



Environmental Impact Assessment for the Proposed St Helena Community Wind Farm Development, Western Cape Province

HERITAGE IMPACT ASSESSMENT

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DECLARATION OF INDEPENDENCE

I, Lita Ethel Webley as duly authorised representative of Archaeology Contracts Office at the University of Cape Town, hereby confirm my independence (as well as that of Archaeology Contracts Office) as the Heritage Specialist for the St Helena Community Wind Farm Development and declare that neither I nor the Archaeology Contract Office have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which Arcus GIBB was appointed as environmental assessment practitioner in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act) for the St Helena Community Wind Farm Development. I further declare that I am confident in the results of the studies undertaken and conclusions drawn as a result of it. I have disclosed, to the environmental assessment practitioner, in writing, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act. I have further provided the environmental assessment practitioner with written access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not. I am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 and any other specific and relevant legislation (national and provincial), policies, guidelines and best practice.

h.E. Webley

Signature:

Full Name: Lita Ethel Webley Date: 10 February 2012 Title / Position: Principle Investigator Qualification(s): PhD Experience (years/ months): 15 years Registration(s): Member of the Association of Southern African Professional Archaeologists

EXECUTIVE SUMMARY

The Archaeology Contracts Office at the University of Cape Town was appointed by Arcus Gibb (Pty) Ltd of behalf of the proponent Just Energy to conduct a Heritage Impact Assessment on the Farm Langeklip, near St Helena Bay in the Western Cape Province. The proponents propose to construct a 25 MW wind farm (comprising 8 turbines and associated infrastructure) on the top of the Patrysberg, on the eastern edge of the peninsula. The land belongs to the Seeland Development Trust, and the proposed project will be developed for the benefit of the community members, most of whom live in the nearby township of Laingville.

This Heritage Impact Assessment consists of a specialist archaeological study (Lita Webley and Liesbet Schietecatte), a specialist built environment study (Tim Hart), a specialist visual impact assessment (Elmie Weideman and Reuben Heydenrych of Aurecon) and a specialist desktop palaeontological assessment (John Pether).

The heritage indicators are:

- The entire property is underlain by granite rocks of the Vredenburg Batholith which are of no palaeontological interest. A thin layer of "heuweltjies" type soil mantles the granite and has a very low potential for fossils;
- No significant archaeological sites were identified during the field survey;
- The unoccupied farmhouse of Langklip dates to the late 19th century and has been significantly modified. It is considered to be a Grade 3C structure. The distance between the farmhouse and Turbine 1 (the closest turbine) is 600m. This buffer is considered adequate for purposes of this study;
- The Visual Impact Assessment concludes that "The physical characteristics of the area lead to a high level of visual sensitivity. The VIA has further demonstrated that the proposed wind farm will not have a very high impact as expected, as a result of the minimal visual mass or volume of the structures".
- The turbines are located 1-2 km from the MR533 which links the R399 to St Helena Bay. The facility will also be visible to motorists travelling on the R399, R27 and R45. The VIA report does not consider the scenic qualities of these routes but indicates that at least some motorists will be tourists visiting coastal holiday resorts;
- An additional three Wind Farms have been proposed for the Vredenburg Peninsula. Since there is no clarity on how many of these wind energy facilities (if any) will receive official approval, the cumulative impacts are difficult to measure.

The following mitigation measures are recommended:

- Only a basic degree of palaeontological mitigation is proposed. It is recommended that an alert for the uncovering of fossil bone is included in the Construction Phase EMP;
- No archaeological mitigation measures are required. However, if any sub-surface archaeological material (eg pre-colonial burials, shell middens) is uncovered during construction, this should be reported to Heritage Western Cape;
- If any human remains dating to the colonial era are uncovered during construction, work will have to cease in that area, and the matter should be reported to the SAHRA Burials Unit;
- Any changes to the final layout of the WEF, including changes to particularly the turbine positions and road alignments will have to be inspected by heritage specialists at EMP stage;
- A buffer of at least 500m between the farmhouse of Langklip and the closest turbine must be maintained. If there is any intention to use the Langklip farmhouse during the operational phase of the wind farm, then any alterations to the building will require a permit from HWC in terms of Section 34 (1) of the NHRA;
- The VIA report does not mention any specific mitigation measures with regard the placement of the turbines, with the exception that: "The most visually favourable position on the site

would be to move the turbines slightly in a north easterly direction where the existing slope can form a slight backdrop to the turbines, thus minimizing the visual intrusion to some extent";

- Both DEA and HWC have requested 2km buffer zones along local roads of scenic value on the Vredenburg Peninsula with respect to the West Coast 1 Wind Energy facility. If such a buffer zone is implemented along the MR533 then some turbine positions will require adjustment;
- A number of general mitigation measures are offered in the VIA with regard rehabilitation of the landscape after completion of the construction phase;
- Related ancillary structures should be shielded with appropriate landscaping techniques during the operation phase;
- The use of lighting around ancillary structures in the operation phase should be avoided;
- If red and white colouring is used for the turbines, then the amount of red should be reduced to a minimum;
- Three power line alternatives are suggested for the connection to the grid (see VIA report). Alternative 1 is the preferred option as it will result in a short loop in and out of the site.

Mitigation during the De-Commissioning Phase:

 Guarantees for demolition of turbines after their useful life must be in place as a condition of approval.

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED ST HELENA COMMUNITY WIND FARM DEVELOPMENT, WESTERN CAPE PROVINCE:HERITAGE IMPACT REPORT

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Appendix 3: Visual Impact Assessment - Elmie Weideman & Reuben Heydenrych

Appendix 4: Palaeontology – John Pether

ABBREVIATIONS

DEA	Department of Environmental Affairs
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
LSA	Late Stone Age
MSA	Middle Stone Age
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency

GLOSSARY

Archaeology: Remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Early Stone Age: The archaeology of the Stone Age between 700 000 and 2500 000 years ago.

Fossil: *Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.*

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999.

Holocene: The most recent geological time period which commenced 10 000 years ago.

Late Stone Age: The archaeology of the last 20 000 years associated with fully modern people.

Middle Stone Age: The archaeology of the Stone Age between 20 000-300 000 years ago associated with early modern humans.

National Estate: The collective heritage assets of the Nation.

Palaeontology: Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Pleistocene: A geological time period (of 3 million – 20 000 years ago).

SAHRA: South African Heritage Resources Agency – the compliance authority which protects national heritage.

Structure (historic): Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.

Wreck (protected): A ship or an aeroplane or any part thereof that lies on land or in the sea within South Africa is protected if it is more than 60 years old.

1 INTRODUCTION

1.1 Background

The Archaeology Contracts Office at the University of Cape Town was appointed by Arcus Gibb (Pty) Ltd of behalf of the proponent Just Energy to conduct a Heritage Impact Assessment on the Farm Langeklip 47, near St Helena Bay in the Western Cape Province (Figure 1). The proponents propose to construct a 25 MW community wind farm on the land, which belongs to the Seeland Development Trust, for the benefit of the community members, most of whom live in the nearby township of Laingville.

The aim of the project is to establish a community based independent power generation plant whereby the Trust will benefit from an equity share as well as a regular lease payment, which will be used for the social and economic benefit of the $8000 - 10\ 000$ inhabitants of the local township. In addition to providing income to the community, the project will also contribute renewable energy into the South African electricity grid.

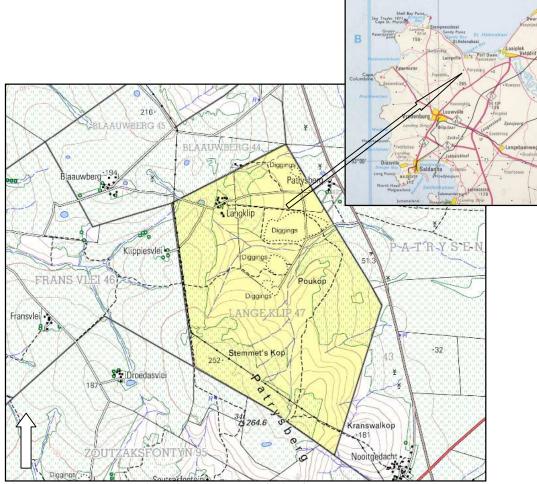


Figure 1: The location of the farm Langeklip (Erf 47) on Patrysberg, located on the eastern section of the Vredenburg Peninsula (1:50 000 map sheet 3218CA-CC Velddrif). Map supplied by client.

1.1.1 The Development Proposal

Since the study area is already zoned agricultural, and that farming will continue under the turbines, it is anticipated that no rezoning will be required.

The project will include (Figure 2):

- 8 wind turbines;
- The turbines will have a height of between 50m and 100m and the blade lengths will vary between 25m and 45m;
- Turbines typically require concrete foundations of about 30m x 30m x 3m set in the ground surface to support the turbine towers;
- Switchgear buildings of 12m x 8m (per 4 turbines);
- A control room of 12m x 12m;
- Transfer buildings of 6m x 6m per turbine;
- There will be underground cables between turbines;
- There will be a permanent net mast of 85m 100m;
- Overhead/underground power line (132kV distribution lines) feeding into the Eskom electricity distribution network which crosses the property. Three options have been proposed and are discussed in the VIA report;
- A substation 66/22kV of 20m x 20m, and a building of 10m x 10m;
- An access road to the site from the main road as well as internal access roads to each wind turbine, and the substations of 8m in width;
- Laydown areas;
- Temporary area for sand.

The Visual Impact Assessment¹ describes the turbines as being linearly located on a ridgeline towards the prevailing wind direction, with gaps ranging from 400m to almost 700m.

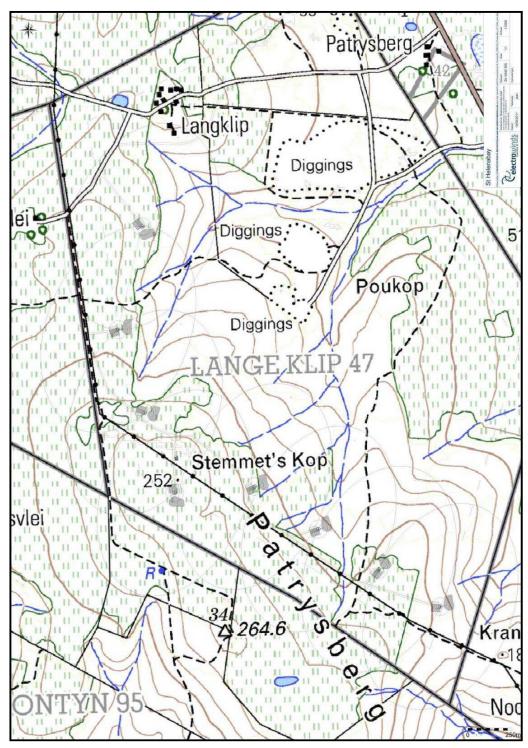


Figure 2: The location of the 8 turbines (and associated infrastructure) as well as internal access roads in light grey (Graphic supplied by client)

1.2 Legislative and Policy Context

The basis for all heritage impact assessment is the National Heritage Resources Act 25 (NHRA) of 1999, which in turn prescribes the manner in which heritage is assessed and managed. In the case of Environmental Impact Assessments in the Western Cape, the guidelines published by the Provincial Department of Environment Affairs and Tourism are directly based on the provisions of the National Heritage Resources Act².

The National Heritage Resources Act 25 of 1999 has defined certain kinds of heritage as being worthy of protection, by either specific or general protection mechanisms. In South Africa the law is directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The National Heritage Resources Act also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. Generally protected heritage which must be considered in any heritage assessment includes:

- cultural landscapes (described below),
- buildings and structures (greater than 60 years of age),
- archaeological sites (greater than 100 years of age),
- palaeontological sites and specimens,
- shipwrecks and aircraft wrecks,
- graves and grave yards.

The Interim Comment of Heritage Western Cape (Unique ID: 1314; Unique case ID: 1402) on the Draft Scoping Report for the St Helena Wind Farm (09-05-2011) called for:

"An Integrated Heritage Impact Assessment is required consisting of a specialist archaeological study, a specialist desktop palaeontological study and a specialist study of the structures that may be developed as well as a visual impact study with an integrated set of heritage recommendations".

1.2.1 Cultural Landscape

Section 3(3) of the NHRA, No 25 of 1999 defines the cultural significance of a place or objects with regard to the following criteria:

(a) its importance in the community or pattern of South Africa's history

(b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage

(c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage

(d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects

(e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group

(f) its importance in demonstrating a high degree of creative or technical achievement at a particular period

(g) its strong or special association with a particular community or cultural group for social cultural or spiritual reasons

(h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and

(i) sites of significance relating to the history of slavery in South Africa.

1.2.2 Scenic Routes

While not specifically mentioned in the NHRA, No 25 of 1999, Scenic Routes are recognised by DEA&DP as a category of heritage resources. In the DEA&DP Guidelines for involving heritage specialists in the EIA process, Baumann & Winter³ comment that the visual intrusion of development on a scenic route should be considered a heritage issue.

1.2.3 Heritage Grading

Heritage resources are graded following the system established by Baumann and Winter⁴ in the guidelines for involving heritage practitioners in EIA's (Table 1).

Grade	Level of significance	Description
1	National	Of high intrinsic, associational and contextual heritage value within a national context, i.e. formally declared or potential Grade 1 heritage resources.
2	Provincial	Of high intrinsic, associational and contextual heritage value within a provincial context, i.e. formally declared or potential Grade 2 heritage resources.
ЗА	Local	Of high intrinsic, associational and contextual heritage value within a local context, i.e. formally declared or potential Grade 3A heritage resources.
3B	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources.
3C	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources.

Table 1: Grading of heritage resources after Baumann and Winter⁵.

1.2.4 Wind Energy Guidelines

International literature indicates that visual impact and changes to the sense of place or setting are among the most contentious issues that the wind energy industry has had to face in terms of finding social acceptability. The proliferation of wind energy facilities in South Africa, in the absence of heritage guidelines or policy, is a cause of concern in terms of cumulative impacts. Wind energy facilities which require vast amounts of landscape pose significant impacts in terms of loss of iconic vistas, and landscape character change, especially in the Cape Province where the identity of the region is strongly linked to its spectacular landscape character.

A pilot study commissioned by the Provincial Government of the Western Cape "Towards a Regional Methodology for Wind Energy Site Selection in the West Cape region"⁶ is the only locally available policy guideline with respect to wind farms. The study looked at landscape character rather than at the "cultural landscape" or "heritage" but concluded that wind energy facilities can have a profound impact on the landscape in terms of quality of place. In general terms it recommends a buffer of at least 500 m between a wind turbine and heritage sites.

Neither SAHRA nor HWC have developed policies with respect to heritage and renewable energy although the issue has received considerable attention in European countries.

A recent decision by the Department of Environmental Affairs with respect to Wind Energy Facilities is discussed below to illustrate the kind of outcome which may be anticipated. In the Environmental Authorisation (12/12/20/1581) for the "West Coast 1 Wind Energy Facility" on the Vredenburg Peninsula (2010), the Department implemented a:

- 2km buffer around the Provincial Heritage Site (Grade 2) of Kasteelberg;
- 2km buffer along local roads, through the proposed wind energy facility, which have high scenic value.

1.2.5 Permit requirements

A permit, issued by Heritage Western Cape, will be required if:

- Any houses or structures such as barns, kraals, etc older than 60 years are intended to be altered or demolished (Section 34 (1) of the NHRA);
- Any archaeological or palaeontological sites are to be mitigated by excavation or destroyed during construction (Section 35 (4) of the NHRA).

Human remains from the colonial period are considered a national issue in terms of the National Heritage Resources Act 25 of 1999. Section 36 of the Act and the regulations attached thereto are implemented by the SAHRA Burials Unit in Pretoria. They are the permitting authority and are responsible for the issuing of exhumation/grave relocation permits. Control with respect to Pre-colonial human remains is devolved to the PHRA (HWC) and they oversee the process of either conservation in situ or exhumation

1.3 Assessment Methodology

The source of information for the Archaeology and Built Environment used in this report is based on an extensive database of published and unpublished information which is available for the Vredenburg Peninsula⁷. The field survey was conducted by Lita Webley and Liesbet Schietecatte on the 12 September 2011. Both 4 wheel drive and foot surveys were conducted to examine the position of the turbines and the access roads. The position of the turbines (towers) was pre-loaded onto a Garmin 60CSx. Tracks were recorded (Figure 3) and digital photographs were taken in the field. Comments on the Built Environment (i.e. farm buildings at Langklip) were obtained from Tim Hart.

Webley and Schietecatte interviewed Mr Johan Lewin of the Seeland Development Trust regarding the history of the property. However, the Trust acquired the 926ha farm through the Land Reform Programme by the Department of Land Affairs in 2006. The previous land owner was a Mr J Laubscher, probably of the same Laubscher family who have farmed in this area for several generations.

The Visual Impact Assessment, according to Weideman & Heydenrych⁸, identified landscape characteristics, visual character and visual quality, landforms, vegetation type, land cover and land use. A 3-dimensional (3D) GIS terrain model was used to

assess the visibility of the development. The report considered potential visual receptors and critical views toward the proposed wind farm as important (Appendix 3).

1.3.1 Limitations

- In terms of Archaeology, thick vegetation over much of the area meant that it was difficult to examine the soil surface closely. This was particularly pertinent at Turbines 5-8;
- There were no significant limitations with respect to the Visual Impact Assessment.

2 DESCRIPTION OF AFFECTED ENVIRONMENT

The Visual Impact specialist describes the topography of the Vredenburg peninsula as being gently undulating as a result of the domed granite base rocks.

The farm Langeklip is located on an elevated ridge called "Patrysberg" on the Vredenburg peninsula some 5km south from the town of St Helena Bay and to the north-east of the town of Vredenburg (Figure 1). The MR533, which connects the R399 with the coastal towns of St Helena Bay, Stompneus Bay and Britannia Bay, runs parallel to the Patrysberg. The R399 which connects Velddrif to Vredenburg passes to the south of the proposed site. Velddrif is located 12km east-northeast of the site, Vredenburg is located 10.5km southwest of the site and Laingville is located 4km north of the site.

The geological structures exposed on the mountain consist of the granite rocks of the Vredenburg Batholith⁹ (Plate 1). It is the granites which form the distinctive topography of rolling hills with domes and pinnacles of granite outcrops¹⁰. "A thin soil of the "heuweltjiesveld" type mantles the granites. The vegetation on the undisturbed lands is variously described as Strandveld or West Coast Renosterveld. The vegetation is a short scrub with taller shrubs in protected places amongst the granite boulders. The vegetation is dense particularly around turbines 5 - 8, where it is waist high (Plate 2). Aerial photographs and foot surveys suggest that much of the area was ploughed in the past and the ground cover is less dense around turbines 1, 2 and 4. The farm is used for the cultivation of wheat and for sheep farming.



Plate 1: View of the Patrysberg from R399 between Velddrif and Vredenburg.



Plate 2: View of the top of the Patrysberg covered in waist high vegetation, between Turbines 7 and 8.

2.1 Palaeontology

The geology and palaeontology of the area is discussed by Pether in Appendix 4¹¹. The entire property is underlain by granite rocks of the Vredenburg Batholith. Diggings on the flanks of the drainage in the northern portion of the area relate to quarrying of kaolin clay formed by the deep weathering of the granites. The granite bedrock is of no palaeontological interest.

The soil cover is generally thin and numerous outcrops of the granite bedrock can be seen in aerial images. The dot-patterned nature of the soil cover is typical of "heuweltjiesveld", the low hillocks being termitaria. The "heuweltjiesveld" is an old soil cover and it has a low fossil potential.

2.2 Pre-Colonial Archaeological Background

Appendix 1 addresses the archaeological background of the study area. There is evidence for Early (ESA) and Middle Stone Age (MSA) occupation of the Vredenburg peninsula.

Intensive archaeological research has however, been undertaken on the Later Stone Age. We know hunter-gatherers were living along the coastline for the last 10 000 years. Archaeologists have postulated that the first pastoralist groups (with cattle, sheep and pottery) entered South Africa along the West Coast some 2000 years ago.

The most important pastoralist site on the Vredenburg peninsula (and arguably in South Africa) is that of **Kasteelberg**, which is located on the farm Rooiheuwel of Boebezaks Kraal¹². This site is critical to our understanding of the introduction of pastoralism into southern Africa.

Other important archaeological sites on the peninsula include the cave site of **Witklip**, situated in a granite koppie at the town of Vredenburg. **Heuningklip**, some 8km to the south-east of Langeklip, is also an open site on a granite hill overlooking the surrounding landscape. All these sites are on koppies which dominate the surrounding landscape, suggesting that these elevated localities were preferred for prehistoric occupation.

A selective archaeological survey of the Vredenburg Peninsula was undertaken by Sadr and others¹³ and they recorded129 archaeological sites, mainly around granite koppies. However, their survey did not extend to the Patrysberg.

2.3 Colonial Background and Built Environment

No historical archaeological research has been conducted on the Vredenburg Peninsula and Phase 1 Archaeological Impact Assessments very rarely discuss historical remains relating to the colonial period or the built environment.

The history of this area is discussed in depth in Appendix 2. Briefly, historical accounts indicate that the Vredenburg peninsula was occupied by the Chariguriqua (later the Griqua?), a Khoekhoe group during the 17th century. The Saldanha Bay

area was the focus of intense competition between French and Dutch interests during the 17th and 18th centuries, with a number of military outposts established in the area. One of these posts was Soldatenpost. Its exact location has not been identified but the farm of that name is located to the north of the Study Area

Farmers in the area recommended to the VOC that the outpost should be established at the foot of the Patrysenberg, on a loan farm belonging to H.O. Eksteen. The farm Patrysenberg is important to this study as Lange Klip 47 originally formed part of the farm Patrysenberg 43 (No. 1016/1857). Governor J.W. Janssens visited the farm Patrijsenberg of the *Veldkornet* J. Laubscher in 1803. There was a government building on the farm which was occupied by the "flagman" of the post. According to Sleigh¹⁴, the flagman had to walk for approximately 30min to the right of his house (which Sleigh interprets as 3km south-east) to reach the signal station on the highest point of the Patrysberg (at 265m above sea level), where the signal post was positioned. Here he sent signals to Saldanha Bay by flags. It was postulated during the Scoping study that the flag pole may have been positioned at Stemmet's Kop on the top of the Patrysberg and within the Study Area.

The farm Patrysenberg features prominently in all these early records of European settlement on the Vredenburg Peninsula. Subsequently, the farm was subdivided into a number of smaller farms, one of them becoming Lange Klip 47. The Surveyor General Diagram (No. 1318/1881) shows that this subdivision took place in 1882.

3 FINDINGS

The turbine locations, access roads and underground cable positions were surveyed during the fieldwork (Figure 3).



Figure 3: The locations of farm buildings at Langeklip (within the red circle), the distribution of the turbine positions and the GPS tracks recorded during the survey.

3.1 **Pre-Colonial and Historical Archaeology**

Prior to the field survey, it was anticipated that scatters of archaeological material (possibly even shell middens) would be found around granite koppies on the top of the Patrysberg (Figure 3).

However, only very ephemeral scatters of stone tools were recovered across most of the mountain (Appendix 1). These scatters of stone tools were in very low numbers. Only one site (Site 001) was recorded at the top of Stemmet's Kop, in the general location of Turbine 4.

The survey did not identify any shell scatters, stone ruins or any historical archaeological material on the top of the mountain.

3.2 Built Environment

While the historical records indicate that the farm Patrysenberg dates back almost 200 years, the sub-division of the farm and the creation of the portion known as Lange Klip 47 dates to 1882. Prior to fieldwork, it was anticipated that historic structures might occur on the property.

The farm complex of Langklip is situated outside the boundary of the proposed wind energy facility. A buffer zone of 600 m between existing structures and the closest turbine has been established. The current farm complex consists of a cluster of buildings (Appendix 2), including the main house which has been significantly

modified. There are some modern sheds behind the house, a shed with a date of 1948, a modern house, a number of worker's cottages and one ruined stone building. No family or farm worker graves were recorded.

Some of these structures can be identified on the 1938 aerial photograph of the area. The main farmhouse has features which suggest a late 19th century date but it has been considerably modified and is likely to be graded as Grade 3C. One of the farm worker's cottages is also reflected on the old photograph. In addition, the ruined stone building is also present. There are two anomalies which suggest a more recent date for the ruin, including a 20th century addition of a chimney and a recent concrete floor. It is possible that this building may originally have been a shed which was later converted into a dwelling.

None of these buildings will be directly impacted by the wind energy facility. The Langklip farm complex will only be indirectly impacted by the proposed WEF.

3.3 Cultural Landscape

The Visual Impact Assessment (Appendix 3) describes the landscape character of the area in terms of the topography, vegetation and viewers (receptors) in the area. Inland of the coastal zone, the Vredenburg peninsula is composed predominantly of farm land, which is used for wheat production and livestock grazing. The rolling farmlands are interspersed with granite koppies. Farmsteads, many dating to the mid-19th century and earlier, are spread across the landscape. They are frequently associated with stands of Eucalyptus sp. trees. Farming characterises the landscape but this rural character is being rapidly eroded by housing developments and the construction of industrial facilities, particularly south of Vredenburg.

The Patrysberg Mountain has landmark status on the Vredenburg peninsula as it is a prominent landscape feature with panoramic views of the surrounding landscape and towards St Helena Bay, Velddrif and the estuary of the Berg River.

The visual character is determined by the topography, the existing surrounding land use patterns and by the presence of the built environment. Most of the study area is described as having "a rural or pastoral feel with only isolated instances of human infrastructure". However, the VIA also considers the "recreational and tourism related activities of the area and describes them as being located on three nodes, namely the town of Langebaan, the north-facing coastline including the town of Paternoster and the town of Velddrif on the Berg River".

When considering the proximity to the Atlantic Ocean, the small percentage of urban areas, the unique vegetation in smaller dispersed areas and the overall rural feel, the visual quality of the area is described in the VIA as: high – very high.

The proposed wind farm will be visible from a number of roads in the general area. The Visual Impact Assessment¹⁵ identified a number of viewers who would have the possibility of viewing the proposed wind farm and these would include:

- People travelling between Vredenburg and Velddrif (R399);
- People travelling on the R27 connecting Langebaan to Velddrif;
- People travelling of the gravel road to St Helena Bay (MR533);
- People travelling on the R45 from Hopefield to Vredenburg.

The VIA report explains that roads are "used by people to reach a routine destination, a holiday destination or as part of a leisure experience". However, it is important to note that the VIA report does not make an assessment of the scenic qualities of these various routes.

4 IMPACTS AND IDENTIFICATION OF ISSUES

Wind energy facilities are big developments that can produce a wide range of impacts that will affect the heritage qualities of an area. Typically each turbine can be up to 100m high with blades/rotors up to 50m in radius. Each turbine site needs road access that can be negotiated by a heavy lift crane(s) which means that in undulating topography (such as in the study area) deep cuttings and contoured roads will have to be cut into the landscape to create workable gradients. During the construction phase each of the turbine sites will have to be leveled off to create a solid platform for cranes as well as a lay-down area for materials. This will involve earthmoving and road construction, followed by the bringing in of materials and plant. The actual construction of the turbines will involve excavation into the land surface to a depth of 3m and over an area of 400m² for the concrete base. The pre-fabricated steel tower is bolted on to the base and erected in segments. The nacelle containing the generator is finally attached followed by the rotors. The turbines are connected to underground cables to a sub-station(s) (positioned to be determined) where after the generated current will be fed to the national grid via 132kV transmission lines.

During the operational life of the wind farm, it is expected that physical impacts to heritage will diminish or cease. Impacts to intangible heritage are expected to occur. Such impacts relate to changes to the feel, atmosphere and identity of a place or landscape. Such changes are evoked by visual intrusion, noise, changes in land use and population density. In the case of this project, impacts to the rural landscape and wilderness qualities are of concern. The point at which a wind turbine may be perceived as being "intrusive" from a given visual reference point is a subjective judgment, however it can be anticipated that the presence of a number of such facilities on the Vredenburg peninsula will destroy many of the intangible and aesthetic qualities for which the area is valued. The fact that turbines are continuously revolving results in a visual impact that can be very disturbing and destructive to the sense of serenity of a place.

- Due to the size of the turbines the visual impacts will be difficult to mitigate (they have a high impact rating up to 8km away) in virtually all landscapes, however studies suggest¹⁶ that they are perceived to be aesthetically/artistically more acceptable in agricultural or manicured landscapes;
- The fact that the turbines are in continuous motion creates a visual impact more severe than that caused by static objects and buildings;
- Residual impacts can occur after the cessation of operations. The large concrete base will remain buried in the ground indefinitely. Bankruptcy or neglect by a wind energy company can result in turbines standing derelict for years creating a long term eyesore.

4.1 Impacts on Palaeontology

Pether¹⁷ notes that the turbine foundation excavations will penetrate the thin Q2 soils to the granite bedrock. Similarly trenches for cabling will also penetrate to the bedrock. While the overall fossil potential in the soil mantle is very low, the excavations may expose buried crevices and "gullies" in the granite slopes where there is greater potential for fossil finds.

Table 2: Potential Impacts on Palaeontology

Criteria	Without Mitigation	With Mitigation
Nature	Negative	Neutral
Extent	Low	Low
Duration	High (the destruction of palaeontological sites is permanent)	Low
Intensity	Low	Low
Potential for impact on irreplaceable resources	High (palaeontological sites cannot be replaced)	Low
Consequences	Medium	Low
Probability	Low	Low
Significance	Low	Low

4.2 Impacts on Pre-Colonial and Historical Archaeology

It is not anticipated that the impacts on the archaeology of the area will be significant. Only one relatively dense scatter of stone artefacts (Site 001) was recorded. No shell midden accumulations were recorded in the study area. No historical archaeological material was recorded.

4.2.1 Nature of Impacts

The main cause of impacts to archaeological sites is physical disturbance of the material and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example, a deep excavation may expose archaeological artefacts, the artefacts are relatively meaningless once removed from the area in which they are found. Large scale excavations may damage archaeological sites, and construction of roads and laydown areas, and injudicious use of off-road vehicles can also contribute to high levels of impact.

4.2.2 Extent of Impacts

In the case of the proposed wind energy facility, it is expected that impacts on the pre-colonial and historical archaeology will be quite limited (local) but nevertheless possible. There is a chance that the excavations for the tower bases could potentially impact buried archaeological material including human remains, similarly excavations of cable trenches and clearing of access roads could impact on material that lies buried in the surface soils. Potential impacts caused by the power lines as well as proposed access roads are similarly likely to be limited and local.

Table 3: Potential Impacts on Pre-Colonial and Historical Archaeology

Criteria	Without Mitigation	With Mitigation
Nature	Negative	Neutral
Extent	Low	Low

Duration	High (the destruction of archaeological sites is permanent)	N/a
Intensity	Low	Low
Potential for impact on irreplaceable resources	High (archaeological sites cannot be replaced)	Low
Consequences	Medium	Low
Probability	Low	Low
Significance	Low	Low

4.3 Impacts on the Built Environment

The farmhouse of Langklip is older than 60 years and is protected in terms of Section 34 of the NHRA. It has, however, been significantly modified (Appendix 2). The closest turbine position to the farmhouse is Turbine 1 (Figure 3). It is situated some 600m from the house. All impacts would be indirect relating to the context and sense of place in which the structures find themselves (unless the building is used as part of the WEF infrastructure).

Heritage resources are likely to be graded as Grade 3 and various sub-categories of Grade 3 are recognised, namely Grade 3A, 3B and 3C. The latter is defined as having:

Intrinsic Significance Historical fabric is significantly altered (scale and form still intact) Limited evidence for historical layering Few elements of construction are authentic Remaining fabric has historical value (older than 60 years) Remaining fabric contributes to understanding of uses and roles of place over time

Associational Significance

Limited association with historic person/s or social grouping/s Limited association with historic events and activities Limited association with the uses or roles of a place over time Limited value in terms of public memory Limited association with living heritage

Contextual Significance Contributes to the broader historical, visual-spatial character of a place Contributes to the environmental quality of a Grade 3A/B heritage resource

In the context of the above definition, the Langklip farmhouse would probably be considered a Grade 3C site and as such, contributes to the character or significance of its environs.

4.3.1 Nature of the Impact

Historic farm structures (and these include old sheds, stone kraals and family cemeteries) are sensitive to physical damage such as demolition as well as neglect. They are also context sensitive, in that changes to the surrounding landscape will affect their significance. The farmstead and associated farm buildings in this study

area will not be directly impacted. The impact will be of a visual nature but due to the degraded nature of the farm house, this is not considered a significant impact. The farmhouse is approximately 600m from the closest turbine.

4.3.2 Extent of the Impacts

Direct impacts are not expected on farm buildings during the construction phase of the development. However, if the proposed activity results in changes to the way in which the historic farm house is utilized, or affects the context, then negative impacts may result. For example, the farmhouse is currently being used as an office to run the farm. If the farm house is used for the operation of the WEF, and this requires any alterations to the building, then negative impacts can be expected to the building which is older than 60 years of age.

Criteria	Without Mitigation	With Mitigation
Nature	Negative	Neutral
Extent	Low	Low
Duration	High (the destruction of significant buildings is permanent)	N/a
Intensity	Low	Low
Potential for impact on irreplaceable resources	High (significant buildings cannot be replaced)	Low
Consequences	Medium	Low
Probability	Low	Low
Significance	Low	Low

Table 4: Potential Impacts on the Built Environment

4.4 Visual Impacts on the Cultural Landscape and Scenic Routes

The VIA report evaluated the wind farm according to the following criteria:

- Visibility of the project;
- Visual exposure;
- Degree of visual intrusion;
- Visual sensitivity of the area;
- Viewer sensitivity;
- Observer proximity;
- Visual absorption capacity (VAC).

These criteria are numerically weighted according to extent, duration, intensity, probability of occurrence, confidence levels, nature, consequence and significance and are summarised below:

The report predicted a *medium to high visibility* rating. All the proposed turbines will be visible from the eastern to the north-eastern side of the site.

Visual exposure in terms of the overall reading is expected to be *moderate*. Visual exposure will be slightly higher for viewers facing the wind farm at the T junctions

between the R399 and secondary roads running north, east and west of the site. Viewers travelling on the R399 will have a slight view of the turbines, decreasing as they move closer to the wind farm. Even though turbines are visible over a great distance on clear days, the overall exposure will be moderate due to the visually "slim" turbine silhouettes.

Visual intrusion is likely to be *moderate to high*. Visual intrusion "essentially rates the degree of contrast between the proposed development and the existing visual environment". The VIA points out that the immediate study area contains little industrial activity and concludes that "the proposed activity shows considerable contrast and alters the sense of place. Therefore a moderate – high visual intrusion is expected".

The *Visual Sensitivity* of the area is *high*. The Visual Sensitivity of the Area is defined as "the inherent visibility of the landscape, usually determined by a combination of topography, landform, vegetation cover and settlement pattern".

Viewer Sensitivity is likely to be *high*. The VIA report defines viewer sensitivity in terms of familiarity and perception of an area, and ability to adapt to changes in the environment. The report expects viewer sensitivity to increase towards the towns of St Helena Bay, Laingville and Velddrif as they are located closer to the source of impact.

With regard to *Viewer Proximity*, the report concludes that the towns of St Helena Bay, Laingville and Sandy Bay will be highly impacted as they fall within a 10km core area. Table 5 shows the relationship between the distance of the turbine and impact rating, based on a turbine of height of 90 - 100m. Main roads such as the R399, R27 and R45 all fall in this core area. There is no residential development within a 4km radius of the site.

Distance	Impact Rating
0-4km	High
4-8km	Medium/High
8-13km	Medium
13-18km	Medium
18-23km	Low/Medium
23-30km	Low
Beyond 30km	Negligible

Table 5: Relationship between distance of turbine and impact rating

Visual Absorption Capacity is indicated as *low* for the project. It measures the relative ability of the landscape to accept physical changes without transforming the visual character and quality. The report points to the low vegetation height and the location of the turbines on the highest point in the study area and concludes as follows: "The visual scene is not very complex and the turbines will be the focal point in the landscape and will attract visual attention from passers-by, holiday makers and people residing permanently in the area".

The VIA report does not address the specific issue of the cultural landscape or that of scenic routes as discussed in Sections 1.2.1 and 1.2.2. The following general comments are offered by the integration team.

Cultural landscapes are highly sensitive to cumulative impacts and large scale development activities that change the character and public memory of a place. The

construction of eight turbines on the top of the Patrysberg may be considered local in terms of physical extent but there may be wider implications in terms of the change in "identity" of the area and the cumulative impacts this could have on future tourism potential. Careful placement of the turbines, as well as using the shortest turbines, will be required to ensure that the impact is kept to a minimum.

4.4.1 Nature of the Impact

The VIA describes a moderate to high visual impact on the landscape according to established criteria.

4.4.2 Extent of Impact

The extent of the impact (see Table 5) can be quite far reaching, affecting viewers within a range of at least 10km, considered as the core area.

Table 6: Potential Visual Impacts on the Cultural Landscape (ratings as per the VIA report)

Criteria	Without Mitigation	With Mitigation
Extent	2	2
Duration	3	3
Intensity	2.5	2.1
Probability of	4	4
Occurrence		
Confidence	2.25	2.25
Nature	3	2.25
Consequence	2.25	2.45
Significance	3	3
VIA Index	2.7	2.6
(Average)		

A possible maximum average rating which can be scored is 3.1. An overall average of 2.7 indicates a high visual impact.

4.5 **Potential Mitigation Measures**

- In view of the low fossil potential it is proposed that only a basic degree of mitigation is required for palaeontology. It is recommended that an alert for the uncovering of fossil bone is included in the EMP for the project;
- The best way to manage impacts to archaeological material is to avoid impacting them. No significant surface archaeological sites were identified during the field survey and no mitigation measures will be required;
- The distance between the farmhouse of Langklip and Turbine 1 (the closest turbine) is 600m. This buffer is adequate for purposes of this study;
- If there is any intention to use the farmhouse or other buildings at Langklip for purposes of the operation of the wind farm, then any alterations to the building will require a permit from HWC;
- The VIA report does not mention any specific mitigation measures with regard the placement of the turbines, with the exception of the following comment:

"The most visually favourable position on the site would be to move the turbines slightly in a north easterly direction where the existing slope can form a slight backdrop to the turbines, thus minimizing the visual intrusion to some extent";

- Both DEA and HWC have previously requested 2km buffer zones along local roads of scenic value for other proposed wind energy facilities on the Vredenburg Peninsula. If such a buffer zone is implemented along the MR533 then some of the turbine positions will have to be re-positioned;
- A number of general mitigation measures are offered in the VIA with regard rehabilitation of the landscape after completion of the construction phase;
- Related ancillary structures should be shielded with appropriate landscaping techniques during the operation phase;
- The use of lighting around ancillary structures in the operation phase should be avoided;
- If red and white colouring is used for the turbines, then the amount of red should be reduced to a minimum.

5 EMP – HERITAGE MANAGEMENT PLANNING

Action required during the construction, maintenance and de-commissioning of the WEF:

If there are any changes to the layout of the facility after submission to DEA, then further field surveys should be undertaken by the necessary heritage specialists to assess possible impacts and implementation of the necessary mitigation measures.

5.1 Palaeontological Resources

The procedures for the monitoring by construction personnel and general Fossil Find Procedures are outlined in Appendix 4. They include that construction staff should be informed of the need to watch for potential fossil occurrences prior to commencement of construction. That the specialist should inspect pits and record higher risk excavations during construction and that the discovery of any fossil material should be reported to the palaeontologist.

5.2 Archaeological resources

During the construction phase of the project, significant archaeological material may be uncovered. If they are not adequately dealt with, they may be accidentally destroyed. In order to reduce the impacts on below-ground heritage resources, any finds unearthed during construction activity should be reported to an archaeologist and Heritage Western Cape immediately by the Environmental Control Officer.

5.3 Human remains

Human remains may be found during the construction phase of the project It is impossible in most cases to predict the location if no surface markers are in place, but burials commonly occur in soils with some depth, often in silts alongside rivers, or on outwash fans. Several skeletons are retrieved each year from various development projects around the province, so finds of this nature are not necessarily rare. Human remains are protected by several sets of legislation which means that certain protocols must be followed in the event of a find:

- As soon as human remains are found work at the specific location should cease, and remains be left as is, nothing should be removed;
- Cordon off the area;
- Call the archaeologist at Heritage Western Cape (021 483 9685);
- Once an archaeologist has examined the find, the archaeologist/SAHRA should contact SA Police services and the state pathologist to report human remains;
- If the human remains are found to be a legitimate burial or a pre-colonial burial, an emergency exhumation permit will probably be issued by SAHRA or HWC (if exhumation is needed); and
- If a crime is suspected, a police docket will need to be opened.

5.4 De-commissioning

• Guarantees for demolition of turbines after their useful life must be in place as a condition of approval. Abandoned turbines can have a significant negative visual impact on the cultural landscape.

6 CONCLUSION

The study has shown that impacts to palaeontological heritage, archaeological heritage and built environment heritage are likely to be of low significance.

The physical characteristics of the area (undulating topography and low vegetation cover), which allows for wide vistas, as well as the nature of land use indicates a high visual impact may be expected although "the proposed wind farm will not have a very high impact as expected, as a result of the minimal visual mass or volume of the structures".¹⁸

The accumulative impact of up to four wind farms on the Vredenburg Peninsula is difficult to measure. The Cape West Coast is known for scenic landscapes. The proliferation of wind farms in the absence of adequate policy is a direct threat to this heritage.

6.1 Recommendations

- Only a basic degree of palaeontological mitigation is proposed. It is recommended that an alert for the uncovering of fossil bone is included in the Construction Phase EMP;
- No archaeological mitigation measures are required. However, if any sub-surface archaeological material is uncovered during construction, this should be reported to Heritage Western Cape;
- If any human remains are uncovered during construction, work will have to cease in that area, and the matter should be reported to the SAHRA Burials Unit;
- Any changes to the final layout of the WEF, including changes to the turbine positions and road alignments will have to be field-proofed by an archaeologist;
- A buffer of at least 500m between the farmhouse of Langklip and the closest turbine must be maintained. If there is any intention to use the farmhouse of Langklip during the operational phase of the wind farm, then any alterations to the exterior of the building will require a permit from HWC;
- The VIA report does not mention any specific mitigation measures with regard the placement of the turbines, with the exception that: "The most visually favourable position on the site would be to move the turbines slightly in a north easterly direction where the existing slope can form a slight backdrop to the turbines, thus minimizing the visual intrusion to some extent";
- Both DEA and HWC have requested 2km buffer zones along local roads of scenic value on the Vredenburg Peninsula with respect to the West Coast 1 Wind Energy facility. If such a buffer zone is implemented along the MR533 then some of the turbine positions will have to be re-positioned;
- A number of general mitigation measures are offered in the VIA with regard rehabilitation of the landscape after completion of the construction phase;
- Related ancillary structures should be shielded with appropriate landscaping techniques during the operation phase;
- The use of lighting around ancillary structures in the operation phase should be avoided;
- If red and white colouring is used for the turbines, then the amount of red should be reduced to a minimum;
- Road alignments must be planned in such a way that the minimum of cut and fill operations are required;
- Existing farm tracks should be used where possible to minimise the amount of change to the landscape;

• Three power line alternatives are suggested for the connection to the grid (see VIA report). Alternative 1 is the preferred option as it will result in a short loop in and out of the site.

Mitigation during the De-Commissioning Phase:

• Guarantees for demolition of turbines after their useful life must be in place as a condition of approval.

7 APPENDIX 1: PRE-COLONIAL AND HISTORICAL ARCHAEOLOGY

Lita Webley Archaeology Contracts Office University of Cape Town

7.1 Pre-colonial Archaeological Background

The West Coast of South Africa has been settled for at least 100 000 years. There are shell middens dating to the Middle Stone Age (MSA) both north and south of the Vredenburg peninsula. Associated with these middens are MSA stone tools and a single clearly modern human tooth from Sea Harvest.

Later Stone Age sites on the Cape West coast indicate that hunter-gatherers made seasonal use of the coastal resources. The excavations of numerous sites on the Vredenburg peninsula have shown that hunter-gatherer, and later pastoralist, groups utilized resources such as seals, marine birds, crayfish and beached whales. Archaeologists have postulated that the first pastoralist groups (with cattle, sheep and pottery) entered South Africa along the West Coast some 2000 years ago.

The most important pastoralist site on the Vredenburg peninsula (and arguably in South Africa) is that of **Kasteelberg**, which is located on the farm Rooiheuwel of Boebezaks Kraal¹⁹. The Kasteelberg koppie is located 8.2km due west of the Study Area. The granite koppie is surrounded by agricultural lands and is highly visible from adjoining properties. Shell midden deposits on the slopes of the koppie include sheep and cattle bones, pottery and stone artefacts. These sites are critical to our understanding of the introduction of pastoralism into southern Africa.

Other important archaeological sites on the peninsula include the cave site of **Witklip**, situated in a granite koppie at the town of Vredenburg. It is 9km from the coast. **Heuningklip**, some 8km to the south-east of Langeklip, is also an open site on a granite hill overlooking the surrounding landscape. All these sites are on koppies which dominate the surrounding landscape, suggesting that these elevated localities were preferred for prehistoric occupation.

A selective archaeological survey of the Vredenburg Peninsula was undertaken by Sadr and others²⁰ and they recorded129 archaeological sites, mainly around granite koppies. However, their survey did not extend to the Patrysberg. Webley & Orton²¹ also surveyed large areas of farmland between Kasteelberg and Patrysberg for a proposed wind energy facility. They noted that archaeological sites tend to be concentrated around granite koppies, but they did find some sites in ploughed lands.

The archaeological sites at Kasteelberg have featured prominently in the academic literature concerned with identifying pastoralist sites. Can archaeologists identify the ancestors of the 17th century Khoekhoen groups encountered by the Cape by early Dutch colonists? Were they a different group from the San hunter-gatherers or could San acquire sheep and cattle and become pastoralists? The "Great Debate", which has attracted the views of both archaeologists and historians working in southern Africa and elsewhere, is concerned with whether the pastoralists had a different cultural signature from the hunter-gatherer groups. Much of this research in centred on the Vredenburg peninsula, highlighting its archaeological importance.

7.2 Findings

Prior to the field survey, it was anticipated that scatters of archaeological material (possibly even shell middens) would be found around granite koppies on the top of the Patrysberg (Figure 3).

However, only very ephemeral scatters of stone tools were recovered across most of the mountain. The artefacts were easier to identify in previously ploughed lands. They comprised quartz and quartzite flakes, chunks and cores. A single large core of silcrete (Plate 3) was found near the location of Turbine 1, and a single MSA flake (Plate 5) on silcrete was recorded at Turbine 8.

These scatters of stone tools were in very low numbers and did not warrant recording as an archaeological site.



Plate 3: Silcrete Core.

Plate 4: Quartz and silcrete flakes and cores at Site 001.



Plate 5: MSA flake

Only one site (Site 001) was recorded (Table 2) around the concrete reservoir at the top of Stemmet's Kop, in the general location of Turbine 4. There is a greater density of artefacts in this area, comprising quartz and silcrete flakes.

Table 1: Location of archaeological sites.

LABLE	LONGITUDE	LATITUDE	Туре	Significance
001	S32 49 58.3		Scatter of stone artefacts (indeterminate	Low
			age) comprising quartz flakes and cores,	

	silcrete flakes and cores, around a cemer reservoir on the top of Patrysberg – calle Stemmet's Kop	
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7.3 Impacts to Archaeology

It is not anticipated that the impacts on the archaeology of the area will be significant. Only one relatively dense scatter of stone artefacts (Site 001) was recorded. No shell midden accumulations were recorded in the study area. No historical archaeological material was recorded.

7.3.1 Nature of Impacts

The main cause of impacts to archaeological sites is physical disturbance of the material and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example, a deep excavation may expose archaeological artefacts, the artefacts are relatively meaningless once removed from the area in which they are found. Large scale excavations may damage archaeological sites, and construction of roads and laydown areas, and injudicious use of off-road vehicles can also contribute to high levels of impact.

7.3.2 Extent of Impacts

In the case of the proposed wind energy facility, it is expected that impacts on the pre-colonial and historical archaeology will be quite limited (local) but nevertheless possible. There is a chance that the excavations for the tower bases could potentially impact buried archaeological material including human remains, similarly excavations of cable trenches and clearing of access roads could impact on material that lies buried in the surface soils. Potential impacts caused by the power lines as well as proposed access roads are similarly likely to be limited and local.

Criteria	Without Mitigation	With Mitigation
Nature	Negative	Neutral
Extent	Low	Low
Duration	High (the destruction of archaeological sites is permanent)	N/a
Intensity	Low	Low
Potential for impact on irreplaceable resources	High (archaeological sites cannot be replaced)	Low
Consequences	Medium	Low
Probability	Low	Low
Significance	Low	Low

Table 1: Potential Impacts on Pre-Colonial and Historical Archaeology

8 APPENDIX 2: BUILT ENVIRONMENT

Tim Hart and Lita Webley Archaeology Contracts Office University of Cape Town

8.1 Historical Background to the area

No historical archaeological research has been conducted on the Vredenburg Peninsula and Phase 1 Archaeological Impact Assessments very rarely discuss historical remains relating to the colonial period or the built environment.

Early travellers reported that large numbers of cattle and sheep were being pastured around St Helena Bay on the Vredenburg peninsula by the 17th century. Nienaber²² in his review of the historic accounts, confirms that the *Chariguriqua* (later the Griqua?), a Khoekhoe group, occupied the area around St Helena Bay during the 17th century, with the Cochoquas or Saldanhars further to the west around Saldanha Bay. The name "Boebezaks Kraal" implies the presence of a Khoekhoe group in this area. Smith²³ has postulated a seasonal transhumant cycle for the Khoekhoe groups between the coast and the interior which was later disrupted by the Dutch settlement.

The Saldanha Bay area was the focus of intense competition between French and Dutch interests during the 17th and 18th centuries, with a number of military outposts established in the area to provide protection for fishing and sealing interests. One such post was established at St Helena Bay in 1734²⁴. The post, Soldatenpost, has not been identified but the farm of that name is located to the north of the Study Area²⁵. A map by Frederici, dated 1788, shows an approximate location for the outpost but the map is very inaccurate and it is impossible to be exact. The map also indicates the approximate location of the original Patrysenberg farmstead to the east of the Patrysberg.

Farmers in the area recommended to the VOC that the outpost should be established at the foot of the Patrysenberg, on a loan farm belonging to H.O. Eksteen. The farm Patrysenberg is important to this study as Lange Klip 47 originally formed part of the farm Patrysenberg 43 (No. 1016/1857). There is a great deal of information available on the history of Patrysenberg because of its strategic position on the Vredenburg peninsula. In 1745 the VOC negotiated with the widow of H.O. Eksteen promising that she could obtain ownership of her loan farm, De Patrijse Berg in St Helena Bay, if she provided the soldiers at the outpost with supplies. When the outpost was occupied in 1781, the soldiers were quartered on the farm Patrijzenberg belonging to Pieter Laubscher (Eksteen's son-in-law).

In 1803, the Governor J.W. Janssens visited the farm Patrijsenberg of the *Veldkornet* J. Laubscher (Pieter's son). There was a government building on the farm which was occupied by the "flagman" of the post. According to Sleigh²⁶, the flagman had to walk for approximately 30min to the right of his house (which Sleigh interprets as 3km south-east) to reach the signal station on the highest point of the Patrysberg (at 265 m above sea level), where the signal post was positioned. Here he sent signals to Saldanha Bay by flags. It was postulated during the Scoping study that the flag pole may have been positioned at Stemmet's Kop on the top of the Patrysberg and within the Study Area.

The farm Patrysenberg features prominently in all these early records of European settlement on the Vredenburg Peninsula. Subsequently, the farm was subdivided into a number of smaller farms, one of them becoming Lange Klip 47. The Surveyor

General Diagram (No. 1318/1881) shows that this subdivision took place in 1882. With regard buildings of historic significance in the vicinity, Fransen²⁷ notes that only the 19th century farmhouse of Honingklip (now Heuningklip, some 8km to the southeast of Langeklip), is one of the few major old houses in the Vredenburg peninsula.

8.2 Findings of the Built Environment

According to the historic sources, the farm Patrysenberg was subdivided into a number of smaller farms, one of them becoming the farm Lange Klip 47. The Surveyor General Diagram (No. 1318/1881) shows that this subdivision took place in 1882. The structures on the farm Langeklip are likely to date after 1882.

The Langklip farm complex will only be indirectly impacted by the proposed WEF. A buffer zone of 600 m between existing structures and the closest turbine (Turbine 1) has been established. All impacts would be indirect, relating to the context and sense of place in which the structures find themselves.

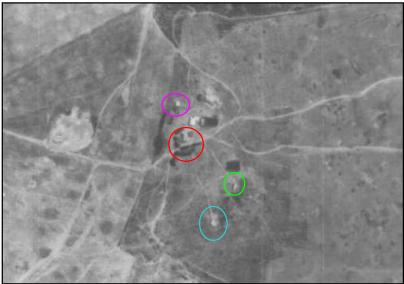


Figure 4: An extract from the 1938 aerial photograph showing the Langklip farmhouse. The circled buildings are still standing.

The current farm complex consists of a cluster of buildings, including the main house which has been significantly modified (Plate 6). There are some modern sheds behind the house, a shed with a date of 1948 (Plate 9), a modern house occupied by the previous owner Mr J Laubscher, a number of worker's cottages (Plate 10) and one ruined stone building (Plate 11). No family or farm worker graves were recorded.



Plate 6: The original farmhouse of Langeklip which is now used as offices by the Seeland Community Trust.

The house can be identified in a grove of Eucalyptus trees on the 1938 aerial photograph of the farm (Figure 4) and is circled in red. It is a single-storey, L-shaped house with modern steel windows under a pitched roof of corrugated iron. There is a verandah, but only at the front of the building and this has been enclosed. It too contains steel window frames and a modern door. There are outside steps leading up to a loft door, located on the short leg of the L-shape (Plate 6 & 9). The house is connected to a kitchen area at the back of the building by a flat-roofed link (Plate 7).



Plate 7: The back of the house, showing the flat-roofed extension connecting to the projecting oven and chimney. Note the buttressing at the back of the house, supporting the chimney.

There are no windows at the back of the house (Plate 7), and the flat-roofed extension has a modern "Bo-en-onder" door but no windows. The projecting hearth and chimney stack at the back of the house is called an "abba vuurherd"²⁸, the southern wall of the vaulted oven contains a small window which provides a little light to the top of the wood burning stove or open hearth.



Plate 8: Bakoond at the back of the house. Plate 9: Outside steps leading to the loft door.

There is a square, brick-lined reservoir at the back of the house which collects the rainwater from the gutters (Plate 7).

The building has features which suggest a 19th century date but it has been considerably modified and is likely to be graded as Grade 3C.



Plate 10: Shed with date of 1948.

Plate 11: Flat-roofed worker's cottage.

The shed (Plate 10) has the date 1948 engraved in plaster above the door. It (or an earlier core) is shown on the 1938 aerial photograph.

There are three worker's cottages on the farm; the one is of modern breeze blocks. One cottage is reflected on the 1938 aerial photograph of the farm complex (Plate 11). It has a flat roof, two small, square steel framed windows and a door in the front façade. The chimney is located in one end of the house. A recent corrugated iron lean-to has been added to the front of the house and this hides the second window.



Plate 12: Ruined stone building.

A long, rectangular stone building is located in close proximity to the three worker's cottages. The age and function of the stone building is unclear but it is shown in the 1938 aerial photograph of the farm complex and is circled in green in Figure 4. The structure is walls of rubble plastered with clay and whitewashed. It is a long, narrow structure, divided into two rooms, with a "chimney" added at one end. The core of the building may originally have consisted of only one room, with the southern room added at a later date. There are wooden window frames and a wooden lintel above the interior door. No historical archaeological material was recorded around the building. The main entrance is situated in the east facing façade.

There are two anomalies which suggest a more recent date for the ruin. The chimney is pulling away from the wall, suggesting it may have been added at a later date. Cemented into the chimney is a modern, screw top bottle, which suggests a late 20th century date. There is also a recent concrete floor in the one room. It is possible that this building may have been a shed which was later converted into a dwelling.



Plate 13: The interior rooms in the stone building. Plate 14: The "bakoond" appears to have been added at the end of the building.

Mr Lewin informed us that is was the oldest structure on the site but this information would have been oral history obtained from the previous owner, Mr Laubscher.

None of these buildings will be directly impacted by the wind energy facility.

8.3 Impacts to the Built Environment

The farmhouse of Langklip is older than 60 years and is protected in terms of Section 34 of the NHRA. It has, however, been significantly modified. The closest turbine position to the farmhouse is Turbine 1 (Figure 3). It is situated some 600m from the house. All impacts would be indirect relating to the context and sense of place in which the structures find themselves (unless the building is used as part of the WEF infrastructure),.

Heritage resources are likely to be graded as Grade 3 and various sub-categories of Grade 3 are recognised, namely Grade 3A, 3B and 3C. The latter is defined as having:

Intrinsic Significance Historical fabric is significantly altered (scale and form still intact) Limited evidence for historical layering Few elements of construction are authentic Remaining fabric has historical value (older than 60 years) Remaining fabric contributes to understanding of uses and roles of place over time

Associational Significance

Limited association with historic person/s or social grouping/s Limited association with historic events and activities Limited association with the uses or roles of a place over time Limited value in terms of public memory Limited association with living heritage

Contextual Significance

Contributes to the broader historical, visual-spatial character of a place Contributes to the environmental quality of a Grade 3A/B heritage resource

In the context of the above definition, the Langklip farmhouse would probably be considered a Grade 3C site and as such, contributes to the character or significance of its environs.

8.3.1 Nature of the Impact

Historic farm structures (and these include old sheds, stone kraals and family cemeteries) are sensitive to physical damage such as demolition as well as neglect. They are also context sensitive, in that changes to the surrounding landscape will affect their significance. The farmstead and associated farm buildings in this study area will not be directly impacted. The impact will be of a visual nature but due to the degraded nature of the farm house, this is not considered a significant impact. The farmhouse is approximately 600m from the closes turbine.

8.3.2 Extent of the Impacts

Direct impacts are not expected on farm buildings during the construction phase of the development. However, if the proposed activity results in changes to the way in which the historic farm house is utilized, or affects the context, then negative impacts may result. For example, the farmhouse is currently being used as an office to run the farm. If the farm house is used for the operation of the WEF, and this requires any alterations to the building, then negative impacts can be expected to the building which is older than 60 years of age.

Criteria	Without Mitigation	With Mitigation
Nature	Negative	Neutral
Extent	Low	Low
Duration	High (the destruction of significant buildings is permanent)	N/a
Intensity	Low	Low
Potential for impact on irreplaceable resources	High (significant buildings cannot be replaced)	Low
Consequences	Medium	Low
Probability	Low	Low
Significance	Low	Low

Table 1: Potential Impacts on the Built Environment

9 APPENDIX 3: VISUAL IMPACT ASSESSMENT

Elmie Weideman and Reuben Heydenrych Aurecon

10 APPENDIX 4: PALAEONTOLOGICAL IMPACT ASSESSMENT

BRIEF PALAEONTOLOGICAL IMPACT ASSESSMENT

PROPOSED ST. HELENA COMMUNITY WIND FARM DEVELOPMENT Saldanha Bay Municipality, Vredenburg District, Western Cape

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Prepared at the Request of

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10 February 2012

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SUMMARY

The context of this report is the proposed St. Helena Community Wind Farm Development on the farm Lange Klip 47 (Figure 1), near the township of Laingville on the St. Helena Bay coast. The owner, Seeland Development Trust is partnered by Just Energy in the project, which is intended to benefit of the local community. Just Energy have appointed Arcus GIBB (Pty) Ltd to undertake the Environmental Impact Assessment Process for the proposed project.

The proposed development will involve the installation of 8 wind turbines on concrete foundations, underground cabling, a substation and other operational infrastructure and access roads.

The entire property is underlain by granite rocks of the Vredenburg Batholith (Figure 2 which are of no palaeontological interest. A thin soil of the "heuweltjiesveld" type mantles the granites. The potential for fossils in the soil mantle is very low. Notwithstanding, the excavations may expose buried crevices and "gullies" in the granite slopes where there is greater potential for fossil finds.

In view of the low fossil potential it is proposed that only a basic degree of mitigation is required.

It is recommended that an alert for the uncovering of fossil bone and implements be included in the Construction Phase EMP for the project.

Appendices 1 and 2 outline monitoring by construction personnel and general Fossil Find Procedures. This is a general guideline, to be adapted to circumstances.

In the event of possible fossil and/or archaeological finds, the contracted archaeologist or palaeontologist must be contacted. For possible fossil finds, the palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established.

The author, John Pether, is an independent consultant/researcher and is a recognized authority in the field of coastal-plain and continental-shelf palaeoenvironments and is consulted by exploration and mining companies, by the Council for Geoscience, the Geological Survey of Namibia and by colleagues/students in academia pursuing coastal-plain/shelf projects.

Expertise

- Shallow marine sedimentology.
- Coastal plain and shelf stratigraphy (interpretation of open-pit exposures and on/offshore cores).
- Marine macrofossil taxonomy (molluscs, barnacles, brachiopods).
- Marine macrofossil taphonomy.
- Sedimentological and palaeontological field techniques in open-cast mines (including finding and excavation of vertebrate fossils (bones).
- Analysis of the shelly macrofauna of modern samples e.g. for environmental surveys.

Membership Of Professional Bodies

- South African Council of Natural Scientific Professions. Earth Science. Reg. No. 400094/95.
- Geological Society of South Africa.
- Palaeontological Society of Southern Africa.
- Southern African Society for Quaternary Research.
- Heritage Western Cape. Member, Permit Committee for Archaeology, Palaeontology and Meteorites.
- Accredited member, Association of Professional Heritage Practitioners, Western Cape.

11 INTRODUCTION

The context of this report is the proposed St. Helena Community Wind Farm Development on the farm Lange Klip 47 (Figure 1), near the township of Laingville on the St. Helena Bay coast. The property is owned by a community-based trust, Seeland Development Trust, and the aim is to generate income for the benefit of the local community. The trust is partnered by Just Energy, founded by Oxfam UK to aid local communities to participate in renewable energy generation. Just Energy have appointed Arcus GIBB (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment Process for the proposed project.

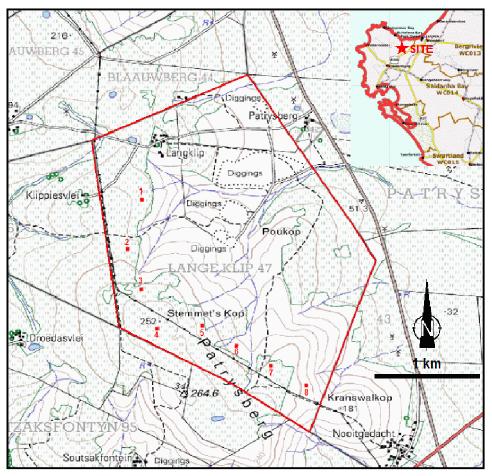


Figure 1. Location of the proposed St. Helena Community Wind Farm Development. Extract from 3218CA_CC_2003_ED5_GEO.TIF 1:50000 topo-cadastral map . Chief Directorate: Surveys & Mapping.

The proposed development will involve the installation of 8 wind turbines on concrete foundations (Figure 1), underground cabling between turbines, a substation, a control room, switchgear housings and power lines to the national grid network into which the generated electricity will feed. Also involved are access roads and temporary construction-related laydown areas.

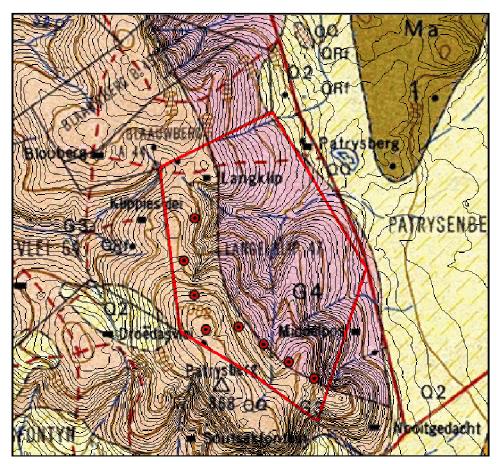


Figure 2. Geology of the study area. From Visser & Schoch (1972). Contours at 5 m intervals added.

The project area is situated on the slopes and crest of an elevated ridge, the Patrysberg. The provisional positions of the wind turbines are near or on the crest of the ridge, at elevations ranging between ~170 to ~250 m asl. The main information for the area is Visser & Schoch (1972, 1973) and the accompanying geological map, the relevant part of which is reproduced as Figure 2.

The entire property is underlain by granite rocks of the Vredenburg Batholith. These are labelled G3 (Saldanha Granite) and G4 (Cape Columbine Granite) (Figure 2). Subsequently, the granites have been re-examined and renamed. The G3 granite is now called the Vredenburg Granite while the G4 granite is comprised of the Patrysberg Biotite Granite and the Slippers Bay Granite (Siegfried, 2006). Diggings on the flanks of the drainage in the northern portion of the area (Figures 1 & 3) relate to quarrying of kaolin clay formed by the deep weathering of the granites.

The soil cover is generally thin and numerous outcrops of the granite bedrock can be seen in aerial images (Figure 3). The less steep parts of the property have been cultivated. The dot-patterned nature of the soil cover is evident (Figure 3) and is typical of "heuweltjiesveld", the low hillocks being termitaria. The "heuweltjiesveld" is an old soil cover depicted as Q2 on the geological map (Figure 2), but it is only mapped where thicker and for mapping purposes is ignored where thinly developed on bedrock.

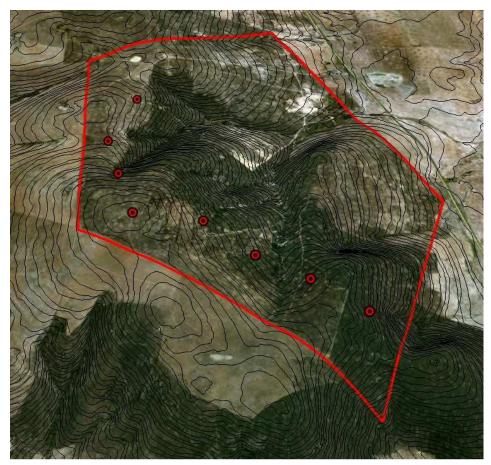


Figure 3. Simulated oblique view of the project area, looking north. From Google Earth.

13 EXPECTED PALAEONTOLOGY

The granite bedrock underlying the property is of no palaeontological interest.

The turbine foundation excavations will fully penetrate the thin Q2 soil to the granite bedrock. Similarly, trenches for cabling will likely penetrate to the bedrock for much of their length. The overall potential for fossils in the soil mantle is very low. Notwithstanding, the excavations may expose buried crevices and "gullies" in the granite slopes where there is greater potential for fossil finds.

14 **RECOMMENDATIONS**

In view of the low fossil potential it is proposed that only a basic degree of mitigation is required.

It is recommended that an alert for the uncovering of fossil bone and implements be included in the EMP for the project.

Appendices 1 and 2 outline monitoring by construction personnel and general Fossil Find Procedures. This is a general guideline, to be adapted to circumstances.

In the event of possible fossil and/or archaeological finds, the contracted archaeologist or palaeontologist must be contacted. For possible fossil finds, the palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established.

14.1 Monitoring

Table 2. Basic measures for the Construction EMP

OBJECTIVE: To see and rescue fossil material that may be exposed in the various excavations made for installation foundations and cabling.

Project components	Foundation excavations, trenches for cabling and pipes, spoil					
	from excavations.					
Potential impact	Loss of fossils by their being unnoticed and/ or destroyed.					
Activity/ risk source	All bulk earthworks.					
Mitigation: target/ objective	To facilitate the likelihood of noticing fossils and ensure					
	appropriate actions in terms of the relevant legislation.					
Mitigation: Action/ control	Responsibility	Timeframe				
Inform staff of the need to watch for potential fossil occurrences.	Just Energy, Arcus GIBB, the ECO & contractors.	Pre-construction.				
Inform staff of the procedures to be followed in the event of fossil occurrences.	ECO/specialist.	Pre-construction.				
Monitor for presence of fossils	Contracted personnel and ECO.	Construction.				
Liaise on nature of potential finds and appropriate responses.	ECO and specialist.	Construction.				
Excavate main finds, inspect pits & record selected, key/higher-risk excavations.	Specialist.	Construction.				
Obtain permit from HWC for finds.	Specialist.	Construction				
Performance Indicator	Reporting of and liaison about possible fossil finds. Fossils noticed and rescued.					

Monitoring	Due	effort	to	meet	the	requirements	of	the	monitoring
	procedures.								

15 APPLICATION FOR A PALAEONTOLOGICAL PERMIT

A permit from Heritage Western Cape (HWC) is required to excavate fossils. The applicant should be the qualified specialist responsible for assessment, collection and reporting (palaeontologist).

Should fossils be found that require rapid collecting, application for a palaeontological permit will be made to HWC immediately.

The application requires details of the registered owners of the sites, their permission and a site-plan map.

All samples of fossils must be deposited at a SAHRA-approved institution.

16 **REPORTING**

Should fossils be found a detailed report on the occurrence/s must be submitted. This report is in the public domain and copies of the report must be deposited at the IZIKO S.A. Museum and Heritage Resources Western Cape. It must fulfil the reporting standards and data requirements of these bodies.

The report will be in standard scientific format, basically:

- A summary/abstract.
- Introduction.
- Previous work/context.
- Observations (incl. graphic sections, images).
- Palaeontology.
- Interpretation.
- Concluding summary.
- References.
- Appendices

The draft report will be reviewed by the client, or externally, before submission of the Final Report.

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18 APPENDIX 1 – MONITORING FOR FOSSILS

A regular monitoring presence over the period during which excavations are made, by either an archaeologist or palaeontologist, is generally not practical.

The field supervisor/foreman and workers involved in digging excavations must be encouraged and informed of the need to watch for potential fossil and buried archaeological material. Workers seeing potential objects are to report to the field supervisor who, in turn, will report to the ECO. The ECO will inform the archaeologist and/or palaeontologist contracted to be on standby in the case of fossil finds.

To this end, responsible persons must be designated. This will include hierarchically:

- The field supervisor/foreman, who is going to be most often in the field.
- The Environmental Control Officer (ECO) for the project.
- The Project Manager.

Should the monitoring of the excavations be a stipulation in the Archaeo-logical Impact Assessment, the contracted Monitoring Archaeologist (MA) can also monitor for the presence of fossils and make a field assessment of any material brought to attention. The MA is usually sufficiently informed to identify fossil material and this avoids additional monitoring by a palaeontologist. In shallow coastal excavations, the fossils encountered are usually in an archaeological context.

The MA then becomes the responsible field person and fulfils the role of liaison with the palaeontologist and coordinates with the developer and the Environmental Control Officer (ECO). If fossils are exposed in non-archaeological contexts, the palaeontologist should be summoned to document and sample/collect them.

19 APPENDIX 2 - FOSSIL FIND PROCEDURES

In the context under consideration, it is improbable that fossil finds will require declarations of permanent "no go" zones. At most a temporary pause in activity at a limited locale may be required. The strategy is to rescue the material as quickly as possible.

The procedures suggested below are in general terms, to be adapted as befits a context. They are couched in terms of finds of fossil bones that usually occur sparsely, such as in the aeolian deposits. However, they may also serve as a guideline for other fossil material that may occur.

In contrast, fossil shell layers are usually fairly extensive and can be easily documented and sampled.

Bone finds can be classified as two types: isolated bone finds and bone cluster finds.

19.1 Isolated Bone Finds

In the process of digging the excavations, isolated bones may be spotted in the hole sides or bottom, or as they appear on the spoil heap. By this is meant bones that occur singly, in different parts of the excavation. If the number of distinct bones exceeds 6 pieces, the finds must be treated as a bone cluster (below).

(a) Response by personnel in the event of isolated bone finds

- Action 1: An isolated bone exposed in an excavation or spoil heap must be retrieved before it is covered by further spoil from the excavation and set aside.
- Action 2: The site foreman and ECO must be informed.
- Action 3: The responsible field person (site foreman or ECO) must take custody of the fossil. The following information to be recorded:
 - Position (excavation position).
 - Depth of find in hole.
 - Digital image of hole showing vertical section (side).
 - Digital image of fossil.
- Action 4: The fossil should be placed in a bag (e.g. a Ziplock bag), along with any detached fragments. A label must be included with the date of the find, position info., depth.
- Action 5: ECO to inform the developer, the developer contacts the standby archaeologist and/or palaeontologist. ECO to describe the occurrence and provide images asap. by email.

(b) Response by Palaeontologist in the event of isolated bone finds

The palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established.

19.2 Bone Cluster Finds

A bone cluster is a major find of bones, *i.e.* several bones in close proximity or bones resembling part of a skeleton. These bones will likely be seen in broken sections of the sides of the hole and as bones appearing in the bottom of the hole and on the spoil heap.

- (a) Response by personnel in the event of a bone cluster find
 - Action 1: Immediately stop excavation in the vicinity of the potential material. Mark (flag) the position and also spoil that may contain fossils.
 - Action 2: Inform the site foreman and the ECO.
 - Action 3: ECO to inform the developer, the developer contacts the standby archaeologist and/or palaeontologist. ECO to describe the occurrence and provide images asap. by email.

(b) Response by Palaeontologist in the event of a bone cluster find

The palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established. It is likely that a Field Assessment by the palaeontologist will be carried out asap.

It will probably be feasible to "leapfrog" the find and continue the excavation farther along, or proceed to the next excavation, so that the work schedule is minimally disrupted. The response time/scheduling of the Field Assessment is to be decided in consultation with developer/owner and the environmental consultant.

The field assessment could have the following outcomes:

- If a human burial, the appropriate authority is to be contacted (see AIA). The find must be evaluated by a human burial specialist to decide if Rescue Excavation is feasible, or if it is a Major Find.
- If the fossils are in an archaeological context, an archaeologist must be contacted to evaluate the site and decide if Rescue Excavation is feasible, or if it is a Major Find.
- If the fossils are in an palaeontological context, the palaeontologist must evaluate the site and decide if Rescue Excavation is feasible, or if it is a Major Find.

19.3 Rescue Excavation

Rescue Excavation refers to the removal of the material from the just the "design" excavation. This would apply if the amount or significance of the exposed material appears to be relatively circumscribed and it is feasible to remove it without compromising contextual data. The time span for Rescue Excavation should be reasonably rapid to avoid any or undue delays, *e.g.* 1-3 days and definitely less than 1 week.

In principle, the strategy during mitigation is to "rescue" the fossil material as quickly as possible. The strategy to be adopted depends on the nature of the occurrence, particularly the density of the fossils. The methods of collection would depend on the preservation or fragility of the fossils and whether in loose or in lithified sediment. These could include:

- On-site selection and sieving in the case of robust material in sand.
- Fragile material in loose/crumbly sediment would be encased in blocks using Plasterof Paris or reinforced mortar.

If the fossil occurrence is dense and is assessed to be a "Major Find", then carefully controlled excavation is required.

19.4 Major Finds

A Major Find is the occurrence of material that, by virtue of quantity, importance and time constraints, cannot be feasibly rescued without compromise of detailed material recovery and contextual observations.

A Major Find is not expected.

(a) Management Options for Major Finds

In consultation with developer/owner and the environmental consultant, the following options should be considered when deciding on how to proceed in the event of a Major Find.

Option 1: Avoidance

Avoidance of the major find through project redesign or relocation. This ensures minimal impact to the site and is the preferred option from a heritage resource management perspective. When feasible, it can also be the least expensive option from a construction perspective.

The find site will require site protection measures, such as erecting fencing or barricades. Alternatively, the exposed finds can be stabilized and the site refilled or capped. The latter is preferred if excavation of the find will be delayed substantially or indefinitely. Appropriate protection measures should be identified on a site-specific basis and in wider consultation with the heritage and scientific communities.

This option is preferred as it will allow the later excavation of the finds with due scientific care and diligence.

Option 2: Emergency Excavation

Emergency excavation refers to the "no option" situation wherein avoidance is not feasible due to design, financial and time constraints. It can delay construction and emergency excavation itself will take place under tight time constraints, with the potential for irrevocable compromise of scientific quality. It could involve the removal of a large, disturbed sample by excavator and conveying this by truck from the immediate site to a suitable place for "stockpiling". This material could then be processed later.

Consequently, emergency excavation is not a preferred option for a Major Find.

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