



PGS HERITAGE

FRONTEER WIND FARM BETWEEN MAKHANDA AND SOMERSET EAST, EASTERN CAPE

Heritage Impact Assessment

Issue Date: 21 June 2021
Revision No.: 2.0
Project No.: 444HIA



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Declaration of Independence

I, Cherene de Bruyn, declare that –

General declaration:

- I act as the independent heritage practitioner in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting heritage impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

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ACKNOWLEDGEMENT OF RECEIPT

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EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd (PGS) was appointed by Savannah Environmental (Pty) Ltd (Savannah) to undertake a Heritage Impact Assessment (HIA) and Palaeontological Impact Assessment (PIA) which will serve to inform the Basic Assessment Report (BAR) and Environmental Management Programme (EMPr) for the proposed Fronteer Wind Farm, between Makhanda and Somerset East, Eastern Cape.

The proposed development forms part of a cluster of renewable energy developments that will include several wind energy facilities as well as solar photovoltaic (PV) facilities. The location of the wind and solar energy facilities and grid connection infrastructure is within the Cookhouse Renewable Energy Development Zone (REDZ) and the Eastern Corridor of the Strategic Transmission Corridors. The site is split into two definitive areas, namely:

- Eastern Priority development area situated close to Makhanda with access from the Nquara Harbour being along the N2 to Grahamstown, along the R335 to Bedford and the wind farm site.
- The Western Priority development area situated immediately to the west of the N10 up to Somerset East.

This HIA aims to evaluate the possible impacts on heritage resources present within the proposed development footprint of the Fronteer Wind Farm.

A team of heritage specialist developed an integrated HIA to evaluate the possible immediate and direct impacts on heritage resources present within the footprint and adjacent area for cumulative impacts. Immediate and direct impacts on archaeological and palaeontological resources were addressed through the HIA and a Palaeontological Impact Assessment (PIA) (Appendix C), while the indirect impacts on the cultural landscape was addressed through a Cultural Landscape Assessment (CLA) (Appendix D).

Site Name and Location

Fronteer (Pty) Ltd is proposing the development of a commercial wind farm and associated infrastructure on a site located approximately 12km north-west of Grahamstown (measured from the centre of the site) within the Makana Local Municipality and the Sarah Baartman District Municipality in the Eastern Cape Province. The project site comprises the following eight (8) farm portions:

- The remainder of Farm Table Hill Farm No 187
- Portion 2 of Table Hill Farm No 187
- Portion 3 of the Farm Table Hill Farm No 187
- The remainder of the Farm Hounshow No 131
- Portion 1 of Farm Draai Farm No 184

- Portion 1 of Farm No 132
- Portion 1 of Farm Burnt Kraal No 189
- Portion 1 of Farm Table Hill No 187

A preferred project site with an extent of ~5091ha has been identified by Fronteer (Pty) Ltd as a technically suitable area for the development of the Fronteer Wind Farm with a contracted capacity of up to 213MW that can accommodate up to 38 turbines.

It should be noted that the proposed Fronteer Wind Farm is situated in the Cookhouse Renewable Energy Development Zone (REDZ) and the Eastern Corridor of the Strategic Transmission Corridors. The REDZ was proclaimed in February 2018 (published under Government Notice No. 114 in Government Gazette No. 41445 of 16 February 2018; and Government Gazette 43528, Notice 786 for consultation with the intention to identify three additional REDZ to the eight REDZ) and allows for the completion of a BA in the case of large-scale wind and solar developments situated within the REDZ.

Fieldwork

The fieldwork component of the study was aimed at identifying tangible remains of archaeological, historical and heritage significance. The fieldwork was undertaken by way of intensive walkthroughs of the study area. The fieldwork was conducted over several days on 23 March 2020 as well as from 8 to 13 June 2020. This fieldwork team consisted of an archaeologist (Cherene de Bruyn) and field assistant (Pascal Snyman). The following provides a breakdown of the heritage resources identified and graded in the study area. During the survey, five (5) heritage sites were identified. Of these five sites, four (4) sites (**EWF2-01** to **EWF2-04**) consist of structures (Farmhouses, Labourer houses, and stone walls), and one (1) site contain graves (**EWF2-05**).

Historical structures

Two (2) labourer houses (**EWF2-02** and **EWF2-04**) were rated as not conservation worthy and of no heritage significance.

One (1) stone farm wall (**EWF2-03**) was identified with low heritage significance and heritage rating of IIIC.

A farmstead (**EWF2-01**) was also identified. This site has a medium heritage significance and heritage rating of IIIB.

Burial Grounds and graves

One (1) burial ground (**EFW2-05**) was identified that may be affected by the proposed project. Graves have a high heritage significance and heritage rating of IIIA.

The significance grading of the archaeological and historical heritage resources ranged from IIIB to IIIA. Sufficient mitigation measures were proposed.

Palaeontology

A 3-day site-specific field survey of the development footprint was conducted on foot and by a motor vehicle on 20 November to 23 November 2020. According to the PIA conducted by Banzai Environmental (Butler, 2021) the proposed development is by the Dwyka Group; the Fort Brown Formation of the Ecca Group (Karoo Supergroup), Adelaide Subgroup (Koonap and Middleton Formations) of the Beaufort Group (Karoo Supergroup) and the Witteberg Group of the Cape Supergroup, Karoo Dolerite (Karoo Supergroup), and Quaternary deposits. According to the PalaeoMap of SAHRIS the Palaeontological Sensitivity of the Dwyka Group is Low, the Collingham Formation, Rippon Formation, Fort Brown Formation of the Ecca Group is Moderate, while the Prince Albert Formation has a High and the Whitehill Formation of the Ecca has a Very High Palaeontological Sensitivity. The Adelaide Subgroup has a Very high Palaeontological Sensitivity while Dolerite is igneous in origin and thus has an Insignificant Paleontological Sensitivity (Almond et al, 2013; SAHRIS website).

As such, there is a moderate to high chance of finding fossils in this area. No visible evidence of fossiliferous outcrops was found. **It is concluded that the Fronteer WEF project area is of MODERATE to HIGH palaeontological sensitivity overall, with small but unpredictable areas of MODERATE to VERY HIGH sensitivity. No palaeontological No-Go areas have been designated within the project area.**

Cultural Landscape

The proposed Fonteer Wind Energy Facility is located on a plateau of undulating plains and hills situated between the Great Fish River valley to the north, the New Years River valley to the south-west and Makhanda (previously known as Grahamstown) about 12kms to the south-east. The area, known as the Zuurveld, is characterised by hills and mountains covered in low shrubby vegetation, interspersed with river valleys and watercourses with vast grazing lands and a rural and wilderness sense of place.

The farmsteads are connected through several farm roads and old historic ox-wagon routes that link the local communities to the busy towns of Makhanda (Grahamstown) and Somerset East. The site is accessed via three scenic historic regional roads which run through the site.

These roads have carried inhabitants and travellers between historic towns, farmsteads and further regional destinations since at least the late C18th. Views and vistas of the distant mountains and destinations give significance to the experience of the landscape. The history of the area is one of contact, conflict and survival and is an example of a long history of the symbiotic relationship between man and nature. Significant landscape elements were identified within the study site, including tangible heritage resources, specific cultural landscape areas and intangible heritage resources and graded according to NHRA grading. **The significance grading of the landscape elements ranged from IIIC to I. Sufficient mitigation measures were proposed.**

Impact Statement

Analysis of the various components of the HIA indicates a mitigated low negative impact on heritage resources and are expanded on below.

Historical structures

An assessment of the possible impacts of the proposed project on historical heritage resources has shown that unmitigated impacts vary between low to medium negative impacts mostly confined to the construction phase of the project. **By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.**

Burial Grounds and graves

An assessment of the possible impacts of the proposed project on historical heritage resources has shown that unmitigated impacts consist of a high negative impact mostly confined to the construction phase of the project. **By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.**

Palaeontology

An assessment of the possible impacts of the proposed project on palaeontological resources has shown that unmitigated impacts consist of a medium negative impact mostly confined to the construction phase of the project. **By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.**

Cultural landscape

The cultural assessment found that without mitigation the impacts to the cultural landscape elements would result in a very high negative impact due to the magnitude and permanence of the impact on the cultural landscape, especially perceptual qualities from historic routes,

heritage sites and impacts on cultural landscape areas and associated heritage resources. There are many visual receptors in the area as it is located close to the main urban node of the region, Makhanda, and eco-tourism facilities are common in the area, with three regional roads passing through or past the proposed site. Historic farmsteads and their associated stock farms are permanently occupied and offer accommodation to visitors to the area. Conservation and protected biodiversity areas dominate the landscape outside the proposed WEF site. Situated on a plateau the site is visible from distances of up to 50kms. **The negative impact of the development on the cultural landscape with the recommended mitigation will be moderate.**

Cumulative Impacts

Considering the development of other WEF located next to the Frontier Wind Farm and within the broader Grahamstown (Makanda region) the cumulative unmitigated impacts on Historical structures, Burial ground and graves as well as palaeontological resources consist of a medium to high negative impact mostly confined to the construction phase of the project. This could potentially result in an unacceptable loss of heritage resources. **However, by implementing the mitigation measures as listed in this report the cumulative impacts can be managed to low negative.**

Recommendations

The following mitigation measures are listed in Error! Reference source not found..

Table 1 - Heritage management recommendations.

Area and site no.	Mitigation measures
General project area	<ul style="list-style-type: none"> • Implement a chance to find procedures in case possible heritage finds are uncovered. • A detailed “walk down” of the final approved turbine locations, access roads, powerlines and substations will be required before construction commences. • Any heritage features of significance identified during this walk down will require formal mitigation (i.e. permitting where required) or where possible a slight change in design could accommodate such resources. • A Heritage Management Plan (HMP) for the heritage resources needs to be compiled and approved for implementation during construction and operations where heritage features of significance are identified.
Historical Structures that were rated as NCW (EFW2-02 and EFW2-04)	<ul style="list-style-type: none"> • No mitigation is required
Historical Structures (EFW2-03) that were rated as low heritage significance and heritage rating of IIIC.	<ul style="list-style-type: none"> • A 30m No-Go-Buffer-Zone be recommended for sites of low significance and a rating of IIIC. • If development occurs within 30m of the sites, it needs to be satisfactorily studied and recorded before impact. • Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b) photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings.

Area and site no.	Mitigation measures
<p>Historical Structures (EWF2-01) that were rated as medium heritage significance and heritage rating of IIIB.</p>	<ul style="list-style-type: none"> • Although the site is located outside of the proposed development area, it is recommended that a no-go-buffer-zone from the outer perimeter of the farmstead/ “werf” (which is currently occupied) is kept to the closest WEF infrastructure (including turbines, substation facilities and roads). • In terms of general conservation of the historical farmsteads, a 500m no-go-buffer-zone is recommended. However, considering the impact of the proposed development of the Frontier WEF on the cultural landscape of these historical farmsteads, a 1000m no-go-buffer-zone (inclusive of the 500m no-go-buffer-zone) should be implemented. • If development occurs within 1000m of EWF2-01 the main homesteads/ “werf” need to be satisfactorily studied and recorded before impact occurs. • Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b) photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings.
<p>Graves and Burial grounds (EWF2-05)</p>	<ul style="list-style-type: none"> • The sites should be demarcated with a 30-meter no-go-buffer-zone and the graves should be avoided and left in situ. • A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by Eastern Cape Provincial Heritage Authority (ECPHRA)). • If the site is going to be impacted directly and the graves need to be removed a grave relocation process for these sites is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the ECPHRA under the NHRA and National Health Act regulations.
<p>Possible graves</p>	<ul style="list-style-type: none"> • When graves are discovered/uncovered the site should be demarcated with a 30-meter no-go-buffer-zone and the grave should be avoided. • Undertake archaeological monitoring at earth clearance stage. • If human remains are discovered a grave relocation process is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the ECPHRA under the NHRA and National Health Act regulations. • If during the test excavations it is determined that the feature is not a grave, the site will then have no heritage significance and require no further mitigation.
<p>Palaeontological finds</p>	<ul style="list-style-type: none"> • If fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments. • Fossil discoveries ought to be protected and the ECO/site manager must report to SAHRA
<p>Cultural Landscape</p>	<p>Ecological</p> <ul style="list-style-type: none"> • Most of the area is prized for the fact that its natural character is retained, and that the landscape therefore still performs a range of biodiversity and ecological functions. This is mainly due to the low agricultural potential of the area for anything other than grazing, which has limited the impact on the landscape and vegetation. Species and ecosystem loss should be prevented by limiting fragmentation in the landscape, and should therefore adhere to the following: • The remaining areas of endemic and endangered natural vegetation should be conserved. • Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from the development of the wind turbines or any associated development during all phases. • Areas of critical biodiversity should be protected from any damage during all phases; where indigenous and endemic vegetation should be preserved at all cost.

Area and site no.	Mitigation measures
	<ul style="list-style-type: none"> • Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed. • Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. • No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines • Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character. <p>Aesthetic</p> <ul style="list-style-type: none"> • Encourage mitigation measures (for instance use of vegetation) to 'embed' or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc; • The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building material. This would also help to embed structures into the landscape and should not consist of shipping containers that clutter the landscape. • Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site. • Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration. The local material such as the rocks found within the area could be applied to address stormwater runoff from the road to prevent erosion. • Infrastructure improvement, including new roads and upgrades to the road network, should be appropriate to the rural context (scale, material etc.). • The layout of the turbines should have an emphasis on placemaking, i.e. landscape-related heritage considerations, as opposed to standard infrastructure driven requirements; • Prevent the construction of new buildings/structures on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests. Retain the integrity of the distinctive Frontier landscape character; • Significant and placemaking viewsheds of surrounding ridgelines and distant mountain should be maintained by limiting the placement of turbines or associated infrastructure on opposing sides of any of the regional roads, so that at any time a turbine-free view can be found when travelling through the landscape or at the historic farmsteads. • Avoid visual clutter in the landscape by intrusive signage, and the intrusion of commercial, corporate development along roads. • The mountains in the study area are landforms vital to its overall landscape character. They enclose the valleys and settlements of heritage significance. Prevent development on visually sensitive mountain slopes and ridgelines in order to preserve the continuity of the mountains as a backdrop. Although the Waainek WEF negatively impacts southern views from the study site, the limited number of turbines (8) has reduced the impact considerably. However, the impact of the turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark.

Area and site no.	Mitigation measures
	<ul style="list-style-type: none"> • Avoid development of infrastructure (such as buildings, wind turbines and power lines), on crests or ridgelines due to the impact on the visual sensitivity of skylines. The visual impact of turbines can be reduced by distancing them from viewpoints such as roads and farmsteads and placing them in lower-lying plains to reduce their impact on the surrounding sensitive cultural landscape. • Retain view-lines and vistas focused on prominent natural features such as mountain peaks or hills (such as Table Hill, Hellsport, the Swartwaterberg and the south-facing slope of the Great Fish River valley), as these are important placemaking and orientating elements for experiencing the cultural landscape. • Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution in a long term and ongoing basis. <p>Historic</p> <ul style="list-style-type: none"> • The integrity of the historic farm werfs should be maintained and protected. Therefore, care should be exercised in the placement of the turbines at least 1000m from all werfs and historic farmsteads. • Names of routes and watercourses that refer to traditional use during the time of the hunter-gatherers and herders, as well as the colonial era in the Cape, should be celebrated. Public access to these sites should be encouraged, and care should be taken to protect these names. • Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes, such as the aloes along the historic route on Draai Farm as it crosses over Hounslow and the driveway to Thursford homestead. In some cases, remnant planting patterns (even single trees) uphold the historic character of an area. Interpretation of these landscape features as historic remnants should occur. • Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint should be conducted to ensure no further unmarked graves are threatened. • Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. • Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area. • Roads running through the area have historic stone way markers, such as observed along the R350. Where these are found care should be taken that they are left in tact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers.

Area and site no.	Mitigation measures
	<ul style="list-style-type: none"> • Where the historic function of a building/site is still intact, the function has heritage value and should be protected. • Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running over Table Hill, Draai and Hounslow Farms is on private land and as such not publicly accessible. Where it is visible from the R350 it should be conserved together with the associated stone walling. The historic route to Kranzdrift through Kwandwe should be maintained as publicly accessible. • Historic military structures such as Fort Brown and Fort Selwyn are of provincial heritage significance. Their locations were chosen for their position on the landscape allowing distant views of and across the frontier boundary of the Great Fish River. Their distance from the proposed WEFs is reasonably far and this will reduce the impact of the development on the sense of place and heritage value of these sites. The historic site of Makanaskop holds similar historic value in relation to military history, however, there is no structure to mark the place. The top of the hill itself therefore is recognised as a heritage site. The distance from the proposed WEF reduces the visual impact of the development and the sense of place should not be heavily impacted upon. • The new roads (especially those that align with historic wagon routes) should display minimum scale designs where possible. • Maintain traditional movement patterns across rural landscapes or to places of socio-historical value; a) Avoid privatization or the creation of barriers to traditional access routes, b) Retain old roadways, which have been replaced by newer roads, for use as recreation trails. • Commonages and outspans were located at water points, and these places were likely gathering points before the arrival of colonists and continued to provide communal resources. In the mid-20th century, many old commonages came under the ownership of the Municipality, and have since been rented out to private individuals or organisations. The Municipality should facilitate the use of common land in a way that promotes the well-being and quality of life of the public. These sites can play a restorative role within the community, for instance for those who have limited alternative opportunities for recreation. No portions of the identified outspan near Hounslow is earmarked for development, but should the road nearby be upgraded, this area should be conserved for communal use as it was historically. • Respect existing patterns, typologies and traditions of settlement-making by promoting the continuity of heritage features. These include: (a) indigenous; (b) colonial; and (c) current living heritage in the form of tangible and intangible associations to place. • Evidence of the earliest settlement of the landscape is not always visible. Should any be uncovered, the provincial heritage authority (ECPHRA) should be notified and engaged with to determine appropriate action. • Alterations and additions to conservation-worthy structures should be sympathetic to their architectural character and period detailing. • Respect traditional werf settlement patterns by considering the entire werf as the component of significance. This includes the backdrop of the natural landscape against which it is sited, as well as its spatial structure. Any development that impacts the inherent character of the werf component should be discouraged. As such a 1000m buffer around farmsteads for any development associated with the WEF should be maintained. • Heritage expertise is required where appropriate.

Area and site no.	Mitigation measures
	Socio-economic <ul style="list-style-type: none"> • The local community around the development should benefit from job opportunities created by the proposed development and the development should not cause a reduction in the economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. • Sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.

Findings

The assessment of the possible impacts on the archaeological, historical and palaeontological resources has shown a Low impact from the WEF project after mitigation measures. It is further considered that the project can have a potential positive influence on such resources in the region when the proposed conservation initiative from the project considers such resources as part of a larger development strategy.

The CLA indicated that the project will have a significant Moderate to High impact on the CL. The project has indicated that the reduction of turbines as recommended by the CLA will not be economically feasible and cannot consider such turbine reductions. The remaining CL recommendations will still result in a marginal reduction of impact. However, the size and bulk of the turbines in the landscape will unlikely be totally mitigatable.

It must further be considered that the addition of the infrastructure of the WEF will constitute an additional layer to the cultural landscape and must be considered as such within a gazetted REDZ area. Through the implementation of the economically feasible recommendations as set out in the CLA and contained in this report it will be possible to preserve older layers of the cultural landscape and in some cases even enhance them through consideration such as the use of older name places in the naming of infrastructure and enhancing local heritage through the incorporation of such structures in project conservation initiatives to name a few.

Analysis of the findings of the SEIA for this project further reveals that the economic benefit for the region and the overall energy needs such project address outweighs the need for conservation of cultural resources at all costs.

The overall impact of the Fronteer Wind Farm, on the heritage resources identified during this report, is considered as acceptable after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.

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Refer to Appendix B for CVs specialist

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C	Palaeontological Impact Assessment
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TERMINOLOGY AND ABBREVIATIONS

Archaeological resources

This includes:

- material remains resulting from human activity 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;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Cultural Landscapes Terminology

“perceptual qualities” Aspects of a landscape which are perceived through the senses, specifically views and aesthetics.

“cultural landscape” A representation of the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (World Heritage Committee, 1992). Includes and extends beyond the study site boundaries.

“cultural landscape area” These are single unique areas which are the discrete geographical areas of a particular landscape type. Each will have its own individual character and identity, even though it shares the same generic characteristics with other areas of the same type.

“study site” The study site is assumed to include the area within the boundaries of the proposed development

“characteristics” elements, or combination of elements, which make a particular contribution to distinctive character.

“elements” individual components which make up the landscape, such as trees and fences.

“landscape character” A distinct, and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.

“landscape character assessment” This is the process of identifying and describing variation in the character of the landscape. It seeks to identify and explain the unique combination of elements and features (characteristics) that make landscapes distinctive. This process results in the production of a Landscape Character Assessment.

“sense of place” The unique quality or character of a place, whether natural, rural or urban. It relates to uniqueness, distinctiveness or strong identity.

“scenic route” A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail.

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influences its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Earlier Stone Age

The archaeology of the Stone Age between ~300 000 and 3 300 000 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).

Heritage resources

This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;

- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa

Holocene

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

Later Stone Age

The archaeology of the last 30 000 years associated with fully modern people.

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's, associated with iron-working and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age between 30 000-300 000 years ago, associated with early modern humans.

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.

Site

Site in this context refers to an area place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.

Table 2 – List of abbreviations used in this report

Abbreviations	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
BA	Basic Environmental Assessment
BESS	Battery energy storage system
CLA	Cultural Landscape Assessment
CRM	Cultural Resource Management
DEFF	Department of Environmental Affairs, Forestry and Fisheries
ECPHRA	Eastern Cape Provincial Heritage Resources Authority
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIA practitioner	Environmental Impact Assessment Practitioner
ESA	Earlier Stone Age
GN	Government Notice
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HMP	Heritage management plan
I&AP	Interested & Affected Party
LIA	Late Iron Age
LSA	Late Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
O&M	Operation and Maintenance
PGS	PGS Heritage (Pty) Ltd
PIA	Palaeontological Impact Assessment
PV	Photovoltaic
RE	Renewable Energy
REDZ	Renewable Energy Development Zone
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SED	Socio-Economic Development
WEFs	Wind Energy Facilities

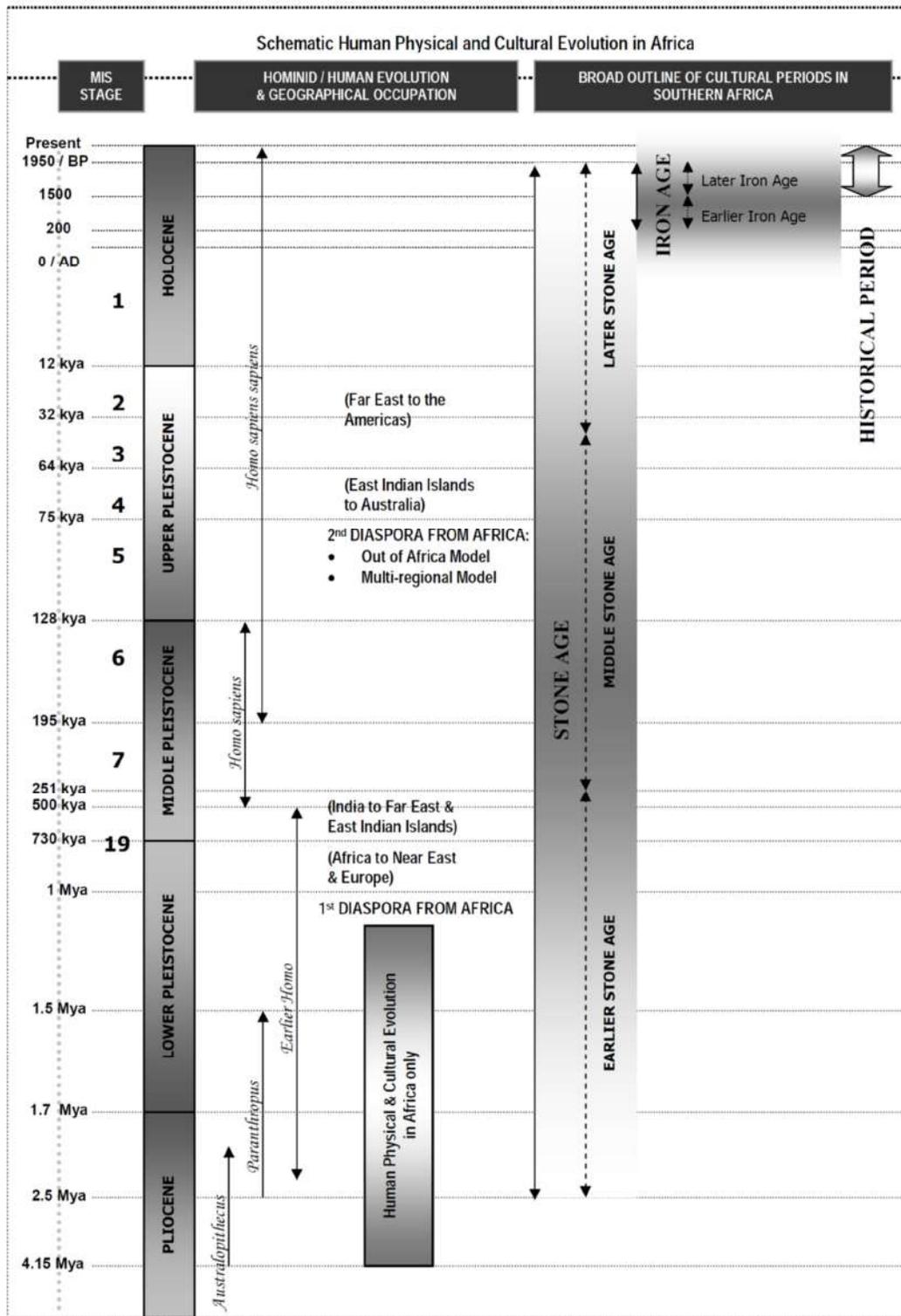


Figure 1 – Human and Cultural Timeline in Africa (Morris, 2008)

1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Savannah Environmental (Pty) Ltd (Savannah) to undertake a Heritage Impact Assessment (HIA) and Palaeontological Impact Assessment (PIA) which will serve to inform the Basic Assessment Report (BAR) and Environmental Management Programme (EMPr) for the proposed Fronteer Wind Farm, between Makhanda (previously known as Grahamstown) and Somerset East, Eastern Cape.

1.1 Scope of the Study

The aim of the study is to identify possible heritage resources that may occur in the proposed development area. The HIA aims to inform the BAR in the development of a comprehensive EMPr to assist the project applicant in managing the identified heritage resources in a responsible manner in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

This study was compiled by PGS and its appointed specialists and is detailed below:

The staff at PGS have a combined experience of nearly 90 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Wouter Fourie, the Project Coordinator, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

Cherene de Bruyn, the author of this report, is registered with ASAPA as a Professional Archaeologist and is accredited as a Principal Investigator and Field Director, she is further also a member of the International Association for Impact Assessment South Africa (IAIASA). She holds a MA in Archaeology, BSc (Hons) in Physical Anthropology and a BA (Hons) in Archaeology.

Emmylou Rabe Bailey, director of Hearth Heritage consultancy (est 2009), has over 10 years of experience in the heritage field, in the public and private sectors. Emmylou holds an MA in Archaeology and Heritage Conservation from the University of Leicester, UK (2008), specialising in the assessment, conservation and representation of archaeological resources and cultural landscapes. Her BA(Hons) in Environmental Science and Archaeology was interdisciplinary research that focused on heritage assessment, conservation and management of the Luyolo

Cultural Landscape in Simonstown, Cape Town (UCT, 2002). Emmylou's PhD in Environmental Anthropology (Rhodes University) around conservation and care ethics in cultural landscapes is currently on hold. Emmylou is an Accredited Professional Heritage Practitioner with the APHP and registered with the ASAPA as a Professional Archaeologist. She also sits on Heritage Western Cape Council and the HWC Archaeology, Palaeontology and Meteorites Permitting Committee.

Elize Butler the director of Banzai Environmental (Pty) Ltd has an MSc in Palaeontology from the University of the Free State, Bloemfontein, South Africa. She has been working in Palaeontology for more than twenty-four years. She has extensive experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the Karoo Basin. She has been a member of the Palaeontological Society of South Africa for 10 years. She has been conducting Palaeontological Impact Assessments since 2014.

1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the current vegetation cover. Due to time restrictions and the large extent of the proposed project area the survey was limited to priority areas, that most likely contained heritage resources. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

1.4 Identification of Policies, Legislation, Standards & Guidelines

1.4.1 Statutory Framework: The National Heritage Resources (Act 25 of 1999)

The NHRA has applicability, as the study forms part of an overall HIA in terms of the provisions of Section 34, 35, 36 and 38 of the NHRA and forms part of a heritage study that serves to identify key heritage resources, informants, and issues relating to the palaeontological, archaeological, built environment and cultural landscape, as well as the need to address such issues during the Basic assessment phase of the HIA process.

The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically

impacted on by the development as stipulated in Section 38 of NHRA. This study falls under s38(8) and requires comment from the Eastern Cape Provincial Heritage Resources Authority (ECPHRA).

1.4.2 Section 3 - National estate

3) Without limiting the generality of subsections (1) and (2), a place or object is to be considered part of the national estate if it has cultural significance or other special value because of—

- 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.

1.4.3 Section 34 – Structures

According to Section 34 of the NHRA, no person may alter, damage or destroy any structure that is older than 60 years, and which forms part of the sites built environment, without the necessary permits from the relevant provincial heritage authority.

1.4.4 Section 35 – Archaeology, Palaeontology and Meteorites

According to Section 35 (Archaeology, Palaeontology and Meteorites) and Section 38 (Heritage Resources Management) of the NHRA, Palaeontological Impact Assessments (PIA) is required by law in the case of developments in areas underlain by potentially fossiliferous (fossil-bearing) rocks, especially where substantial bedrock excavations are envisaged, and where human settlement is known to have occurred during prehistory and the historic period.

1.4.5 Section 36 – Burial Grounds & Graves

A section 36 permit application is made to the SAHRA or the competent provincial heritage authority which protects burial grounds and graves that are older than 60 years and must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit. SAHRA must also identify and record the

graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with these graves and must maintain such memorials. A permit is required under the following conditions:

Permitting requirements for burial grounds and graves older than 60 years to the South African Heritage Resources Agency:

- a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves.
- b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.
- d) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant.

1.4.6 Section 38 HIA as a Specialist Study within the EIA in terms of Section 38(8)

The NHRA Section 38 (Heritage Impact Assessments) application to ECPHRA is required when the proposed development triggers one or more of the following activities:

Permitting requirements for demolition of built environment features:

- a) the construction of a road, wall, power line, pipeline, canal or other similar forms of linear development or barrier exceeding 300m in length;
- b) the construction of a bridge or similar structure exceeding 50 m in length;
- c) any development or other activity which will change the character of a site,
 - i. exceeding 5 000 m² in extent; or
 - ii. involving three or more existing erven or subdivisions thereof; or
 - iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- d) the re-zoning of a site exceeding 10 000 m² in extent; or
- e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority

In this instance, the heritage assessment for the property is to be undertaken as a component of the Basic Assessment (BA) process for the project. Provision is made for this in terms of Section 38(8) of the NHRA, which states that:

An HIA report is required to identify, and assess archaeological resources as defined by the Act, assess the impact of the proposal on the said archaeological resources, review alternatives and recommend mitigation (see methodology above).

Section 38 (3) Impact Assessments are required, in terms of the statutory framework to conform to basic requirements as laid out in Section 38(3) of the NHRA. These are:

- The identification and mapping of heritage resources in the area affected
- The assessment of the significance of such resources
- The assessment of the impact of the development on the heritage resources
- An evaluation of the impact on the heritage resources relative to sustainable socio/economic benefits
- Consideration of alternatives if heritage resources are adversely impacted by the proposed development
- Consideration of alternatives
- Plans for mitigation in the future.

1.4.7 Cultural Heritage Survey Guidelines and Assessment Tools for Protected Areas in South Africa, May 2017 (Gazetted Dec 2017)

This guide is meant for those who work in Protected Areas and manage cultural heritage resources. The guide should be used together with the National Heritage Resource Act, 1999 (Act No 25 of 1999) (NHRA), the National Environmental Management Act: Protected Areas Act, 2003 (Act No. 57 of 2003), the South African Heritage Resources Agency (SAHRA) and Provincial Heritage Resources Agency (PHRA) Guidelines on Norms and Standards. In lieu of minimum standards guidelines for cultural landscapes assessment specifically in South African legislation, the CHG offers cultural heritage survey guidelines and assessment tools that can be used for the purposes of Cultural Landscape Assessments (CLA) in the EIA process.

Tools for inventories of different categories of cultural heritage resources

- Intangible Cultural Heritage
Types: a) Elements of folklore and traditional crafts
 b) Elements of oral tradition

- Cultural Landscapes
Characteristics: a) processes – spatial pattern, land uses, response to natural features and cultural traditions
 b) components – circulation, boundaries, vegetation, structural types, cluster arrangements, archaeological types, small-scale elements
 c) perceptual qualities – views and aesthetics.

1.4.8 World Heritage Convention

The United Nations Educational, Scientific and Cultural Organization (UNESCO) Operational Guidelines for the World Heritage Convention (2017) define Cultural Landscapes as:

- Cultural properties that represent the "combined works of nature and of man". They are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal.
- Cultural landscapes should be selected based on their representation in terms of a clearly defined geo-cultural region and also for their capacity to illustrate the essential and distinct elements of such regions.
- Cultural landscapes often reflect the specific techniques of sustainable land use, considering the characteristics and limits of the natural environment they are established in, and a specific spiritual relation to nature.

1.4.9 Renewable Energy Development Zone

The proposed Frontier Wind Farm is situated in the Cookhouse Renewable Energy Development Zone (REDZ) and the Eastern Corridor of the Strategic Transmission Corridors. The REDZ was proclaimed in February 2018 (published under Government Notice No. 114 in Government Gazette No. 41445 of 16 February 2018; and Government Gazette 43528, Notice 786 for consultation with the intention to identify three additional REDZ to the eight REDZ) and allows for the completion of a BA in the case of large-scale wind and solar developments situated within the REDZ.

1.4.10 Notice 648 of the Government Gazette 45421

Although the minimum standard for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA, Government Notice (GN) 648 requires sensitivity verification for a site selected on the national web-based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this GN is listed in **Table 3** and the applicable section in this report noted.

Table 3 - Reporting requirements for GN648.

GN 648	Relevant section in report	Where not applicable in this report
2.2 (a) a desk top analysis, using satellite imagery;	section 4	
2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc.	section 5	-
2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by	section 5	-

GN 648	Relevant section in report	Where not applicable in this report
the national web based environmental screening tool;		
2.3(b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity;	Section 5 provides a description of the current use and confirms the status in the screening report	

An assessment of the Environmental Screening tool provides the following sensitivity ratings for archaeological and heritage resources (**Figure 2**) as well as palaeontological resources as a medium to high (**Figure 3**).

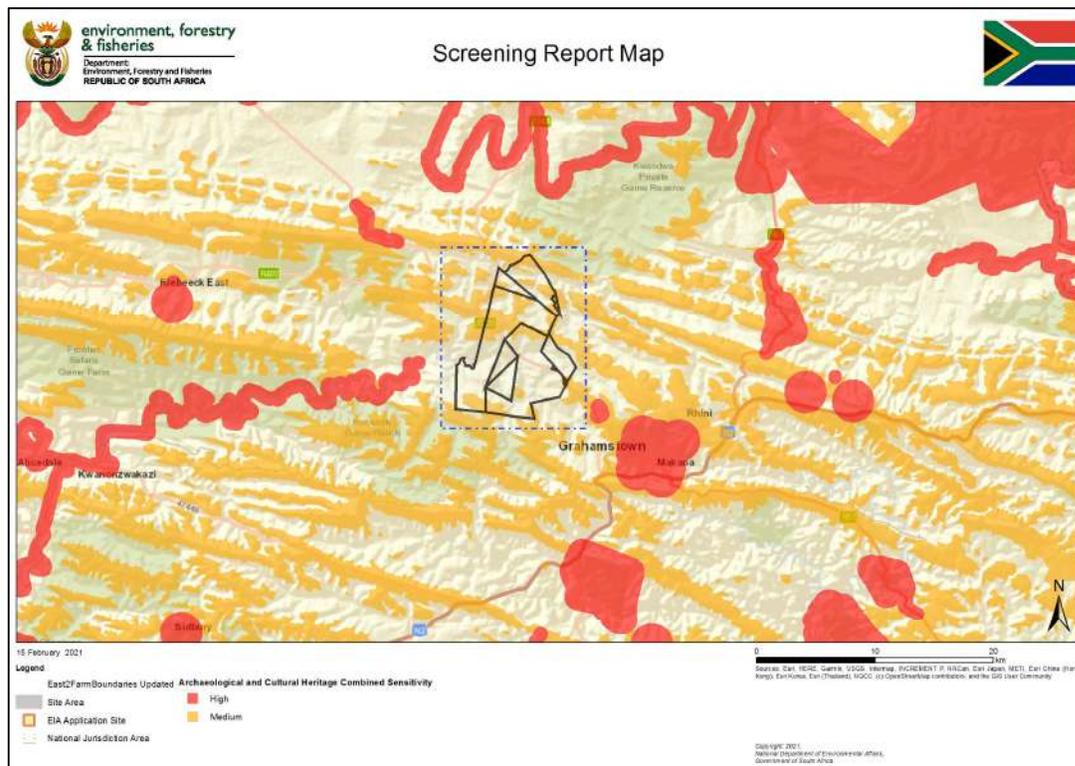


Figure 2 - Environmental screening tool - archaeological and heritage sensitivity that includes the Frontier Wind Farm project area.

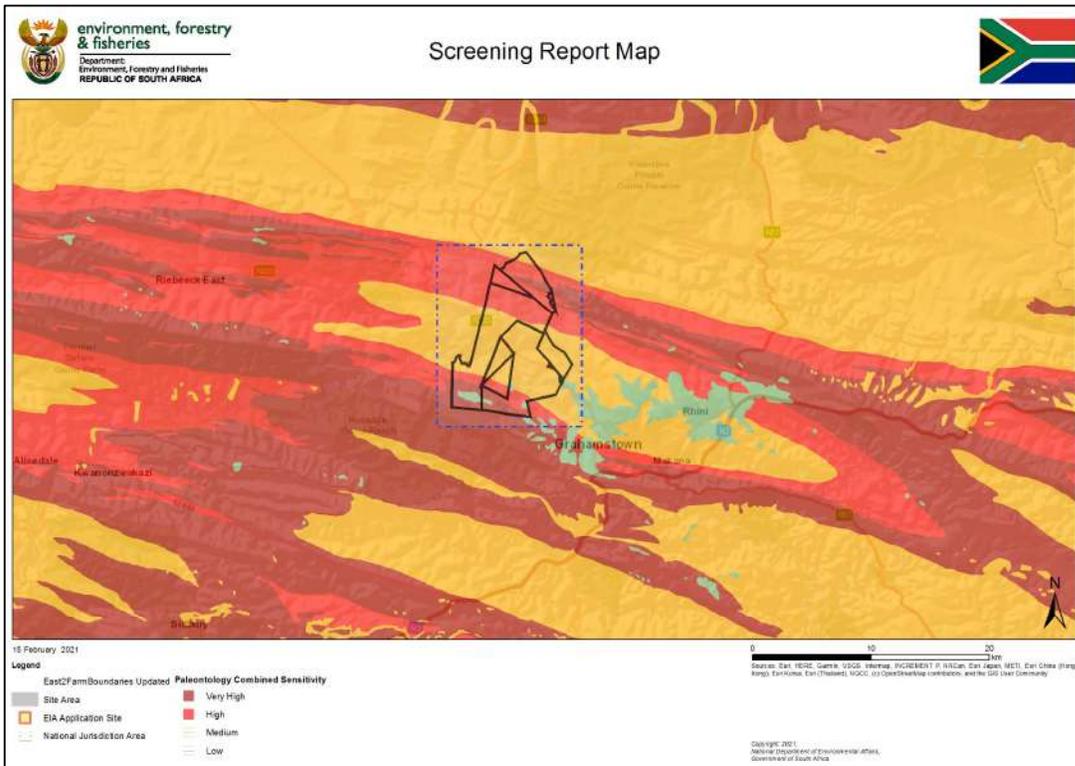


Figure 3 - Environmental screening tool - palaeontology sensitivity that includes the Frontier Wind Farm project area.

1.4.11 NEMA – Appendix 6 requirements

The HIA report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) Appendix 6 requirements for specialist reports as indicated in the table below. For ease of reference, the table below provides cross-references to the report sections where these requirements have been addressed. It is important to note, that where something is not applicable to this HIA, this has been indicated in the table below.

Table 4 - Reporting requirements as per NEMA, as amended, Appendix 6 for specialist reports.

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
1.(1) (a) (i) Details of the specialist who prepared the report	Page 2 of Report – Contact details and company	-
(ii) The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 – refer to Appendix C	-
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report	-
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 1.1	-

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
(cA) An indication of the quality and age of base data used for the specialist report	Section 3	-
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 67	-
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3 and 4	-
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3 and Appendix A and B	-
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 4 and 5	-
(g) An identification of any areas to be avoided, including buffers	Section 4	-
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 4 and Section 4	
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3	-
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 7 and 8	
(k) Any mitigation measures for inclusion in the EMPr	Section 4	
(l) Any conditions for inclusion in the environmental authorisation		Non required
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 4, 5 and 7	
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Section 8	
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and		
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 8	-
(o) A description of any consultation process that was undertaken during the course of carrying out the study		Not applicable. A public consultation process was handled as part of the BA and EMPr process.
(p) A summary and copies if any comments that were received during any consultation process		Not applicable. To date no comments regarding

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Relevant section in report	Comment where not applicable.
		heritage resources that require input from a specialist have been raised.
(q) Any other information requested by the competent authority.		Not applicable.
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	NEMA Appendix 6 and GN648 SAHRA guidelines on HIAs, PIAs and AIAs	

2 SITE LOCATION AND DESCRIPTION

2.1 Locality and Site Description

The following project background and technical description have been supplied by Savannah Environmental (Pty) Ltd.

Fronteer (Pty) Ltd is proposing the development of a commercial wind farm and associated infrastructure on a site located approximately 12km north-west of Grahamstown (measured from the centre of the site) within the Makana Local Municipality and the Sarah Baartman District Municipality in the Eastern Cape Province (**Figure 4**).

A preferred project site with an extent of ~5091ha has been identified by Fronteer (Pty) Ltd as a technically suitable area for the development of the Fronteer Wind Farm with a contracted capacity of up to 213MW that can accommodate up to 38 turbines. The entire project site is located within the Cookhouse Renewable Energy Development Zone (REDZ). Due to the location of the project site within the REDZ, a Basic Assessment (BA) process will be undertaken in accordance with GN114 as formally gazetted on 16 February 2018. The project site comprises the following eight (8) farm portions:

- The remainder of Farm Table Hill Farm No 187
- Portion 2 of Table Hill Farm No 187
- Portion 3 of the Farm Table Hill Farm No 187
- The remainder of the Farm Hounshow No 131
- Portion 1 of Farm Draai Farm No 184
- Portion 1 of Farm No 132
- Portion 1 of Farm Burnt Kraal No 189
- Portion 1 of Farm Table Hill No 187

The following existing infrastructure and land uses are encountered in the area:

- Provincial roads (R334);
- Residential properties;
- Agricultural properties;
- Power lines.

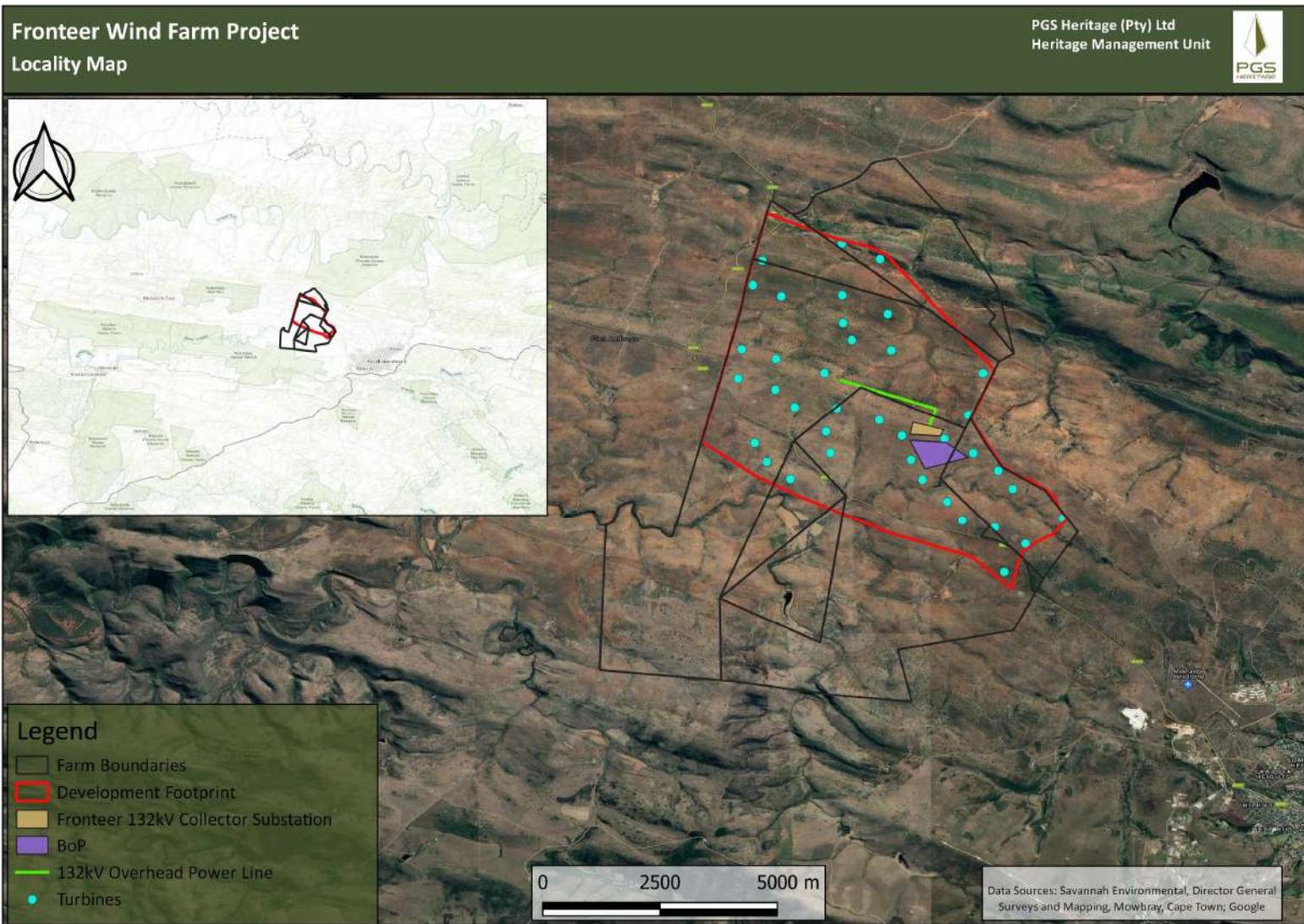


Figure 4 –Locality map of the Fronteer Wind Farm illustrating the proposed development footprint (i.e. proposed infrastructure) within a regional context

2.2 Technical Project Description

The Frontier Wind Farm project site is proposed to accommodate the following infrastructure, which will enable the wind farm to supply a contracted capacity of up to 213MW:

- Up to 38 wind turbines with a maximum hub height of up to 120m. The tip height of the turbines will be up to 200m;
- A 132kV switching station and a 132/33kV on-site collector substation to be connected via a 132kV overhead power line (twin turn dual circuit). The wind farm will be connected to the national grid through a connection from the 132/33kV collector substation via the 132kV power line which will connect to the 132kV switching station that will loop in and loop out of the existing Poseidon – Albany 132kV line;
- Concrete turbine foundations and turbine hardstands;
- Temporary laydown areas which will accommodate the boom erection, storage and assembly area;
- Cabling between the turbines, to be laid underground where practical;
- Access roads to the site and between project components with a width of approximately 4.5m;
- A temporary concrete batching plant;
- Staff accommodation; and
- Operation and Maintenance buildings including a gatehouse, security building, control centre, offices, warehouses, a workshop and visitors centre.

A development envelope for the placement of the wind energy facility infrastructure (i.e. development footprint) has been identified within the project site and assessed as part of the BA process. The development envelope is ~2689ha in extent and the much smaller development footprint of ~49.4ha will be placed and sited within the development envelope.

2.2.1 Consideration of Alternatives

For this project, no alternatives have been proposed. Alternative layouts for the project could be proposed depending on the outcome of the several specialist studies forming part of the BAs process.

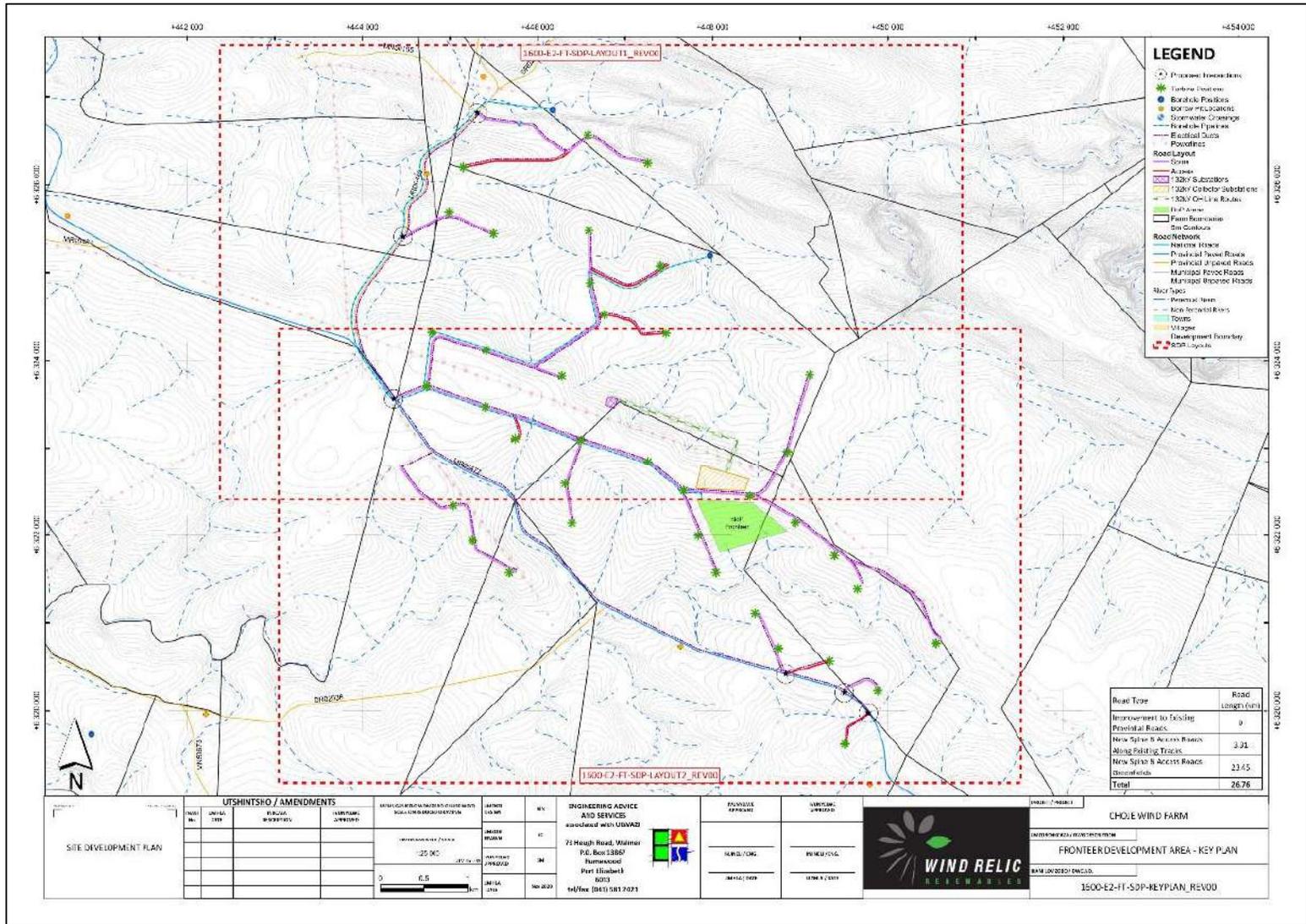


Figure 5 - Frontier Wind Farm Site Development Plan (Provided by WindRelic).

3 CURRENT STATUS QUO

3.1 Site Description

The project area falls within the existing agricultural areas surrounding Makhanda (previously known as Grahamstown) and Somerset-West.

According to Mucina & Rutherford (2006), the Frontier project area is characterised by the following vegetation types Kowie Thicket, Suurberg Quartzite Fynbos, Suurberg Shale Fynbos, Albany Broken Veld and Bhisho Thornveld. The vegetation types are briefly described below.

- Kowie Thicket: *“On mainly steep and north-facing (dry) slopes. Tall thickets dominated by succulent euphorbias and aloes with a thick understorey composed of thorny shrubs, woody lianas (Capparis, Secamone, Rhoicissus, Aloe), and shrubby succulents (Crassulaceae, Asphodelaceae). Moister south-facing slopes support thorny thickets dominated by low evergreen trees (Cussonia, Euclea, Hippobromus, Pappea, Ptaeroxylon, Schotia) and shrubs (Azima, Carissa, Gymnosporia, Putterlickia) with fewer succulent shrubs and trees”* (Mucina & Rutherford, 2006; Sanbi, 2021).
- Suurberg Quartzite Fynbos: *“Low rounded hills and mountains supporting low to medium-high, closed, ericoid shrubland or grassland, with closed restioid and/or grass understorey. Grassy fynbos is the most typical structural type, with localised patches of dense proteoid and ericaceous fynbos. On drier, north-facing slopes grassland replaces this unit, but the south-facing slopes always carry fynbos unless converted to grassland by over-burning, or to thicket by over-protection from fire. Thicket is found on the richer soils at the base of the formation and in gullies”* (Mucina & Rutherford, 2006; Sanbi, 2021).
- Suurberg Shale Fynbos: *“Low mountains or hills, supporting low to medium-high, closed, ericoid shrubland or grassland, with closed restioid and/or grass understorey. Graminoid fynbos, with localised patches of dense proteoid fynbos, also occurs* (Mucina & Rutherford, 2006; Sanbi, 2021)
- Albany Broken Veld: *Low mountain ridges and hills with an open grassy karroid dwarf shrubland with scattered low trees (Boscia oleoides, Euclea undulata, Pappea capensis, Schotia afra var. afra) with a matrix of dwarf shrubs (Becium burchellianum, Chrysocoma 15btuse15) and grasses (Eragrostis 15btuse)”* (Mucina & Rutherford, 2006; Sanbi, 2021).
- Bhisho Thornveld: *“On undulating to moderately steep slopes, sometimes in shallow, incised drainage valleys. Open savanna characterised by small trees of Acacia natalitia with a short to medium, dense, sour grassy understorey, usually dominated by Themeda triandra when in good condition”* (Mucina & Rutherford, 2006; Sanbi, 2021).

Existing surrounding land uses associated with the project area include a combination of:

- farming and agricultural areas, and
- dirt roads.

As a result, the vast majority of the Frontier Wind Farm development footprint overlays highly disturbed terrain. Overall, the accessibility of the project footprint area was fairly good. Although the site has been disturbed by previous agricultural activities, visibility was fair.



Figure 6 – View of Draai Farm 184.



Figure 7 – View of the grassland type vegetation found at the farm Table Hill 187.

4 ASSESSMENT METHODOLOGY

This HIA report was compiled by PGS for the proposed development of the Frontier WEF. The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the NEMA (no 107 of 1998). The HIA process consisted of three steps:

Step I – Desktop Study: A detailed archaeological and historical overview of the study area and surroundings were undertaken. This work was augmented by an assessment of reports and data contained on the South African Heritage Resources Information System (SAHRIS). Additionally, an assessment was made of the available historic topographic maps. All these desktop study components were undertaken to support the fieldwork.

Step II – Physical Survey: The fieldwork was conducted over several days on 23 March 2020 as well as from 8 to 13 June 2020. This fieldwork team consisted of an archaeologist (Cherene de Bruyn) and a field assistant (Pascal Snyman). The fieldwork for the Palaeontological component was completed by a palaeontologist, Elize Butler over a 3-day site-specific field survey from 20 November to 23 November 2020 (as described in the PIA - **Appendix C**), while the component for the Cultural Landscape Assessment by a cultural landscape specialist (archaeologist/anthropologist/heritage specialist), Emmylou Rabe Bailey, over 4 days from 3rd to 6th June 2021 (as described in the CLA - **Appendix D**), which aimed at locating and documenting sites falling within the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant heritage resources, the assessment of resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

4.1 Archaeological specific methodology

Additional to the preceding methodological description the archaeological methodology included fulfilling the requirements of the NHRA (section 35 and 36) that protects the following features in the landscape:

- Material remains resulting from human activity 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;
- Rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- Graves and burial grounds, including ancestral graves, royal graves, graves of traditional leaders, graves of victims of conflict, historical graves and cemeteries, and other human remains not covered by the Human Tissue Act (1983) (Act No 65 of 1983).

4.2 Palaeontological specific methodologies

In summary, the approach to PIA was as follows. Fossil bearing rock units occurring within the broader study area is determined from geological maps and relevant geological sheet explanations as well as satellite images. Known fossil heritage in each rock unit is inventoried from scientific literature, previous assessments of the broader study region, and the author's field experience and palaeontological database. Based on this data as well as field examination of representative exposures of all major sedimentary rock units present, the palaeosensitivity of the development area and impact significance of the proposed development is assessed together with recommendations for any further specialist palaeontological studies or mitigation. This PIA was undertaken in line with the SAHRA 2016 Minimum Standards for the palaeontological component of heritage impact assessment.

The PIA is contained in Appendix C of this report.

4.3 Cultural Landscape Assessment specific methodologies

4.3.1 Desktop analysis (including using satellite imagery) and literature review.

- Review of relevant Archaeological Impact Assessment (AIA), Heritage Impact Assessment (HIA), Visual Impact Assessment (VIA) and Socio-economic Impact Assessment reports (SEIA) on the proposed Frontier and adjacent Wind Garden WEFs as well as other relevant assessment reports from Waainek WEF and proposed and operational Cookhouse WEFs;
- Review of relevant academic literature and articles on cultural landscape assessment;
- Review of relevant academic literature and articles on the cultural heritage of the regional study area;
- Review of relevant policies and legislation on cultural landscapes assessment, scenic drives and route assessment and heritage assessment in EIA process;
- Review of historic and current maps of the study area and surrounds;
- Review of REDZs Strategic Environmental Assessment (SEA) reports (DEA, 2015); and
- Review of relevant international cultural landscapes best practice.

4.3.2 Preliminary field survey

The field survey of cultural landscape elements was conducted by a cultural landscapes specialist (archaeologist/anthropologist / heritage specialist) over 4 days from 3rd to 6th June 2021 (mid-Winter). The survey was conducted in a vehicle on existing farm access roads and on foot where no vehicle access was possible. Cultural heritage resources and cultural landscape elements falling within and adjacent to the proposed development footprint were identified, mapped and photographed where appropriate. The season for field work did not impact the research for this study.

4.3.3 *Recording and documentation of relevant cultural heritage and cultural landscape elements, the assessment of resources in terms of the specialist requirements for CLA criteria, report writing, mapping and recommendations.*

The significance of the cultural landscape is based on the examination of the

- processes (spatial pattern, land uses, response to natural features and cultural traditions);
- components (circulation, boundaries, vegetation, structural types, cluster arrangements, archaeological types, small-scale elements); and
- perceptual qualities (views and aesthetics), which are then utilized to identify and assess the relationships between the patterns of human use, the natural environment and cultural beliefs and attitudes.

Evaluation of provisionally identified heritage elements' significance according to World Heritage Convention Operational Guidelines (2017) and National Heritage Resources Act (NHRA) (Act 25 of 1999) as is required as part of the BA process.

4.3.4 *Sensitivity mapping for cultural landscapes (SEA, 2015)*

Landscape sensitivity was determined as part of this study through the identification of natural, scenic and cultural resources which have aesthetic and economic value to the local community, the region, and society as a whole. The resources considered include features of topographic, geological or cultural interest, together with landscape grain or complexity. Protected landscapes, such as national parks, nature reserves, game parks or game farms, as well as heritage sites, add to the cultural value of an area and were thus considered as essential criteria in the determination of landscape sensitivities. Landscape sensitivity was further determined by taking into account existing receptors in the area including settlements, national roads, arterial roads, scenic routes, and tourist destinations such as guest farms and resorts.

4.3.5 *Community engagement*

Limited interviews with landowners in and around the proposed development and residents in Makhanda were done as part of the cultural landscape assessment to identify any values associated with identified heritage resources and to ascertain whether any meaningful intangible heritage resources are associated with any of the built structures or natural features. The socio-economic impact assessment report for the proposed Fronteer and Wind Garden WEFs was consulted to gain insight into cultural landscapes concerns that may have been raised. Further research/ other studies beyond the brief of this BA would be required to determine the significance of the intangible or living heritage of the Fronteer CL.

The CLA is contained in Appendix D of this report.

5 HISTORICAL OVERVIEW OF THE STUDY AREA

5.1 Overview of Study Area and Surrounding Landscape

DATE	DESCRIPTION
2.5 million to 250 000 years ago	<p>The Early Stone Age is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates back to approximately 1.5 million years ago (Korsman, & Meyer, 1999; Klein, 2000).</p> <p>Some sites dating to the ESA have been identified in the general area. These are usually concentrations of stone tools found close to watercourses (van Schalkwyk, 2010). One of the more important ESA sites occurs at Ananzi Springs, near Uitenhage. This is the only ESA site in the Eastern Cape which has been excavated (Webley and Hall, 1998). Ananzi Springs was excavated by the late HJ Deacon in the 1970s and wood and seed material as well as a large number of stone artefacts was found in situ in the spring deposits (Binneman et al, 2011). Scatters of ESA tools are also often found in hollows between sand dunes like the site of Geelhoutboom near Humansdorp (Webley and Hall, ibid).</p> <p>ESA stone artefacts have been found in the Addo Elephant National Park, and amongst the gravels of old river terraces which line most of the Coega River and estuary (Booth, 2011). Furthermore, a scatter of some possible ESA stone artefacts was recorded on one of the adjacent properties with the area of the already authorised Cookhouse Wind Energy Facility (Booth, 2011).</p> <p><i>No ESA sites are known from the immediate vicinity of the footprint area.</i></p>
250 000 to 40 000 years ago	<p>The Middle Stone Age (MSA) is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique (Korsman, & Meyer, 1999). Several MSA sites have been identified in the Eastern Cape.</p> <p>Klasies River sites are located on the Tsitsikamma coast between Port Elizabeth and Plettenberg Bay and provides information about anatomically modern people who lived in southern Africa between 110 000 and 120 000 years ago (Steele, 2001; Mitchell, 2002). The Klasies River Mouth was excavated in 1967–1968. During the excavation's pieces of shell, animal bones and some human remains were found, that were associated with an MSA occupation of the site (Rightmire & Deacon, 1991).</p> <p>Evidence of MSA occupation has been found at Strathalan Cave B, located in the Maclear district, north-eastern Cape, approximately 500 km North-east of Uitenhage by Opperman (1996). Apart from stone tools, Opperman also excavated several hearths and grass beddings at the site.</p> <p>A MSA cave site, Howiesons Poort is located near Grahamstown (Shaw & Jameson, 2002). Several stone artefacts including backed blades were excavated from the site.</p> <p>In 1979 Opperman conducted research in the Stormberg region. During this time, he excavated a trench at Grassridge Rockshelter, which is located in the interior region of the Eastern Cape at the base of the Stormberg Mountains and contains a rich sequence of late Pleistocene and Holocene occupations (Collins <i>et al.</i>, 2017). Opperman focused on the MSA and Late Stone Age (LSA) occupation of the site and identified several stone age tools.</p>

DATE	DESCRIPTION
	<p>During a rescue excavation by Gess (1969), two MSA lithic artefacts and bone tools were excavated from the Aloe site near St Georges Strand, Port Elizabeth.</p> <p>The Albany Museum database holds records of the occurrence of MSA stone artefacts around the Cradock area and the Department of Archaeology has curated MSA stone artefacts in its collection from the Cradock area including Highlands Rock Shelter excavated by H.J. Deacon during the 1970's (Booth, 2011).</p> <p><i>No MSA sites are known from the immediate vicinity of the footprint area.</i></p>
40 000 years ago, to the historic past	<p>A number of LSA sites are known to occur in the region, located to the west and north of the study area. The majority of archaeological sites date from the past 10 000 years and are associated with the campsites of San hunter-gatherers and Khoi pastoralists (Binneman <i>et al.</i>, 2011).</p> <p>Research by Binneman has shown that a number of very important LSA sites occur in the Kabeljousrivier area (inland of Jeffreys Bay). These sites include artefacts other than stone tools, like ostrich eggshell beads, bone arrowheads, small bored stones and occasionally wood fragments with incised markings (van Schalkwyk, 2010). Archaeologists believe that LSA people moved between the coast and the inland areas according to a seasonal pattern. Rock art sites are also associated with the LSA. These rock art sites are found mostly in the sandstone caves and shelters around Uitenhage, Grahamstown and Alicedale [Webley and Hall, 1998</p> <p>Another rock shelter, Mafusing 1 containing LSA lithics, pottery and rock art is located near Matatiele. The site was excavated in 2011 as part of the Matatiele Archaeology and Rock Art or MARA research programme (Pinto <i>et al.</i>, 2018).</p> <p>There are many San hunter-gatherer sites in the nearby Groendal Wilderness Area and adjacent mountains. Here, caves and rock shelters were occupied by the San during the LSA and contain numerous paintings along the walls. The last San/KhoiSan group was killed by Commando's in the Groendal area in the 1880's (Binneman <i>et al.</i>, 2011).</p> <p>LSA stone artefact manufacture site and ceramic sherds have also been found in the Winterberg Mountain Range (Booth, 2011). LSA occupational deposits of the few caves and rock shelters surrounding Grahamstown that have been excavated, namely Melkhoutboom in the Suurberg (Deacon 1976), Wilton near Alicedale, Uniondale about 20km north-east of Grahamstown (Leslie-Brooker 1987), Springs Rock Shelter and Glen Craig situated immediately north and north-east of Grahamstown, and Edgehill and Welgeluk located on the Koonap River some 40km to the north of Grahamstown (Hall 1985).</p> <p><i>No LSA sites are known from the immediate vicinity of the footprint area.</i></p>
AD 450 – AD 750	<p>In the Eastern Cape, Early Iron Age (EIA) sites dating to around the eighth century AD (700s) have been identified at Kulubele on the Kei River and Canasta Place near East London. Excavations at Kulubele have identified evidence of ironworking, ceramic sculptures, grain pits and sheep bones, and highly decorated potsherds have been found at Canasta Place (Fourie, 2011). However, Canasta Place probably represents the most southerly evidence of early farmers in the Eastern Cape (Hall & Webley, 1998). EIA sites have also been found within the Great Kei River Valley (Booth, 2011).</p> <p>EIA sites have also been recorded by Opperman (1987) during his research at Colwinton (located approximately 400km northeast of Uitenhage) and Bonawe, near Barkley East (Mazel, 1992). At these sites, Iron age ceramics date to AD775. Bonawe rock shelter is located near Elliot, approximately 500km northeast of Uitenhage. The site contains both end-Pleistocene and Holocene material (Booth, 2012).</p>

DATE	DESCRIPTION
	<p>Some 2 000 years ago Khoi pastoralists occupied the region and lived mainly in small settlements. They were the first food producers in South Africa and introduced domesticated animals (sheep, goat and cattle) and ceramic vessels to southern Africa (Binneman, 2011).</p> <p><i>No EIA sites are known from the immediate vicinity of the footprint area.</i></p>
<p>AD 1650 – AD 1850</p>	<p>Hilltop settlement is mainly associated with Later Iron Age (LIA) settlement patterns that occurred during the second millennium AD (Booth, 2011). LIA settlements have been formally recorded by the Albany Museum and cover a relatively extended area including within the nearby Koonap River Valley between Bedford and Grahamstown (Booth, 2011).</p> <p>The Nguni groups of South African can be divided into four distinct groups: the Zulu-speaking peoples, the Xhosa-speaking peoples, the Swazi people from Swaziland and adjacent areas and the Ndebele people (SA History, 2019c). Around 1600's the Xhosa groups began expanding their power.</p> <p>Tshawe founded the Xhosa kingdom by defeating the Cirha and Jwarha groups (Peires, 1982; SA History, 2019c). His descendants expanded the kingdom by settling in new territory and bringing people living there under the control of the amaTshawe (SA History, 2019c). As the Xhosa expanded their influence westwards, they came into contact with Khoi and San groups. The Khoi and San groups were later intermarried into the Xhosa culture Jwarha groups (SA History, 2019c). His descendants expanded the kingdom by settling in new territory and bringing people living there under the control of the amaTshawe (SA History, 2019c). From about 1700, amaXhoseni, the place of the Xhosa or Xhosaland, stretched roughly along the seaboard of South Africa between the Mbashe River and the Sundays River, from the slopes of the Khahlamba, Amathole and Winterberg mountains down the coast (Peires, 1982; Fourie, 2011).</p> <p>As the first European settlers started moving north from the Cape they came into contact with Xhosa speaking groups. In the Eastern Cape, the 18th and 19th century is marked with conflict and wars between the European settlers and the Xhosa groups (SA History, 2019c). A marked change in the conflict appeared in 1820, when John Brownlee founded a mission on the Tyhume River near Alice, and William Shaw established a chain of Methodist stations throughout the Transkei (SA History, 2019c).</p> <p>There are records of Observation Posts that were constructed under the leadership of Sir John Cradock, to keep the Xhosa from crossing the Fish River (Booth, 2011). These were in place and functioning between 1812 and 1817. Positions of observation posts include Addo Heights Post (Addo), Rautenbach's Drift (Addo), Sandflats (Paterson), Coerney, Swartwaterspoort and Kommadagga (Coetzee 1994; Booth, 2011). Several historical features and buildings were recorded during the survey for the already authorised Cookhouse Wind Energy Facility.</p> <p><i>No Late Iron Age (LIA) sites are known from the immediate vicinity of the footprint area</i></p>

5.2 Historical Background of Grahamstown, Riebeeck East

5.2.1 Grahamstown (now known as Makhanda)

Before the arrival of the British settlers, the Albany, Bathurst and Alexandria regions were known as the Zuurveld (Corry, 1920). When Britain reoccupied the Cape in 1806, the new administration found itself faced with several conflicts with the Xhosa on the Eastern frontier, as the border, the Great Fish River, was regularly breached by raiders who attacked the white farmers in the region (Erasmus, 1995). In 1811 the Xhosa launched a full scale attack against the settlers (Erasmus, 1995). This attack is known as the

fourth frontier war (Erasmus, 1995). During the attack, some 20 000 Xhosa warriors stormed and drove away from the settlers once and for all (Erasmus, 1995). Many of the structures in the region were severely damaged.

In an effort to counter such an invasion Governor Sir John Cradock decided to build a line of blockhouses along the Fish River, and Colonel John Graham was selected for the task (Erasmus, 1995). When Colonel John Graham came upon the partially destroyed remains of the Rietfontein homestead he decided to build his military headquarters and garrison there (Erasmus, 1995). Grahamstown was founded in 1812 by Colonel John Graham as a frontier garrison post near the Xhosa territory (Cory, 1920). The plans for the new village were drawn up by John Knobel, the district surveyor of Uitenhage, and the first residential stands were sold in 1815 (Erasmus, 1995). The Rietfontein homestead was repaired and served as the garrison's officers mess (Erasmus, 1995). The first school in Grahamstown opened in 1814 near the wall of the garrison (Erasmus, 1995). Convent High, seen as the first "proper" school in Grahamstown opened in 1849 (Erasmus, 1995). On 22 April 1819, a large number of Xhosa warriors, under the leadership of Nxele (or Makanda), launched an attack against the British colonial forces. During the fifth frontier war, about 10 000 Xhosa Nxele (or Makanda) attacked the garrison (Erasmus, 1995). The 350 men at the garrison stood their ground and drove away the Xhosa leaving 1000 dead (Erasmus, 1995). With the arrival of settlers in 1820, and their migration through the Eastern Cape, they began to farm (Erasmus, 1995). Records relating to the distribution of the 1820 Settlers suggest that the point at which the wagon parties divided and went their respective ways took place on the farm called Assegai Bosch (Webley 2007). Here the wagon tracks split either to Salem or to Grahamstown (Webley & Way-Jones, 2007).

In 1822 Grahamstown was proclaimed the seat of the magistracy of the new district of Albany (**Figure 8**), with Colonel Jacob Cuyler appointed as the first landdrost (Erasmus, 1995).

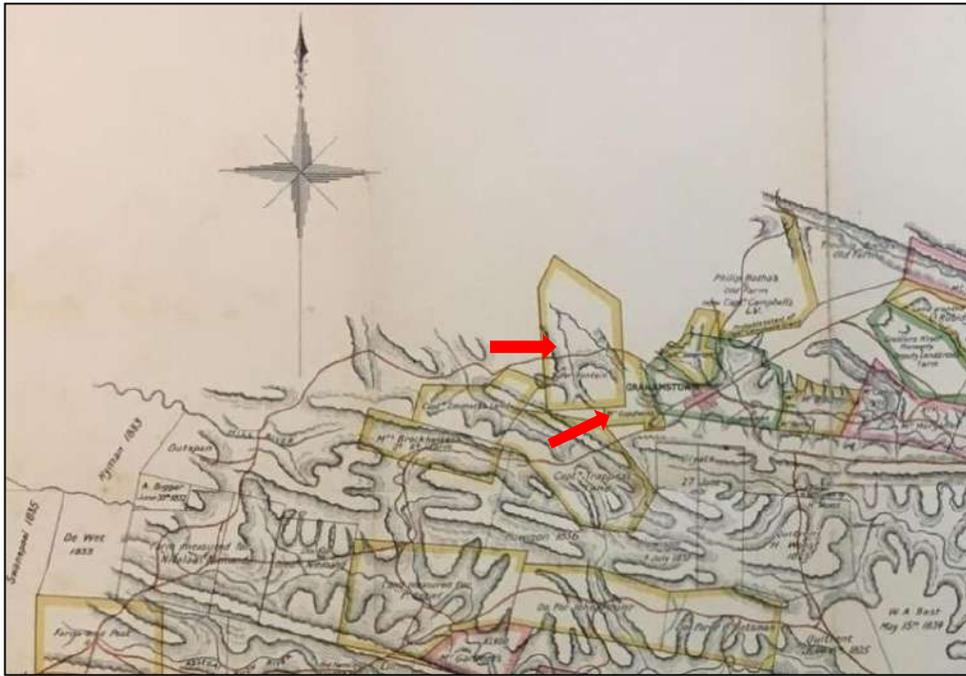


Figure 8 - Map showing District of Albany in the Colony of Good Hope, and the location of the old roads, and the approach to Grahamstown through the farm "Zyfer Fontein" and "Mr Goodwins (Red Arrow) (Source: Campbell, 1897). The study area is located to the north-west of Grahamstown and not depicted on the map.

In 1822 Grahamstown was proclaimed the seat of the magistracy of the new district of Albany, with Colonel Jacob Cuyler appointed as the first landdrost (Erasmus, 1995). In 1962 the town received full municipal status (Erasmus, 1995). Throughout 1834-1850 conflict still brewed between the Xhosa's and the settlers. During this time the sixth, seventh and eighth frontier war was fought (**Figure 9**) (Erasmus, 1995). Several heritage sites are located to the east of Grahamstown including the declared Provincial Heritage Site (PHS) of Fraser's Camp Signal Tower, constructed in 1843 during the Frontier Wars and the nearby Fraser's Camp, constructed a few years earlier (1835 / 1836), as well as the Maranatha Mission, dating to circa. 1909 (Van Ryneveld, 2016). According to the SAHRIS database Grahamstown's has approximately 60 houses, buildings and other structures listed as Grade II sites.

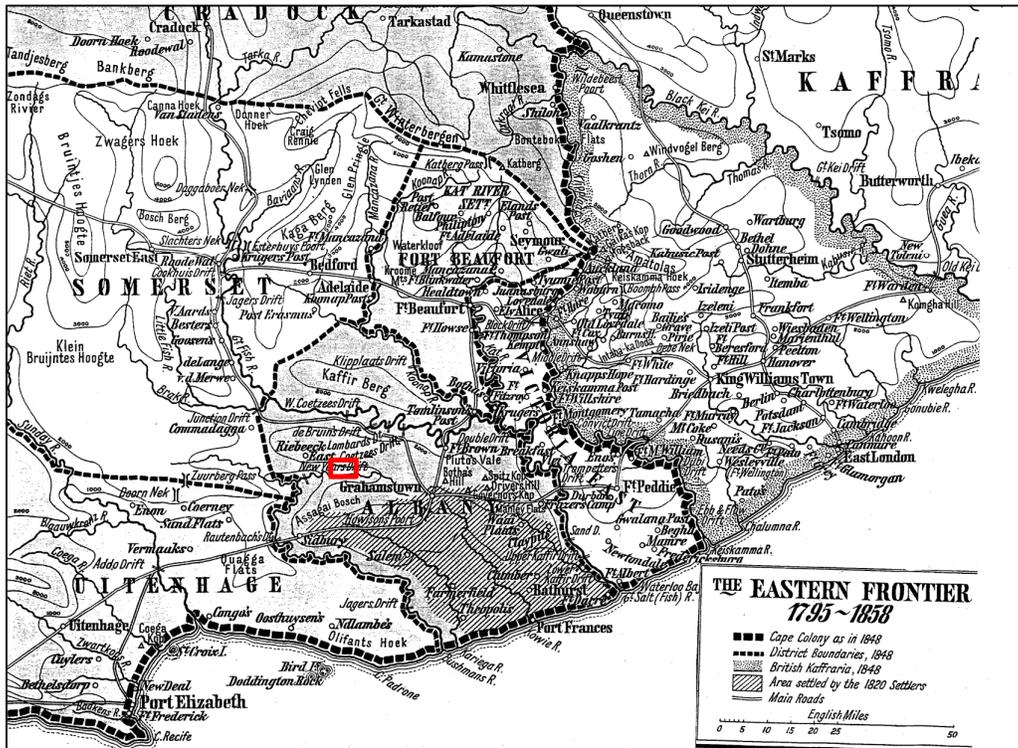


Figure 9 - Map showing of the Eastern Frontier in 1860 (Source: Militaryhistorysa, 2017). (Study area depicted by the red square).

5.2.1.1 The Farm Hilton

The farm Hilton was first owned by Philip Schutte and was known as “Roodedraai (Webster, 1978). In 1923, the farm was granted to Harry Rivers (Webster, 1978). After Harry Rivers left for Swellendam, the farm was transferred to Messrs Lee and Cock in 1825 (Webster, 1978). The farm was later owned by Coenraad Fredrick Scheepers. However, by 1836 Alexander George Cummings became the owner of the farm (Webster, 1978). The Cumming family owned the farm Hilton until 1922 when the Hilton-Barbers bought the farm (Webster, 1978). The farm was finally bought by T. C. White and Sons in 1951 (Webster, 1978).

5.2.1.2 The Farm Table Hill

Table Hill Farm was first known as “Noutoe” (Webster, 1978). The farm “Noutoe” was abandoned in 1810 when many farmers in the area moved to Graaf-Reinet to escape marauding tribes (Webster, 1978). Col. Graham used “Noutoe” as the site where the Cape Regiment was to be stationed (Webster, 1978). Building began on 6 May 1812, however it stopped shortly when Stockensröm and Graham found a better site, located at the site where Grahamstown is currently located (Webster, 1978).

5.2.2 Riebeeck East

In 1820 British Settlers was sent to colonize the Zuurveld area and to act as a buffer between the new colonies in the west and the Xhosa tribes in the east. The settlement of the British settlers led to an "anglicizing" of the area (Riebeeck East, 2013). Many of the independent Afrikaner farmers that lived in

the area remained loyal to the Dutch Reformed Church and had to travel to Graaf-Rienet and Uitenhage to attend church services (Riebeeck East, 2013). The Afrikaans speaking community of farmers in the Albany District sent a petition for their own church, but this was declined on the basis that the English church in Grahamstown should be used by the Dutch congregation in the same way that the Dutch church in Cape Town is used by the English (Riebeeck East, 2013). One of those signatories to this petition was Piet Retief, one of the leaders on the Great Trek (Riebeeck East, 2013).

In 1830 another petition to the government was sent, and Captain Campbell, the civil commissioner was instructed to appoint elders and deacons (Theal, 2010). The new elders and deacons were installed by reverent Alexander Smith 1 January 1831 (Theal, 2010). The first visiting preacher was Dr George Morgan who presided at the first church gathering on 7th May 1831 on the farm Driefontein (Theal, 2010; Riebeeck East, 2013). On 2 April 1839 the church appointed Dr John Pears, as the first resident clergy (Theal, 2010; Riebeeck East, 2013). In April 1840 the church council bought the farm Mooimeisiesfontein, for the purpose of establishing a village and building a church (Theal, 2010; Riebeeck East, 2013). The farm Mooimeisiesfontein had belonged to Mr Piet Retief (Theal, 2010). The village of Riebeeck was established in 1842 and was named in honour of the first Dutch Governor of the Cape, Jan van Riebeeck. Its name was amended to Riebeeck East in about 1881 to differentiate it from its namesake in the Division of Malmesbury (SA History, 2019).

5.2.3 *Cookhouse*

Located on the west bank of the Great Fish River, which, until 1819 formed the eastern boundary of the Cape Colony (Erasmus, 1995). The origin of the name of the town is still debated (Van Schalkwyk, 2011). Troops patrolling the boundary often camped in these parts and eventually built small stone houses in which they sheltered and cooked (Erasmus, 1995). Some of these “cookhouses” were still visible into the 20th century, although most of them have disappeared (Erasmus, 1995). The railway from Port Elizabeth to the diamond fields in Kimberley reached Cookhouse in 1880 (Erasmus, 1995). The original railway between Cookhouse and Bedford runs over the Farm Request as well as the original road between Cookhouse and Grahamstown (now known as Makhanda) (Booth, 2011). According to various databases consulted it has approximately 15 houses, buildings and other structures listed as provincial heritage sites.

5.2.4 *Somerset East*

As early as 1771 land was allotted to farmer Willem Prinsloo on the banks of the Little Fish river at the Foot of the Boschberg (Erasmus, 1995). Later, part of this land came into possession of Louis Trichardt. Trichardt's successful cultivation of tobacco on his land prompted Lord Charles Somerset to establish Somerset Farm (Erasmus, 1995). Lord Charles Somerset, the governor at the Cape from 1814 to 1826, founded in 1814 an experimental farm in the shadow of the Boschberg. Here many different crops were grown, including tobacco which was in short supply due to the British-American War (Gaigher, 2010). After the ending of that war, tobacco production on the farm ceased but it continued to help provision the army garrison (Gaigher, 2010).

In 1825 a township was laid out on the grounds of this farm and was named after Lord Somerset (Gaigher, 2010). The "East" was to distinguish it from the other Somerset ("West") near Cape Town and was only added 30 years later. The first street of this new township was Paulet Street, at the foot of the Boschberg, and still contains many properties dating from this early era (Gaigher, 2010). In 1835 a volunteer mounted unit of about 170 of the town's citizens was formed to take part in the 6th Frontier War and also saw action in subsequent wars (Gaigher, 2010). When Dr William Gill, the district surgeon, died in 1863 he bequeathed most of his estate for an institution of higher learning but with the stipulation that none of the money be spent on erecting or acquiring buildings (Gaigher, 2010). According to the SAHRIS database Somerset East has approximately 15 houses, buildings and other structures listed as Grade II sites.

5.3 Archival/historical maps

The examination of historical data and cartographic resources represents a critical tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Relevant topographic maps and satellite imagery were studied to identify structures, possible burial grounds or archaeological sites present in the footprint area.

Topographic maps (1:50 000) for various years (1946,1976 and 1989) were assessed to observe the development of the area, as well as the location of possible historical structures and burial grounds. The maps were also used to assess the possible age of structures to determine whether they could be considered as heritage sites. Map overlays were created showing the possible heritage sites identified within the areas of concern, as can be seen below. The relevant topographical maps include:

- Grahamstown Topographic map. 1901.
- 3326AB Pigott's Bridge, surveyed in 1955 and drawn in 1959 by the Trigonometrical Survey Office. Printed by the Government Printer in 1959.
- 3326AB Pigott's Bridge published by the Chief Director of Surveys and Mapping. Printed by the Government Printer in 1977.
- 3326AD Salem, surveyed in 1960 and drawn in 1962 by the Trigonometrical Survey Office. Printed by the Government Printer in 1962.
- 3326AD Salem published by the Chief Director of Surveys and Mapping. Printed by the Government Printer in 1979.

It can be seen that all the map sheets consulted depict the entire project area surrounded by several huts, as well as old agricultural fields. Historical roads are also depicted.

Furthermore, from the Chief Surveyor-General database (<http://csg.dla.gov.za/>) the following farms was surveyed:

- Draai Farm 184 was surveyed by the Land Surveyor T. Watkins on 17 February 1827.
- Farm Hounslow 131 was surveyed by the Government Land Surveyor W. Barnfather in July 1849.

- Portion 2 of the Farm Hounslow 131 was surveyed by the Land Surveyor P. Copeman on 5 December 1910.
- Table Hill Farm 187 was surveyed by the Land Surveyor M. Hilten in February and March 1966.

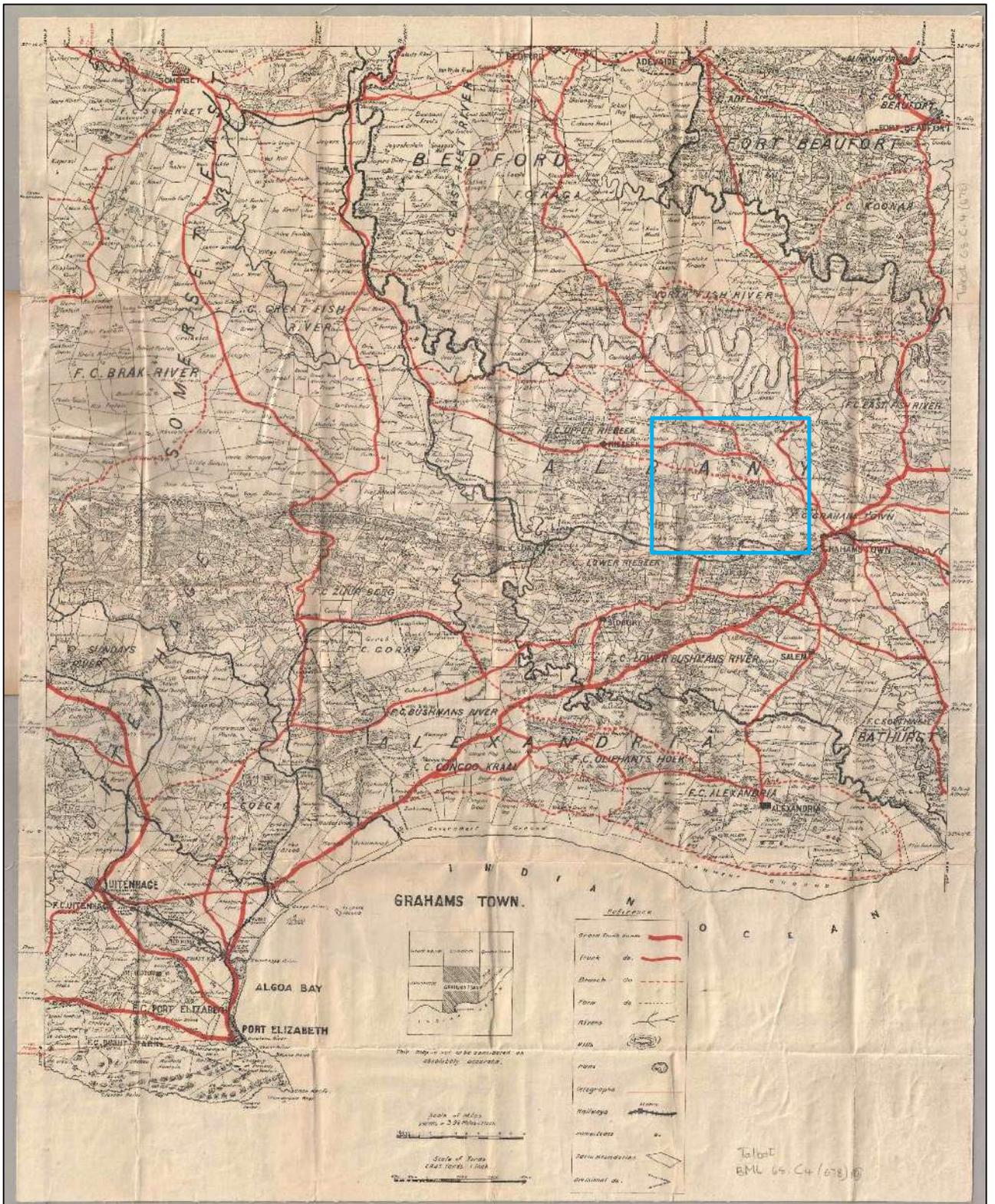


Figure 10 – Topographic map Graham's Town dating to 1901 showing the several farms, in the project area (blue polygon).

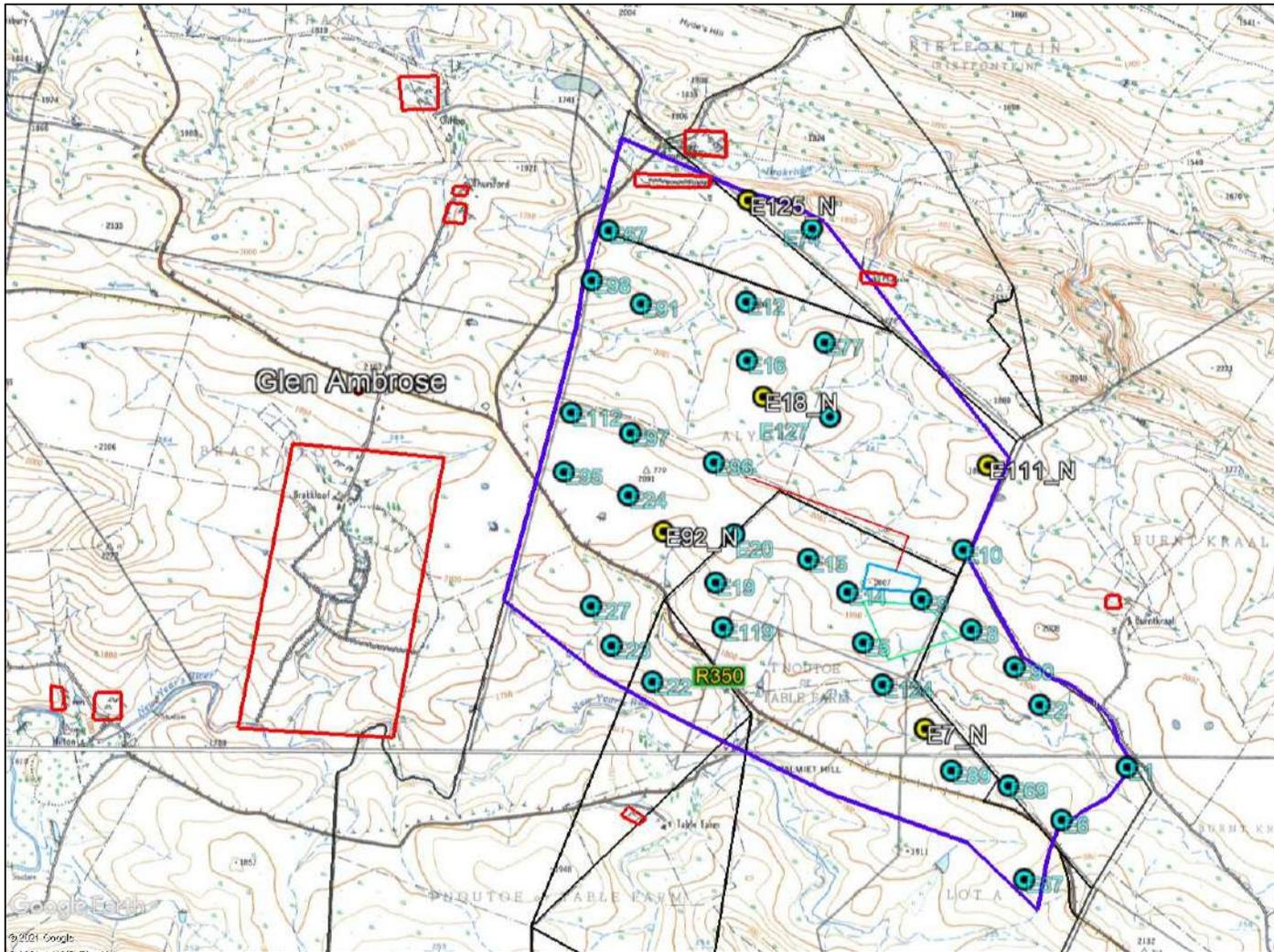


Figure 11 – First Edition Topographic maps (1:50 000) 326AB Pigott's Bridge (1959) and 3326AD Salem (1962) showing the Frontier Wind Farm, with several heritage features (red polygons) located in close proximity to the project development area (blue polygon).

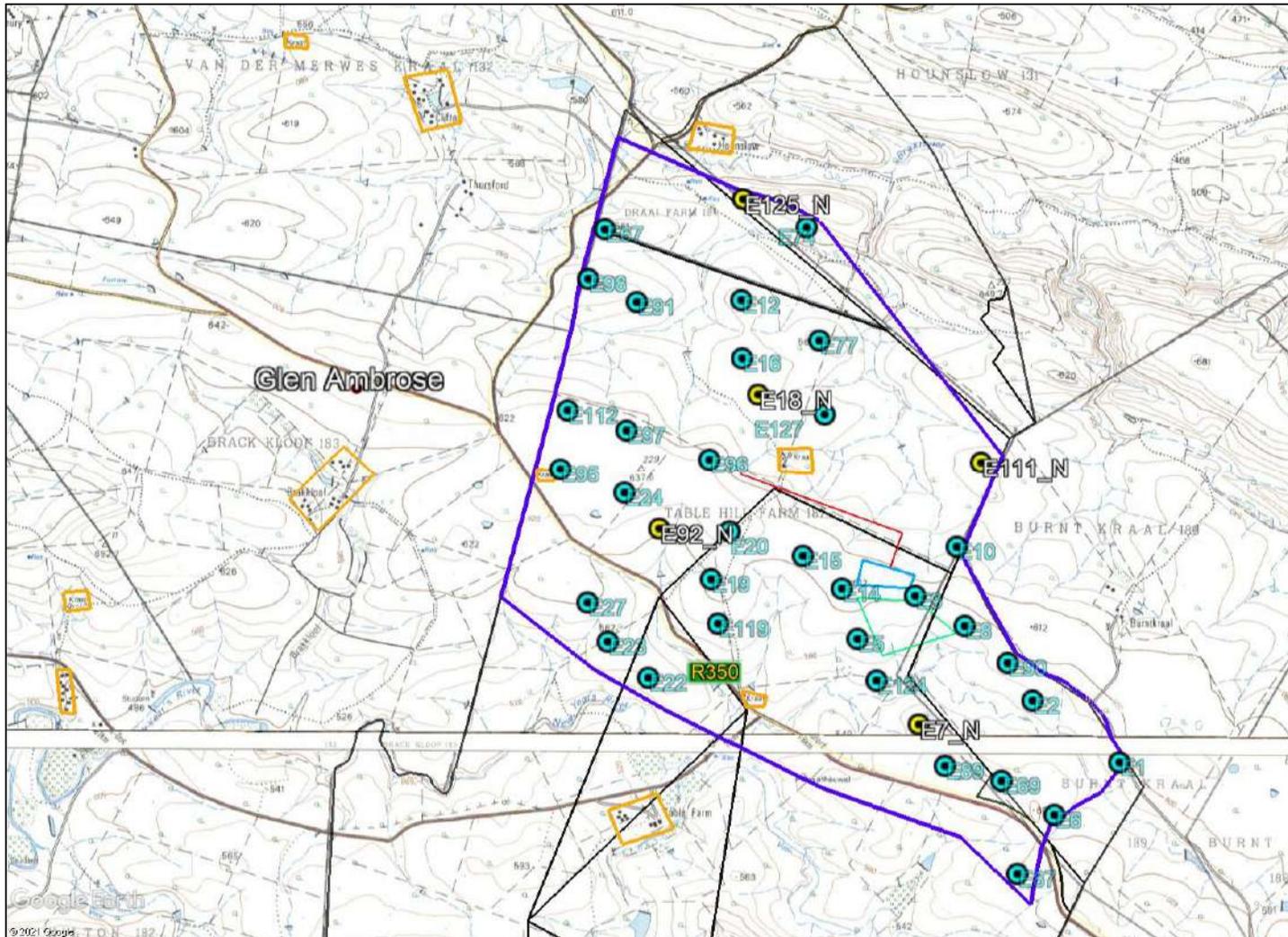
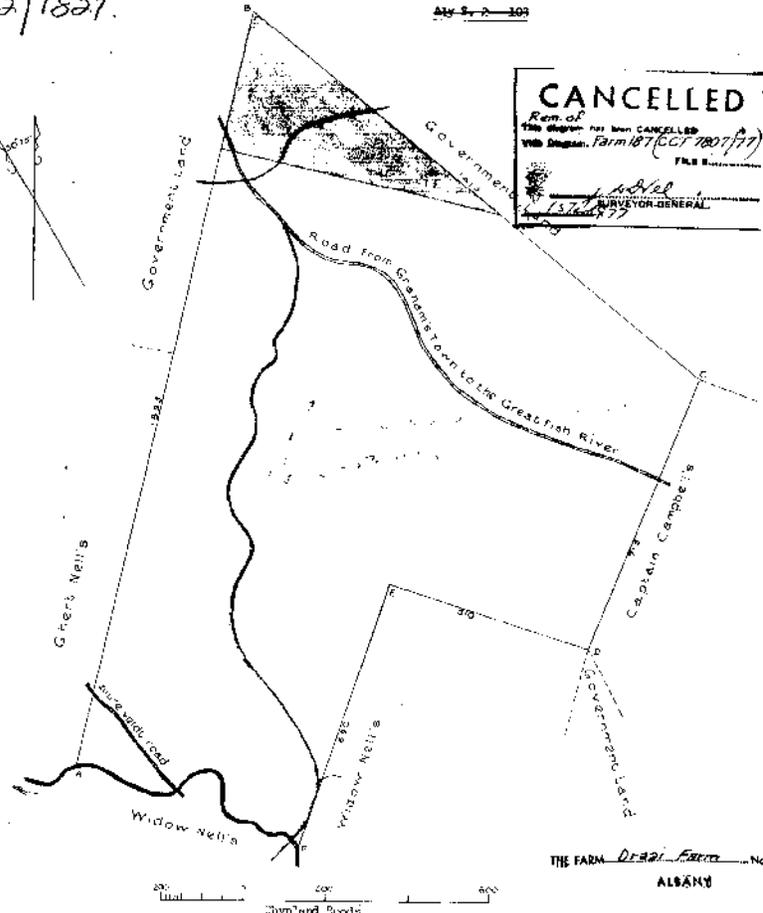
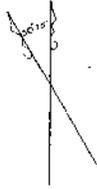


Figure 12 – Second Edition Topographic map (1:50 000) 326AB Pigott's Bridge (1977) and 3326AD Salem (1979) showing the Frontier Wind Farm, with several heritage features (red polygons) located in close proximity to the project development area (blue polygon).

192/1827.

Alb 2-2-103



CANCELLED
 Rem. of
 This diagram has been CANCELLED
 With Diagram Farm 187 (CGT 7807/77)
 FILE #
 13/6/1877
 SURVEYOR-GENERAL

S.G. Dgm. No. 192/1827

THE FARM *Draai Farm* No. 184
ALBANY

The above diagram A - - F encloses 206 morgen and 430 square rods of land in the District of Albany, being the extent of the lease granted to Gerrit Nel.

- Extending Northwards to Government Land,
- Southwards to the widow Nell's,
- Eastwards to Captain Campbell's and
- Westwards to Chert Nell's and Government Land. All sweet grass.

Surveyed 17th February 1827

The^s Watkins

Original from the diagram relating to
 Title Deed No. 2,413
 dated 15th May 1834 in favour of
 Gerrit Nel
Wm. H. Stanger
 SURVEYOR-GENERAL,
 CAPE TOWN.
 21/11/1951

For list of
 objections see
 back of diagram

Figure 13 – SG-Diagram from the Chief Surveyor General database for Draai Farm 184 was surveyed by the Land Surveyor T. Watkins on 17 February 1827.

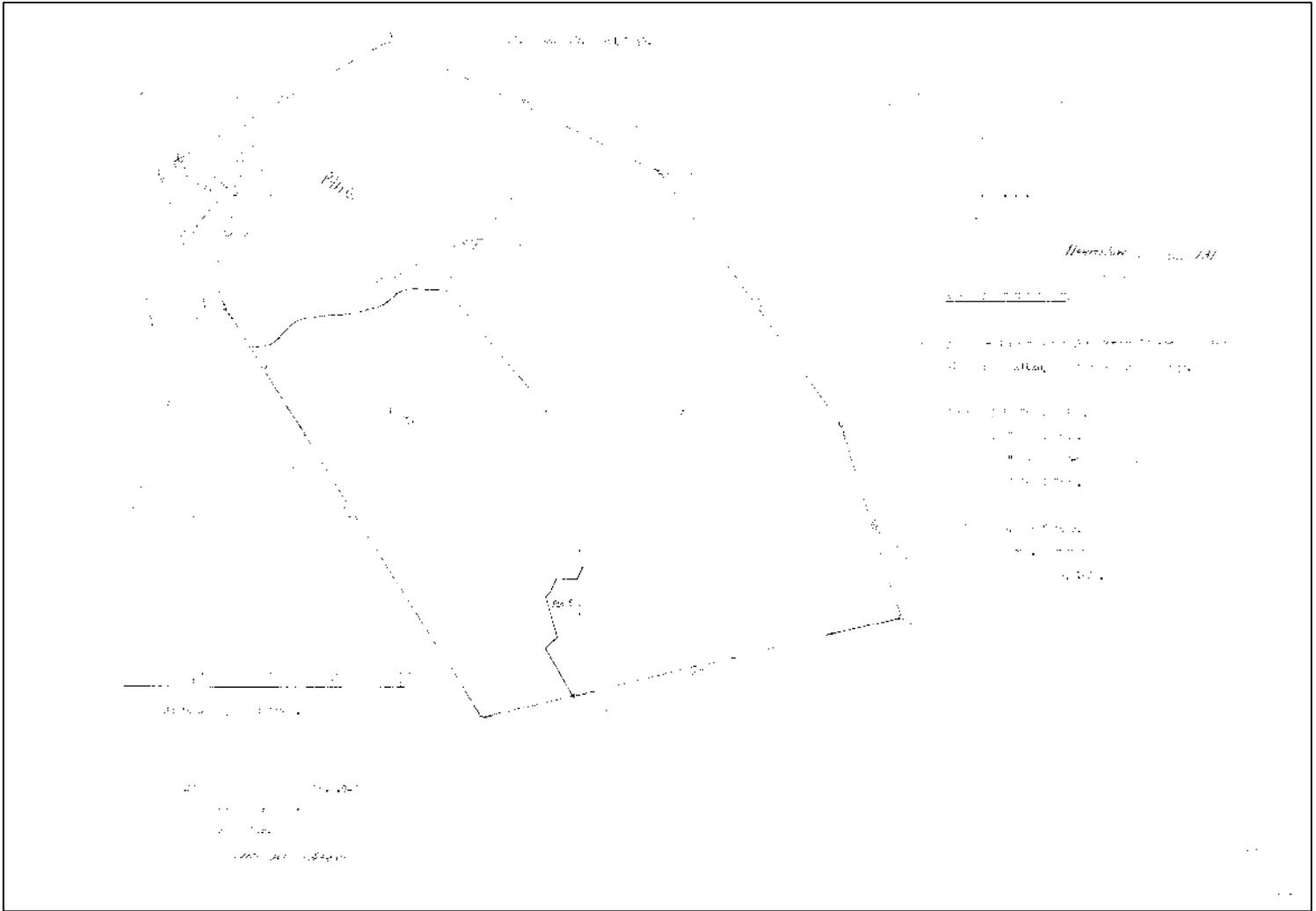


Figure 14 – SG-Diagram from the Chief Surveyor General database for the Farm Hounslow 131 was surveyed by the Government Land Surveyor W. Barnfather in July 1849.

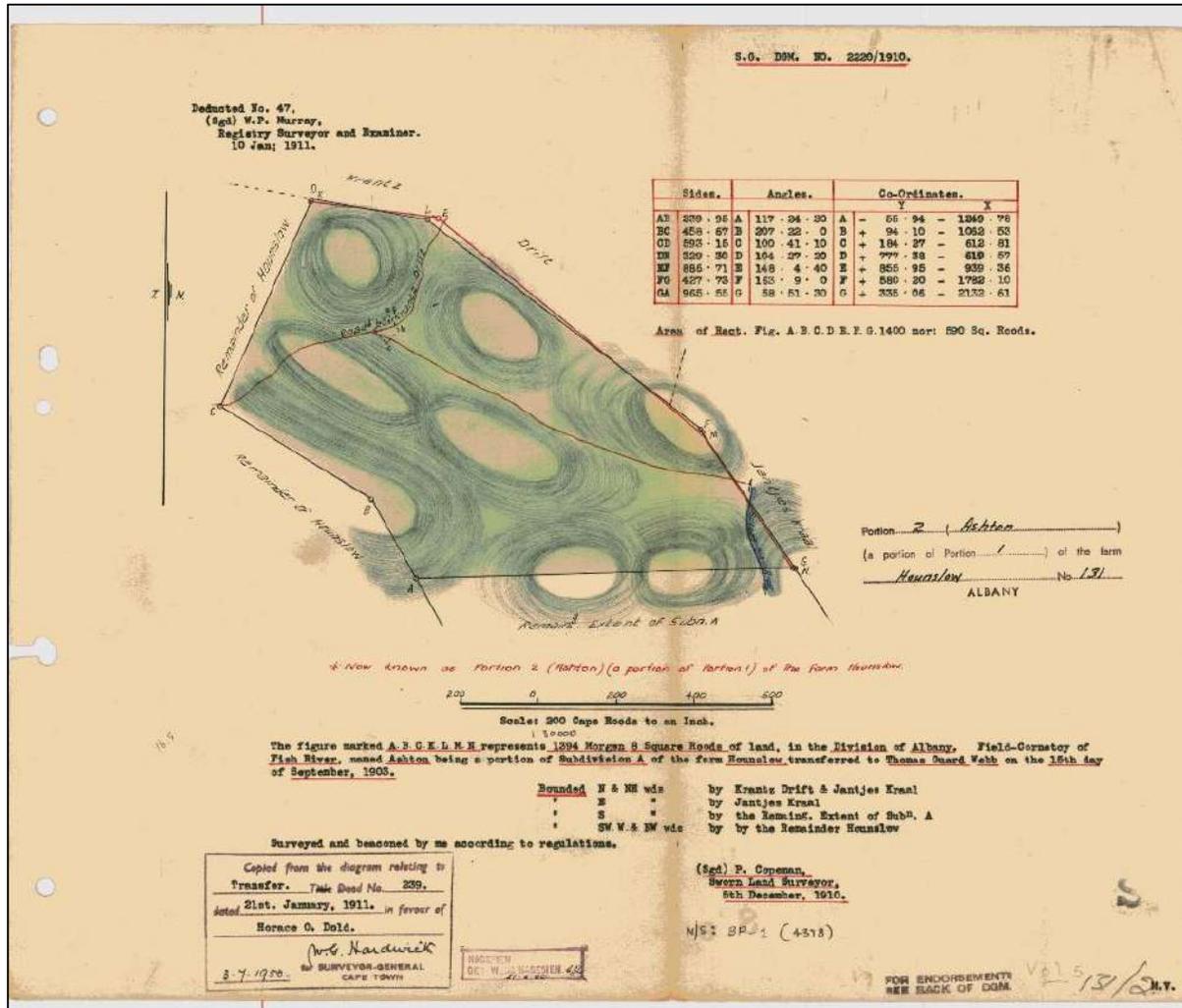
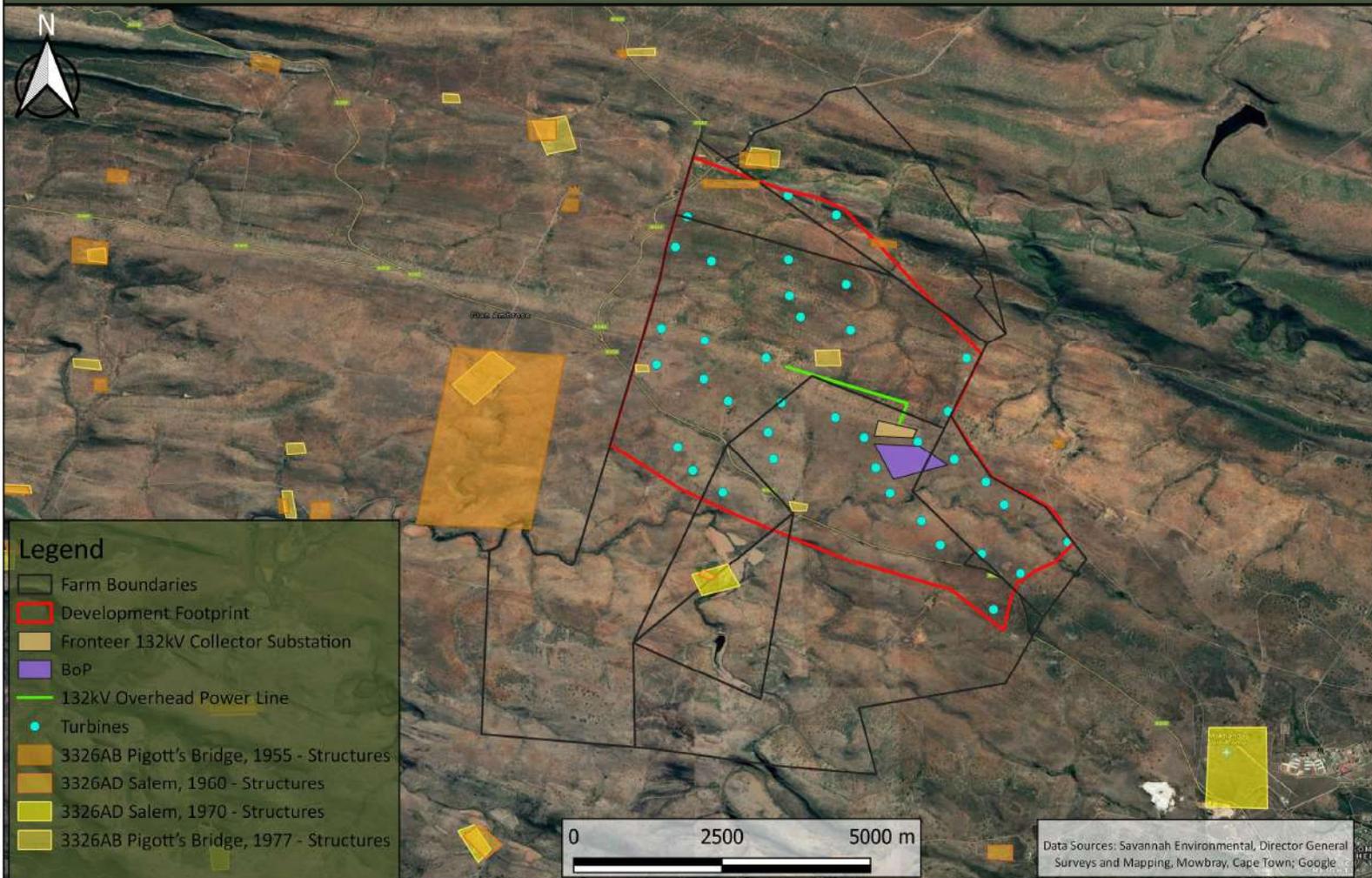


Figure 15 – SG-Diagram from the Chief Surveyor General database for Portion 2 of the Farm Hounslow 131 was surveyed by the Land Surveyor P. Copeman on 5 December 1910.

Fronteer Wind Farm Project Heritage Sensitivity

PGS Heritage (Pty) Ltd
Heritage Management Unit



Data Sources: Savannah Environmental, Director General
Surveys and Mapping, Mowbray, Cape Town; Google

Figure 17 - Heritage sensitivity map indicating possible sensitive areas around and within Fronteer Wind Farm site – Overview map.

5.4 Palaeontological background

The geology of the proposed Eastern Block Wind Farms is indicated on the 1: 250 000 3326 Grahams Town (1976) Geological Map (Council for Geosciences) (Figure 9-10) while the Western Block is indicated on the 1: 250 000 3224 Graaff-Reinet (1993) and 3324 Port Elizabeth (1990) Geological Maps (Figure 11-15).

The Eastern Block (Figure 7-8) is underlain by the:

- Dwyka Group
- Witteberg Group of the Cape Supergroup
- Witpoort Formation, Witteberg Group of the Cape Supergroup
- Weltevrede Formation, Witteberg Group of the Cape Supergroup

5.4.1 Dwyka Group

The Permo-Carboniferous Dwyka Group is the oldest deposit in the Karoo Supergroup and spans the Late Carboniferous to Early Permian. The Dwyka Group overlies the glaciated Precambrian bedrocks in the north and unconformably and paraconformably the Cape Supergroup in the south. In the east, it overlies the Natal Group and Msikaba Formation unconformably. Glacial pavements underlying the Dwyka Group has well-developed striations (specifically in the north) (Johnson et al, 2006). The Dwyka Group is believed to be deposited in a marine basin (Visser, 1989). South Africa was covered by an ice sheet during the Dwyka. These deposits were thus deposited in a cold, glacially dominated environment. This Group consists mainly of gravelly sediments with mudstones with scraped and faceted pebbles and subordinate varved shales. Dark grey tillite was deposited by retreating glaciers (Visser et al, 1987) and thus the Dwyka is known for its rich assemblage of dropstones of various sizes.

The Permo-Carboniferous Dwyka Group is known for its trackways (trace fossils) that was formed by fish and arthropods, while fossilized faeces have also been recovered. Body fossils consist of gastropods, invertebrates and marine fish. Fossil plants from this group include a rich diversity of conifers, cordaitaleans, glossopterids, ginkgoaleans, horsetails, lycopods, pollens and spores ferns (Almond and Pether, 2008).

5.4.2 Cape Supergroup

The Cape Supergroup is about 10 km thick and represents approximately 170 million years of Earth's history from the Early Ordovician to the Early Carboniferous. This Supergroup is divided into three subdivisions namely the Table Mountain, Bokkeveld and Witteberg Groups. These Groups are lithologically distinctive and form the southern mountain ranges of the Eastern Cape and Western Cape Provinces. The Witteberg Group decreases in thickness from the eastern part to the southwestern part of the basin. This Group consists basically of micaceous mudrock and quartzitic sandstone which occur in almost equal proportions.

The Weltevrede Subgroup forms the basal unit of the Cape supergroup and is Devonian in age. The Witpoort Formation forms the top unit of the Weltevrede Subgroup.

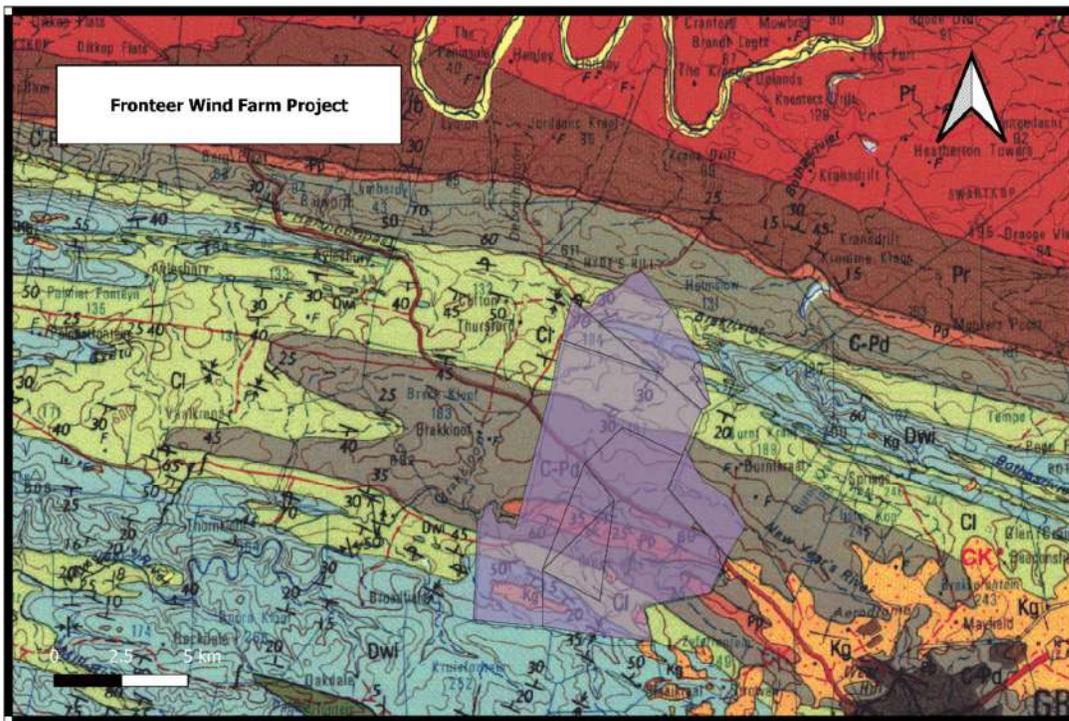


Figure 18 - Extract of the 1:250 000 3326 Grahamstown Geological Map (Council of Geosciences [Pretoria]) indicating the Eastern Block (Fronteer) Wind Farms .

5.5 Cultural and Living Heritage Background

The creation of the Cookhouse REDZ, and the ensuing applications for WEFs in this area has resulted in several HIAs having been compiled for the region since 2009/2010. All these reports have addressed the region's archaeological and palaeontological heritage, while very few reports have assessed the cultural landscape as well.

The proposed Fonteer Wind Energy Facility is located on a plateau of undulating plains and hills situated between the Great Fish River valley to the north, the New Years River valley to the south-west and Makhanda (previously known as Grahamstown) about 12kms to the south-east. The area is characterised by hills and mountains interspersed with river valleys and watercourses. The site is accessed via three scenic historic regional roads which run through the site. These roads have carried inhabitants and travellers between historic towns and further regional destinations since at least the late C18th according to maps and earlier considering the topographical layout of the area which requires the navigation of poorts (passage through mountains) and drifts (river crossings) to traverse the landscape.

The largest town in the area, Makhanda, is largely visually hidden from the surrounding landscape as it is situated in a low lying depression between enclosing hills and ridges. A few historic heritage

sites such as Makaanaskop and Fort Selwyn (PHS) on Gunfire Hill are located on higher elevations along the outskirts of the town, which would have offered the inhabitants a better defensive viewpoint of their surroundings. On leaving Makhanda along the R350 regional routes, the road rises up onto the hilly plateau on which the proposed WEF site is located, from where the surrounding landscape is experienced as open vistas bounded to the north and south by skylines of mountain ranges viewed intermittently through viewsheds between the hills. These scenic routes wind between the hills of the plateau before they drop down into the surrounding lower elevations. Further along the R350, on leaving the proposed adjacent proposed WEF site, the road enters the historic Hellsportpas between two steep ridges before heading down into the Great Fish River valley. The R400 travels over the plateau slowly descending west out of the proposed WEF area towards the historic Riebeeck East, which grew out of the historically significant Mooimeisiesfontein farm, originally belonging to Piet Retief, one of the leaders of the Groot Trek. The R344 travels north towards the Great Fish River, passing through historic mountain passes (poorts) and over historic river crossings (drifts) away from the Cape Fold Mountains into the Great Fish River valley and the Karoo and Eastern Cape escarpments beyond. The catchment area drains into the Nuwejaars and the Brak Rivers, with numerous smaller drainage lines leading from the ridges. According to Mucina and Rutherford (2006), the area is characterised by Kowie Thicket, Suurberg Quartzite Fynbos, Suurberg Shale Fynbos, Albany Broken Veld and Bisho Thornveld vegetation types, all low lying shrubby vegetation. Given the form of the indigenous vegetation, clusters of tall trees are indicative of human transformation and usually habitation.

Outside of Makhanda, the area is sparsely populated with several farmsteads, most historic, with their associated and adapted agricultural structures located on the valley floors usually near watercourses or springs and adjacent to historic routes. Sites of habitation are usually layered in their historic signature, with various periods of habitation and human influence evident on the same site over time. The farmsteads are connected through several farm roads and old ox-wagon routes that join the local communities, through linking historic regional roads, to the towns of Makhanda and Somerset East and smaller historically significant settlements like Riebeeck East and Fort Beaufort. Many farm buildings in the area contain elements greater than 60 years of age and fall with the general protection of the NHRA. Remnant outspan areas are found in the area, which relate to the trekboere and possibly other pastoral travellers on the landscape.

Sheep, cattle and other livestock farms exist alongside mostly nature reserves, game farms and other protected biodiversity conservation areas populated with game species. The reintroduction of wildlife into the landscape through nature and game reserves echoes labels like “Rhinoster Jagt” (rhinoceros hunt) on historic maps which testify to these species dominating the landscape in the past. Many previous agricultural activities have been replaced and/ or supported by conservation and game initiatives aimed at the tourist market, relying on the wilderness sense of the landscape to set the scene for an ‘African’ experience. The result is a landscape with an overwhelmingly rural and natural sense of place, wide-open spaces and distant vistas of surrounding mountain horizons,

recalling the historic frontier landscape of conflict, survival and conquest, crisscrossed with wire fencing demarcating parcels of custodianship of people over the land and its inhabitants.

5.6 Archaeological and Heritage Studies in and around the Study Area

A scan of the SAHRIS database has revealed the following studies conducted in and around the study area of this report. These studies are summarised below in ascending date order:

- WEBLEY, L & WAY-JONES, M. F. 2007. Phase 1 heritage impact assessment on erven 1,44,7586 and 4979, Rhodes University, Grahamstown, Eastern Cape. Prepared for Rhodes University. **No archaeological material was observed.**
- NEL, J. & DE KAMPER, G. 2008. Heritage resources scoping survey & preliminary assessment Transnet Freight Line EIA, Eastern Cape and Northern Cape. Prepared for Environmental Resource Management in Southern Africa. **Sixty-five sites, including fossils, Early, Middle and Late Stone Age, Historical sites and structures and graves were observed during the survey.**
- VAN SCHALKWYK, L. 2008. Heritage impact assessment of four borrow pits, Ndlambe and Makana Municipalities, Greater Cacadu Region, Eastern Cape Province, South Africa. Prepared for BKS (Pty) Ltd. **No heritage resources were identified within any of the proposed development areas.**
- ANDERSON, G. 2009. Heritage survey of the proposed Waainek Wind Farm, Grahamstown, Eastern Cape. Prepared for Coastal and Environmental Services. **No heritage sites were identified in the affected area.**
- BINNEMAN, J. AND BOOTH, C. 2009. A Phase 1 archaeological heritage impact assessment for the proposed subdivision and rezoning of Erf 8517, Grahamstown, Makana Municipality, Cacadu District Municipality, for the purposes of constructing residential and town housing, and business centre. Prepared for Conservation Support Services. **The area is of low cultural sensitivity. No archaeological sites were found.**
- GAIGHER, S. 2010. Heritage Impact Assessment for the Proposed Upgrading of the Storm Water Drainage Network for the Town of Somerset East, Eastern Cape Province. **Only one area containing an informal cemetery was identified.**
- HALKETT, D. & WEBLEY, L. 2010. Heritage Scoping Assessment of a proposed Wind Energy Facility to be situated on farms in the Cookhouse District, Eastern Cape. Prepared for Savannah Environmental (Pty). **No heritage sites or features were identified.**
- HALKETT, D. & WEBLEY, L. & ORTON, J.& PINTO, H. 2010. Heritage impact assessment of the proposed Amakhala-Emoyeni wind energy facility, Cookhouse District, Eastern Cape. Prepared for Savannah Environmental (Pty). **Historical features, buildings and graveyards associated with farms are present within the study area.**
- BOOTH, C. 2011A. A Phase 1 Archaeological Impact Assessment for the proposed Cookhouse li Wind Energy Facility, Blue Crane Route Local Municipality, Eastern Cape Province. Prepared for Savannah Environmental (Pty). **Isolated surface scatters of**

predominantly MSA stone artefacts, a LSA site, and some historical ceramics were observed.

- BOOTH, C. 2011B. Phase 1 archaeological impact assessment for the Golf Course Development On Portions 1 and 2 of the Farm Willow Glen and Portion 6 of Belmont Farm, Grahamstown, Makana Municipality, Cacadu District Municipality, Eastern Cape Province. Prepared for Coastal and Environmental Services. **No archaeological heritage material remains or sites were found.**
- NILSSEN, P. 2011. Proposed development of the Plan 8 Grahamstown Wind Energy Project: including Farms Gilead 361, Peynes Kraal 362 and Tower Hill 363, Grahamstown, Makana Municipality, Eastern Cape Province. Prepared for Coastal & Environmental Services. **Two unmarked graves, a cave with rock art, stone age artefacts and an old horse/oxen-drawn plough were observed in the area.**
- VAN SCHALKWYK, J. 2011. Heritage impact assessment for the proposed Eskom 400kv Electricity Transmission Line, Neptune To Poseidon Substations, East London To Cookhouse, Eastern Cape. **Several stone and iron age sites were identified.**
- VAN RYNEVELD, K. 2011. Cultural heritage impact assessment upgrade of the National Route 10 Section 3(N10/3) from Baviaans River to Rietvlei (Vriscgewaagd), between Cookhouse and Cradock, Eastern Cape, South Africa. Prepared for MPM Environmental Consultants. **No Stone Age or Iron Age sites were identified, while 2 Colonial structures and a grave was found.**
- BINNEMAN, J. 2013. An archaeological walkthrough survey of the turbine footprint for the proposed Phase 1 Amakhala Emoyeni Wind Energy Facility, Cookhouse District, Blue Crane Route Municipality, Eastern Cape Province. **The study area investigated appears to be of low archaeological and historical sensitivity.**
- BINNEMAN, J. 2013. A Phase 1 Archaeological Impact Assessment of the proposed new substation and 132kv power line and the Nojoli Wind Farm near Cookhouse, Blue Crane Route Local Municipality, Cacadu District, Eastern Cape Province. Prepared for Savannah Environmental (Pty) Ltd. **The study area investigated appears to be of low archaeological and historical sensitivity.**
- BINNEMAN, J. 2014. An archaeological walkthrough survey of the final layout of the proposed Nojoli Wind Energy Facility near Cookhouse, Blue Crane Route Local Municipality, Bedford District, Eastern Cape Province. Prepared for Savannah Environmental (Pty) Ltd. **The study area investigated appears to be of low archaeological and historical sensitivity.**
- BINNEMAN, & REICHERT, K. 2015. An archaeological walkthrough survey of the final optimised layout of the authorised Nxuba Wind Farm near Cookhouse, Blue Crane Route Local Municipality, Sarah Baartman District Municipality, Eastern Cape Province. Prepared for Savannah Environmental (Pty) Ltd. **Only a few isolated weathered Middle Stone Age stone tools of low heritage significance were observed.**
- VAN RYNEVELD, K. 2016. Phase 1 Archaeological & Cultural Heritage Impact Assessment – Proposed Hempel Quarry, Crusher and Stockpile Area, Farm No 604, near

Grahamstown, Makana Local Municipality, Eastern Cape. Prepared for Terreco Environmental. **No archaeological or cultural heritage was identified.**

- SMUTS, K. & LAVIN, J. 2017. Heritage impact assessment for the proposed Spitskop WEF 132kv Power Lines. Prepared for Terramanzi Group (Pty) Ltd. **Six MSA artefacts were found**

5.7 Findings of historical desktop study

The findings can be compiled as follows and have been combined to produce a heritage sensitivity map for the project based on the desktop assessment (Error! Reference source not found.).

5.7.1 Heritage Sensitivity

The sensitivity maps were produced by overlying:

- Satellite Imagery;
- Current Topographical Maps; and
- First to third edition Topographical Maps dating from the 1940's to 1970s.

This enabled the identification of possible heritage sensitive areas that included:

- Dwellings;
- Clusters of dwellings (homesteads, huts and farmsteads);
- Archaeological Sensitive areas; and
- Structures/Buildings.

By superimposition and analysis, it was possible to rate these structure/areas according to age and thus their level of protection under the NHRA. Note that these structures refer to possible tangible heritage sites as listed in **Table 5**.

Table 5 -Tangible heritage sites in the study area

Name	Description	Legislative protection
Archaeology - Iron Age Sites	Older than 100 years	NHRA Sect 3 and 35
Architectural Structures	Possibly older than 60 years	NHRA Sect 3 and 34
Graves and Burial Grounds	60 years or older	NHRA Sect 3 and 36

Additionally, evaluation of satellite imagery has indicated the following areas that may be sensitive from a heritage perspective. The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix in *Table 6 - Landform type to heritage find matrix***Table 6**.

Table 6 - Landform type to heritage find matrix

LANDFORM TYPE	HERITAGE TYPE
Crest and foot hill	LSA and MSA scatters, LIA settlements

Crest of small hills	Small LSA sites – scatters of stone artefacts, ostrich eggshell, pottery and beads
Watering holes/pans/streams	LSA sites, LIA settlements
Farmsteads	Historical archaeological material
Ridges and drainage lines	LSA sites, LIA settlements
Forested areas	LIA sites

6 FIELDWORK AND FINDINGS

A controlled surface survey was conducted on foot and by a vehicle over a period of one day by a heritage specialist and field assistant from PGS. The fieldwork was conducted over several days on 23 March 2020 as well as from 8 to 13 June 2020. The tracklogs (in yellow) for the survey are indicated in **Figure 19**.

During the survey, five (5) heritage sites were identified. Of these five sites, four (4) sites (**EWF2-01** to **EWF2-04**) consist of structures (Farmhouses, Labourer houses, and stone walls), and one (1) site contain graves (**EWF2-05**).

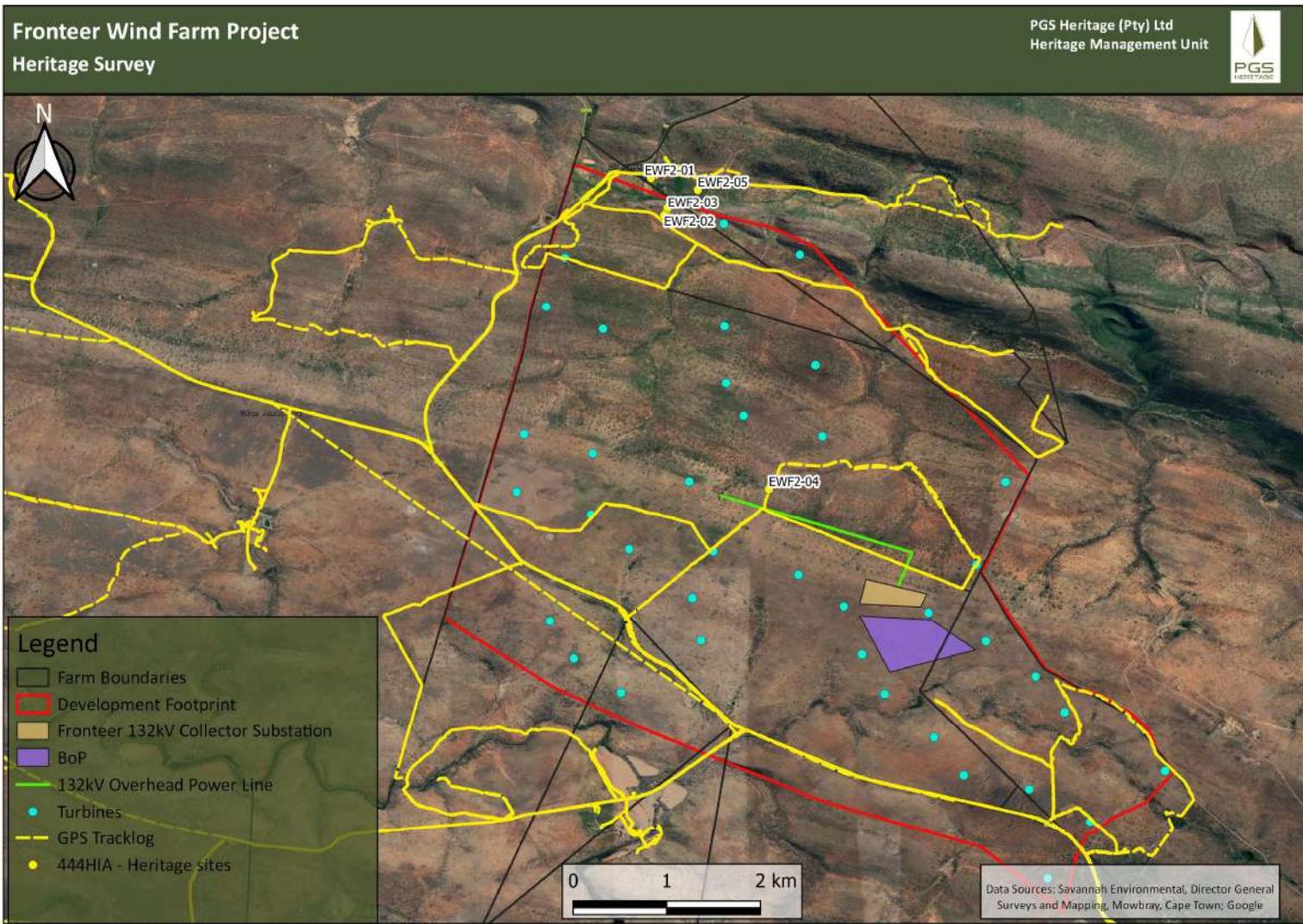


Figure 19 – Locality of the heritage resource in the study area

Table 7 - Sites identified during heritage survey

Site ¹ number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EWF2-01	33°11'38.21"S	26°25'11.38"E	<p>Several structures were found on Draai Farm 184. The structures have been converted to guest Accommodation as part of the Hounslow Lodge. Hounslow farmstead has a cluster of historic stone military structures associated with the farmstead. The Hounslow homestead itself is of historic significance. In terms of architecture, the main house consists of a two-story building with a corrugated iron roof. Characteristics of the house include a gable roof, lean-to-verandah and casement windows in steel frames. A small balcony also extends from one of the rooms on the second story along the Southern façade of the house. Many of the other buildings identified to consist of multi-room old stone farm/military buildings, with corrugated iron roofs.</p> <p>The following information has been extracted from the Artefacts website (Artefacts, 2020) for the Hounslow farmstead:</p> <p><i>"In 1845 Niemand's Kraal, belonging to Nicolaas Niemand, became the property of William Potter, who was born in 1788 . He was a carpenter by trade and came out as a member of David Mills' Party on Sir George Osborne in 1820. He was accompanied by his wife Hannah, then aged 27, and their two daughters, Mary aged 10 and Ann who was 6. He renamed his farm Hounslow.</i></p> <p><i>Mary Potter married John Kapel Hyde in 1824. Hyde is recorded as a mason, being a member of Pigot's Party from Berkshire. Their son William, was raised by his grandparents, William and Hannah Potter.</i></p> <p><i>The young William married Sarah King in 1845 and continued to live on Hounslow. The homestead became known as "The Belle Inn" with William Hyde as the licensee although it remained owned by William Potter. Apparently, the Inn was so named by Mr Potter because it is 10 miles (16km) from Grahamstown as is the former Inn in London.</i></p> <p><i>Thomas Baines, the war artist, stayed there in 1848 and on two later occasions. He painted a picture of the home in payment for his lodging.</i></p>	Medium	IIIB

¹ Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.

Site ¹ number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			<p><i>As far as is known, this painting belongs to the Currie family from Pretoria. According to a letter written to Dr Currie "the size of the actual canvas is about 23 inches by 33 inches and is enclosed by the original old yellowwood frame. The painting is in excellent condition, and is signed and dated (1848) on the back of the canvas by Thomas Baines."</i></p> <p><i>During the war (1846 - 1847), a military post of 60 Fingo Levies was established at Hounslow commanded by William Hyde. The homestead also endured heavy attack during the 1850 - 1853 war, but survived.</i></p> <p><i>The homestead has been added onto – during the ostrich boom early 1900s – it was the men's billiard room-cum-drinks and smoking room entered from the outside and separate from the house as such.</i></p> <p><i>The L shape at the back was once stables and the last room had prison type bars on the one window. "</i></p> <p>Several structures were identified on the 3326AB Pigott's Bridge Topographic map dating to 1955 near the location of the main farmhouse.</p> <p>Aerial Photograph (3_011_01159) dating 1942 from the CDNGI Geospatial Portal (http://www.cdngiportal.co.za/cdngiportal/) shows the farmhouse, shed and other smaller buildings at the location of EWF2-01. This is the oldest Aerial Photograph of the main farmhouse that is available.</p> <p>As such, considering the historic fabric of the Hounslow Farmstead, it has been determined, that the farmstead has a special relationship between the community and the surrounding environment. Furthermore, the main farmhouse and the stone buildings are older than 60 years and of heritage significance. The site is provisionally rated as IIIB with medium heritage significance.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • Although the site is located outside of the proposed development area, it is recommended that a no-go-buffer-zone from the outer perimeter of the farmstead/ "werf" (which is 		

Site ¹ number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			<p>currently occupied) is kept to the closest WEF infrastructure (including turbines, substation facilities and roads).</p> <ul style="list-style-type: none"> • In terms of general conservation of the historical farmsteads, a 500m no-go-buffer-zone is recommended. However, considering the impact of the proposed development of the Fronteer WEF on the cultural landscape of these historical farmsteads, a 1000m no-go-buffer-zone (inclusive of the 500m no-go-buffer-zone) should be implemented. • If development occurs within 1000m of EWF2-01 the main homesteads/ “werf” need to be satisfactorily studied and recorded before impact occurs. • Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b) photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings. 		



Figure 20 - Northern facade of the main house



Figure 21 - Southern facade of the house

Site ¹ number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p data-bbox="191 748 840 776"><i>Figure 22 - One of the original stone buildings at EWF2-01</i></p>	 <p data-bbox="1073 756 1587 784"><i>Figure 23 - Old old stone outbuilding and toilet</i></p>	
			 <p data-bbox="191 1295 840 1323"><i>Figure 24 - Modern brick building used for accommodation</i></p>	 <p data-bbox="1073 1300 1734 1328"><i>Figure 25 - A shed used for animals and farming equipment</i></p>	

Site ¹ number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
<p>Figure 26 - View of the structure (red polygon) identified on the 3326AB Pigott's Bridge 1955 Topographic map near the location of EWF2-01</p>					

Site ¹ number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			 <p>The image is a black and white aerial photograph of a rural landscape. It shows a network of roads and paths crisscrossing the terrain. In the center-right portion of the image, a cluster of buildings, likely a farmstead, is circled in yellow. To the left of this circled area, there is a black crosshair symbol. The surrounding land appears to be a mix of open fields and wooded areas.</p>		
<p>Figure 27 - Section of the 1952 photograph (3_011_01159) showing the main farmstead (yellow circle).</p>					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EWF2-02	33°11'51.49"S	26°25'15.97"E	<p>A brick labourer house was found on Draai Farm 184.</p> <p>As far has been determined, the house does not have a special relationship between the community and the surrounding environment. Thus, the site is provisionally rated as NCW as it has no research potential or is of other cultural significance.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> No mitigation is required 	NCW	No research potential or other cultural significance



Figure 28 - View of the north-eastern facade



Figure 29 - View of the south-western facade

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EWF2-03	33°11'48.71"S	26°25'17.14"E	<p>A historic stone pack farm wall was found on Draai Farm 184. The wall is approximately 300m long, 0,7m wide and 0,9m high. A wall was identified on the 3326AB Pigott's Bridge Topographic map dating to 1955 near the location of EWF2-03.</p> <p>According to the CLA the stone packed wall along the southern ridge its follows the old historic ox-wagon road shown on the 1827 Draai Farm SG diagram from Grahamstown to the Great Fish River. The site is provisionally rated as IIIC with low heritage significance.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • A 30m No-Go-Buffer-Zone be recommended for WWF1-07. • If development occurs within 30m of WWF1-07, the site needs to be satisfactorily studied and recorded before impact. • Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b) photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings. 	Low	IIIC

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
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Figure 30 - General view of the historical stone wall



Figure 31 - View of the wall (red polygon) identified on the 3326AB Pigott's Bridge 1955 Topographic map near the location of EWF2-03

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EWF2-04	33°13'26.02"S	26°25'52.07"E	<p>A labourer house, kraal and a goat shed were found in the farm Table Hill 187.</p> <p>Structures and a kraal were identified on the 3326AB Pigott's Bridge Topographic map dating to 1977 near the location of EWF2-04. As such the structure appears to be younger than 60 years and not of heritage significance. As far has been determined, the site does not have a special relationship between the community and the surrounding environment. Thus, the site is provisionally rated as NCW as it has no research potential or is it of other cultural significance.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> No mitigation is required 	NCW	No research potential or other cultural significance



Figure 32 - View of the labourer house



Figure 33 - View of the kraal

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
<p>Figure 34 - View of the structures (red polygon) identified on the 3326AB Pigott's Bridge 1977 Topographic map near the location of EWF2-04</p>					

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
EWF2-05	33°15'26.47"S	26°25'13.88"E	<p>Graves of the White family were found on the farm Table Hill 187. Approximately 44 graves were found. The graves contain headstones and grave dressing. The graves are fenced off with a small stone wall.</p> <p>Burial grounds and graves are protected under Section 36 of the NHRA 25 of 1999. Thus, the site is provisionally rated as having a high heritage significance with a heritage rating of IIIA. All graves have high levels of emotional, religious and in some cases historical significance. It is also important to understand that the identified graves could have significant heritage value to the relevant families. The site is of Generally Protected A (GP. A) or High/Medium Significance.</p> <p>It is recommended that:</p> <ul style="list-style-type: none"> • The site should be demarcated with a 30-meter no-go-buffer-zone and the graves should be avoided and left in situ. • A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by ECPHRA. • If the site is going to be impacted directly and the graves need to be removed a grave relocation process for these sites is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the ECPHRA under the NHRA and National Health Act regulations. 	High	IIIA

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					

Figure 35 - View of some of the headstones and graves found at EWF2-16

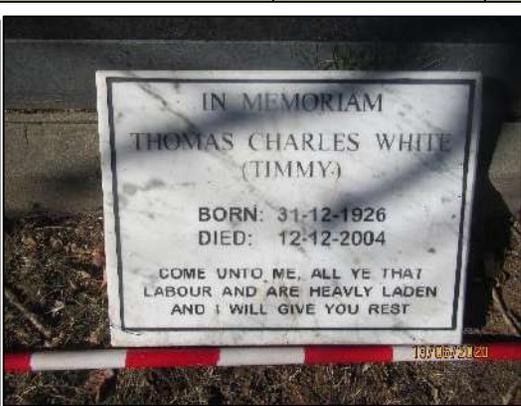
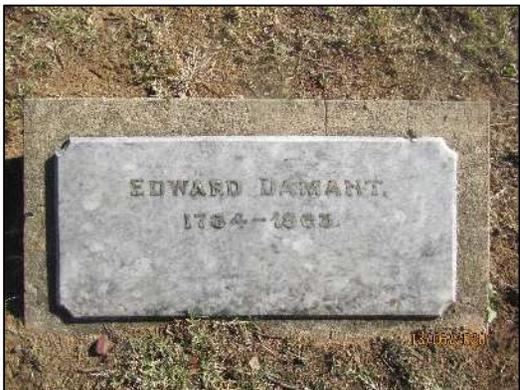
Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
					
					

Figure 36 - View of some of the headstones

6.1 Archaeological and Historical sensitivity assessment outcome

From the desktop assessment high to low heritage sensitive areas were identified that was followed with a field assessment in which five (5) heritage sites were identified. Of these five sites, four (4) sites (**EWF2-01** to **EWF2-04**) consist of structures (Farmhouses, Labourer houses, and stone walls), and one (1) site contain graves (**EWF2-05**).

Of these sites, two sites (**EWF2-02** to **EWF2-04**) were rated as not conservation worthy and of no heritage significance. One site (**EWF2-03**) has a low heritage significance and a rating of IIIC, while one site (**EWF2-01**) has a medium heritage significance and heritage rating of IIIB. The remaining site (**EWF2-05**) has a high heritage significance and sensitivity and heritage rating of IIIA.

7 PALAEOLOGY

The palaeontological impact assessment (PIA) conducted by Banzai Environmental (Butler, 2021) determined that the site is underlain by the Dwyka Group; the Fort Brown Formation of the Eccca Group (Karoo Supergroup), Adelaide Subgroup (Koonap and Middleton Formations) of the Beaufort Group (Karoo Supergroup) and the Witteberg Group of the Cape Supergroup, Karoo Dolerite (Karoo Supergroup), and Quaternary deposits. According to the PalaeoMap of SAHRIS the Palaeontological Sensitivity of the Dwyka Group is Low, the Collingham Formation, Rippon Formation, Fort Brown Formation of the Eccca Group is Moderate, while the Prince Albert Formation has a High and the Whitehill Formation of the Eccca has a Very High Palaeontological Sensitivity(**Figure 38**). The Adelaide Subgroup has a Very high Palaeontological Sensitivity while Dolerite is igneous in origin and thus has an Insignificant Paleontological Sensitivity (Almond et al, 2013; SAHRIS website). The geology of the proposed Fronteer Wind Farm is indicated on the 1: 250 000 3326 Grahams Town (Council for Geosciences) (**Figure 37**).

A 3-day site-specific field survey of the development footprint was conducted on foot and by a motor vehicle on 20 November to 23 November 2020. No visible evidence of fossiliferous outcrops was found. The scarcity of fossil heritage at the proposed development footprint indicates that the impact of the WEF and associated grid connection infrastructure will be of a low significance in palaeontological terms.

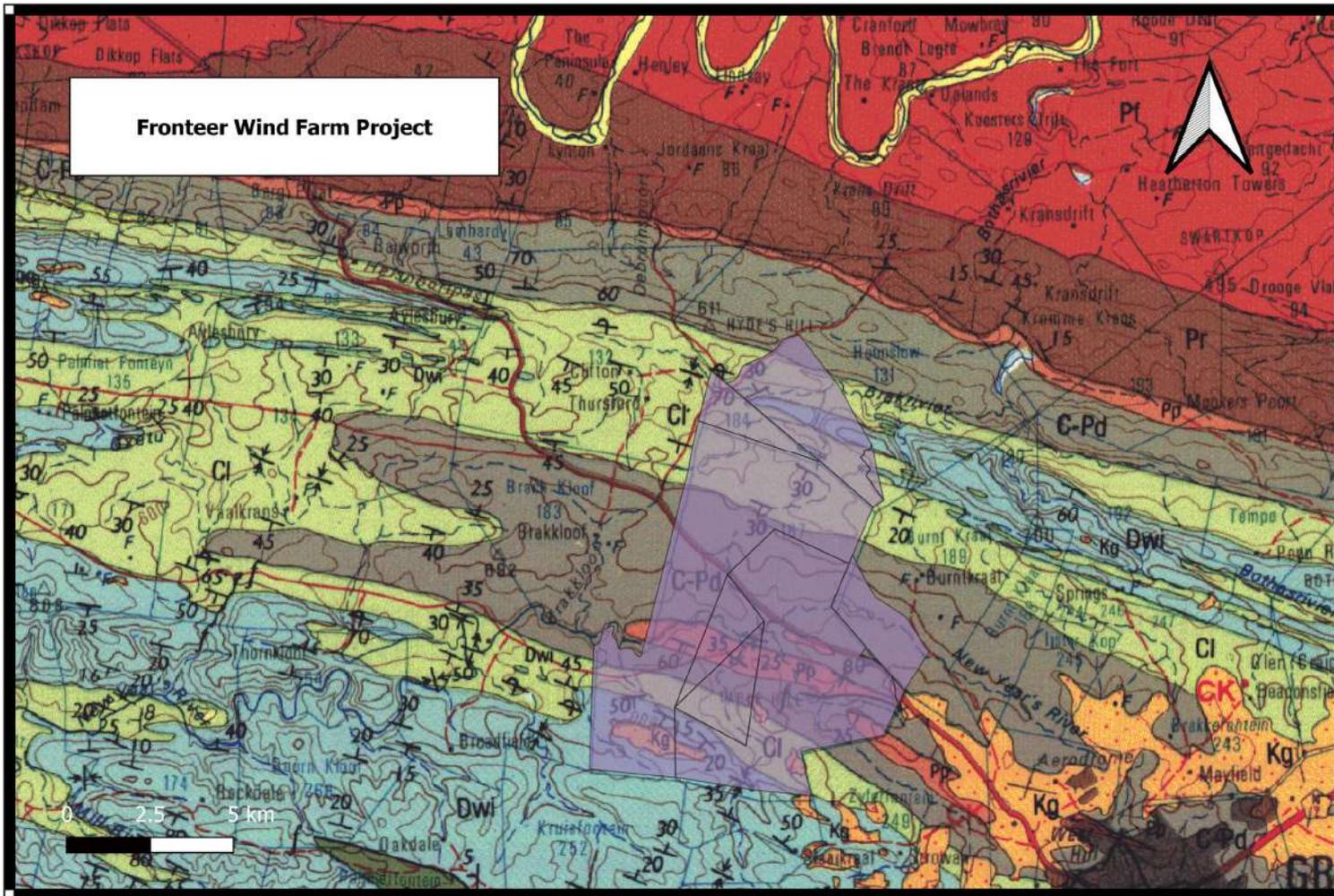


Figure 37 - Extract of the 1:250 000 3326 Grahamstown Geological Map (Council of Geosciences [Pretoria]) indicating the Frontier Wind Farm.



Legend

Qc-Quaternary-Calcrete

Jd-Dolerite

Pb- Balfour Formation (Adelaide Subgroup, Beaufort Group, Karoo Supergroup); Sandstone and Grey mudstone

Pm- Middleton Formation (Adelaide Subgroup, Beaufort Group, Karoo Supergroup); Sandstone; Grey and red mudstone

Pk- Koonap Formation (Adelaide Subgroup, Beaufort Group, Karoo Supergroup); sandstone, shale and grey mudstone

Pf- Fort Brown Formation (Ecca Group, Karoo Supergroup); Shale

Pr-Rippon Formation (Ecca Group, Karoo Supergroup); sandstone and shale

Pp- Collingham Formation, Whitehill Formation, Prince Albert Formation (Ecca Group, Karoo Supergroup)

C-Pd- Dwyka, Tillite

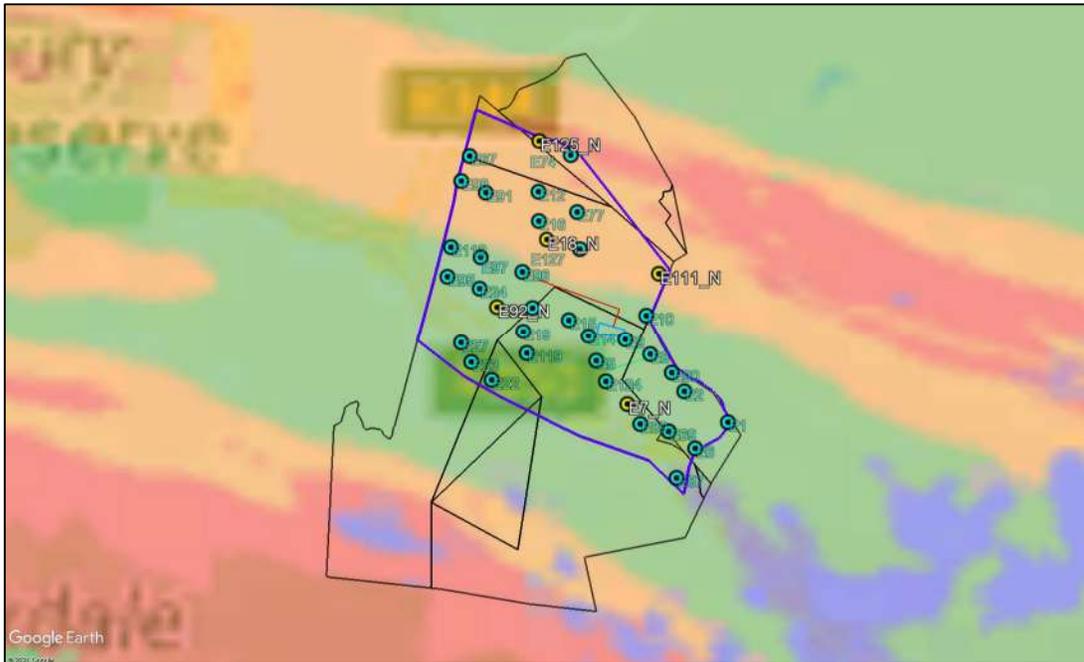


Figure 38 – Overlay of the Frontier Wind Farm on the palaeosensitivity map from the SAHRIS database. This shows that most of the proposed development footprint (blue polygon) falls in an area that is coloured green and orange, which is rated as Moderate to High sensitivity.

Table 8 - SAHRIS palaeosensitivity ratings table

Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study; a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, sahra will continue to populate the map.

8 CULTURAL LANDSCAPE

The following section is taken from the CLA (Rabe-bailey, 2021) completed for this project.

Rabe Bailey (2021) notes that cultural landscapes are a significant factor in the evaluation of the impact of the proposed development on cultural heritage resources, tangible (e.g. Historic settlements, landscapes, technological) and intangible (e.g. language, indigenous knowledge systems, oral traditions). The area investigated for the proposed Fronteer and Wind Garden WEFs is considered as having a high to very high cultural landscape heritage significance.

The Fronteer site can be divided into three landscape character areas with three cultural heritage resource types. These units were determined by taking the larger landscape context into consideration in order to understand the character and cultural heritage values that underpin the proposed development site.

A: Fronteer – Wind Garden Plateau

The plateau of undulating hills and plains on which the proposed Fronteer WEF is located is of higher elevation to the surrounding landscape and visible to a very significant part of the surrounding area, including significant heritage sites such as Fort Brown, Fort Selwyn, the Great Fish River eastern ridge, Riebeeck East and many farmsteads and nature reserves in the surrounding area (**Figure 39**). The visual impact on these sites is further discussed in the VIA for the site (March 2021). The plateau is characterised by undulating terrain with hills and riverine corridors. The entire site is located on the plateau, as such, it is not indicated on the cultural landscape elements map.

B. Mountainous ridges

The plateau of undulating and strongly undulating hills and plains is bounded to the north by mountainous and tall hills. These mountain ridges create a visual buffer between the plateau and lower-lying areas when experienced from close proximity. Gaps between these ridges have become poorts through which animals and people navigate the landscape.

C. Riverine corridors

In juxtaposition to the hilly undulations of the plateau and surrounding landscape, riverine corridors intersect the landscape creating a network of drainage lines. Shallower parts of these water courses have become drifts through which animals and people navigate the landscape. Historic farmsteads and their associated structures are largely found in this landscape unit.

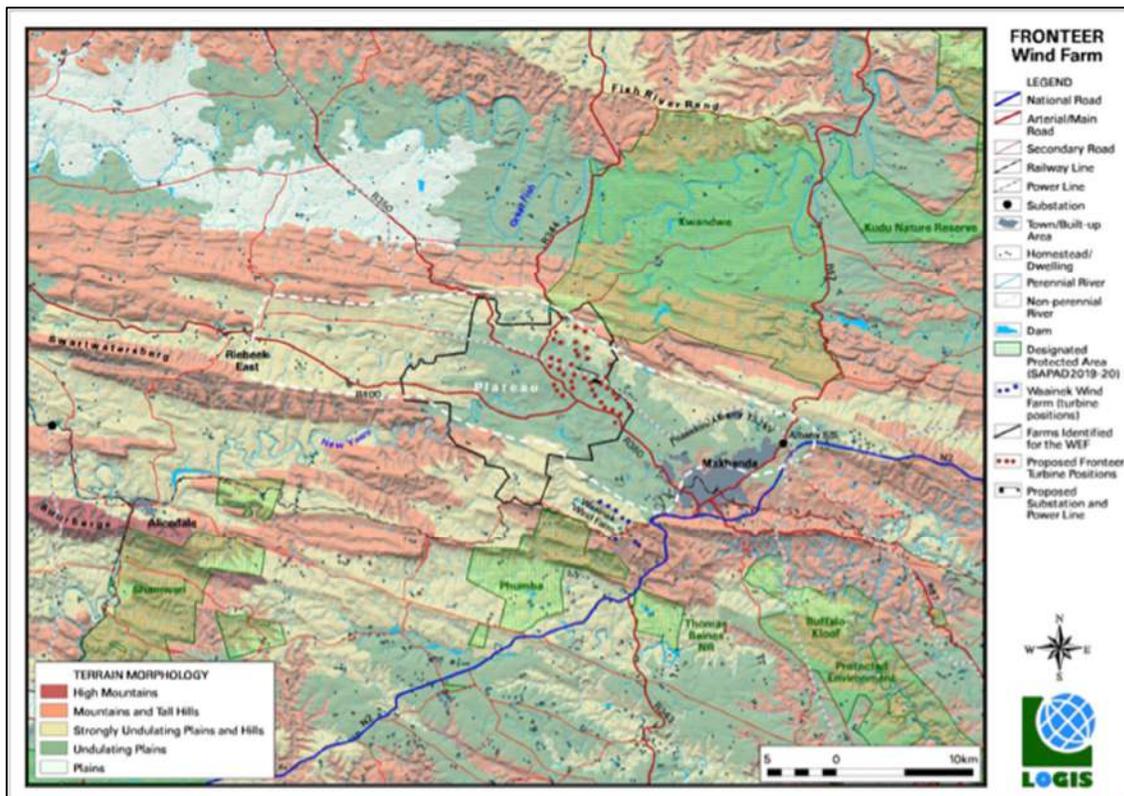


Figure 39 - Terrain morphology of the study area and surrounding landscape (Rabe, 2021)

The man-made and natural heritage resources interacting with the above characteristic landscape types are:

D. Historic farmsteads and associated stock farms – Grade IIIA – II cultural heritage resources

The farmsteads in this study are all located adjacent or near to watercourses or springs in the lower elevations of the undulating plains, with associated grazing lands for livestock on the higher elevations and ridges.

E. Conservation areas – Grade II – I Bio-cultural heritage resources

Critical biodiversity areas and a large portions of ecological support area in the study area support biodiversity conservation. Many properties outside of the study area fall in this landscape unit and would add to the wilderness sense of place.

F. Historic routes and gateways – Grade IIIA – II cultural heritage resources

The R350, R400 and R344 are scenic historic routes that wind over the undulating plateau. Intermittent views between the hills of farmsteads and distant mountain ranges give the sense of place in the landscape (**Figure 40**). The gateways to the plateau on each of these routes allows for significant views on exiting and the transitional experience of leaving one distinct landscape area for another. This is most strongly experienced on entering the plateau on the R350 from Makhanda and more impressively travelling through the Hellspoorpas, as well entering the plateau

from the northern ridge on the R344 overlooking Van Der Merwes Kraal and Clifton. Hounslow is a nexus point at a gap between the ridges where the R344 and the Kranzdrift roads join with the historic road to Grahamstown/ Makhanda.

G. Archaeological and palaeontological sites – Grade III C to II cultural heritage resources

All archaeological and palaeontological resources are protected by the NHRA and were investigated for grading by the AIA. Stone walling, kraals, graveyards/ cemeteries and rock art on Hounslow, Brack Kloof, Hilton, Draai and Table Hill Farms are included here. These resources, where their locations are known, are largely contained within the farmstead areas and as such have not been mapped separately in the CLA report.

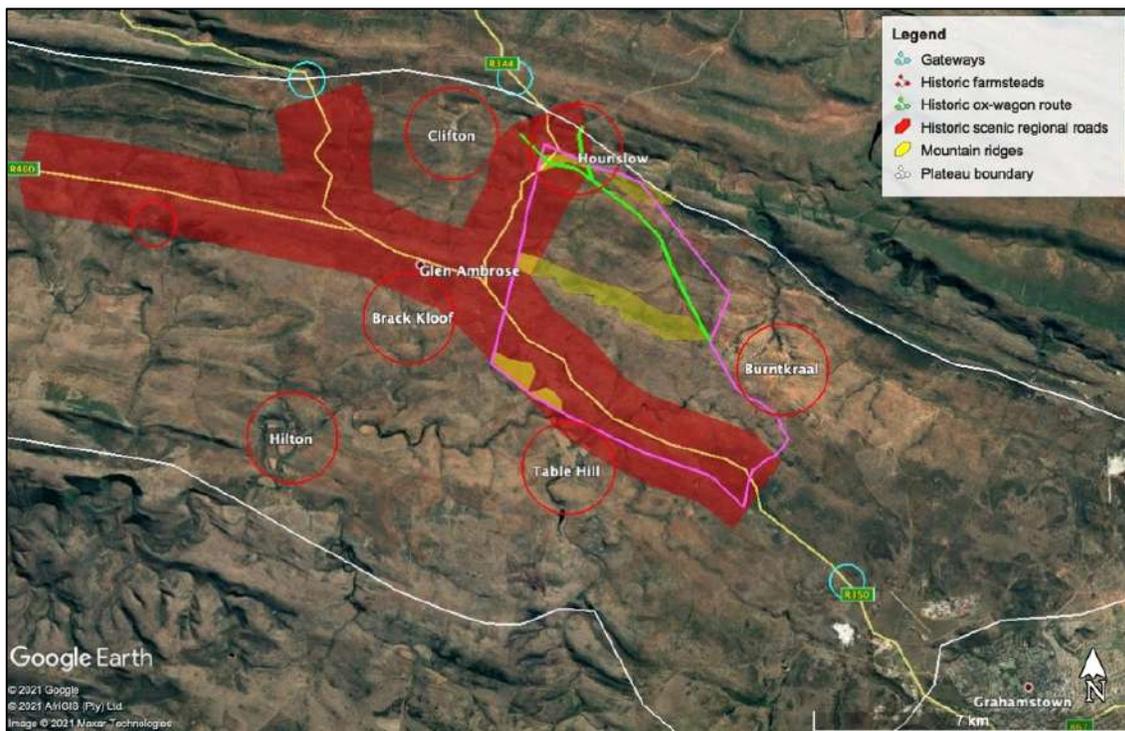


Figure 40 - Cultural landscape units reflecting cultural heritage values identified for Frontier landscape (Rabe, 2021)

9 SOCIO-ECONOMIC PROJECT INITIATIVE

The Socio-Economic Impact Assessment Report for Frontier Wind Farm was completed by Matthew Keeley, a Senior Development Economist, and Elena Broughton, the Unit Manager: Innovation and Sustainable Development; Senior Development Economist of Urban-Econ Development Economists in 2021.

9.1 Economic Impact of SED Spend

As required by the National Energy Regulator of South Africa in relation to an Application for an Electricity Generation Licence in terms of the Electricity Generation Act (No. 4 of 2006), the applicant is required to demonstrate certain commitments to empowerment and economic development within the designated local area.

The developer of the proposed WEF has communicated that their total forecasted socio-economic development (SED) spend for the fully operational Fronteer WEF will be in the order of 2.5% of the Gross Annual Revenue generated.

Of the 2.5%, 0.5% will be contributed to the Just Energy Transition Fund, with the remaining 2% being spent on community development initiatives within the immediate vicinity of the proposed project.

Given the planned 213 MW generation capacity of the Fronteer WEF, the total estimated contribution to SED within the study area is estimated at R12,48 million per annum with the figure increasing annually by CPI. Over the first ten years of operation, this equates to a forecasted SED spend of R153,30 million, while over the full lifecycle of the project SED spend as anticipated to amount to R391,38 million.

The developer of Fronteer WEF has prepared a Conservation Framework document putting forward its intentions when it comes to its future intended commitments to community development within the immediate vicinity of the proposed project. Their intentions are that their future socio-economic interventions in the area should also include conservation-related interventions. These should dually seek to increase both the wealth and the overall well-being of communities, while at the same time ensuring the extension of conservation efforts in the region. The latter includes the promotion of eco-tourism in the region.

The objectives of the above are set out as follows:

Socio-economic spend objectives:

- Increase in the level and diversify the type of skills in communities required to support conscious conservation; and
- Creation of sustainable employment opportunities for the local community which results in a sustainable increase in household income.

Conservation spend objectives:

- Preservation of pristine natural assets abounding in Makana Municipality for the purpose both of conservation and the promotion of eco-tourism; and
- Protection of natural assets that are indigenous and endangered, for the purpose of preserving these assets for future generations.

9.2 Community Enrichment Initiative Spending

The developer's SED spend commitments related to local community enrichment initiatives are detailed below. In future planning, specific budget allocations from the total annual figures presented above will be targeting at the following initiatives:

- **Skills Development:** Both on-project, and non-wind energy skills development initiatives will be funded. The non-wind energy skills to be developed should be relevant and required in the region and should seek to provide value to the community and the environment.
- **Employment Opportunities:** In addition to the planned employment creation during construction and 20-year operation of the WEF, the developer intends to make a positive contribution to employment opportunities in other non-wind related industries. Given the anticipated SED spend commitments, it is assumed that up to R5,614 million could potentially be channelled towards both short- and long-term job opportunities on an annual basis.
- **Standard of living for local communities:** skills development coupled with sustainable employment creation opportunities listed above, are expected to contribute towards an improved standard of living amongst families that might not have had a sustainable income previously.
- **Conservation Contributions:** The developer has recognised that for a certain portion of visitors to the study area, their perceptions regarding the placement of wind turbines close to an area of biodiversity conservation, it will be important that resources are channelled towards the natural assets of the region and their protection. The developer proposes the introduction of various programmes, that it will design in conjunction with landowners in the area that would cumulatively make a marked difference in terms of conservation of the region generally, and protected areas specifically. This might include:
 - Financial contributions towards increases in available veterinarian capacity in the area
 - Financial contributions towards increasing the number of game rangers available for nature and game reserves
 - Financial contributions towards increased anti-poaching activities and assets
 - Financial contributions towards setting up an Emergency Animal Wellness Fund

10 IMPACT ASSESSMENT

The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the management and approval process; secondly, it shows the primary impact characteristics, as defined above, used to evaluate impact significance.

The impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. Direct, indirect and cumulative impacts will be assessed in terms of the following criteria:

- » **Nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- » The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- » The **duration**, wherein it will be indicated whether:
 - * the lifetime of the impact will be of very short duration (0–1 year) – assigned a score of 1;
 - * the lifetime of the impact will be of short duration (2-5 years) - assigned a score of 2;
 - * medium-term (5–15 years) – assigned a score of 3;
 - * long term (> 15 years) - assigned a score of 4; or
 - * permanent - assigned a score of 5;
- » The **magnitude**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in the complete destruction of patterns and permanent cessation of processes.
- » The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. The probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (a distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- » the **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- » the **status**, which will be described as either positive, negative or neutral.
- » the degree to which the impact can be reversed.
- » the degree to which the impact may cause irreplaceable loss of resources.
- » the *degree* to which the impact can be *mitigated*.

The **significance** is calculated by combining the criteria in the following formula:

$$S=(E+D+M) \times P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- » < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- » 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

10.1 Assessment of Cumulative Impacts

As per DEA's requirements, specialists are required to assess the cumulative impacts. In this regard, please refer to the methodology below that will need to be used for the assessment of Cumulative Impacts.

"Cumulative Impact", in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities².

The role of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e. whether the addition of the proposed project in the area will increase the impact). This section should address whether the construction of the proposed development will result in:

- » Unacceptable risk
- » Unacceptable loss
- » Complete or whole-scale changes to the environment or sense of place
- » Unacceptable increase in impact

The specialist is required to conclude if the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area.

² Unless otherwise stated, all definitions are from the 2014 EIA Regulations, GNR 326.

Example of a cumulative impact table:

Nature: Complete or whole-scale changes to the environment or sense of place (example)

Nature: [Outline and describe fully the impact anticipated as per the assessment undertaken]		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Low (1)	High (3)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Medium (36)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	No	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: "Mitigation", means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible. Provide a description of how these mitigation measures will be undertaken keeping the above definition in mind		
Residual Impacts: "Residual Risk", means the risk that will remain after all the recommended measures have been undertaken to mitigate the impact associated with the activity (Green Leaves III, 2014).		

10.2 Heritage Impacts and Impact Assessment Tables

During the survey, five (5) heritage sites were identified. Of these five sites, four (4) sites (**EWF2-01** to **EWF2-04**) consist of structures (Farmhouses, Labourer houses, and stone walls), and one (1) site contain graves (**EWF2-05**).

Of these sites, three sites (**EWF2-02** and **EWF2-04**) were rated as not conservation worthy and of no heritage significance. One site (**EWF2-03**) has a low heritage significance with a rating of IIIC, and one site (**EWF2-01**) has a medium heritage significance and heritage rating of IIIB. The remaining site (**EWF2-05**) has a high heritage significance and sensitivity and heritage rating of IIIA.

10.2.1 Historical structures

EWF2-02 and **EWF2-04** were rated as not conservation worthy and of no heritage significance. The impact significance before mitigation on the structures will be LOW negative *The impact of the proposed development will be local in extent. The possibility of the impact occurring is probable.* The expected duration of the impact is assessed as potentially permanent. Implementation of the recommended mitigation measures will reduce this impact rating to an acceptable LOW negative impact.

EWF2-03 has a low heritage significance and heritage rating of IIIC.

The impact significance before mitigation on the structures will be MODERATE negative before mitigation. The impact of the proposed development will be local in extent. **The possibility of the**

impact occurring is probable. The expected duration of the impact is assessed as potentially permanent. Implementation of the recommended mitigation measures will reduce this impact rating to an acceptable LOW negative impact.

EWF2-01 has a medium heritage significance and heritage rating of IIIB.

The impact significance before mitigation on the structures will be MODERATE negative before mitigation. *The impact of the proposed development will be local in extent.* **The possibility of the impact occurring is probable.** The expected duration of the impact is assessed as potentially permanent. Implementation of the recommended mitigation measures will reduce this impact rating to an acceptable LOW negative impact.

Table 9 - Impact Assessment Table for Historical structures of no heritage significance.

Historical Structures (EWF2-02 to EWF2-04) have been identified during the survey, including farmhouses and labourer houses. These sites were rated as not conservation worthy and of no heritage significance.		
	Without mitigation	With mitigation
Extent	Low (1)	Low (1)
Duration	Long term (4)	Long Term (4)
Magnitude	Minor (2)	Minor (1)
Probability	Probable (3)	Unlikely (2)
Significance	Low (21)	Low (12)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
The irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: No mitigation is required		
Cumulative impacts: Considering the potential incremental, interactive, sequential and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change. Therefore, no cumulative impact is expected to occur.		
Residual Impacts: Considering the nature of the sites identified in the present study, the residual risk will be minimal.		

Table 10 - Impact Assessment Table for Historical structures of low significance

Historical Structures have been identified during the survey. This site was rated as having a low heritage significance and heritage rating of IIIC.		
	Without mitigation	With mitigation
Extent	Moderate (3)	Low (1)
Duration	Permanent (5)	Short term (2)
Magnitude	Moderate (3)	Minor (2)
Probability	Improbable (2)	Unlikely (2)
Significance	Low (22)	Low (10)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
The irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: <ul style="list-style-type: none"> A 30m No-Go-Buffer-Zone be recommended for sites of low significance and a rating of IIIC. If development occurs within 30m of the sites, it needs to be satisfactorily studied and recorded before impact. Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b) photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings. 		

Cumulative impacts: Considering the potential incremental, interactive, sequential and synergistic cumulative impacts, it is possible that the impact could lead to the irreplaceable loss of historical resources.
Residual Impacts: Considering the nature of the sites identified in the present study, the residual risk will be moderate.

Table 11 - Impact Assessment Table for Historical structures of medium significance

Historical Structures (EWF2-01) have been identified during the survey, including a farmhouse. This site was rated as having a medium heritage significance and heritage rating of IIIB.		
	Without mitigation	With mitigation
Extent	Moderate/High (4)	Low (1)
Duration	Permanent (5)	Moderate (3)
Magnitude	High (8)	Low (2)
Probability	Probable (3)	Unlikely (2)
Significance	Medium (51)	Low (12)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
The irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> Although the site is located outside of the proposed development area, it is recommended that a no-go-buffer-zone from the outer perimeter of the farmstead/ "werf" (which is currently occupied) is kept to the closest WEF infrastructure (including turbines, substation facilities and roads). In terms of general conservation of the historical farmsteads, a 500m no-go-buffer-zone is recommended. However, considering the impact of the proposed development of the Fronteer WEF on the cultural landscape of these historical farmsteads, a 1000m no-go-buffer-zone (inclusive of the 500m no-go-buffer-zone) should be implemented. If development occurs within 1000m of EWF2-01 the main homesteads/ "werf" need to be satisfactorily studied and recorded before impact occurs. Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b) photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings. 		
Cumulative impacts: Considering the potential incremental, interactive, sequential and synergistic cumulative impacts, it is possible that the impact could lead to the irreplaceable loss of historical resources.		
Residual Impacts: Considering the nature of the sites identified in the present study, the residual risk will be moderate and possibly permanent.		

10.2.2 Burial Grounds and graves

EWF2-05 has a high heritage significance and sensitivity and a heritage rating of IIIA.

The impact significance before mitigation on the graves will be HIGH negative before mitigation. *The impact of the proposed development will be local in extent. The possibility of the impact occurring is probable.* The expected duration of the impact is assessed as potentially permanent. Implementation of the recommended mitigation measures will reduce this impact rating to an acceptable LOW negative impact.

Table 12 - Impact Assessment Table for Graves and Burial Grounds

Graves and Burial Grounds (EWF2-05) have been identified during the survey. These sites are of high significance and rated as IIIA.		
	Without mitigation	With mitigation
Extent	Moderate/High (4)	Low (1)
Duration	Permanent (5)	Long-term (4)
Magnitude	High (8)	Low (2)

Probability	Highly Probable (4)	Unlikely (2)
Significance	High (68)	Low (14)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
The irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> The sites should be demarcated with a 30-meter no-go-buffer zone, as per the SAHRA BGG policy for General developments, and the graves should be avoided and left <i>in situ</i>. If an impact occurs within the 30m no-go-buffer zone, the graves need to be removed and a grave relocation process for these sites is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the ECPHRA under the NHRA and National Health Act regulations. 		
Cumulative impacts:		
Considering the potential incremental, interactive, sequential and synergistic cumulative impacts, it is possible that the impact could lead to the irreplaceable loss of burial grounds and graves.		
Residual Impacts:		
Considering the nature of the sites identified in the present study, the residual risk will be moderate and possibly permanent.		

10.3 Palaeontological Impacts

According to the PIA conducted by Banzai Environmental (Butler, 2020) determined that the site is underlain by the Dwyka Group; the Fort Brown Formation of the Ecca Group (Karoo Supergroup), Adelaide Subgroup (Koonap and Middleton Formations) of the Beaufort Group (Karoo Supergroup) and the Witteberg Group of the Cape Supergroup, Karoo Dolerite (Karoo Supergroup), and Quaternary deposits. According to the PalaeoMap of SAHRIS the Palaeontological Sensitivity of the Dwyka Group is Low, the Collingham Formation, Rippon Formation, Fort Brown Formation of the Ecca Group is Moderate, while the Prince Albert Formation has a High and the Whitehill Formation of the Ecca has a Very High Palaeontological Sensitivity(Figure 37). The Adelaide Subgroup has a Very high Palaeontological Sensitivity while Dolerite is igneous in origin and thus has an Insignificant Paleontological Sensitivity (Almond et al, 2013; SAHRIS website).

According to the PIA the impact significance before mitigation on the Paleontological resources will be MODERATE negative before mitigation. *The impact of the proposed development will be local in extent.* The possibility of the impact occurring **is very likely**. The expected duration of the impact is assessed as potentially permanent. Implementation of the recommended mitigation measures will reduce this impact rating to an acceptable LOW negative impact.

Table 13 - Impact Assessment Table for Palaeontological Resources (After Butler, 2020)

Nature:		
The excavations and site clearance of the Fronteer Wind Farm will involve extensive excavations into the superficial sediment cover as well as into the underlying bedrock. These excavations will change the existing topography and may destroy and seal-in fossils at or below the ground surface. These fossils will then be unavailable for research		
Impacts on Palaeontological Heritage are likely to happen only within the construction phase. No impacts are expected to occur during the operation phase.		
	Without mitigation	With mitigation
Extent	Local (1)	Development area (1)
Duration	Permanent (5)	Medium-term (3)
Magnitude	High (8)	Minor (2)
Probability	Highly Probable (4)	Improbable (1)

Significance	Medium (-56)	Low (6)
Status (positive or negative)	Negative	Neutral
Reversibility	Irreversible	
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation procedure: See Chance find protocol		
<p>Chance Find Procedure</p> <ul style="list-style-type: none"> • If a chance find is made the person responsible for the find must immediately stop working and all work must cease in the immediate vicinity of the find. • The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the Environmental Officer (EO) (if appointed) or site manager. The EO must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates. • A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates. • Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found. <p>Upon receipt of the preliminary report, the Heritage Agency will inform the EO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.</p> <ul style="list-style-type: none"> • The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find. • In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the EO (or site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site. • Once Heritage Agency has issued the written authorization, the developer may continue with the development. 		
<p>Residual Impacts: Loss of fossil heritage</p>		

10.4 Impact on Cultural Landscape elements

The impact of the proposed development on the cultural landscape will be assessed according to five core values developed by Job Roos (2007), which include ecologic, aesthetic, historic, social and economic (taken from the Cultural Landscapes study by Jansen and Franklin, 2020). These values merge the requirements of significance assessment according to cultural and natural heritage resources as is required for consideration of cultural landscapes which, by definition, are the manifestation of the relationship between these characteristics of a landscape over time.

The cultural assessment found that without mitigation the impacts to the cultural landscape elements would result in a very high negative impact due to the magnitude and permanence of the impact on the cultural landscape, especially perceptual qualities from historic routes, heritage sites and impacts on cultural landscape areas and associated heritage resources. There are many visual receptors in the area as it is located close to the main urban node of the region, Makhanda, and eco-tourism facilities are common in the area, with three regional roads passing through or past the proposed site. Historic farmsteads and their associated stock farms are permanently occupied

and offer accommodation to visitors to the area. Conservation and protected biodiversity areas dominate the landscape outside the proposed WEF site. Situated on a plateau the site is visible from distances of up to 50kms. The negative impact of the development on the cultural landscape with the recommended mitigation will be moderate.

Table 14 - Impact Assessment Table for Historic Cultural Landscape

Nature of Impact: Impact on historic cultural landscape elements by all phases of development.		
	Without mitigation	With mitigation
Extent	Regional (5)	Regional (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Very high (9)	Moderate (5)
Probability	Definite (5)	Definite (5)
Significance	High (95)	Moderate (55)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Cumulative impacts: Complete or whole-scale changes to the environment or sense of place		
Residual impacts: The character of the landscape will remain changed permanently after the duration of the project as over time the sense of place will change. It is unlikely that the infrastructure will be decommissioned.		
Mitigation:		
Ecological		
<ul style="list-style-type: none"> Most of the area is prized for the fact that its natural character is retained, and that the landscape therefore still performs a range of biodiversity and ecological functions. This is mainly due to the low agricultural potential of the area for anything other than grazing, which has limited the impact on the landscape and vegetation. Species and ecosystem loss should be prevented by limiting fragmentation in the landscape, and should therefore adhere to the following: <ul style="list-style-type: none"> Remaining areas of endemic and endangered natural vegetation should be conserved. Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from development of the wind turbines or any associated development during all phases. Areas of critical biodiversity should be protected from any damage during all phases; where indigenous and endemic vegetation should be preserved at all cost. Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed. Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character. 		
Aesthetic		
<ul style="list-style-type: none"> Encourage mitigation measures (for instance use of vegetation) to 'embed' or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc; The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building material. This would also help to embed structures into the landscape and should not consist of shipping containers that clutter the landscape. Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site. Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration. The local material such as the 		

rocks found within the area could be applied to address stormwater runoff from the road to prevent erosion.

- Infrastructure improvement, including new roads and upgrades to the road network, should be appropriate to the rural context (scale, material etc.).
- The layout of the turbines should have an emphasis on place-making, i.e. landscape-related heritage considerations, as opposed to standard infrastructure driven requirements;
- Prevent the construction of new buildings/structures on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests. Retain the integrity of the distinctive Frontier landscape character;
- Scale and massing should be sensitive to the surrounding Frontier landscape. Limiting the number of turbines to clusters of no more than 8 that allow for views between the clusters from the scenic viewpoints should be maintained. The extent of cover of the Frontier and associated Wind Garden WEF currently exceeds that of the whole of Makhanda urban area and must be reduced so that the area taken up is less than that of the urban and historic centre of the region.
- Significant and placemaking viewsheds of surrounding ridgelines and distant mountain should be maintained by limiting the placement of turbines or associated infrastructure on opposing sides of any of the regional roads, so that at any time a turbine-free view can be found when travelling through the landscape or at the historic farmsteads.
- Avoid visual clutter in the landscape by intrusive signage, and the intrusion of commercial, corporate development along roads.
- The mountains in the study area are landforms vital to its overall landscape character. They enclose the valleys and settlements of heritage significance. Prevent development on visually sensitive mountain slopes and ridgelines in order to preserve the continuity of the mountains as a backdrop. Although the Waainek WEF negatively impacts on southern views from the study site, the limited number of turbines (8) has reduced the impact considerably. However, the impact of the turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark.
- Avoid development of infrastructure (such as buildings, wind turbines and power lines), on crests or ridgelines due to the impact on the visual sensitivity of skylines. The visual impact of turbines can be reduced by distancing them from viewpoints such as roads and farmsteads, and placing them in lower lying plains to reduce their impact on the surrounding sensitive cultural landscape.
- Retain view-lines and vistas focused on prominent natural features such as mountain peaks or hills (such as Table Hill, Hellsport, the Swartwaterberg and the south facing slope of the Great Fish River valley), as these are important placemaking and orientating elements for experiencing the cultural landscape.
- Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution on a long term and ongoing basis.

Historic

- The integrity of the historic farm werfs should be maintained and protected. Therefore, care should be exercised in the placement of the turbines at least 1000m from all werfs and historic farmsteads.
- Names of routes and watercourses that refer to traditional use during the time of the hunter-gatherers and herders, as well as the colonial era in the Cape, should be celebrated. Public access to these sites should be encouraged, and care should be taken to protect these names.
- Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes, such as the aloes along the historic route on Draai Farm as it crosses over Hounslow and the driveway to Thursford homestead. In some cases, remnant planting patterns (even single trees) uphold the historic character of an area. Interpretation of these landscape features as historic remnants should occur.
- Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint should be conducted to ensure no further unmarked graves are threatened.
- Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed.
- Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area.

- Roads running through the area have historic stone way markers, such as observed along the R350. Where these are found care should be taken that they are left in tact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers.
- Where the historic function of a building/site is still intact, the function has heritage value and should be protected.
- Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running over Table Hill, Draai and Hounslow Farms is on private land and as such not publicly accessible. Where it is visible from the R350 it should be conserved together with the associated stone walling. The historic route to Kranzdrift through Kwandwe should be maintained as publicly accessible.
- Historic military structures such as Fort Brown and Fort Selwyn are of provincial heritage significance. Their locations chosen for their position on the landscape allowing distant views of and across the frontier boundary of the Great Fish River. Their distance from the proposed WEFs is reasonably far and this will reduce the impact of the development on the sense of place and heritage value of these sites. The historic site of Makanaskop holds similar historic value in relation to military history, however there is no structure to mark the place. The top of the hill itself, therefore is recognised as the heritage site. The distance from the proposed WEF reduces the visual impact of the development and the sense of place should not be heavily impacted upon.
- The new roads (especially those that align with historic wagon routes) should display minimum scale designs where possible.
- Maintain traditional movement patterns across rural landscapes or to places of socio-historical value; a) Avoid privatization or the creation of barriers to traditional access routes, b) Retain old roadways, which have been replaced by newer roads, for use as recreation trails.
- Commonages and outspans were located at water points, and these places were likely gathering points before the arrival of colonists and continued to provide communal resources. In the mid-20th century, many old commonages came under the ownership of the Municipality, and have since been rented out to private individuals or organisations. The Municipality should facilitate the use of common land in a way that promotes the well-being and quality of life of the public. These sites can play a restorative role within the community, for instance for those who have limited alternative opportunities for recreation. No portions of the identified outspan near Hounslow is earmarked for development, but should the road nearby be upgraded, this area should be conserved for communal use as it was historically.
- Respect existing patterns, typologies and traditions of settlement-making by promoting the continuity of heritage features. These include: (a) indigenous; (b) colonial; and (c) current living heritage in the form of tangible and intangible associations to place.
- Evidence of the earliest settlement of the landscape is not always visible. Should any be uncovered, the provincial heritage authority (ECPHRA) should be notified and engaged with to determine appropriate action.
- Alterations and additions to conservation-worthy structures should be sympathetic to their architectural character and period detailing.
- Respect traditional werf settlement patterns by considering the entire werf as the component of significance. This includes the backdrop of the natural landscape against which it is sited, as well as its spatial structure. Any development that impacts the inherent character of the werf component should be discouraged. As such a 1000m buffer around farmsteads for any development associated with the WEF should be maintained.
- Heritage expertise is required where appropriate.

Socio-economic

- The local community around the development should benefit from job opportunities created by the proposed development and the development should not cause reduction in the economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented.
- Sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.

10.5 Cumulative Impacts

This section evaluates the possible cumulative impacts on heritage resources with the addition of the Frontier Wind Farm. The cumulative impacts considered below assumes that mitigation measures have been applied.

Table 15 - Cumulative Impact Assessment Table for Historical structures of low significance

Historical Structures have been identified during the survey. These sites were rated as having a low heritage significance and heritage rating of IIIC. Cumulative impacts to historical resources would occur during the construction and operation phase when the ground surface is cleared and when turbine, substation foundations and roads are excavated.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Low (1)	Low (1)
Duration	Short term (2)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Unlikely (2)	Unlikely (2)
Significance	Low (10)	Low (14)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
The irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
<p>Mitigation: "Mitigation", means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible. Mitigation measures as proposed in the HIA's, and approved by the ECPHRA for the proposed facilities that reduce negative impacts on historical structures must be implemented in line with the NHRA 25 of 1999 and National Health Act regulations.</p>		
<p>Residual Impacts: "Residual Risk", means the risk that will remain after all the recommended measures have been undertaken to mitigate the impact associated with the activity (Green Leaves III, 2014). Considering the nature of the sites identified in the present study, the residual risk will be moderate.</p>		

Table 16 – Cumulative Impact Assessment Table for Historical structures of medium significance

Historical Structures have been identified during the survey. This site was rated as having a medium heritage significance and heritage rating of IIIB. Cumulative impacts to historical resources would occur during the construction and operation phase when the ground surface is cleared and when turbine, substation foundations and roads are excavated.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Low (1)	Low (1)
Duration	Moderate (3)	Moderate (3)
Magnitude	Low (2)	Low (3)
Probability	Unlikely (2)	Unlikely (2)
Significance	Low (12)	Low (14)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
The irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
<p>Mitigation: "Mitigation", means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.</p> <ul style="list-style-type: none"> Mitigation measures as proposed in the HIA's, and approved by the ECPHRA for the proposed facilities that reduce negative impacts on historical structures must be implemented in line with the NHRA 25 of 1999 and National Health Act regulations. 		
Residual Impacts:		

"Residual Risk", means the risk that will remain after all the recommended measures have been undertaken to mitigate the impact associated with the activity (Green Leaves III, 2014).

Considering the nature of the sites identified in the present study, the residual risk will be moderate.

Table 17 – Cumulative Impact Assessment Table for Graves and Burial Grounds

Graves and Burial Grounds have been identified during the survey. These sites are of high significance and rated as IIIA.		
Cumulative impacts to Burial Grounds and graves resources would occur during the construction and operation phase when the ground surface is cleared and when turbine, substation foundations and roads are excavated.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Low (1)	Low (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Low (3)
Probability	Unlikely (2)	Unlikely (2)
Significance	Low (14)	Low (16)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
The irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: "Mitigation", means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.		
<ul style="list-style-type: none"> Mitigation measures as proposed in the HIA's, and approved by the ECPHRA for the proposed facilities that reduce negative impacts on graves and burial grounds must be implemented in line with the NHRA 25 of 1999 and National Health Act regulations. 		
Residual Impacts: "Residual Risk", means the risk that will remain after all the recommended measures have been undertaken to mitigate the impact associated with the activity (Green Leaves III, 2014).		
Considering the nature of the sites identified in the present study, the residual risk will be moderate.		

Table 18 – Cumulative Impact Assessment Table for Palaeontological Resources (After Butler, 2020)

Nature: Cumulative impacts on fossil remain preserved at or beneath the ground surface.		
	Overall impact of the proposed project considered in isolation	The cumulative impact of the project and other projects in the area
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Medium-term (5)
Magnitude	Minor (2)	Minor (2)
Probability	Highly Probable (1)	Improbable (1)
Significance	Medium (-8)	Low (+8)
Status (positive or negative)	Negative	Neutral
Reversibility	Irreversible	
Mitigation: Not necessary		
Residual Impacts: Loss of fossil heritage		

Table 19 - Cumulative Impact Assessment Table for Cultural Landscape.

Nature of Impact: The potential cumulative visual impact of wind farms on the cultural landscape		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area

Extent	Regional (5)	Regional (5)
Duration	Long term (5)	Long term (5)
Magnitude	High (9)	High (10)
Probability	Highly probable (5)	Highly probable (5)
Significance	High (95)	High (100)
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation measures: As per CLA		
Residual impacts: The visual impact will be removed after decommissioning, provided the WEF infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain. The character of the landscape will remain changed permanently after the duration of the project as over time the sense of place will change. It is unlikely that the infrastructure will be decommissioned.		

Consideration of the CLA recommendation as contained in **Table 14** and **Table 19** by the client has identified the following recommendations as not feasible for the project implementation and as such not possible for implementation as part of the proposed mitigation measures. These have been considered in the impact tables above and ratings adjusted accordingly.

- Due to the scenic and historic significance of the regional roads that cross the study site, a buffer of 1000m to either side of the road should be maintained for no development associated with the WEF other than sensitive road upgrades which must not impact on the views from the road. The visual impact of the turbines will be 50% less at 1km distance and therefore this distance will greatly reduce the negative visual impact of the turbines on the experience of the historic road and the values that give it significance.
- Scale and massing should be sensitive to the surrounding Frontier landscape. Limiting the number of turbines to clusters of no more than 8 that allow for views between the clusters from the scenic viewpoints should be maintained.

10.810.6 Consideration of the socio-economic benefit relative to heritage resources

In this section, the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development, as prescribed by Section 38(3)(d) requirement of the NHRA will be discussed.

It is evident that a larger portion of local farming has moved away from traditional farming to game farming and eco-tourism (SEIA, 2021). The study provides the following general facts related to the properties in the viewshed (also relative to the CLA):

- The average farm size is 2,086 ha

- The average number of employed individuals on each farm is 10, 5 being permanent and 5 temporary positions, while on average 13 people reside permanently on each farm
- Of those farms that offer trophy hunting activities, total guests that visit each farm range between 65 and 100 per annum, with the majority indicated as being international hunters. The average duration of stay for such domestic hunters is 3.5 days, while for international hunters, 7.5 days
- In addition to hunters, the same farms also host domestic and international leisure tourists, indicated at between 20 to 30 visitors on average per annum. Such visitors typically spend 2 to 3 days on the farm during their stay
- Respondents have indicated that on average, 77% of revenue is derived from international tourists
- It is noted that there are a small number of farms within the viewshed of the development that still practices traditional forms of agriculture. For these farms a combination of beef, small livestock farming, and game breeding activities take place

Important in the above figures are the average income of 77% of revenue derived from international tourists. Concerns raised by respondents are related to a loss of income due to a reduction in tourism as a result of the WEF project. A large component of this tourism is linked to the eco-tourism intrinsically part of the experience of sense of place and the natural landscape and in some cases, the historical landscapes associated with old farmsteads developed as part of the eco-tourism experience.

The assessment of the possible impacts on archaeological, historical and palaeontological resources has shown a Low impact from the WEF project and as such do not come into play in the evaluation of the social and economic benefit relative to heritage resources. It in fact can have a positive influence on such resources in the region when the proposed conservation initiative from the project considers such resources as part of a larger development strategy.

CLA indicates that the project will have a significant Moderate to High impact on the CL. The project has indicated that the reduction of turbines as recommended by the CLA will not be economically feasible and cannot consider such turbine reductions. Thus, resulting in a potential no-reduction of the impact on the CL and keeping with a High impact rating.

Keeping the above in mind the findings of the SEIA summarise that,

“The assessment of the proposed facility, and its net effective impact from a socio-economic perspective, indicates that the project would generate greater socio-economic benefits during both the construction and operation phases than the potential losses that could occur as a result of its establishment. Stimulation of production, employment, government revenue, skills development and household income as a result of the investment in the project and its subsequent operations

will outweigh possible production, employment and household income losses that could be experienced by local businesses affected by changes in the areas aesthetic and visual resources.

The positive effects generated by the project will not directly offset many of the negative impacts. These include impacts on the sense of place and property and business values that could occur during both construction and operation, the effect on social and economic infrastructure, and crime and social conflicts in the area that could be created during only the construction phase. These impacts though will only affect local communities either temporarily or over the long term. These impacts are not highly significant and can be traded off for the net positive impact created by the project in terms of production, employment, government revenue, community benefits and households' earnings. This means that when compared with the no-go option, the proposed project is associated with greater socio-economic benefits."

The economic benefit for the region and the overall energy needs such a project address outweigh the need for the conservation of cultural resources at all costs. Especially where a project is situated within a gazetted REDZ area.

10.9.10.7 Management recommendations and guidelines

10.9.10.7.1 Construction phase

The project will encompass a range of activities during the construction phase, including ground clearance, the establishment of construction camp areas and small-scale infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however, foundation holes do offer a window into the past, and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project, and these must be catered for. Temporary infrastructure developments, such as construction camps and laydown areas, are often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in a little alteration of the land surface, but still, need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented.

10.9.210.7.2 *Chance find procedure*

- A heritage practitioner/archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts.
- An appropriately qualified heritage practitioner/archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.
- The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner/archaeologist.

10.9.310.7.3 *Grave Management Plan guidelines*

The HIA identified several burial Grounds and Graves (BGG). These will require management and mitigation if any of the resources will be affected by any construction-related activities. The following should be included in the Management Plan to be drafted for the BGG to be retained in situ in the project area:

- Direct what needs to be done, how the identified and accidentally discovered BGG must be protected and managed, and who will be responsible;
- Define the goals to be achieved and the type of activities;
- Guide any future construction or development-related activities;
- Determine the monitoring methodology;
- Assist with stakeholder engagement and identification of interested parties, if needed;
- Explain the permitting procedure;
- Describe any professional requirements and clarify responsibilities;
- Identify the significance of the heritage resources and provide guiding principles for activities on site;
- Identify the site value and provide guiding principles for activities on-site;
- Minimise loss or avoid adverse impacts on heritage resources;
- Ensure that cultural heritage is incorporated in spatial planning and linked to social strategies;
- Improve the understanding of cultural heritage and the contribution it makes to the broader management processes; and
- Ensure that proper investigation, recording and stakeholder meetings take place.
- Includes the Chance Finds Procedure, which outlines the process to follow if any culturally significant heritage resources are found during construction/or operation-related activities

10.9.410.7.4 Possible finds during construction and operation

The study area occurs within a greater historical and archaeological site as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed reclamation activities could uncover the following:

- stone foundations;
- ash middens associated with the historical structures that can contain bone, glass and clay ceramics, ash, metal objects such as spoons, forks, and knives.
- unmarked graves

10.1010.8 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. Table 20 gives guidelines for lead times on permitting.

Table 20 - Lead times for permitting and mobilisation

Action	Responsibility	Timeframe
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	3 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

10.11.10.9 Heritage Management Plan for EMPr implementation

Table 21 - Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
General project area	<ul style="list-style-type: none"> Implement a chance to find procedures in case possible heritage finds are uncovered. A detailed “walk down” of the final approved turbine locations, access roads, powerlines and substations will be required before construction commences. Any heritage features of significance identified during this walk down will require formal mitigation (i.e. permitting where required) or where possible a slight change in design could accommodate such resources. A Heritage management plan (HMP) for the heritage resources needs to be compiled and approved for implementation during construction and operations where heritage features of significance are identified. 	Construction	During construction	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
Historical Structures that were rated as NCW (EWF2-02 to EWF1-04)	<ul style="list-style-type: none"> No mitigation is required 	Construction	Prior to and during construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
Historical Structures (EWF2-03) that were rated as low heritage significance and heritage rating of IIIC.	<ul style="list-style-type: none"> A 30m No-Go-Buffer-Zone be recommended for sites of low significance and a rating of IIIC. If development occurs within 30m of the sites, it needs to be satisfactorily studied and recorded before impact. 	Construction	Prior to and during construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report

Area and site no.	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
	<ul style="list-style-type: none"> Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b) photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings. 						
Historical Structures (EWF2-01) that were rated as medium heritage significance and heritage rating of IIB.	<ul style="list-style-type: none"> Although the site is located outside of the proposed development area, it is recommended that a no-go-buffer-zone from the outer perimeter of the farmstead/ "werf" (which is currently occupied) is kept to the closest WEF infrastructure (including turbines, substation facilities and roads). In terms of general conservation of the historical farmsteads, a 500m no-go-buffer-zone is recommended. However, considering the impact of the proposed development of the Fronteer WEF on the cultural landscape of these historical farmsteads, a 1000m no-go-buffer-zone (inclusive of the 500m no-go-buffer-zone) should be implemented. If development occurs within 1000m of EWF2-01 the main homesteads/ "werf" need to be satisfactorily studied and recorded before impact occurs. Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b) photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings. 	Construction	Prior to and during construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report

Area and site no.	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
Graves and Burial grounds (EWF2-05)	<ul style="list-style-type: none"> The sites should be demarcated with a 30-meter no-go-buffer-zone and the graves should be avoided and left in situ. A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by Eastern Cape Provincial Heritage Authority (ECPHRA). If the site is going to be impacted directly and the graves need to be removed a grave relocation process for these sites is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the ECPHRA under the NHRA and National Health Act regulations. 	Construction	Prior to and during construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
Possible graves	<ul style="list-style-type: none"> When graves are discovered/uncovered the site should be demarcated with a 30-meter no-go-buffer-zone and the grave should be avoided. Undertake archaeological monitoring at earth clearance stage. If human remains are discovered a grave relocation process is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the ECPHRA under the NHRA and National Health Act regulations. 	Construction	During Construction	Applicant Environmental Control Officer (ECO) Heritage specialist	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report

Area and site no.	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
	<ul style="list-style-type: none"> If during the test excavations it is determined that the feature is not a grave, the site will then have no heritage significance and require no further mitigation. 						
Palaeontological finds	<ul style="list-style-type: none"> If fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments. Fossil discoveries ought to be protected and the ECO/site manager must report to SAHRA 	Construction	Construction	Applicant ECO Palaeontologist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA	Final report to be used by the developer to apply for a destruction permit under s35 of the NHRA
Cultural Landscape	Refer to Table 22 of this report.	Construction	Construction	Applicant ECO Palaeontologist	Monthly	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA	Final report to be used by the developer to apply for a destruction permit under s35 of the NHRA

11 CONCLUSIONS

The HIA has shown that the study area and surrounding area has some heritage resources situated within the proposed development boundaries. Through data analysis and a site investigation, the following issues were identified from a heritage perspective.

A team of heritage specialist developed an integrated HIA to evaluate the possible immediate and direct impacts on heritage resources present within the footprint and adjacent area for cumulative impacts. Immediate and direct impacts on archaeological and palaeontological resources were addressed through the HIA and a PIA (**Appendix C**), while the indirect impacts on the cultural landscape were addressed through a CLA (**Appendix D**).

11.1 Heritage Sites

The fieldwork component of the study was aimed at identifying tangible remains of archaeological, historical and heritage significance. The fieldwork was undertaken by way of intensive walkthroughs of the study area. The fieldwork was conducted over several days on 23 March 2020 as well as from 8 to 13 June 2020. This fieldwork team consisted of an archaeologist (Cherene de Bruyn) and field assistant (Pascal Snyman). The following provides a breakdown of the heritage resources identified and graded in the study area. During the survey, five (5) heritage sites were identified. Of these five sites, four (4) sites (**EWF2-01 to EWF2-04**) consist of structures (Farmhouses, Labourer houses, and stone walls), and one (1) site contain graves (**EWF2-05**).

11.1.1 Historical structures

Two (2) labourer houses (**EWF2-02 and EWF2-04**), and were rated as not conservation worthy and of no heritage significance.

One (1) stone farm wall (**EWF2-03**) was rated as low heritage significance with a rating of IIIC.

A farmstead (**EWF2-01**) was also identified. This site has a medium heritage significance and heritage rating of IIIB.

11.1.2 Burial Grounds and graves

One (1) burial ground (**EWF2-05**) was identified that may be affected by the proposed project. Graves have a high heritage significance and heritage rating of IIIA.

The significance grading of the archaeological and historical heritage resources ranged from IIIC to IIIA. Sufficient mitigation measures were proposed.

11.1.3 Palaeontology

A 3-day site-specific field survey of the development footprint was conducted on foot and by a motor vehicle on 20 November to 23 November 2020. According to the PIA conducted by Banzai Environmental (Butler, 2021) the proposed development is by the Dwyka Group; the Fort Brown Formation of the Ecca Group (Karoo Supergroup), Adelaide Subgroup (Koonap and Middleton Formations) of the Beaufort Group (Karoo Supergroup) and the Witteberg Group of the Cape Supergroup, Karoo Dolerite (Karoo Supergroup), and Quaternary deposits. According to the PalaeoMap of SAHRIS the Palaeontological Sensitivity of the Dwyka Group is Low, the Collingham Formation, Rippon Formation, Fort Brown Formation of the Ecca Group is Moderate, while the Prince Albert Formation has a High and the Whitehill Formation of the Ecca has a Very High Palaeontological Sensitivity. The Adelaide Subgroup has a Very high Palaeontological Sensitivity while Dolerite is igneous in origin and thus has an Insignificant Paleontological Sensitivity (Almond et al, 2013; SAHRIS website).

As such, there is a moderate to high chance of finding fossils in this area. No visible evidence of fossiliferous outcrops was found. **It is concluded that the Fronteer WEF project area is of MODERATE to HIGH palaeontological sensitivity overall, with small but unpredictable areas of MODERATE to VERY HIGH sensitivity. No palaeontological No-Go areas have been designated within the project area**

11.1.4 Cultural Landscape

The proposed Fonteer Wind Energy Facility is located on a plateau of undulating plains and hills situated between the Great Fish River valley to the north, the New Years River valley to the south-west and Makhanda (previously known as Grahamstown) about 12kms to the south-east. The area, known as the Zuurveld, is characterised by hills and mountains covered in low shrubby vegetation, interspersed with river valleys and watercourses with vast grazing lands and a rural and wilderness sense of place.

The farmsteads are connected through several farm roads and old historic ox-wagon routes that link the local communities to the busy towns of Makhanda (Grahamstown) and Somerset East. The site is accessed via three scenic historic regional roads which run through the site. These roads have carried inhabitants and travellers between historic towns, farmsteads and further regional destinations since at least the late C18th. Views and vistas of the distant mountains and destinations give significance to the experience of the landscape. The history of the area is one of contact, conflict and survival and is an example of a long history of the symbiotic relationship between man and nature. Significant landscape elements were identified within the study site, including tangible heritage resources, specific cultural landscape areas and intangible heritage resources and graded according to NHRA grading. **The significance grading of the landscape elements ranged from IIIC to I. Sufficient mitigation measures were proposed.**

11.2 Impact Statement

Analysis of the various components of the HIA indicates a mitigated low negative impact on heritage resources and are expanded on below.

11.2.1 Historical structures

An assessment of the possible impacts of the proposed project on historical heritage resources has shown that unmitigated impacts vary between low to medium negative impacts mostly confined to the construction phase of the project. **By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.**

11.2.2 Burial Grounds and graves

An assessment of the possible impacts of the proposed project on historical heritage resources has shown that unmitigated impacts consist of a medium negative impact mostly confined to the construction phase of the project. **By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.**

11.2.3 Palaeontology

An assessment of the possible impacts of the proposed project on palaeontological resources has shown that unmitigated impacts consist of a medium negative impact mostly confined to the construction phase of the project. **By implementing the mitigation measures as listed in this report these impacts can be managed to low negative.**

11.2.4 Cultural landscape

The cultural assessment found that without mitigation the impacts to the cultural landscape elements would result in a very high negative impact due to the magnitude and permanence of the impact on the cultural landscape, especially perceptual qualities from historic routes, heritage sites and impacts on cultural landscape areas and associated heritage resources. There are many visual receptors in the area as it is located close to the main urban node of the region, Makhanda, and eco-tourism facilities are common in the area, with three regional roads passing through or past the proposed site. Historic farmsteads and their associated stock farms are permanently occupied and offer accommodation to visitors to the area. Conservation and protected biodiversity areas dominate the landscape outside the proposed WEF site. Situated on a plateau the site is visible from distances of up to 50kms. **The negative impact of the development on the cultural landscape with the recommended mitigation will be moderate.**

11.2.5 Cumulative Impacts

Considering the development of other WEF located next to the Fronteer Wind Farm and within the broader Grahamstown (Makanda region) the cumulative unmitigated impacts on Historical structures, Burial ground and graves as well as palaeontological resources consist of a medium to

high negative impact mostly confined to the construction phase of the project. This could potentially result in an unacceptable loss of heritage resources. **However, by implementing the mitigation measures as listed in this report the cumulative impacts can be managed to low negative.**

11.2.6 Recommendations

The following mitigation measures are listed in **Table 18**.

Table 22 - Heritage management recommendations.

Area and site no.	Mitigation measures
General project area	<ul style="list-style-type: none"> • Implement a chance to find procedures in case possible heritage finds are uncovered. • A detailed “walk down” of the final approved turbine locations, access roads, powerlines and substations will be required before construction commences. • Any heritage features of significance identified during this walk down will require formal mitigation (i.e. permitting where required) or where possible a slight change in design could accommodate such resources. • A Heritage Management Plan (HMP) for the heritage resources needs to be compiled and approved for implementation during construction and operations where heritage features of significance are identified.
Historical Structures that were rated as NCW (EWF2-02 and EWF2-04)	<ul style="list-style-type: none"> • No mitigation is required
Historical Structures (EWF2-03) that were rated as low heritage significance and heritage rating of IIIC.	<ul style="list-style-type: none"> • A 30m No-Go-Buffer-Zone be recommended for sites of low significance and a rating of IIIC. • If development occurs within 30m of the sites, it needs to be satisfactorily studied and recorded before impact. • Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b) photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings.
Historical Structures (EWF2-01) that were rated as medium heritage significance and heritage rating of IIIB.	<ul style="list-style-type: none"> • Although the site is located outside of the proposed development area, it is recommended that a no-go-buffer-zone from the outer perimeter of the farmstead/ “werf” (which is currently occupied) is kept to the closest WEF infrastructure (including turbines, substation facilities and roads). • In terms of general conservation of the historical farmsteads, a 500m no-go-buffer-zone is recommended. However, considering the impact of the proposed development of the Fronteer WEF on the cultural landscape of these historical farmsteads, a 1000m no-go-buffer-zone (inclusive of the 500m no-go-buffer-zone) should be implemented. • If development occurs within 1000m of EWF2-01 the main homesteads/ “werf” need to be satisfactorily studied and recorded before impact occurs. • Recording of the buildings i.e. (a) map indicating the position and footprint of all the buildings and structures (b) photographic recording of all the buildings and structures (c) measured drawings of the floor plans of the principal buildings.
Graves and Burial grounds (EWF2-05)	<ul style="list-style-type: none"> • The sites should be demarcated with a 30-meter no-go-buffer-zone and the graves should be avoided and left in situ. • A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by Eastern Cape Provincial Heritage Authority (ECPHRA)). • If the site is going to be impacted directly and the graves need to be removed a grave relocation process for these sites is recommended

Area and site no.	Mitigation measures
	<p>as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the ECPHRA under the NHRA and National Health Act regulations.</p>
Possible graves	<ul style="list-style-type: none"> • When graves are discovered/uncovered the site should be demarcated with a 30-meter no-go-buffer-zone and the grave should be avoided. • Undertake archaeological monitoring at earth clearance stage. • If human remains are discovered a grave relocation process is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the ECPHRA under the NHRA and National Health Act regulations. • If during the test excavations it is determined that the feature is not a grave, the site will then have no heritage significance and require no further mitigation.
Palaeontological finds	<ul style="list-style-type: none"> • If fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments. • Fossil discoveries ought to be protected and the ECO/site manager must report to SAHRA
Cultural Landscape	<p>Ecological</p> <ul style="list-style-type: none"> • Most of the area is prized for the fact that its natural character is retained, and that the landscape therefore still performs a range of biodiversity and ecological functions. This is mainly due to the low agricultural potential of the area for anything other than grazing, which has limited the impact on the landscape and vegetation. Species and ecosystem loss should be prevented by limiting fragmentation in the landscape, and should therefore adhere to the following: • The remaining areas of endemic and endangered natural vegetation should be conserved. • Critical Biodiversity Areas, and Ecological Support Areas (along drainage lines), should be protected from the development of the wind turbines or any associated development during all phases. • Areas of critical biodiversity should be protected from any damage during all phases; where indigenous and endemic vegetation should be preserved at all cost. • Areas of habitat are found among the rocky outcrops and contribute to the character, as well as biodiversity of the area. Care should be taken that habitats are not needlessly destroyed. • Identified medicinal plants used for healing or ritual purposes should be conserved during all phases if threatened for use. • No wind turbines should be placed within the 1:100-year flood line of the watercourses. In the context of the sensitivity to soil erosion in the area, as well as potential archaeological resources, it would be a risk to include any structures close to these drainage lines • Careful planning should incorporate areas for stormwater runoff where the base of the structure disturbed the natural soil. Local rocks found on the site could be used to slow stormwater (instead of concrete, or standard edge treatments), and prevent erosion that would be an unfortunate consequence that would alter the character of the site. By using rocks from site it helps to sensitively keep to the character. <p>Aesthetic</p> <ul style="list-style-type: none"> • Encourage mitigation measures (for instance use of vegetation) to 'embed' or disguise the proposed structures within the surrounding tourism and agricultural landscape at ground level, road edges etc; • The continuation of the traditional use of material could be enhanced with the use of the rocks on the site as building material.

Area and site no.	Mitigation measures
	<p>This would also help to embed structures into the landscape and should not consist of shipping containers that clutter the landscape.</p> <ul style="list-style-type: none"> • Using material found on the site adds to the sense of place and reduces transportation costs of bringing materials to site. • Where additional infrastructure (i.e. roads) is needed, the upgrade of existing roads to accommodate the development should be the first consideration. The local material such as the rocks found within the area could be applied to address stormwater runoff from the road to prevent erosion. • Infrastructure improvement, including new roads and upgrades to the road network, should be appropriate to the rural context (scale, material etc.). • The layout of the turbines should have an emphasis on place-making, i.e. landscape-related heritage considerations, as opposed to standard infrastructure driven requirements; • Prevent the construction of new buildings/structures on visually sensitive, steep, elevated or exposed slopes, ridgelines and hillcrests. Retain the integrity of the distinctive Frontier landscape character; • Significant and placemaking viewsheds of surrounding ridgelines and distant mountain should be maintained by limiting the placement of turbines or associated infrastructure on opposing sides of any of the regional roads, so that at any time a turbine-free view can be found when travelling through the landscape or at the historic farmsteads. • Avoid visual clutter in the landscape by intrusive signage, and the intrusion of commercial, corporate development along roads. • The mountains in the study area are landforms vital to its overall landscape character. They enclose the valleys and settlements of heritage significance. Prevent development on visually sensitive mountain slopes and ridgelines in order to preserve the continuity of the mountains as a backdrop. Although the Waainek WEF negatively impacts southern views from the study site, the limited number of turbines (8) has reduced the impact considerably. However, the impact of the turbine night lighting on the wilderness landscape is intrusive and overwhelms the rural character of the landscape, giving it an industrial sense of place after dark. • Avoid development of infrastructure (such as buildings, wind turbines and power lines), on crests or ridgelines due to the impact on the visual sensitivity of skylines. The visual impact of turbines can be reduced by distancing them from viewpoints such as roads and farmsteads and placing them in lower-lying plains to reduce their impact on the surrounding sensitive cultural landscape. • Retain view-lines and vistas focused on prominent natural features such as mountain peaks or hills (such as Table Hill, Hellspoort, the Swartwaterberg and the south-facing slope of the Great Fish River valley), as these are important placemaking and orientating elements for experiencing the cultural landscape. • Reduce the impact of turbine night lighting by minimizing the number of turbines with lighting to only those necessary for aviation safety, such as a few identified turbines on the outer periphery, or use aircraft triggered night lighting. Due to the reduced receptors on the roads at night, the impact of the lighting at night is reserved mainly for farmsteads and other places of overnight habitation such as the surrounding tourist facilities, which would be heavily impacted by the light pollution in a long term and ongoing basis. <p>Historic</p> <ul style="list-style-type: none"> • The integrity of the historic farm werfs should be maintained and protected. Therefore, care should be exercised in the placement of the turbines at least 1000m from all werfs and historic farmsteads. • Names of routes and watercourses that refer to traditional use during the time of the hunter-gatherers and herders, as well as the colonial era in the Cape, should be celebrated. Public access to

Area and site no.	Mitigation measures
	<p>these sites should be encouraged, and care should be taken to protect these names.</p> <ul style="list-style-type: none"> • Traditional planting patterns should be protected by ensuring that existing trees are not needlessly destroyed, as these signify traces of cultural intervention in a harsh environment. These planting patterns include the trees planted around the werfs and along travel routes, such as the aloes along the historic route on Draai Farm as it crosses over Hounslow and the driveway to Thursford homestead. In some cases, remnant planting patterns (even single trees) uphold the historic character of an area. Interpretation of these landscape features as historic remnants should occur. • Burial grounds and places of worship are automatically regarded as Grade IIIa or higher. Any development that threatens the inherent character of family burial grounds must be assessed and should be discouraged. No turbines have been proposed for placement near known unmarked burials or family cemeteries. A preconstruction micro-survey of each turbine footprint should be conducted to ensure no further unmarked graves are threatened. • Mountain slopes have been used for traditional practices for many years, and care should be taken that any significant cultural sites, such as burials and veldkos/medicinal plant resources, are not disturbed. • Farms in the area followed a system of stone markers to demarcate the farm boundaries in the area. Where these structures are found on the site, care should be taken that they are not needlessly destroyed, as they add to the layering of the area. • Roads running through the area have historic stone way markers, such as observed along the R350. Where these are found care should be taken that they are left in tact and in place. Road upgrades must not move or threaten their position and they should be visible from the road they are related to by passing travellers. • Where the historic function of a building/site is still intact, the function has heritage value and should be protected. • Surviving examples (wagon routes, outspans, and commonage), where they are owned in some public or communal way (or by a body responsible for acting in the public interest) and where they are found to be actively operating in a communal way, will have cultural and heritage value and should be enhanced and retained. The historic route running over Table Hill, Draai and Hounslow Farms is on private land and as such not publicly accessible. Where it is visible from the R350 it should be conserved together with the associated stone walling. The historic route to Kranzdrift through Kwandwe should be maintained as publicly accessible. • Historic military structures such as Fort Brown and Fort Selwyn are of provincial heritage significance. Their locations were chosen for their position on the landscape allowing distant views of and across the frontier boundary of the Great Fish River. Their distance from the proposed WEFs is reasonably far and this will reduce the impact of the development on the sense of place and heritage value of these sites. The historic site of Makaanaskop holds similar historic value in relation to military history, however, there is no structure to mark the place. The top of the hill itself therefore is recognised as a heritage site. The distance from the proposed WEF reduces the visual impact of the development and the sense of place should not be heavily impacted upon. • The new roads (especially those that align with historic wagon routes) should display minimum scale designs where possible • Maintain traditional movement patterns across rural landscapes or to places of socio-historical value; a) Avoid privatization or the creation of barriers to traditional access routes, b) Retain old roadways, which have been replaced by newer roads, for use as recreation trails. • Commonages and outspans were located at water points, and these places were likely gathering points before the arrival of colonists and

Area and site no.	Mitigation measures
	<p>continued to provide communal resources. In the mid-20th century, many old commonages came under the ownership of the Municipality, and have since been rented out to private individuals or organisations. The Municipality should facilitate the use of common land in a way that promotes the well-being and quality of life of the public. These sites can play a restorative role within the community, for instance for those who have limited alternative opportunities for recreation. No portions of the identified outspan near Hounslow is earmarked for development, but should the road nearby be upgraded, this area should be conserved for communal use as it was historically.</p> <ul style="list-style-type: none"> • Respect existing patterns, typologies and traditions of settlement-making by promoting the continuity of heritage features. These include: (a) indigenous; (b) colonial; and (c) current living heritage in the form of tangible and intangible associations to place. • Evidence of the earliest settlement of the landscape is not always visible. Should any be uncovered, the provincial heritage authority (ECPHRA) should be notified and engaged with to determine appropriate action. • Alterations and additions to conservation-worthy structures should be sympathetic to their architectural character and period detailing. • Respect traditional werf settlement patterns by considering the entire werf as the component of significance. This includes the backdrop of the natural landscape against which it is sited, as well as its spatial structure. Any development that impacts the inherent character of the werf component should be discouraged. As such a 1000m buffer around farmsteads for any development associated with the WEF should be maintained. • Heritage expertise is required where appropriate. <p>Socio-economic</p> <ul style="list-style-type: none"> • The local community around the development should benefit from job opportunities created by the proposed development and the development should not cause a reduction in the economic viability of surrounding properties in excess of those offered by the development. Short-term job opportunities at the expense of long term economic benefit and local employment opportunities must be prevented. • Sheep, cattle or game farming should be allowed to continue below the wind turbines, or be rehabilitated to increase biodiversity in the area.

11.3 Finding

The assessment of the possible impacts on the archaeological, historical and palaeontological resources has shown a Low impact from the WEF project after mitigation measures. It is further considered that the project can have a potential positive influence on such resources in the region when the proposed conservation initiative from the project considers such resources as part of a larger development strategy.

CLA indicated that the project will have a significant Moderate to High impact on the CL. The project has indicated that the reduction of turbines as recommended by the CLA will not be economically feasible and cannot consider such turbine reductions. The remaining CL recommendations will still result in a marginal reduction of impact. However, the size and bulk of the turbines in the landscape will unlikely be totally mitigatable.

It must further be considered that the addition of the infrastructure of the WEF will constitute an additional layer to the cultural landscape and must be considered as such within a gazetted REDZ area. Through the implementation of the economically feasible recommendations as set out in the CLA and contained in this report it will be possible to preserve older layers of the cultural landscape and in some cases even enhance them through consideration such as the use of older name places in the naming of infrastructure and enhancing local heritage through the incorporation of such structures in project conservation initiatives to name a few.

Analysis of the findings of the SEIA for this project further reveals that the economic benefit for the region and the overall energy needs such a project address outweighs the need for conservation of cultural resources at all costs.

The overall impact of the Fronteer Wind Farm, on the heritage resources identified during this report, is considered as acceptable after the recommendations have been implemented and therefore, impacts can be mitigated to acceptable levels allowing for the development to be authorised.

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Heritage Assessment Methodology

The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the NEMA (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review: The background information to the field survey relies greatly on the Heritage Background Research.

Step II – Physical Survey: A physical survey was conducted by vehicle through the proposed project area by a qualified heritage specialist. The survey was conducted over one day (21 August 2019), aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant archaeological resources, the assessment of resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

The significance of heritage sites was based on four main criteria:

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
 - Low - <10/50m²
 - Medium - 10-50/50m²
 - High - >50/50m²
- Uniqueness; and
- Potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

- A - No further action necessary;
- B - Mapping of the site and controlled sampling required;
- C - No-go or relocate development activity position;
- D - Preserve site, or extensive data collection and mapping of the site; and
- E - Preserve site.

Impacts on these sites by the development will be evaluated as follows:

Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2016) is implemented in this report

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table A 1** and **Table A 2**).

Table A 1: Rating system for archaeological resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by ECPHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible where not possible it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

Table A 2: Rating system for built environment resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by ECPHRA	Exceptionally High Significance
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
IIIC	Such a resource is of contributing significance to the environs. These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section	No research potential or other cultural significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
	heritage significance to be retained as part of the National Estate.	34 can even be lifted by ECPHRA for structures in this category if they are older than 60 years.	

WOUTER FOURIE

Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage

Summary of Experience

Specialised expertise in Archaeological Mitigation and excavations, Cultural Resource Management and Heritage Impact Assessment Management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, Geographic Information Systems, including *inter alia*

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Involvement in various grave relocation projects (some of which relocated up to 1000 graves) and grave “rescue” excavations in the various provinces of South Africa

Involvement with various Heritage Impact Assessments, within South Africa, including -

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects
 - Iron Age Mitigation Work for various projects, including archaeological excavations and monitoring
 - Involvement with various Heritage Impact Assessments, outside South Africa, including -
- Archaeological Studies in Democratic Republic of Congo
- Heritage Impact Assessments in Mozambique, Botswana and DRC
- Grave Relocation project in DRC

Key Qualifications

BA [Hons] (Cum laude) - Archaeology and Geography - 1997

BA - Archaeology, Geography and Anthropology - 1996

Professional Archaeologist - Association of Southern African Professional Archaeologists (ASAPA) - Professional Member

Accredited Professional Heritage Specialist – Association of Professional Heritage Practitioners (APHP)

CRM Accreditation (ASAPA) -

- Principal Investigator - Grave Relocations
- Field Director – Iron Age
- Field Supervisor – Colonial Period and Stone Age
- Accredited with Amafa KZN

Key Work Experience

2003- current - Director – Professional Grave Solutions (Pty) Ltd

2007 – 2008 - Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the

Witwatersrand

2005-2007 - Director – Matakoma Heritage Consultants (Pty) Ltd

2000-2004 - CEO– Matakoma Consultants

1998-2000 - Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng

1997-1998 - Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

Worked on various heritage projects in the SADC region including, Botswana, Mozambique, Malawi, Mauritius, Zimbabwe and the Democratic Republic of the Congo

CHERENE DE BRUYN

Professional Archaeologist for PGS Heritage

KEY QUALIFICATIONS

2016-2017	MA in Archaeology University College London, United Kingdom
2015	BSC Honours in Physical Anthropology, University of Pretoria, South Africa
2013	BA Honours in Archaeology University of Pretoria, South Africa
2010-2012	BA (General) University of Pretoria, South Africa Major subjects: Archaeology and Anthropology

PROFESSIONAL QUALIFICATIONS:

- Association of Southern African Professional Archaeologists - Professional Member (#432)
- International Association for Impact Assessment South Africa - Member (#6082)
- Association of Southern African Professional Archaeologists - CRM Accreditation
 - Principal Investigator: Grave relocation
 - Field Director: Colonial period archaeology, Iron Age archaeology
 - Field Supervisor: Rock art, Stone Age archaeology
 - Laboratory Specialist: Human Skeletal Remains
- KZN Amafa and Research Institute - Accredited Professional Heritage Practitioner

Languages:

Afrikaans & English

SUMMARY OF EXPERIENCE

Expertise in Heritage Impact Assessment Management, Historical and Archival Research, Archaeology, Physical Anthropology, Grave Relocations, Fieldwork, Geographic Information Systems and Project Management including *inter alia* -

Involvement in various grave relocation projects

- Grave exhumation, test excavations and grave “rescue” excavations in the various provinces of South Africa.
- Permit applications with SAHRA BGG and AMAFA, including relevant Munciplaities and Authorities for grave relocation projects.

Involvement with various Heritage Impact Assessments,

- Heritage Impact Assessments and Management for various projects within Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West and Western Cape Province.
- Archaeological Walkdowns for various projects.
- Instrument Survey and recording for various projects.
- Desktop, archival and heritage screening for projects.

Heritage Assessment Projects

Below a selected list of Heritage Impact Assessments (HIA) Projects involvement:

- Heritage Management Plan for the proposed development of the 305MW Oya solar photovoltaic (PV) facility and associated infrastructure near Matjiesfontein, Western Cape.
- Heritage Impact Assessment for the Proposed Township Establishment on the Remainder of Portion 8 of the Farm Boschoek 103 JQ, near Boschoek, North West Province.

- The Proposed Irenedale Water Pipeline Between Bosjesspruit Colliery And A Local Reservoir, Located In The Lekwa Local Municipality And The Govan Mbeki Local Municipality, Gert Sibande District Municipality, Mpumalanga Province.
- Heritage Impact Assessment for the proposed development of the Msobo Coal Tselentis Colliery: Albion Opencast project, Near Breyten, Mpumalanga Province.
- Heritage Impact Assessment for the Proposed Development Of An Airport For Kolomela Mine In Postmasburg, Northern Cape.
- Heritage Impact Assessment for the Proposed South African Coal Estates (SACE) Clydesdale Pit Project, near Emalahleni, Mpumalanga Province.
- Heritage Impact Assessment for the Amendment of the Mogalakwena Mine Expansion Project, near Mokopane, Limpopo Province.
- Heritage Impact Assessment for the Mogalakwena Mine Integrated Permitting Project near Mokopane, Limpopo Province.
- Heritage Impact Assessment for the Proposed Solar PV Plant at Armoede, near Mokopane, Limpopo Province.
- Heritage Impact Assessment for the Proposed New Cargo Precinct For The O.R. Tambo International Airport On The Farm Witkoppie 64, Gauteng Province.
- Heritage Impact Assessment for the upgrade of road d4407 between Hluvukani and Timbavati, road d4409 at Welverdiend and road d4416/2 between Welverdiend and road P194/1 in the Bohlabela region of the Mpumalanga Province.
- Heritage Impact Assessment for the proposed Piggery on Portion 46 of the farm Brakkefontien 416, within the Nelson Mandela Bay Municipality, Eastern Cape.
- Heritage Impact Assessment for proposed development On Erf 30, Letamo Town, Farm Honingklip 178 Iq, Mogale Local Municipality, Gauteng Province.
- Heritage Impact Assessment for the proposed Prospecting Right Application on the Farm Reserve No 4 15823 And 7638/1, near St Lucia, within the jurisdiction of the Mfolozi Local Municipality in the King Cetshwayo District Municipality, KwaZulu-Natal Province.

Grave Relocation Projects

Below, a selection of grave relocation projects involvement:

- Report On Test Excavations. Ivn_078 Maruma Graves, Farm Turfspruit 241 Kr, Mokopane, Limpopo Province. Test Excavation Of Possible Burial Ground As Identified By The Maruma Family.
- Relocation Of Two Infant Graves From The Farm Wonderfontein 428 Js, Belfast, Mpumalanga Province.
- Relocation Of Approximately 4 Stillborn Graves From Farm Wonderfontein 428 Js, Umsimbithi Mining (Pty) Ltd, Belfast, Chief Albert Luthuli Local Municipality, Mpumalanga Province.

EMPLOYMENT SUMMARY:

Positions Held

- 2020 – to date: Archaeologist - PGS Heritage (Pty) Ltd
- 2018 – 2019: Manager of the NGT ESHS Heritage Department – NGT Holdings (Pty) Ltd
Archaeologist and Heritage Consultant – NGT Holdings (Pty) Ltd
- 2015-2016: Archaeological Contractor - BA3G, University of Pretoria
- 2014 – 2015: DST-NRF Archaeological Intern, Forensic Anthropological Research Centre

ELIZE BUTLER
Palaeontologist for Banzai Environmental

PROFESSION: Palaeontologist

YEARS' EXPERIENCE: 26 years in Palaeontology

EDUCATION:

B.Sc Botany and Zoology, 1988

University of the Orange Free State

B.Sc (Hons) Zoology, 1991

University of the Orange Free State

Management Course, 1991

University of the Orange Free State

M. Sc. *Cum laude* (Zoology), 2009

University of the Free State

Dissertation title: The postcranial skeleton of the Early Triassic non-mammalian Cynodont *Galesaurus planiceps*: implications for biology and lifestyle

Registered as a PhD fellow at the Zoology Department of the UFS

2013 to current

Dissertation title: A new gorgonopsian from the uppermost *Daptocephalus Assemblage Zone*, in the Karoo Basin of South Africa

MEMBERSHIP

Palaeontological Society of South Africa (PSSA) 2006-currently

EMPLOYMENT HISTORY

Part-time Laboratory assistant Department of Zoology & Entomology
University of the Free State Zoology 1989-
1992

Part-time laboratory assistant Department of Virology

	University of the Free State Zoology 1992
Research Assistant	National Museum, Bloemfontein 1993 – 1997
Principal Research Assistant and Collection Manager	National Museum, Bloemfontein 1998–currently

TECHNICAL REPORTS

E. Butler. 2019. Palaeontological Desktop Assessment of the proposed Westrand Strengthening Project Phase II.

E. Butler. 2019. Palaeontological Field Assessment for the proposed Sirius 3 Photovoltaic Solar Energy Facility near Upington, Northern Cape Province

E. Butler. 2019. Palaeontological Field Assessment for the proposed Sirius 4 Photovoltaic Solar Energy Facility near Upington, Northern Cape Province

E. Butler. 2019. Palaeontological Field Assessment for Heuningspruit PV 1 Solar Energy Facility near Koppies, Ngwathe Local Municipality, Free State Province.

E. Butler. 2019. Palaeontological Field Assessment for the Moeding Solar Grid Connection, North West Province.

E. Butler. 2019. Recommended Exemption from further Palaeontological studies for the Proposed Agricultural Development on Farms 1763, 2372 And 2363, Kakamas South Settlement, Kai! Garib Municipality, Mgcawu District Municipality, Northern Cape Province.

E. Butler. 2019. Recommended Exemption from further Palaeontological studies: of Proposed Agricultural Development, Plot 1178, Kakamas South Settlement, Kai! Garib Municipality

E. Butler. 2019. Palaeontological Desktop Assessment for the Proposed Waste Rock Dump Project at Tshipi Borwa Mine, near Hotazel, Northern Cape Province:

E. Butler. 2019. Palaeontological Exemption Letter for the proposed DMS Upgrade Project at the Sishen Mine, Gamagara Local Municipality, Northern Cape Province

E. Butler. 2019. Palaeontological Desktop Assessment of the proposed Integrated Environmental Authorisation process for the proposed Der Brochen Amendment project, near Groblershoop, Limpopo

E. Butler. 2019. Palaeontological Desktop Assessment of the proposed updated Environmental Management Programme (EMPr) for the Assmang (Pty) Ltd Black Rock Mining Operations, Hotazel, Northern Cape

E. Butler. 2019. Palaeontological Desktop Assessment of the proposed Kriel Power Station Lime Plant Upgrade, Mpumalanga Province

E. Butler. 2019. Palaeontological Impact Assessment for the proposed Kangala Extension Project Near Delmas, Mpumalanga Province.

E. Butler. 2019. Palaeontological Desktop Assessment for the proposed construction of an iron/steel smelter at the Botshabelo Industrial area within the Mangaung Metropolitan Municipality, Free State Province.

E. Butler. 2019. Recommended Exemption from further Palaeontological studies for the proposed agricultural development on farms 1763, 2372 and 2363, Kakamas South settlement, Kai! Garib Municipality, Mgcawu District Municipality, Northern Cape Province.

E. Butler. 2019. Recommended Exemption from further Palaeontological Studies for Proposed formalisation of Gamakor and Noodkamp low cost Housing Development, Keimoes, Gordonia Rd, Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province.

E. Butler. 2019. Recommended Exemption from further Palaeontological Studies for proposed formalisation of Blaauwskop Low Cost Housing Development, Kenhardt Road, Kai !Garib Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province.

E. Butler. 2019. Palaeontological Desktop Assessment of the proposed mining permit application for the removal of diamonds alluvial and diamonds kimberlite near Windsorton on a certain portion of Farm Zoelen's Laagte 158, Registration Division: Barkly Wes, Northern Cape Province.

E. Butler. 2019. Palaeontological Desktop Assessment of the proposed Vedanta Housing Development, Pella Mission 39, Khâi-Ma Local Municipality, Namakwa District Municipality, Northern Cape.

E. Butler. 2019. Palaeontological Desktop Assessment for The Proposed 920 Kwp Groenheuwel Solar Plant Near Augrabies, Northern Cape Province

E. Butler. 2019. Palaeontological Desktop Assessment for the establishment of a Super Fines Storage Facility at Amandelbult Mine, Near Thabazimbi, Limpopo Province

E. Butler. 2019. Palaeontological Impact Assessment for the proposed Sace Lifex Project, Near Emalahleni, Mpumalanga Province

E. Butler. 2019. Palaeontological Desktop Assessment for the proposed Rehau Fort Jackson Warehouse Extension, East London

E. Butler. 2019. Palaeontological Desktop Assessment for the proposed Environmental Authorisation Amendment for moving 3 Km Of the Merensky-Kameni 132KV Powerline

E. Butler. 2019. Palaeontological Impact Assessment for the proposed Umsobomvu Solar PV Energy Facilities, Northern and Eastern Cape

E. Butler. 2019. Palaeontological Desktop Assessment for six proposed Black Mountain Mining Prospecting Right Applications, without Bulk Sampling, in the Northern Cape.

E. Butler. 2019. Palaeontological field Assessment of the Filling Station (Rietvlei Extension 6) on the Remaining Portion of Portion 1 of the Farm Witkoppies 393JR east of the Rietvleidam Nature Reserve, City of Tshwane, Gauteng

E. Butler. 2019. Palaeontological Desktop Assessment Of The Proposed Upgrade Of The Vaal Gamagara Regional Water Supply Scheme: Phase 2 And Groundwater Abstraction

E. Butler. 2019. Palaeontological Desktop Assessment Of The Expansion Of The Jan Kempdorp Cemetry On Portion 43 Of Farm Guldenskat 36-Hn, Northern Cape Province

E. Butler. 2019. Palaeontological Desktop Assessment of the Proposed Residential Development On Portion 42 Of Farm Geldunskat No 36 In Jan Kempdorp, Phokwane Local Municipality, Northern Cape Province

E. Butler. 2019. Palaeontological Impact Assessment of the proposed new Township Development, Lethabo Park, on Remainder of Farm Roodepan No 70, Erf 17725 And Erf 15089, Roodepan Kimberley, Sol Plaatjies Local Municipality, Frances Baard District Municipality, Northern Cape

E. Butler. 2019. Palaeontological Protocol for Finds for the proposed 16m WH Battery Storage System in Steinkopf, Northern Cape Province

E. Butler. 2019. Palaeontological Exemption Letter of the proposed 4.5WH Battery Storage System near Midway-Pofadder, Northern Cape Province

E. Butler. 2019. Palaeontological Exemption Letter of the proposed 2.5ml Process Water Reservoir at Gloria Mine, Black Rock, Hotazel, Northern Cape

E. Butler. 2019. Palaeontological Desktop Assessment for the Establishment of a Super Fines Storage Facility at Gloria Mine, Black Rock Mine Operations, Hotazel, Northern Cape:

E. Butler. 2019. Palaeontological Desktop Assessment for the Proposed New Railway Bridge, and Rail Line Between Hotazel And The Gloria Mine, Northern Cape Province

E. Butler. 2019. Palaeontological Exemption Letter Of The Proposed Mixed Use Commercial Development On Portion 17 Of Farm Boegoeberg Settlement Number 48, !Kheis Local Municipality In The Northern Cape Province

E. Butler. 2019. Palaeontological Desktop Assessment of the Proposed Diamond Mining Permit Application Near Kimberley, Sol Plaatjies Municipality, Northern Cape Province

E. Butler. 2019. Palaeontological Desktop Assessment of the Proposed Diamonds (Alluvial, General & In Kimberlite) Prospecting Right Application near Postmasburg, Registration Division; Hay, Northern Cape Province

E. Butler. 2019. Palaeontological Desktop Assessment of the proposed diamonds (alluvial, general & in kimberlite) prospecting right application near Kimberley, Northern Cape Province.

E. Butler. 2019. Palaeontological Phase 1 Impact Assessment of the proposed upgrade of the Vaal Gamagara regional water supply scheme: Phase 2 and groundwater abstraction

E. Butler. 2019. Palaeontological Desktop Assessment of the proposed seepage interception drains at Duvha Power Station, Emalaheni Municipality, Mpumalanga Province

E. Butler. 2019. Palaeontological Desktop Assessment letter for the Proposed PV Solar Facility at the Heineken Sedibeng Brewery, near Vereeniging, Gauteng.

E. Butler. 2019. Palaeontological Phase 1 Assessment letter for the Proposed PV Solar Facility at the Heineken Sedibeng Brewery, near Vereeniging, Gauteng.

E. Butler. 2019. Palaeontological field Assessment for the Proposed Upgrade of the Kolomela Mining Operations, Tsantsabane Local Municipality, Siyanda District Municipality, Northern Cape Province, Northern Cape

E. Butler. 2019. Palaeontological Desktop Assessment of the proposed feldspar prospecting rights and mining application on portion 4 and 5 of the farm Rozynen 104, Kakamas South, Kai! Garib Municipality, Zf Mgcawu District Municipality, Northern Cape

E. Butler. 2019. Palaeontological Phase 1 Field Assessment of the proposed Summerpride Residential Development and Associated Infrastructure on Erf 107, Buffalo City Municipality, East London.

E. Butler. 2019. Palaeontological Desktop Impact Assessment for the proposed re-commission of the Old Balgray Colliery near Dundee, Kwazulu Natal.

E. Butler. 2019. Palaeontological Phase 1 Impact Assessment for the Proposed Re-Commission of the Old Balgray Colliery near Dundee, Kwazulu Nata.l

E. Butler. 2019. Palaeontological Desktop Assessment for the Proposed Environmental Authorisation and Amendment Processes for Elandsfontein Colliery.

E. Butler. 2019. Palaeontological Impact Assessment and Protocol for Finds of a Proposed New Quarry on Portion 9 (of 6) of the farm Mimosa Glen 885, Bloemfontein, Free State Province

E. Butler. 2019. Palaeontological Impact Assessment and Protocol for Finds of a proposed development on Portion 9 and 10 of the Farm Mimosa Glen 885, Bloemfontein, Free State Province

E. Butler. 2019. Palaeontological Exemption Letter for the proposed residential development on the Remainder of Portion 1 of the Farm Strathearn 2154 in the Magisterial District of Bloemfontein, Free State

E. Butler. 2019. Palaeontological Field Assessment for the Proposed Nigel Gas Transmission Pipeline Project in the Nigel Area of the Ekurhuleni Metropolitan Municipality, Gauteng Province

E. Butler. 2019. Palaeontological Desktop Assessment for five Proposed Black Mountain Mining Prospecting Right Applications, Without Bulk Sampling, in the Northern Cape.

E. Butler. 2019. Palaeontological Desktop Assessment for the Proposed Environmental Authorisation and an Integrated Water Use Licence Application for the Reclamation of the Marievale Tailings Storage Facilities, Ekurhuleni Metropolitan Municipality - Gauteng Province.

E. Butler. 2019. Palaeontological Impact Assessment for the Proposed Sace Lifex Project, near Emalahleni, Mpumalanga Province.

E. Butler. 2019. Palaeontological Desktop Assessment for the proposed Golfview Colliery near Ermelo, Msukaligwa Local Municipality, Mpumalanga Province

E. Butler. 2019. Palaeontological Desktop Assessment for the Proposed Kangra Maquasa Block C Mining development near Piet Retief, in the Mkhondo Local Municipality within the Gert Sibande District Municipality

E. Butler. 2019. Palaeontological Desktop Assessment for the Proposed Amendment of the Kusipongo Underground and Opencast Coal Mine in Support of an Environmental Authorization and Waste Management License Application.

E. Butler. 2019. Palaeontological Exemption Letter of the Proposed Mamatwan Mine Section 24g Rectification Application, near Hotazel, Northern Cape Province

E. Butler. 2020. Palaeontological Field Assessment for the Proposed Environmental Authorisation and Amendment Processes for Elandsfontein Colliery

E. Butler. 2020. Palaeontological Desktop Assessment for the Proposed Extension of the South African Nuclear Energy Corporation (Necsa) Pipe Storage Facility, Madibeng Local Municipality, North West Province

E. Butler. 2020. Palaeontological Field Assessment for the Proposed Piggery on Portion 46 of the Farm Brakkefontien 416, Within the Nelson Mandela Bay Municipality, Eastern Cape

E. Butler. 2020. Palaeontological field Assessment for the proposed Rietfontein Housing Project as part of the Rapid Land Release Programme, Gauteng Province Department of Human Settlements, City of Johannesburg Metropolitan Municipality

E. Butler. 2020. Palaeontological Desktop Assessment for the Proposed Choje Wind Farm between Grahamstown and Somerset East, Eastern Cape

E. Butler. 2020. Palaeontological Desktop Assessment of the Proposed Prospecting Right Application for the Prospecting of Diamonds (Alluvial, General & In Kimberlite), Combined with A Waste License Application, Registration Division: Gordonia And Kenhardt, Northern Cape Province

E. Butler. 2020. Palaeontological Impact Assessment for the Proposed Clayville Truck Yard, Ablution Blocks and Wash Bay to be Situated on Portion 55 And 56 Of Erf 1015, Clayville X11, Ekurhuleni Metropolitan Municipality, Gauteng Province

E. Butler. 2020. Palaeontological Desktop Assessment for the Proposed Hartebeesthoek Residential Development

E. Butler. 2020. Palaeontological Desktop Assessment for the Proposed Mooiplaats Educational Facility, Gauteng Province

E. Butler. 2020. Palaeontological Impact Assessment for the Proposed Monument Park Student Housing Establishment

E. Butler. 2020. Palaeontological Field Assessment for the Proposed Standerton X10 Residential and Mixed-Use Developments, Lekwa Local Municipality Standerton, Mpumalanga Province

E. Butler. 2020. Palaeontological Field Assessment for the Rezoning and Subdivision of Portion 6 Of Farm 743, East London

E. Butler. 2020. Palaeontological Field Assessment for the Proposed Matla Power Station Reverse Osmosis Plant, Mpumalanga Province

CONFERENCE CONTRIBUTIONS

NATIONAL

PRESENTATION

Butler, E., Botha-Brink, J., and F. Abdala. A new gorgonopsian from the uppermost *Dicynodon Assemblage Zone*, Karoo Basin of South Africa. 18th the Biennial conference of the PSSA 2014. Wits, Johannesburg, South Africa.

INTERNATIONAL

Attended the Society of Vertebrate Palaeontology 73th Conference in Los Angeles, America. October 2012.

CONFERENCES: POSTER PRESENTATION

NATIONAL

Butler, E., and J. Botha-Brink. Cranial skeleton of *Galesaurus planiceps*, implications for biology and lifestyle. University of the Free State Seminar Day, Bloemfontein. South Africa. November 2007.

Butler, E., and J. Botha-Brink. Postcranial skeleton of *Galesaurus planiceps*, implications for biology and lifestyle. 14th Conference of the PSSA, Matjesfontein, South Africa. September 2008:

Butler, E., and J. Botha-Brink. The biology of the South African non-mammaliaform cynodont *Galesaurus planiceps*. 15th Conference of the PSSA, Howick, South Africa. August 2008.

INTERNATIONAL VISITS

Natural History Museum, London

July 2008

Paleontological Institute, Russian Academy of Science, Moscow

November 2014

EMMYLOU RABE BAILEY
CULTURAL LANDSCAPE SPECIALIST for Hearth Heritage

Emmylou Rabe Bailey holds an MA in Archaeology and Heritage Conservation from the University of Leicester, UK (Memorialisation at Prestwich Place and New York Burial Ground; 2008), specialising in the conservation and representation of archaeological resources and cultural landscapes. Her BA(Hons) was interdisciplinary research which focused on heritage assessment, conservation and management of the Luyolo Cultural Landscape in Simonstown, Cape Town (UCT, 2002). Emmylou's PhD in Environmental Anthropology (Rhodes University) is currently on hold. Emmylou's work has focused on the interdisciplinary research of heritage landscapes and working towards effective and sustainable management practices. She has worked as a Cultural Heritage Specialist for SAHRA, where she was responsible for the research and compilation of site nomination reports for proposed Grade 1 Cultural Landscapes. Before that she was a Heritage Conservation Officer at Heritage Western Cape and the Heritage Conservation Coordinator at the City of Cape Town. Since 2009, Emmylou has worked as an independent heritage specialist as Hearth Heritage, focusing on cultural landscapes and bio-cultural diversity conservation and management through policy, reports and community initiatives.

TERTIARY EDUCATION (chronologically from most recent)

- Rhodes University, Institute for Social and Economic Research 2011 – (on hold)
PhD candidate in Environmental Anthropology (Indigenous knowledge systems, environmental ethics and conservation)
- **South African Netherlands Programme for Alternatives in Development** (SANPAD)
RCi PhD programme 2011-2012
- University of Cape Town, Department of Social Anthropology 2010
Ethnographic Research Methods and Methodology
- University of Leicester (UK) 2008
MA in Archaeology and Heritage Conservation
Dissertation: *"Memories and memorials: Memorialisation at Prestwich Memorial, Cape Town and New York African Burial Ground, New York"*
- University of Cape Town 2005
Architecture and Urban Conservation: Theory and Practice
- University of Cape Town, Centre for African Studies 2003
MA course in Public Culture (incl Representation of Public Culture through publicexhibition)
- University of Cape Town 2002
BA (HONS) – Archaeology, African Studies, History, Environmental Science
Dissertation: *"Towards a Conservation Management Plan for Luyolo, Simonstown"*
- University of Cape Town 1999 – 2001

Bachelor of Arts • Majoring in: Social Anthropology; Archaeology, Environmental and Geographical Science

CONTINUING PROFESSIONAL DEVELOPMENT

- **Introduction to Permaculture 2016**
Oregon State University Online Course

WORK EXPERIENCE (for more information on any of the following projects, please contact me)

- Hearth Heritage – since 2009
Professional Heritage Consultancy
Director; professional heritage practitioner, researcher, writer, photojournalist
- University of Cape Town, Department of Social Anthropology February 2010 – July 2010
Lecturer and tutor on Conservation and Development
- Department of Cultural Affairs and Sport, Western Cape Provincial Government: Museum Services October 2009
Workshop Facilitator: Heritage conservation and management (as Hearth Heritage)
- Silimela Development Services (Pty) Ltd. August 2009
Xhariep NSDP Application Project: Survey coordinator and translator
- vidamemoria heritage consultants – January 2009 – June 2010
Specialist heritage research consultant and report writer (as Hearth Heritage)
- Blomfontein Nature Reserve (near Nieuwoudtville, Northern Cape) - November 2008 – January 2009
Cultural landscape research project (voluntary)
Research, community consultation and report writing
- Nicolas Baumann and Sarah Winter Heritage Consultants June 2003 - 2011
Heritage Specialist (research and report-writing)
- City of Cape Town: Environmental and Heritage Management January 2005 – March 2007
Heritage Conservation Coordinator
- Department of Cultural Affairs and Sport, Western Cape Provincial Government: Heritage Resource Management Services (HRMS) July 2004 – December 2004
- **Heritage Conservation Officer**
South African Heritage Resources Agency: Western Cape (SAHRA) January 2004 to June 2004
Cultural Heritage Specialist

RELEVANT PROJECT EXPERIENCE

- Compilation of Heritage Scoping Reports, Heritage Basic Assessment Reports and Historical Background Reports for Heritage Impact Assessments – Built environment and cultural landscapes (Western Cape).
- Compilation of National Heritage Site nomination reports for Grade 1 Cultural Landscapes.
- Completion of, and input into, Heritage Conservation Management Plans (Western Cape)
- Heritage resources surveys for inventories.

- Over 15 years experience, local and international, in **research, data analysis and report writing** as expert environmental and cultural heritage conservation consultant, specialising in cultural landscapes, IKS, memorialisation, environmental ethics, community heritage conservation projects.
- Over 15 years experience in development, **management and implementation of projects**, programmes, systems, policies and practices dealing with conservation and community management of significant and sensitive environmental and cultural landscapes and resources.
- **Facilitation of coordination and communication** between national, provincial and local heritage and environmental management authorities as well as private and government bodies in terms of conservation and management policy formulation and implementation, as well as facilitating coordination on broader issues of heritage and environmental conservation management.

AFFILIATIONS

- Association for Professional Heritage Professionals (APHP) Accredited Heritage Professional;
- ASAPA Accredited Professional Archaeologist;
- HWC Council Member;
- HWC Archaeology, Palaeontology and Meteorites Permitting Committee member;
- ICOMOS SA Member;
- VASSA Member.

Appendix C
Palaeontological Impact Assessment

Cultural Landscapes Assessment