing traffic service levels.

There are 4 access proposals for Kokerboom 3. WEF:

1. A Northern access point off the public road, that branches off Granaatsboskolk Road to the West.

2. A Western access off the same road

3. Because Farm 214 is bisected by Granaatsboskolk Road and there are turbines on the eastern portion, an Eastern access, off Granaatsboskolk Road is proposed to the East portion.

4. Lastly, a Southern access is also proposed off the Kokerboom 2 access road as it will provide better access to the turbines in the south of the WEF.

Potential Impacts

The traffic volumes associated with Kokerboom 3 WEF will have three distinct patterns, particularly for the construction, operation and de-commissioning stages of the project. The primary road of concern is The Granaatboskolk Road that branches from the R357 approximately 1km outside of Loeriesfontein. The R357 is the main road into Loeriesfontein and there is currently not a lot of detailed traffic information regarding the roads in and around the site.

Construction impacts

The trips associated with the construction phase are primarily the transport of machinery, materials and people to the site. The primary impact of heavy vehicle and abnormal vehicle transportation is the increased rate of road degradation. This will be at its highest intensity during the construction phase of the project. It is expected that the roads in and around Loeriesfontein and the site are able to accommodate the increased loading, however the degradation will be sped up; consequently, affecting any plans for routine maintenance. Abnormal vehicles also present an increased risk to other road users and specific safety protocols must be followed. Warnings and safety instructions should be communicated to the general public in all towns.

Operational impacts

During the operational phase of the project the low volume of regular traffic will not present any increase in road degradation or risk to the general public. In the occurrence of ad-hoc or planned maintenance and replacement of turbine components there would be a limited amount of abnormal vehicle trips, a negligible amount in terms of loading. However, the increased risk to public safety would still apply.

Conclusions and Recommendations

The transport needs for the proposed Kokerboom 3 WEF, located in the Northern Cape Province, on the farms Karree Doorn Pan, Portion 1 of Farm 214 and Karee Doorn Pan, Portion 2 of Farm 214 were assessed. The purpose of the investigation was to identify potential access routes, for the development of the facility which would generally include the transportation of building materials, blades, nacelles, towers, hubs, cables and transformers.

The imported freight will preferably be transported from Coega Port to the site. The preferred freight route from Coega Port, via Graaff-Reinet and Beaufort West, comprises surfaced roads for the majority of the way with only the last 60km on gravel roads. This route is predominantly on National or Provincial Roads, with suitable conditions for the transport of normal freight, or abnormal loads with permits. No toll fees are required on this route; however, abnormal permits will be required for the transport of the transformers and turbine components, irrespective of the final route determined by the logistics contractor.

Building materials will most likely be transported from Calvinia, while certain elements will be transported from various manufacturing centres in South Africa - most likely Coega IDZ for blades, Atlantis for tower sections and Johannesburg for transformers and other equipment. The transport of elements from these manufacturing centres will be predominantly on National and Provincial roads, which presents no limitations for normal freight.

Due to the distance from Calvinia to site (approximately 150km), significant reductions in heavy vehicle trips could be achieved by sourcing road building materials and concrete aggregate from new quarries or borrow pits in proximity to the site, provided that it is feasible with respect to the target implementation programme.

The traffic through all phases of the project would result in less than 50 vehicles during the peak periods and would have almost no noticeable impact on the existing traffic service levels. However, the increased volume of traffic is not the primary concern, it is the delay caused by slow moving transport vehicles. It is therefore recommended that the construction traffic be distributed throughout the day; especially abnormal loads.

There are 4 access proposals for Kokerboom 3. WEF:

1. A Northern access point off the public road, that branches off Granaatsboskolk Road to the West.

2. A Western access off the same road

3. Because Farm 214 is bisected by Granaatsboskolk Road and there are turbines on the eastern portion, an Eastern access, off Granaatsboskolk Road is proposed to the East portion.

4. Lastly, a Southern access is also proposed off the Kokerboom 2 access road as it will provide better access to the turbines in the south of the WEF.

There is a limited risk of delays to the various deliveries required for the construction of the facility, due to potential routine maintenance works (such as repairs and reseals). The impact of such activities is dependent on the scheduling of deliveries and of roads contracts and may be mitigated by the use of the alternative routes proposed in this report.

In general, no obvious problems were identified associated with the transport of freight along the proposed routes to the site, nor for the accesses required for the construction and maintenance of the facility. It will, however, be necessary to confirm certain aspects such as clearances, bridge capacities, etc., by the logistics contractor as part of their preparation as this will be dependent on the actual vehicle configurations used.

There are no obvious issues with the construction of a WEF in the area, as there are several other wind farms in the area. The identified transportation routes and existing road infrastructure are therefore deemed adequate for this construction activity. Granaatsboskolk Road was previously upgraded as part of all the construction activity in the area (construction of the existing wind farms, upgrades to Helios etc.). Based on the low number of trips expected when all the WEFs are fully operational, and the fact that it does not function as an inter-town route, the road does not require any further upgrades. However, post construction the road must be reinstated to its current, pre-construction condition.

6.13 Electromagnetic Interference (EMI) & Radio Frequency Interference (RFI) (ITC, 2020)

Kokerboom 3 is located within the declared Karoo Central Astronomy Advantage Area. As such, the WEFs and associated infrastructure may pose a risk of detrimental impact on the SKA. Electromagnetic interference (EMI) and radio frequency interference (RFI) assessments were thus undertaken.

This section provides a short summary of the EMI assessment, the full specialist assessment compiled by ITC is available in Annexure D11.

Baseline description

The frequency band of concern for SKA mid-band is 100MHz to 25GHz.

The intent of the assessment was is to ensure that the Kokerboom 3 facility poses a low risk of detrimental impact on the SKA by comparing the anticipated emissions from equipment complying to the CISPR 11/32 class B limits minus the path loss due to distance and terrain to the protection levels required by SKA to ensure interference free operations. Because the specific turbine technology has not yet been selected, the assessment is based on a worst-case scenario which assumes that all 60 turbines are constructed, and that each turbines emit the maximum EMI permitted under the CISPR standards, and that emissions arise from the nacelle at 150m hub height.

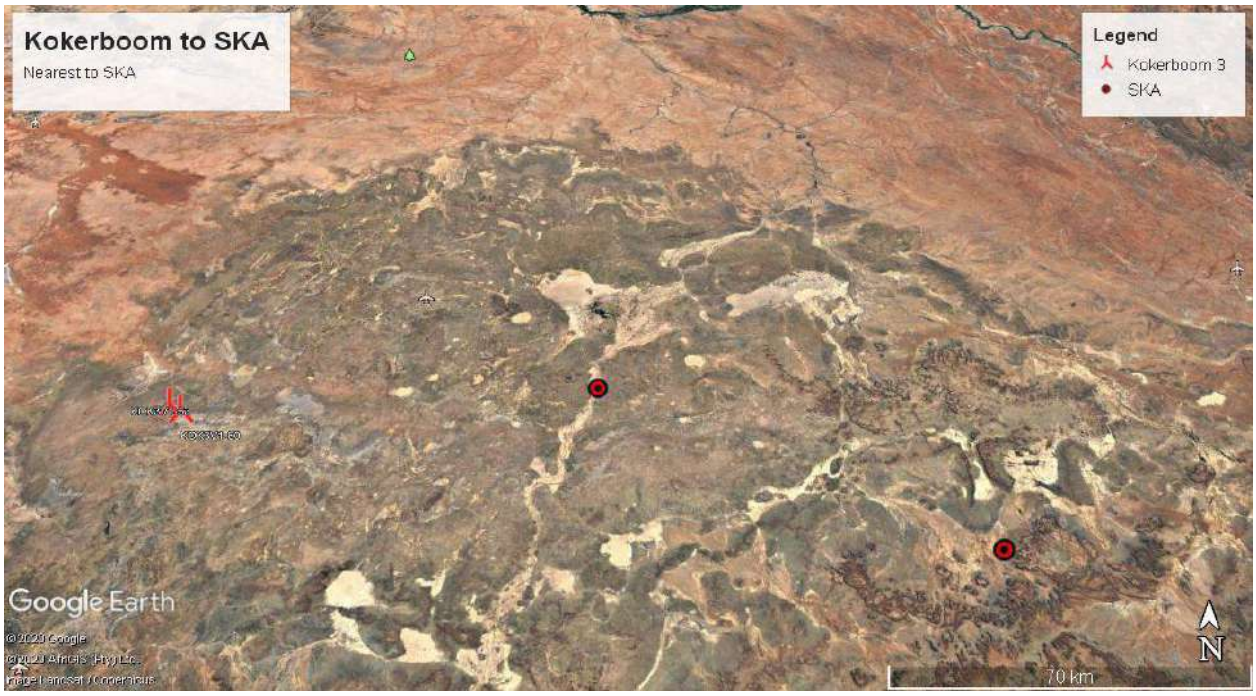


Figure 6-29:|Locality map showing nearest two SKA locations

Potential impacts and risks

The following building blocks are viewed as potential interference sources:

- Control/ monitoring systems – specially nacelle mounted systems
- Power conversion equipment (rectifier/ invertor systems)
- Control and operations centre (computer equipment)

Conclusion and recommendations

Due to the 96.68km distance between Kokerboom 3V1-53 and SKA008, the closest SKA unit, a degradation of performance is expected unless the radiated emissions from each turbine installation can be reduced by 32dB below the CISPR 11 Class B limit across the 100MHz to 6GHz band, by the implementation of suitable mitigation measures (i.e. shielding, filtering, insulation or other attenuation measures).

Such mitigation measures must be integrated into the detailed design for the wind farm, once the final turbine technology has been selected. This assessment has considered the worst case scenario. Should the final selected turbine have a hub height less than 150m, or if the turbine emissions are less than the CISPR 11 Class B limits, then less mitigation would be required. This should be confirmed during the detail design phase, prior to construction.

To verify overall windfarm emissions, ambient measurements should be done at the new site before construction starts. Tests points should be carefully selected based on test equipment sensitivity with the objective to observe the increase in ambient emissions as construction progresses.

Final site tests should be done on completion of the project to confirm the radiated emission levels.

6.14 Shadow Flicker (VRM, 2020)

This section provides a short summary of the shadow flicker report, the full Impact Assessment Report compiled by Visual Resource Management Africa cc is available in Annexure D12.

Baseline description

'Shadow flicker' refers to the shadows that a wind turbine casts over structures and local observers at times of the day when the sun is directly behind the turbine rotor from an observer's position. According to the International Legislation and Regulations for Wind Turbine Shadow Flicker Impact, "Shadow flicker is the flickering effect caused by the rapid periodic occurrence of shadow by the rotating turbine blades. The impacts of shadow flicker impact vary with time and place depending on several factors such as the position and height of the sun relative to the wind turbines and the receptors, the wind turbine hub height and its rotor diameter, cloud cover and wind direction." (Erik Koppen, 2017)

In South Africa, there are no specific guidelines as to how to assess shadow flicker generated by wind turbines. However, international guidelines state that the practical extent to which shadow flicker should be assessed is to a distance of 265 times the distance of the blade chord (the widest part of the turbine blade), or approximately 1.1 km.

Due to the semi-arid nature of the surrounding environment of the proposed Kokerboom 3 facility, the area is sparsely populated, with only a few dwellings located within the immediate viewshed. The nearest farmstead (outside the farm property) is located approximately 8 kilometres to the west. Within the property and assessment area, a single residence was identified on Farm 2/214.

Figure 6-30:| The only residential dwelling within the assessment area (Courtesy, VRM, 2020)

Potential impacts and risks

Turbine shadow flicker effects might cause a nuisance effect for the residents living adjacent to the wind farm. The impact will only be assessed in Operational Phase as the effect requires the movement of the turbine blades. The movement of the blades will not take place in Construction, or Decommissioning Phase.

Furthermore, shadow flicker is often alleged to cause the onset of epileptic seizures. Most people with photosensitive epilepsy are sensitive to flickering around 16-25 Hz, although some people may be sensitive to rates as low as 3 Hz and as high as 60 Hz. Currently available wind turbines for commercial power generation (including the proposed turbines) typically operate at a frequency of 1 Hz or less, and there is no evidence that

wind turbines can trigger seizures (British Epilepsy Association, 2007; Ellenbogen et al., 2012; Parsons Brinckerhoff, 2011; NHMRC, 2010).

Conclusion and recommendations

The area is very remote and has very few receptors. Due to the uniformity of the terrain, in relation to the receptors, the shadows generated by the turbines are limited to the height of the turbines and are not extended due to elevated terrain.

A detailed analysis of the expected shadow flicker impact zone was undertaken using 3D modelling and GIS mapping. The finding of the analysis was that the single receptor located within close proximity to the turbines would not fall within the shadow flicker zone of influence. As such the impact for Shadow Flicker was rated Negligible. The Flicker aspect has thus been screened out and will not be assessed further in the EIR. Assuming no other fatal flaws are defined by other specialists, it is the conclusion of this assessment that the project should be authorised.

7 CONCLUSIONS AND WAY FORWARD

7.1 Conclusions

As per the requirements of NEMA, this Scoping investigation has reviewed the array of potential environmental impacts associated with the proposed activities on the Kokerboom 3 Wind Farm site. Table 7-1 below provides a summary of the description of the proposed project (Chapter 4).

Table 7-1 | Summary of proposed project description

Project Components Description	Specifications & Footprint areas	Estimated Combined Footprint (ha)
Location and Total site size	The proposed site is located approximately 60 km north of Loeriesfontein, 85 km west of Brandvlei and 160 km south east of Springbok in the Namakwa District Municipality and the Hantam Local Municipality. Land use of the site and surrounding properties comprise of low-density livestock farming (grazing).	-
Wind Turbines	• Up to a maximum of 60 wind turbines. • Turbine envelope: o Rotor diameter: up to 180 m (90 m blade) o Hub height: up to 150 m o Rotor top tip height: 240 m o Steel or concrete towers • Kokerboom 3 has a targeted nameplate capacity of up to a maximum of 300 MW.	-
Turbine Foundations and Hardstands	At each turbine position there will be • A hardstand area of up to 150 m x 100 m • A laydown/assembly area of ~150 m x 15 m The turbine hardstands and laydown areas will be located within a 100 m radius of the turbine base. Turbine foundations will be reinforced concrete spread footings and/ or piled foundations with an approx. 26m diameter and will have a construction footprint of 32m X 32m (including the foundation).The exact position and orientation of the hardstands and laydowns will be determined during the detailed design stage.	3,2ha foundations (permanent) 3ha foundations construction footprint (temporary) 90ha hardstand (permanent) 13,5ha laydown (temporary)
Cabling	Turbines to be connected to an on-site substation via 33 kV cables. Cables would be laid underground in trenches parallel to the roads within the road reserve. No overhead MV lines would run from the turbines to the on-site substation.	Cabling included within road reserve
Site roads	Existing farm tracks would be utilized and upgraded where possible, however new roads would also be developed. A total road length of approximately 85km will be required. A 20 m wide road reserve is required; this accounts for a 6 m road surface width, 1 m for side drains either side, and a further 6 m either side of the road surface for MV cable trenches and associated disturbance. After construction the road would be rehabilitated down to 8 m wide (6 m wide road surface + 1 m drain either side) (ie. 8m road width is permanent with an additional 12 m temporary during construction making up the 20 m road reserve.) Roads would be provided with a gravel wearing course. The wind farm terrain is relatively flat therefore cut to fill activities are expected to be limited.	±68ha (8m width) (permanent)* 98.4ha (12m width) (temporary)*
Facility Substation and O&M Complex	A 5 ha area has been identified for the substation and Operational and Management (O&M) complex. The following infrastructure would be located within 5 ha area: • Facility substation (approx. 1ha) • O&M building (approx. 0.5 ha) • Oil storage area (less than 30m^3) (approx. 0.1 ha) • Battery Energy Storage Facility (approx. 2 ha) • Associated facilities including the parking area	5ha (permanent)
Battery Energy Storage System (BESS)	The approximate area of 2 ha has been designated for battery storage within the substation and O&M Complex. The BESS would have a capacity	Within O&M complex

Project Components Description	**Specifications & Footprint areas**	**Estimated Combined Footprint (ha)**
	of up to 150 MWh and would utilise either lithium-ion or redox flow technology.	
Construction Laydown Areas	Three construction laydown areas of up to 15 ha each are proposed - two near the entrances of the site and the other near the substation. One or all of the laydown areas may be utilized. The laydown areas would include temporary site offices, stores, workshops, turbine storage areas, fuel storage, worker mess and ablution facilities etc. These areas would be rehabilitated after construction.	up to 45ha (temporary)
Concrete Batch Plant	A centralised concrete batch plant would be erected for the concrete works required during construction. An area of approximately 100 m x 100 m is required for the batch plant. The batch plant area would include aggregate stockpile areas, cement silos, truck parking areas and the batch plant itself. The batch plant will be located within one of the indicated laydown areas.	Included within Construction Laydown Area
Total disturbance footprint		160 ha temporary and 166.2ha permanent*

The feasible alternatives for this project have been identified and are listed in Table 7-2 on the following page. These will be considered further in the EIR.

Table 7-2 | Summary of alternatives for the Kokerboom 3 Wind Farm

Alternative type	Alternative description
Location alternatives	The Proponent has considered several alternative sites in the Western and Northern Cape Provinces. The consideration of a number of social, economic and technical constraints has made resulted in the Kokerboom 3 Wind Farm being one of three preferred locations (the other preferred locations being the Kokerboom 1 and Kokerboom 2 WEFs, to be assessed via a separate EIA process). It is also noted that this application entails a revision of the existing authorised Kokerboom 3 WEF and as such an alternate location could not be considered.
Design and Layout Alternatives	**Turbine layout:** a single turbine layout will be compiled based on the technical, social, and environmental constraints identified by the specialist studies undertaken. **On-site substation:** The findings of this scoping exercise will refine the sensitive areas and the site layout will be included in the EIA Phase.
Technology Alternative	In order to derive a capacity of up to 300 MW for Kokerboom 3 Wind Farm, up to 60 turbines of up to 6.5 MW each will be considered for this EIA process.
Routing Alternatives for Linear Activities	**Transmission lines**: Not part of the current assessment. Already authorised via DEFF Ref. No.:14/12/16/3/3/1/1818. **Roads:** route alternatives for access and service route alternatives will be considered based on the siting of the wind turbines. These will therefore only be identified during the EIR Phase.
No-go Alternative	A no-go alternative will be assessed in the EIR. This will assume that the proposed revised Kokerboom 3 Wind Farm will not be constructed, and the *status quo* of the existing Kokerboom 3 EA and farming activities will continue.

Table 7-3 sets out the potential environmental impacts that have been identified for further consideration in the EIR. The impact assessment and associated mitigation measures may be revised based on detailed specialist investigation.

Table 7-3 | Summary of potential impacts to be assessed further during the EIR Phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[18]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
CONSTRUCTION PHASE					
Agricultural Production and Productivity • Loss of agricultural land use (-) • Soil degradation (-) • Erosion • Topsoil loss • Increased financial security for farming operations (+)	Site Specific Local Medium Long Term Probable Definite Very Low (-) Low (+) Reversible	The site has been found to have extremely low agricultural potential, and agricultural impacts are thus low to negligible. The recommended mitigation measures are: • Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points, and it must prevent any potential down slope erosion. • Maintain, where possible, all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion. • If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.	Negligible (-)	Out	No further agricultural impact assessment required.
Terrestrial Ecology • Disturbance or destruction of aquatic species of special concern • Disturbance or destruction of faunal species through noise and physical disturbance • Disturbance or destruction of faunal and floral species listed or protected • Increased in the numbers and types of alien plant species	Limited Medium Term Likely Minor (-) Medium	• Develop and implement a Rehabilitation and Monitoring plan. This will be developed following the scoping phase for inclusion in the EIA/EMPr • Develop a Plant and Animal Search and Rescue Plan for implementation prior to any construction activities with the requisite permits in place as supplied by DENC. This plan will be developed following the scoping phase for inclusion in the EMPr • Develop alien management plan, for implementation during the construction phase, coupled to a detailed walkdown of the proposed layout. The management should then continue into all future phases of the project	Low (-)	In	Ecological impact assessment

[18] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	**Anticipated Extent, Duration, Probability, Significance and Reversibility**	**Potential Mitigation Measures[19]**	**Anticipated Impact Post-mitigation**	**Scope in/out**	**Specialist Study**
Bats • Roost disturbance (-) • Roost destruction (-) • Loss of foraging habitat (-) • Creating bat conducive habitat on the development terrain	Local Site specific Short Term Long Term Probable Definite Medium (-) Low (-) Unknown Irreversible Reversible	• Mitigation measures to reduce residual risk or enhance opportunities: ○ It may be possible to limit roost abandonment by avoiding construction activities near roost. No confirmed roosts have been found on site but here are potential roosts that bats may be using including trees, rocky crevices, and buildings. ○ It is recommended that construction activities are limited as much as possible in areas identified as high and medium sensitivity of the bat sensitivity map. ○ The WEF must be designed and constructed in such a way as to avoid the destruction of potential and actual roosts, particularly trees, rocky crevices (if blasting is required) and buildings. ○ It is recommended that construction activities are limited as much as possible in areas identified as medium sensitivity of the bat sensitivity map. Blasting/removal of trees/removal of pre-existing buildings is prohibited within high bat sensitivity areas. ○ Before destruction of features with possible roosts, the ECO needs to investigate the area so as to establish whether there is a bat roost. The ECO must be in contact with the bat specialist so as to be instructed what to look for. If a roost is found, a bat specialist must be contacted before further disturbance of the roost.	Low (-)	In	Bats Impact Assessment

[19] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[20]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
Bats (continued …) • Roost disturbance (-) • Roost destruction (-) • Loss of foraging habitat (-) • Creating bat conducive habitat on the development terrain		○ During construction laydown areas and temporary access roads should be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation. Construction should, where possible, be situated in areas that are already disturbed. ○ This impact must be reduced by limiting the removal of vegetation, particularly trees, as far as possible. ○ Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and a habitat restoration plan must be developed by a specialist and included within the EMPr. ○ All roofs of new buildings must be carefully sealed off so that no bats can start new roosts in the buildings; keeping in mind that some bat species, such as *Neoromicia capensis*, could enter at a hole the size of a finger. Sealing of roofs should be maintained throughout the lifespan of the wind farm. • All excavation areas or artificial ditches formed during construction must be filled and rehabilitated so that no new open water sources are created during rainy periods.			

[20] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	**Anticipated Extent, Duration, Probability, Significance and Reversibility**	**Potential Mitigation Measures[21]**	**Anticipated Impact Post-mitigation**	**Scope in/out**	**Specialist Study**
Avifauna • Displacement of priority species due to disturbance during construction phase • Displacement of priority species due to habitat transformation	Limited Local Short Term Permanent Almost Certain Highly Probable Likely Minor (-) Medium / Low	• Restrict the construction activities to the construction footprint area • Do not allow any access to the remainder of the property during the construction period • A 200m exclusion zone should be implemented around the existing water points where no construction activity or disturbance should take place • A 300m exclusion zone should be implemented around the Southern Pale Chanting Goshawk nest at 30°21'29.26"S 19°34'26.81"E • Little mitigation is possible to prevent habitat transformation caused by the construction of the wind farm infrastructure • To prevent unnecessary habitat destruction (i.e. more than is inevitable), the recommendations of the specialist ecological study must be strictly adhered to. It is especially important that maximum use is made of existing roads	Medium (-)	In	Avifaunal impact assessment
Aquatic Ecology • Damage or loss of riverine systems, wetlands and water courses through the placement of new crossings or infrastructure • Potential impacts on localised water quality, although unlikely due to the ephemeral nature of the systems, but would occur during when rainfall does occur	Limited	• A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout where crossings occur.			

[21] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[22]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
Aquatic Ecology (continued …) • Damage or loss of riverine systems, wetlands and water courses through the placement of new crossings or infrastructure • Potential impacts on localised water quality, although unlikely due to the ephemeral nature of the systems, but would occur during when rainfall does occur	Medium Term	• All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Prosopis (alien invasive tree) is prevalent in areas to the south of the site, thus care in transporting any material, while ensuring that such materials is free of alien seed, coupled with pre and post alien clearing must be stipulated in the EMPr. • Where roads and crossings are upgraded, the following applies: ○ All pipe culverts must be removed and replaced with suitable sized box culverts, where road levels are raised. ○ River levels, regardless of the current state of the river / water course will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown. ○ Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation. ○ Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).	Low (-)	In	Aquatic impact assessment
	Probable Likely				
	Minor (-)				
	High Medium				

[22] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[23]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
Aquatic Ecology (continued …) • Damage or loss of riverine systems, wetlands and water courses through the placement of new crossings or infrastructure • Potential impacts on localised water quality, although unlikely due to the ephemeral nature of the systems, but would occur during when rainfall does occur		• Any dust suppression must be kept to a minimum, to prevent the formation of pools, or runoff that may then contain pollutants. • All liquid chemicals including fuels and oil, including the BESS must be stored in secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, laydown areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. • Littering and contamination associated with construction activity must be avoided through effective construction camp management. • No stockpiling should take place within or near a water course • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable			

[23] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[24]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
Aquatic Ecology (continued …) • Damage or loss of riverine systems, wetlands and water courses through the placement of new crossings or infrastructure • Potential impacts on localised water quality, although unlikely due to the ephemeral nature of the systems, but would occur during when rainfall does occur	Medium Term	• All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Prosopis (alien invasive tree) is prevalent in areas to the south of the site, thus care in transporting any material, while ensuring that such materials is free of alien seed, coupled with pre and post alien clearing must be stipulated in the EMPr. • Where roads and crossings are upgraded, the following applies: ○ All pipe culverts must be removed and replaced with suitable sized box culverts, where road levels are raised. ○ River levels, regardless of the current state of the river / water course will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown. ○ Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation. ○ Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).	Low (-)	In	Aquatic impact assessment
	Probable Likely				
	Minor (-)				
	High Medium				

[24] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[25]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
Aquatic Ecology (continued …) • Damage or loss of riverine systems, wetlands and water courses through the placement of new crossings or infrastructure • Potential impacts on localised water quality, although unlikely due to the ephemeral nature of the systems, but would occur during when rainfall does occur		• Any dust suppression must be kept to a minimum, to prevent the formation of pools, or runoff that may then contain pollutants. • All liquid chemicals including fuels and oil, including the BESS must be stored in secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, laydown areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. • Littering and contamination associated with construction activity must be avoided through effective construction camp management. • No stockpiling should take place within or near a water course • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable			

[25] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	**Anticipated Extent, Duration, Probability, Significance and Reversibility**	**Potential Mitigation Measures[26]**	**Anticipated Impact Post-mitigation**	**Scope in/out**	**Specialist Study**
Heritage • Impacts to archaeological resources • Alteration of cultural landscape	Local Long Term Definite Probable Low (-) Reversible Irreversible	• The final layout must be examined in the field by an archaeologist prior to construction with recommendations made for mitigation as required. • The site at waypoint 722 must be examined and its extent physically marked on site during the pre-construction survey to enable proper cordoning off by the ECO. However, if it will not be possible to avoid direct disturbance to the site, as seems likely, then mitigation (in the form of sampling and collection) will be required prior to construction of turbine #25. • If any archaeological material or human burials are uncovered during the course of development, then the find should be protected from further disturbance and work in the immediate area should be halted if necessary. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.	Low (-)	In	Heritage impact assessment
Palaeontology • Impacts on palaeontological resources	Local Long Term Definite Probable Low (-) Reversible Irreversible	• Given the general low palaeosensitivity of the project area as well as the anticipated low to very low impact significance of the proposed wind farm developments, no further specialist palaeontological studies, monitoring or mitigation are recommended for these two projects, pending the potential discovery of significant new fossil remains (e.g. vertebrate bones and teeth, horn cores, petrified wood) before or during the construction phase. A Chance Fossil Finds protocol has been appended to this report which must be included in the EMPr.	Very low (-)	Out	Paleontolog-ical Statement

[26] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[27]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
Palaeontology (continued …) • Impacts on palaeontological resources		• Should substantial fossil remains - such as vertebrate bones and teeth, or petrified logs of fossil wood - be encountered at surface or exposed during construction, the ECO should safeguard these, preferably in situ. They should then alert the South African Heritage Resources Agency, SAHRA, as soon as possible (Contact details: Dr Ragna Redelstorff. Heritage Officer Archaeology, Palaeontology & Meteorites Unit, SAHRA. 111 Harrington Street, Cape Town, 8001. Tel: +27 (0)21 202 8651. Fax: +27 (0)21 202 4509 E-mail:rredelstorff@sahra.org.za). This is to ensure that appropriate action (i.e. recording, sampling or collection of fossils, recording of relevant geological data) can be taken by a professional palaeontologist at the proponent's expense.			
Socio-economic • Creation of employment and business opportunities (+) • Impacts associated with the presence of construction workers on local communities (-) • Impacts related to the potential influx of job-seekers (-) • Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site (-) • Increased risk of grass fires associated with construction related activities (-)	Regional	• Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories. • The proponent should consider the need for establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from the HLM, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community and farm workers associated with construction workers.	Medium (+)	In	Socio-economic impact assessment

[27] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[28]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
Socio-economic (continued …) • Noise, dust, waste and safety impacts of construction related activities and vehicles (-) • Impact on productive farmland (-)		• The proponent and the contractor(s) should, in consultation with representatives from the MF where applicable, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed and/or appropriate disciplinary action taken. All dismissals must comply with the South African labour legislation. • The proponent and contractor(s) should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. • No workers should be permitted to trespass onto adjacent properties. Failure to adhere to this should be made a dismissible offence or subject to strict disciplinary action. • In the event of workers being accommodated in Loeriesfontein or other remote location, the contractor should provide transport to and from the site on a daily basis for workers. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site. • Where necessary and feasible, the contractors should make the necessary arrangements to enable workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks. • The need and feasibility of establishing accommodation on site should be assessed by the proponent.			

[28] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[29]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
Socio-economic (continued …)		• If accommodation on site is not required and/ or feasible it is recommended that no construction workers, with the exception of security personnel, be permitted to stay over-night on the site. However, some staff may be accommodated in houses located on local farms in the area, by prior agreement with the landowners concerned. • To the extent possible, the proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities; • The proponent should implement a policy that no employment will be available at the gate.			
Visual • Visual intrusion from large and moving construction vehicles, and large cranes in the landscape • Removal of vegetation and associated disturbance during construction	Regional	• Dust suppression measures to reduce dust generated by moving vehicles and earth cleared of vegetation. • Signage on the Granaatboskolk/Nuwepos Road should be moderated (approximately 1m high x 1.5m wide) and natural colours used in the signage as much as possible. • The buildings should be painted a suitable colour in keeping with the surrounding landscape (e.g., grey-brown or light brown) or made of material (e.g., brickwork) in keeping with the colour of the surrounding landscape to assist in reducing colour contrast. • Fencing should be simple and appear transparent from a distance. • The fences should be checked monthly for the collection of litter caught on the fence. • Soil erosion measures need to be adequately implemented and routinely monitored by the ECO.	Minor (-)	In	Visual impact assessment

[29] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	**Anticipated Extent, Duration, Probability, Significance and Reversibility**	**Potential Mitigation Measures[30]**	**Anticipated Impact Post-mitigation**	**Scope in/out**	**Specialist Study**
Noise • Increase in ambient sound levels	Local Regional Temporary Short Term Improbable Likely Probable Low Risk Medium Risk High	• Significance of noise impact is very low for the scenario as conceptualized. • There is a potential for a noise impact if multiple construction activities take place within 2 000 m from the identified NSD. By only allowing the construction of a WTG at one location (within 2 000 m from the house at Struiskom) at a time, the developer can ensure that the significance of the noise impact would be low. Construction activities close to this NSD can be planned during a period when the house is not used. **Note** that if Struiskom (NSD) is not occupied at the time of construction, then the noise impact would not arise and there would be no limitation on night-time construction activities within 2000m of the NSD. • Significance of noise impact is very low for the scenario as conceptualized. It is however recommended that roads not be constructed within 150 m from occupied dwellings used for residential purposes (to reduce noise levels below 42 dBA if construction traffic may use the road at night).	Very Low (-)	In	Noise impact assessment
Traffic • Disturbance of normal local traffic flow (-) • Disturbance of farm access (-) • Increase of accidents caused by construction vehicles (-) • Increase of traffic emissions/ pollution (-)	Local Regional	• A traffic management plan will be included in the EMPr.	Very Low (-)	In	Traffic assessment

[30] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	**Anticipated Extent, Duration, Probability, Significance and Reversibility**	**Potential Mitigation Measures[31]**	**Anticipated Impact Post-mitigation**	**Scope in/out**	**Specialist Study**
Traffic (continued …) • Increase of land disturbed for the construction/ expansion of roads (-) • Construction/ upgrade of new roads could improve accessibility in area (+) • Upgrade existing roads could improve safety (+)	Low Reversible				
Electromagnetic Interference (EMI) Path • Control/monitoring systems – specially nacelle mounted systems • Power conversion equipment (rectifier/invertor systems) • Control and operations centre (computer equipment)		• Kokerboom 3V1-60 to SKA008 mitigation requirement ○ Due to the cumulative effect of 60 units in the facility, mitigation of 32dB at 1GHz and 19 dB at 100MHz would be required. The implication is that the radiated emission in the 100MHz to 1GHz band should be 32dB less than the CISPR 11 Class B radiated emission limit. • Kokerboom 3V1-53 to SKA008 mitigation requirement ○ Due to the cumulative effect of 60 units in the facility, mitigation of 28dB at 1GHz would be required. The implication is that the radiated emission in the 100MHz to 1GHz band should be 24dB less than the CISPR 11 Class B radiated emission limit. ○ Although there is no direct line of sight between the turbine and the telescope, the lack in distance and the diffraction effect result in a substantial reduction in radiated emissions over a wide band that would be required for the turbine installation should it only comply to the CISPR limit. 28 dB reduction in radiated emissions can only be achieved with careful shielded design of cabinets and cables and a well-controlled installation.	Very Low (-)	Out	EMI Loss and Risk Assessment

[31] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	**Anticipated Extent, Duration, Probability, Significance and Reversibility**	**Potential Mitigation Measures[32]**	**Anticipated Impact Post-mitigation**	**Scope in/out**	**Specialist Study**
Electromagnetic Interference (EMI) Path (continued …)		• Kokerboom 3V1-60 to M059 mitigation requirement ○ Due to the cumulative effect of 60 units in the facility, mitigation of 14dB at 1GHz and 4dB 100MHz would be required. The implication is that the radiated emission in the 100MHz to 1GHz band should be 14dB less than the CISPR 11 Class B radiated emission limit. • Mitigation measures must be integrated into the detailed design for the wind farm once the final turbine technology has been selected. This assessment has considered the worst-case scenario. Should the final selected turbine have a hub height less than 150m, or if the turbine emissions are less than the CISPR 11 Class B limits, then less mitigation would be required. This should be confirmed during the detail design phase, prior to construction.			
OPERATIONAL PHASE					
Agricultural Production and Productivity • Loss of agricultural land (-) • Land degradation (-) • Increased financial security for farming operations (+)	Site Specific Local Medium Long Term Probable Definite Very Low (-) Low (+)	• Maintain the storm water run-off control system. Monitor erosion and remedy the storm water control system in the event of any erosion occurring. • Facilitate re-vegetation of denuded areas throughout the site.	Negligible (-)	Out	No further agricultural impact assessment required.

[32] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	**Anticipated Extent, Duration, Probability, Significance and Reversibility**	**Potential Mitigation Measures[33]**	**Anticipated Impact Post-mitigation**	**Scope in/out**	**Specialist Study**
Terrestrial Ecology • Increased in the numbers and types of alien plant species	Limited Medium Term Likely Minor (-) Medium	• Develop alien management plan, for implementation during the construction phase, coupled to a detailed walkdown of the proposed layout. The management should then continue into all future phases of the project	Negligible (-)	In	Ecological impact assessment
Bats • Bat mortalities due to direct blade impact or barotrauma during migration, foraging and commuting activities • Artificial lighting	Local Regional Site Specific	• Mitigation measures to reduce residual risk or enhance opportunities: o Designing the layout of the project to avoid areas that are more frequently used by bats may reduce the likelihood of mortality and should be the primary mitigation measure. These areas are delineated in the bat sensitivity map. Turbines must not be placed in high sensitivity areas, and curtailment measures outlined in section 7 of this report must be applied to turbines within medium sensitivity areas as soon as turbines are functional. o The height of the lower blade swept area must be maximised to the extent possible.	Medium (-)	In	Bat impact assessment

[33] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[34]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
Bats (continued …) • Bat mortalities due to direct blade impact or barotrauma during migration, foraging and commuting activities • Artificial lighting		○ Operational acoustic monitoring and carcass searches for bats must be performed, based on best practice, to monitor mortality and bat activity levels. Acoustic monitoring should include monitoring at height (from more than one location i.e. such as on turbines) and at ground level. ○ Apply additional curtailment, as recommended by a bat specialist, if mortality occurs beyond threshold levels as determined based on applicable guidance (MacEwan *et al*. 2018) ○ This impact can be mitigated by using as little lighting as possible, and only where essential for operation of the facility. ○ Where lights need to be used such as at the substation and elsewhere, these should have low attractiveness for insects such as low-pressure sodium and warm white LED lights (Rydell 1992; Stone 2012). High pressure sodium and white mercury lighting is attractive to insects (Blake *et al*. 1994; Rydell 1992) and should not be used as far as possible. ○ As far as possible, lighting should be fitted with movement sensors to limit illumination and light spill, and the overall lit time. In addition, the upward spread of light near to and above the horizontal plane should be restricted and directed to minimise light trespass and sky glow. ○ Increasing the spacing between lights, and the height of light units can reduce the intensity and volume of the light to minimise the area illuminated and give bats an opportunity to fly in relatively dark areas between and over lights.			

[34] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	**Anticipated Extent, Duration, Probability, Significance and Reversibility**	**Potential Mitigation Measures[35]**	**Anticipated Impact Post-mitigation**	**Scope in/out**	**Specialist Study**
Avifauna • Mortality of priority avifauna due to turbine collisions	Limited	• A 200m no-go buffer is proposed around water points as they serve as focal points for bird activity • A 300m no-go buffer zone should be implemented around the Southern Pale Chanting Goshawk nest at 30°21'29.26"S 19°34'26.81"E • No-turbine buffer zone, starting from the edge of the pan, must be implemented around the following pans: o Pan 1: 30°20'34.17"S 19°28'5.19"E (800m) o Pan 2: 30°19'44.15"S 19°31'31.61"E (800m) o Pan 3: 30°21'0.25"S 19°32'23.08"E (500m) o Pan 4: 30°21'47.87"S 19°33'42.41"E (800m) • A 1km broad turbine-free corridor must be implemented between the pans in the following manner: o Pan 1 to Pan 2, Pan 2 to Pan 3, Pan 3 to Pan 4 • Placement of turbines in highly suitable Red Lark habitat to be avoided where possible. If avoidance is not possible, turbine cut in-speeds should be increased to 3m/s (measure at ground level) when a rainfall event of 10mm or higher is recorded at the site, for turbines located in areas of highly suitable Red Lark habitat, as determined by the avifaunal specialist. The increased cut-in speeds to be maintained for a period of six weeks after the rainfall event. • Depending on the results of the carcass searches, a range of mitigation measures will have to be considered if mortality levels turn out to be biologically significant as determined by the avifaunal specialist, including selective curtailment of problem turbines during high risk periods, or the painting of one blade with a contrasting colour, provided that the latter is technically feasible i.e. in accordance with an industry standard, and can be achieved within the framework of civil aviation regulations.	Minor (-)	In	Avifaunal impact assessment

[35] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	**Anticipated Extent, Duration, Probability, Significance and Reversibility**	**Potential Mitigation Measures[36]**	**Anticipated Impact Post-mitigation**	**Scope in/out**	**Specialist Study**
Avifauna (continued …) Mortality of priority avifuana due to turbine collisions		• If turbines are to be lit at night, lighting should be kept to a minimum and should preferably not be white light. Flashing strobe-like lights should be used where possible (provided this complies with Civil Aviation Authority regulations) • Lighting of the wind farm (for example security lights) should be kept to a minimum. Lights should be directed downwards (provided this complies with Civil Aviation Authority regulations).			
Aquatic Ecology • Impact on aquatic systems through possible increase in surface water runoff within the wind farm site.	Local Long Term Probable Minor (-) Medium	• A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. This stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses or similar) of exposed soil and the re-vegetation of any disturbed watercourses	Negligible (-)	In	Aquatic impact assessment
Socio-economic • Establishment of renewable energy infrastructure • Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training • Generate income for affected landowners	Regional Long Term Definite Low Medium (-) Reversible	• Use the project to promote and increase the contribution of renewable energy to the national energy supply • Where possible and feasible, implement a training and skills development programme for locals during the first 5 years of the operational phase (unless sufficient suitably trained individuals are already available in the local area). The aim of the programme should be to maximise the number of South African's employed during the operational phase of the project	Medium (+)	In	Socio-economic impact assessment

[36] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[37]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
Socio-economic (continued …) • Benefits associated with the establishment of a Community Trust and/or investment in local socio-economic development and enterprise development • The establishment of renewable energy infrastructure • The visual impacts and associated impact on sense of place • Impact on property values and operations • Impact on tourism					
Visual • Visual intrusion from large and moving wind turbines in the landscape	Regional On-Going Certain Definite Moderate (-) Low	• Dust suppression measures to reduce dust generated by moving vehicle. • Routine maintenance for soil erosion and strict litter control.	Moderate (-)	In	Visual impact assessment
Noise • Increase in ambient sound levels	Regional Long Probable Low Risk High	• If a specific nuisance-causing noise is generated by a problem turbine, this turbine should be appropriately fixed (if possible). • Community relations must be maintained throughout the project lifecycle to mitigate potential noise complaints during the operational phase. • Significance of noise impact is low for the scenario as conceptualized.	Very Low (-)	In	Noise impact assessment

[37] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[38]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
Flicker • The nuisance value of the effect of shadow flicker on close proximity receptors.	Very Limited On-Going Highly Unlikely None Negligible (-) High	• Not applicable as impact will not occur	Negligible (-)	Out	Flicker impact assessment
DECOMMISSIONING PHASE					
Agricultural Production and Productivity • Loss of agricultural land (-) • Land degradation (-) • Increased financial security for farming operations (+)	Site Specific Local Medium Long Term Probable Definite Very Low (-) Low (+) Reversible	• Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points, and it must prevent any potential down slope erosion. • Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion. • If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface	Negligible (-)	Out	No further agricultural impact assessment required.

[38] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	Anticipated Extent, Duration, Probability, Significance and Reversibility	Potential Mitigation Measures[39]	Anticipated Impact Post-mitigation	Scope in/out	Specialist Study
Terrestrial Ecology • Disturbance or destruction of faunal species through noise and physical disturbance • Disturbance or destruction of faunal and floral species listed or protected • Increased in the numbers and types of alien plant species	Limited Medium Term Likely Minor (-) Medium	• Develop a Plant and Animal Search and Rescue Plan for implementation prior to any construction activities with the requisite permits in place as supplied by DENC. This plan will be developed following the scoping phase for inclusion in the EMPr • Develop alien management plan, for implementation during the construction phase, coupled to a detailed walkdown of the proposed layout. The management should then continue into all future phases of the project	Low (-)	In	Ecological impact assessment
Avifauna • Displacment of priority species due to dismantling activities	Limited Brief Likely Minor (-) High	• Restrict the construction activities to the de-commissioning footprint area. • Do not allow any access to the remainder of the property during the de-commissioning period.	Minor (-)	In	Avifaunal impact assessment
Aquatic Ecology • Potential impacts on localised water quality, although unlikely due to the ephemeral nature of the systems, but would occur during when rainfall does occur	Limited Medium Term Probable Likely Minor (-) High Medium	• Any dust suppression must be kept to a minimum, to prevent the formation of pools, or runoff that may then contain pollutants. • All liquid chemicals including fuels and oil, including the BESS must be stored in secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely.	Low (-)	In	Aquatic impact assessment

[39] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	**Anticipated Extent, Duration, Probability, Significance and Reversibility**	**Potential Mitigation Measures[40]**	**Anticipated Impact Post-mitigation**	**Scope in/out**	**Specialist Study**
Aquatic Ecology (continued …)		• Washing and cleaning of equipment must be done in designated wash bays, where rinse water is • contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, laydown areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. • Littering and contamination associated with construction activity must be avoided through effective construction camp management. • No stockpiling should take place within or near a water course • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable			
Socio-economic • Loss of employment and business opportunities (-) • Impacts associated with the presence of construction workers on site and in the area (-) • Impact of heavy vehicles, including damage to roads, safety and dust (-)	Regional Short Term Probable Medium Reversible	• The proponent should ensure that retrenchment packages are provided for all staff retrenched when the WEF is decommissioned. • All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning, unless agreed otherwise with the landowner (e.g. the landowner may wish to retain certain roads).	Very Low (-)	In	Socio-economic impact assessment

[40] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	**Anticipated Extent, Duration, Probability, Significance and Reversibility**	**Potential Mitigation Measures[41]**	**Anticipated Impact Post-mitigation**	**Scope in/out**	**Specialist Study**
Socio-economic (continued …)		• The proponent should establish an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas, or otherwise make suitable financial provision for decommissioning. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20-year operational life of the facility or funded via other feasible and reliable mechanisms. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure. Alternatively, the funds from the sale of the WEF as scrap metal should be allocated to the rehabilitation of the site.			
Visual • Visual intrusion from large and moving construction vehicles, and large cranes in the landscape	Municipal Area	• Dust suppression to reduce dust from moving vehicles when required. • Removal of all wind turbine infrastructure, structures, cabling. • Impacted areas need to be rehabilitated and restored to natural veld grasses.	Minor (-)	In	Visual impact assessment
Noise • Increase in ambient sound levels	Local Temporary Improbable Low Risk High	• Significance of noise impact is very low for the scenario as conceptualized.	Very Low (-)	In	Noise impact assessment

[41] To be investigated and refined during the EIR phase

Potential Impact per Environmental Aspect	**Anticipated Extent, Duration, Probability, Significance and Reversibility**	**Potential Mitigation Measures**[42]	**Anticipated Impact Post-mitigation**	**Scope in/out**	**Specialist Study**
Traffic • Disturbance of normal local traffic flow (-) • Disturbance of farm access (-) • Increase of accidents caused by Heavy Goods Vehicles (-) • Increase of traffic emissions/ pollution (-)	Local Regional Decommissioning Period Definite Low Reversible	• A traffic management plan will be included in the EMPr.	Very Low (-)	In	Traffic assessment

[42] To be investigated and refined during the EIR phase

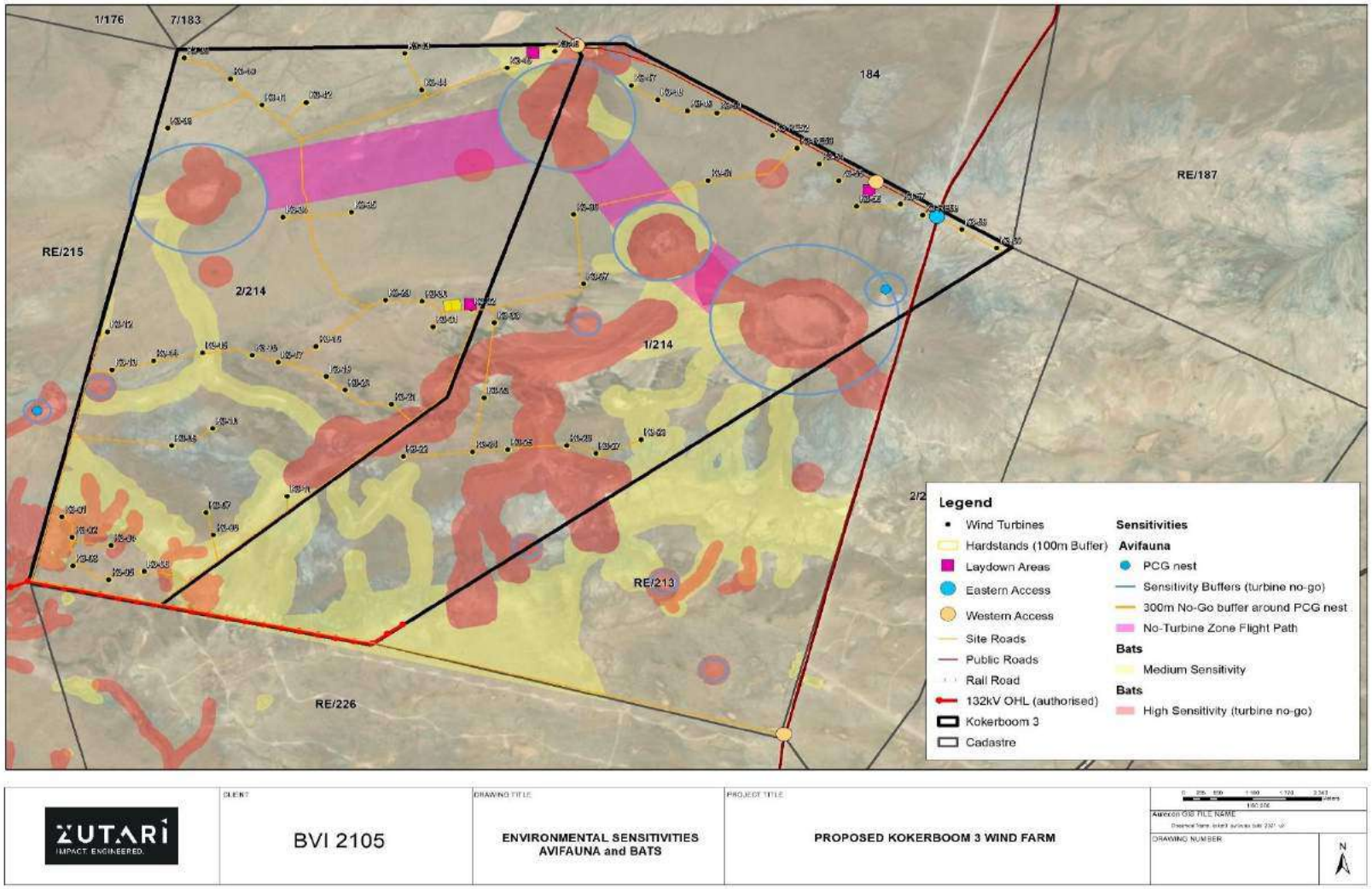


Figure 7-1:| Environmental sensitivities: Avifauna and Bats

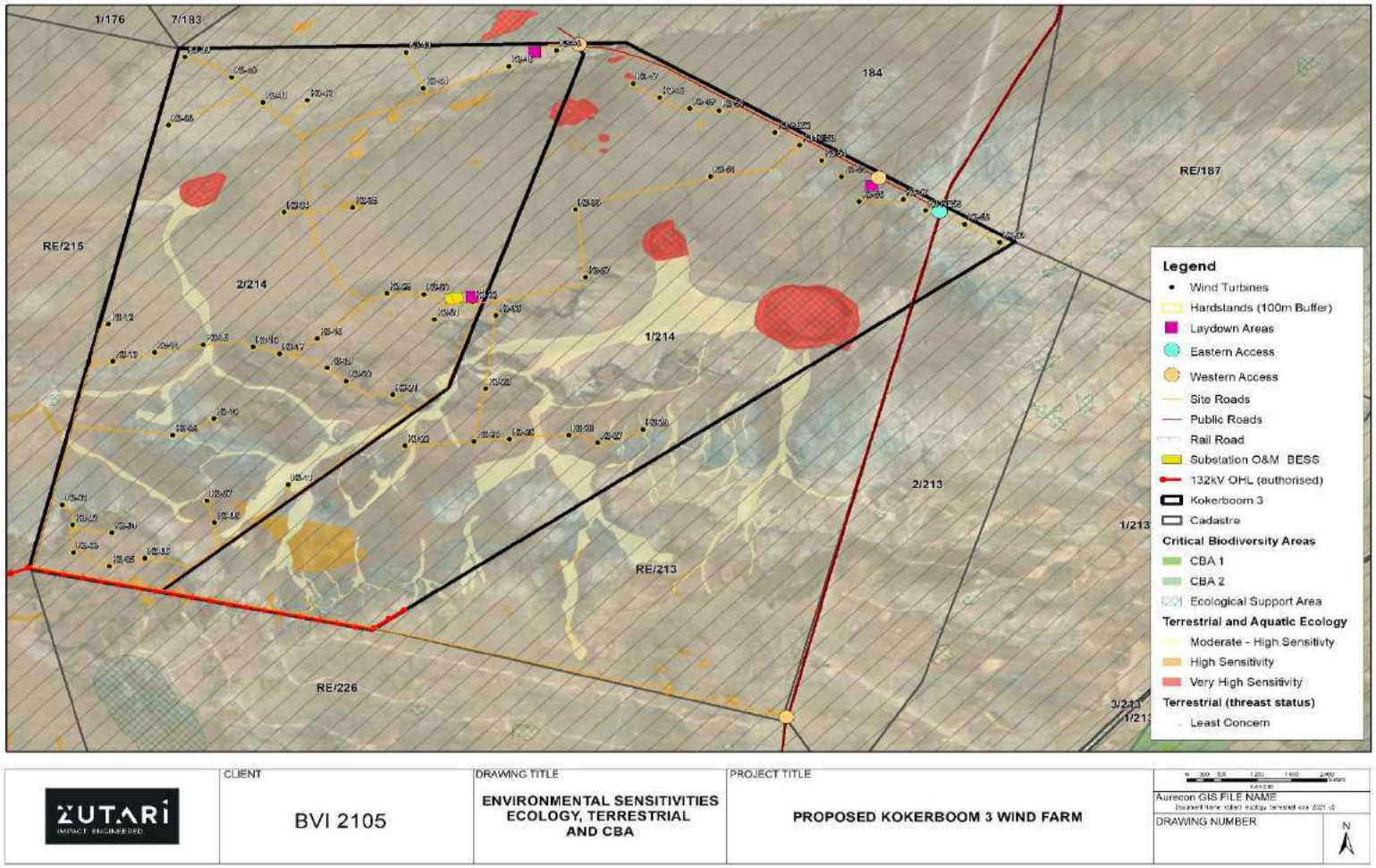


Figure 7-2:| Environmental sensitivities: Ecology, Terrestrial and CBAs.

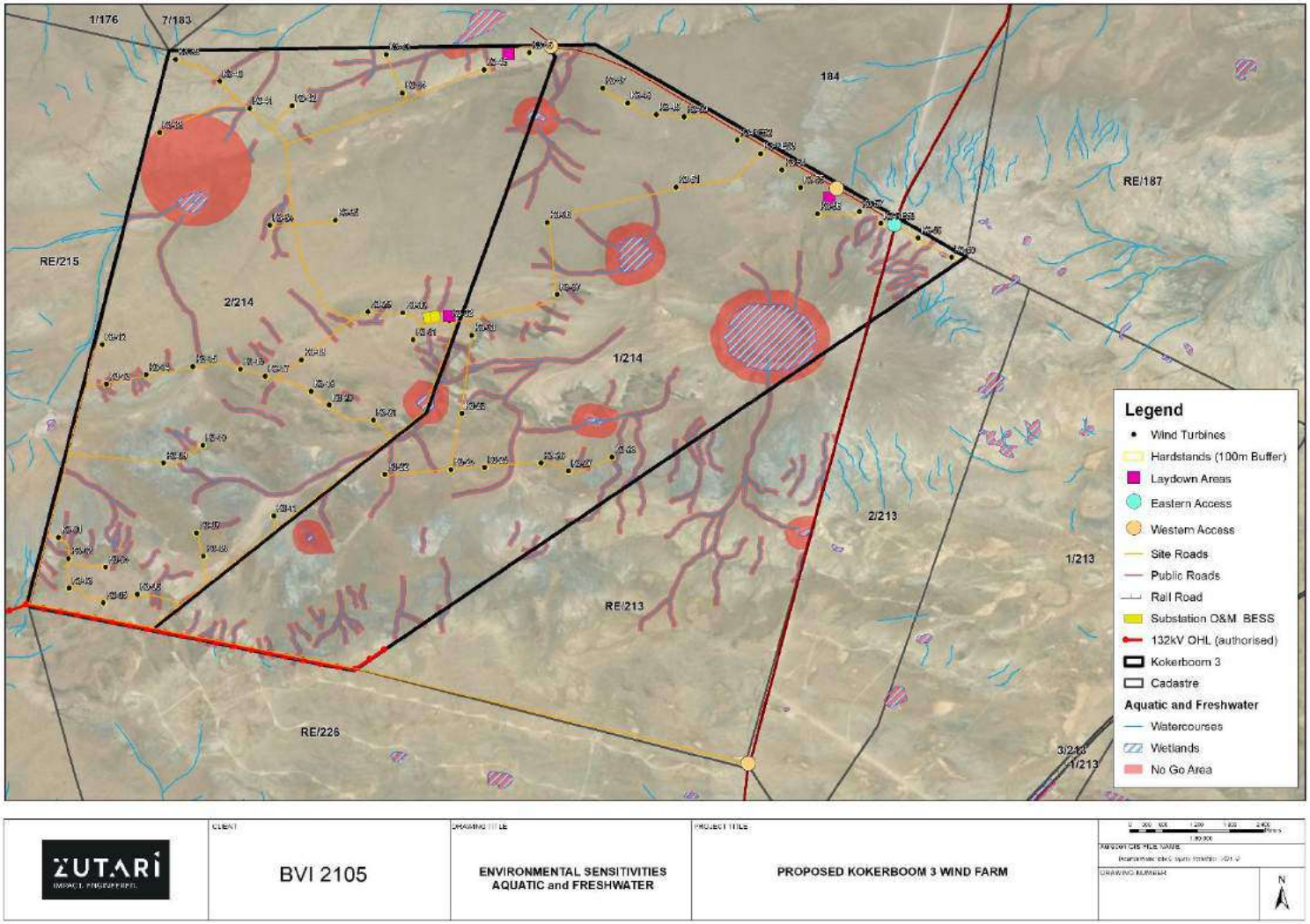


Figure 7-3:| Environmental sensitivities: Aquatic and Freshwater

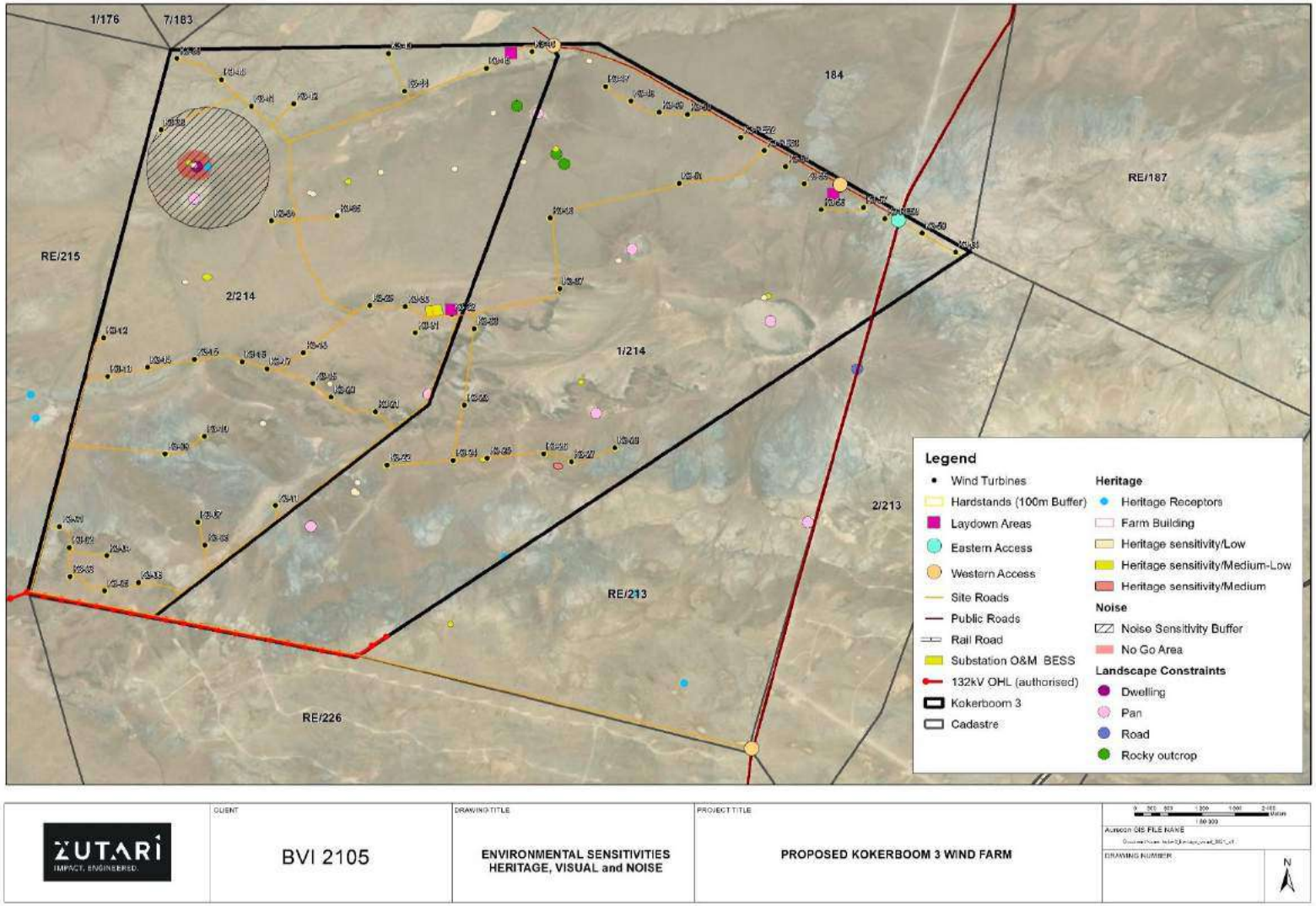


Figure 7-4:| Environmental sensitivities: Heritage and Visual

7.2 The Way Forward

This Scoping Report was compiled to meet the requirements of NEMA[1], with the primary aim of informing I&APs of the proposed project and allowing for an opportunity to comment on the project and the plan of study for the EIA Phase.

This Scoping Report will be updated, where necessary, following 30 days of public review and comment. The updated Scoping Report will be submitted to the DFFE for review and decision-making (for 43 days) on whether to proceed with the EIA phase. The specialist studies included in this report will also be updated with any new information that arises from public participation and included in the EIR.

The EIA Phase will be conducted in terms of the methodology in the Plan of Study for EIA in Annexure F of the Scoping Report.

[1] Appendix 2 of amended EIA Regulations (GN R982) of NEMA lists the content required in a Scoping Report. This has been listed for cross checking purposes on the page preceding the table of contents.

8 REFERENCES

Almond. J.E. 2020. Palaeontological Heritage Site Sensitivity Report and Letter of exemption from firther specialist studies for the Proposed Kokerboom Wind Energy Facility near Loeriesfontein, Namaqua District Municipality, Northern Cape. Prepared for Zutari, South Africa (Pty) Ltd.

Barbour, T. 2021. Social Impact Assessment for up to 300 MW Kokerboom 3 Wind Energy Facility, Northern Cape Province. Report prepared for Zutari South Africa (Pty) Ltd.

Colloty, 2020 Scoping Ecological (Aquatic and Terrestrial) Assessment for Zutari (Pty) Ltd

De Jager, M. 2020: "Environmental Noise Impact Assessment for the proposed Kokerboom 3 Wind Energy Facility and associated Infrastructure North of Loeriesfontein, Northern Cape Province". Enviro-Acoustic Research, Pretoria

Department of Energy. 2015. State of Renewable Energy in South Africa. Department of Energy, Pretoria, South Africa

Department of Energy. 2010. Integrated Resource Plan. Department of Energy, Pretoria, South Africa.

Department of Environmental Affairs. 2015. EIA Guideline for Renewable Energy Projects, Department of Environmental Affairs, Pretoria, South Africa.

Dippenaar, S.2021.Bat Monitoring at the Kokerboom 3 Wind Energy Facility, Northern Cape. Report prepared for Zutari South Africa (Pty) Ltd.

Hantam Municipality. 2015. Integrated Development Plan 2015 – 2020. Hantam Municipality, Calvina.

Herb Lingl/aerialarchives.com 2016.Filename: aerial-Texas-wind-turbines-AHLB3126.jpg (Online). Available for download: **http://aerialarchives.photoshelter.com/image/I0000O7hCVjCoF6U** [Downloaded 10 November 2020].

Hockey, P.A.R, Dean, W.R.J and Ryan, P. 2005. Robert's birds of southern Africa (Vii) edition. The John Voelcker Bird Book Fund, Johannesburg.

ITC Services. 2021. Report Addressing electromagnetic interference (EMI), path loss and risk assessment for Kokerboom 3, Report prepared for Zutari South Africa (Pty) Ltd.

IUCN. 2016. The IUCN Red List of Threatened Species. Version 2016-1. Online. www.iucnredlist.org [Accessed on 1o November 2020].

Jenkins, A.R., van Rooyen, C.S., Smallie, J.J., Harrison, J.A., Diamond, M., Smit-Robinson, H.A. and Ralston, S. 2015 (3e). Best Practice Guidelines for assessing and monitoring the impact of wind energy facilities on birds in southern Africa. Unpublished for BirdlifeSA and Endangered Wildlife Trust.

Koppen climate classification. Encyclopaedia Britannica. (Online). https://global.britannica.com/science/Koppen-climate-classification [Accessed 14 July 2016].

Lanz, J. 2021. Site sensitivity verification and agricultural compliance statement for the proposed Kokerboom 3 Wind Energy Facililty near Loeriesfontein, Northern Cape. Prepared for Zutari South Africa (Pty) Ltd.

Meteoblue. 2016. Climate Loeriesfontein (30.95°S 19.44°E 902m). (Online). https://www.meteoblue.com/en/weather/forecast/modelclimate/loeriesfontein_south-africa_3364501 [Accessed 11 November 2020].

Mucina, L and Rutherford, M.C (eds). 2010. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Northern Cape Department of Economic Development and Tourism. 2020. Northern Cape Province Economic Potential and Investment Profile.

Oberholzer, B. (2005). Guideline for involving visual and aesthetic specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Development. Prepared for Zutari South Africa (Pty) Ltd.

Orton, Jayson, 2021.Heritage Impact Assessmen for the proposed Kokerboom 3 Wind Energy Facility on Farms 214/1 and 214/2, North of Loeriesfontein, Northern Cape.

Power of 9. 2016. Loeriesfontein Wind Farm (Online). Available at: www.loeriesfonteinwind.co.za [Accessed 11 November 2020].

Power of 9. 2016. Khobab Wind Farm (Online). Available at: www.khobabwind.co.za [Accessed 11 November 2020].

Ralston, S. 2016. Avifaunal mortality at operational wind farms in South Africa. Birdlife South Africa, in litt. March 2016.

Statistics South Africa. 2011. Northern Cape Province. Available: http://www.statssa.gov.za/?page_id=964 [Accessed 12 November 2020].

Stead, S. 2021. Visual Impact Assessment Report. The proposed Kokerboom 3 Winde Energy Facility, Northern Cape. Prepared for Zutari South Africa (Pty) Ltd.

Van Rooyen, C. and Froneman, A. 2021. Bird Impact Assessment Report: Kokerboom 3 Wind Energy Facility. Report prepared for Zutari South Africa (Pty) Ltd.

Zutari, 2021. Kokberboom 3 Transpoty Impact Assessment.
World Atlas. 2016. The most dependent countries on fossil fuels. Available: **http://www.worldatlas.com/articles/countries-the-most-dependent-on-fossil-fuels.html** [Accessed 10 Noevmber 2020].
World Imagery from SANBI's BGIS (http://bgisviewer.sanbi.org) [Accessed 9 November 2020].

9 ANNEXURES

Annexure A | Details of the EAP

Annexure B | Correspondence with DFFE

Annexure C | Public Participation

Annexure D | Specialist Input

Annexure E | Peer Review

Annexure F | Plan of Study for EIR

Annexure G | Screening Tool Report

Annexure H | Commission date of Specialists