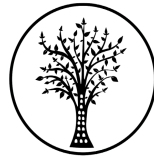


# HERITAGE IMPACT ASSESSMENT

In terms of Section 38(8) of the NHRA for the

## **Proposed Development of the Aberdeen Wind Facility 2 near Aberdeen in the Eastern Cape**

**Prepared by CTS Heritage**

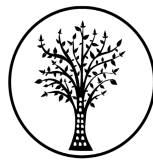


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**For**

**Savannah Environmental**

**February 2023**



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## EXECUTIVE SUMMARY

### 1. Site Name:

Aberdeen Wind Facility 2

### 2. Location:

- Remaining Portion of Farm Doornpoort 93
- Portion 1 of Farm Doornpoort 93
- Remaining Portion of Kraanvogelkuil 155

### 3. Locality Plan:

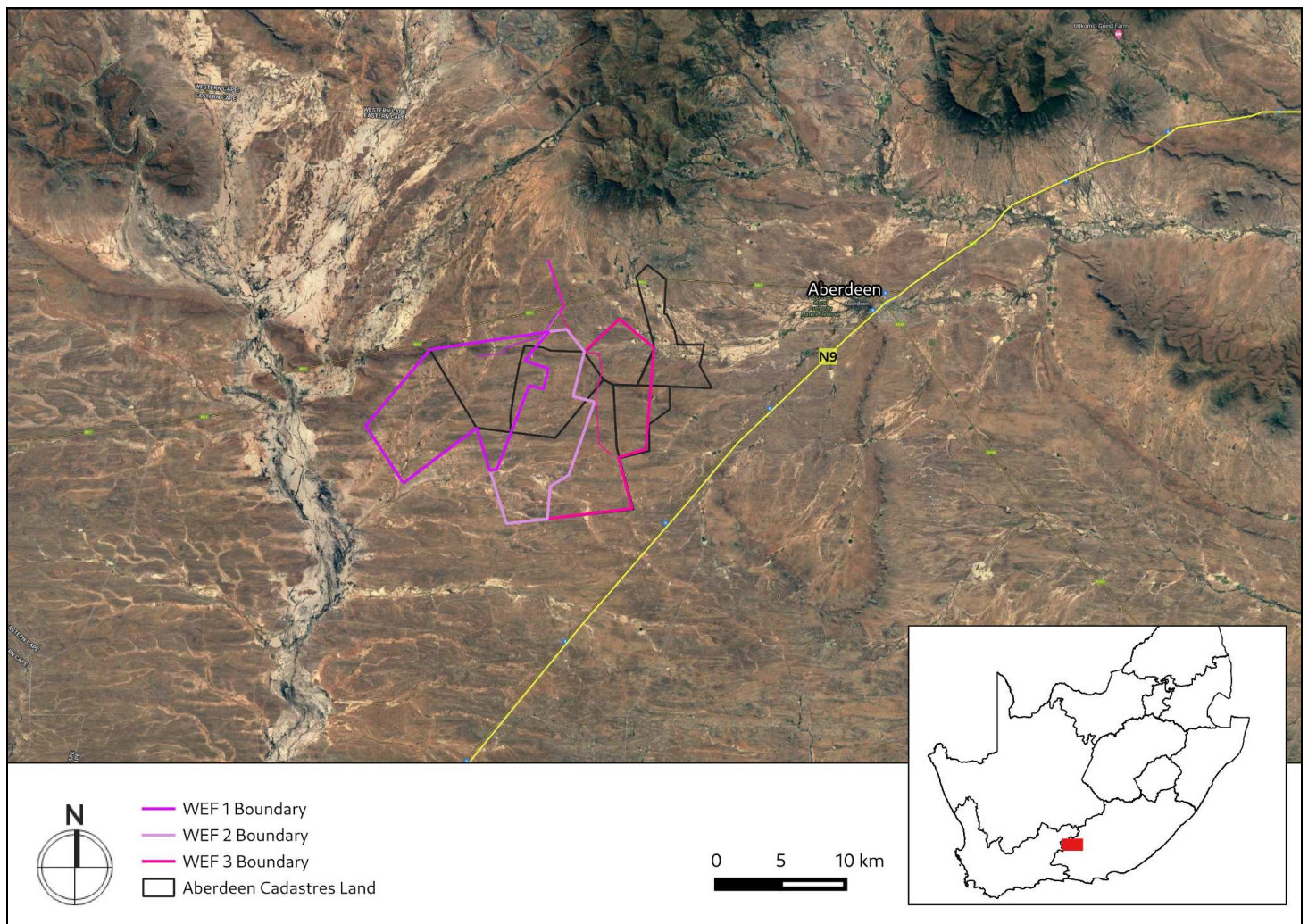


Figure 1: Location of the proposed development area of Aberdeen Wind Facilities 1, 2 and 3



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#### 4. Description of Proposed Development:

**Aberdeen Wind Facility 2 (Pty) Ltd** is proposing the development of a commercial Wind Energy Facility (WEF) and associated infrastructure on a site located approximately 20km west of the town of Aberdeen in the Eastern Cape Province. The site is located within the Dr Beyers Naude Local Municipality in the Sarah Baartman District Municipality.

#### 5. Heritage Resources Identified:

Various Landscape Elements of Cultural Value have been identified within the area proposed for development:

- Topographical Features
  - Wolwekop peak situated just north of the R61 near the Murraysburg secondary road. This is a distinctive landmark feature. It is recommended that the nearest turbine be located more than 2.5km from this peak.
  - Camdeboo Mountains and the “Sleeping Giant” formation framing the long views northwards.
- Water courses and infrastructure
  - The route of the periodical Kraai River crossing a portion of the site and informing a pattern of settlement.
  - Dams, wind pumps and water furrows.
- Planting Patterns
  - Clumps of trees typically founds around homesteads as shelter from the sun/wind and as place-making elements.
- Scenic and historic routes
  - The R61 as a regional linkage route of some scenic value with dramatic views towards the mountain backdrop to the north. A 1km no-development buffer on either side of this road is recommended.
  - The combination of the intersection of the R61 and the Murraysberg Road, change in topography and the landmark qualities of the Wolwekop providing a threshold condition.
  - The east-west historic route running parallel to the R61 and through the site, which has structured a historical pattern of settlement. A 500m no development buffer is recommended on either side of this road.
- Settlements
  - Aberdeen town of suggested Grade IIIA heritage value and situated approximately 16 km east of the proposed Wind Facility.
  - A number of farmsteads and stone kraals situated within or adjacent to the proposed Wind Facility of mostly Grade IIIC heritage value and in some instances of suggested Grade IIIB heritage value. A 500m no-development buffer is recommended for these sites.



In terms of the heritage resources identified in the archaeological field assessment, see Table A below.

**Table A: Artefacts identified during the field assessment development area**

POINT	Project Name	Description	Density/ m <sup>2</sup>	Period	Co-ordinates		Grading	Mitigation
ABD109	Aberdeen WEF 2	Sandstone walled old kraal	n/a	Historic	-32.514289	23.788289	IIIB	500m Buffer
ABD110	Aberdeen WEF 2	Windermere farmhouse complex	n/a	Historic	-32.52117	23.784322	IIIC	500m Buffer

In terms of the heritage resources identified in the palaeontological field assessment, see Table B below.

**Table B: Palaeontological observations made during the field assessment for the proposed WEF**

POINT ID	Project Area	Description	Co-ordinates		Grading	Mitigation
149	Aberdeen 2	Farm Kraanvogel Kuil 155. Blocks of petrified wood among surface gravels. Proposed Field Rating IIIC Local Resource. No mitigation recommended.	-32.62246	23.778256	IIIC	NA
156	Aberdeen 2	Farm Kraanvogel Kuil 155. Blocks of petrified wood with very variable quality of preservation among surface gravels. Proposed Field Rating IIIC Local Resource. No mitigation recommended.	-32.601308	23.751004	IIIC	NA
160	Aberdeen 2	Farm Kraanvogel Kuil 155. Blocks of petrified wood among surface gravels. Proposed Field Rating IIIC Local Resource. No mitigation recommended.	-32.584051	23.760231	IIIC	NA
161	Aberdeen 2	Farm Kraanvogel Kuil 155. Abundant blocks of petrified wood, some substantial and well-preserved, among surface gravels. Proposed Field Rating IIIC Local Resource. No mitigation recommended.	-32.587424	23.767689	IIIC	NA

## 6. Anticipated Impacts on Heritage Resources:

The site forms part of an intact cultural landscape representative of the Central Plateau of the Great Karoo possessing heritage value for historical, aesthetic, architectural, social and scientific reasons. Based on the desktop mapping and assessment of potential heritage resources and receptors, and subsequent fieldwork, the principle of a Wind Facility in the proposed location is acceptable from a cultural landscape perspective. There are no red flags, which identify the project to be a fatal flaw from a cultural landscape perspective.

At a regional scale, the project is located to the south of the Great Escarpment, to the west of the distinctive Camdeboo Plains and at considerable distance from the cluster of Nature Reserves around Graaff Reinet. The site possesses a number of landscape elements contributing to a composite cultural landscape including topographical features, open plains, water features, historic scenic routes and farmsteads. Various buffers are recommended in order to mitigate anticipated negative impacts to these significant cultural landscape elements.

There are limited impacts anticipated to archaeological and palaeontological heritage from this proposed development and as such, the principle of a renewable energy facility in this location is supported from a heritage



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perspective provided that the infrastructure is located in areas able to tolerate the impact of the high degree of change from a cultural landscape perspective.

## **7. Recommendations:**

Based on the outcomes of this report, it is not anticipated that the proposed development of the Aberdeen Wind Energy Facility 2 will negatively impact on significant heritage resources on condition that the following recommendations are implemented:

- Setback from the N9 and the R61 by at least 1km on either side.
- Avoid steep or elevated topography, ridgelines or koppies, with a no development buffer of at least 2.5km from Wolwekop
- Setback from specific graded resources and farmstead settlements IIIB and IIIC, by 500m.
- Setback from farmsteads forming part of the settlement pattern by at least 500m
- A no-go development buffer of 500m must be implemented around sites ABD109 and 110
- The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities
- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and ECPHRA must be alerted immediately to determine an appropriate way forward.

## **8. Author/s and Date:**

Jenna Lavin

February 2023



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### **Details of Specialist who prepared the HIA**

**Jenna Lavin**, an archaeologist with an MSc in Archaeology and Palaeoenvironments, and currently completing an MPhil in Conservation Management, heads up the heritage division of the organisation, and has a wealth of experience in the heritage management sector. Jenna's previous position as the Assistant Director for Policy, Research and Planning at Heritage Western Cape has provided her with an in-depth understanding of national and international heritage legislation. Her 8 years of experience at various heritage authorities in South Africa means that she has dealt extensively with permitting, policy formulation, compliance and heritage management at national and provincial level and has also been heavily involved in rolling out training on SAHRIS to the Provincial Heritage Resources Authorities and local authorities.

Jenna is a member of the Association of Professional Heritage Practitioners (APHP), and is also an active member of the International Committee on Monuments and Sites (ICOMOS) as well as the International Committee on Archaeological Heritage Management (ICAHM). In addition, Jenna has been a member of the Association of Southern African Professional Archaeologists (ASAPA) since 2009. Recently, Jenna has been responsible for conducting training in how to write Wikipedia articles for the Africa Centre's WikiAfrica project.

Since 2016, Jenna has drafted over 250 Screening and Heritage Impact Assessments throughout South Africa.



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3	Cultural Landscape Assessment 2022
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5	Chance Fossil Finds Procedure



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## 1. INTRODUCTION

### 1.1 Background Information on Project

**Aberdeen Wind Facility 2 (Pty) Ltd** is proposing the development of a commercial Wind Energy Facility (WEF) and associated infrastructure on a site located approximately 20km west of the town of Aberdeen in the Eastern Cape Province. The site is located within the Dr Beyers Naude Local Municipality in the Sarah Baartman District Municipality. The project site comprises the following farm portion:

- » Remaining Portion of Farm Doornpoort 93
- » Portion 1 of Farm Doornpoort 93
- » Remaining Portion of Kraanvogelkuil 155

The entire extent of the site falls within the Beaufort West Renewable Energy Development Zones (i.e. REDZ Focus Area 11). The undertaking of a basic assessment process for the project is in-line with the requirements stated in GNR 114 of 16 February 2018.

The project is planned as part of a larger cluster of renewable energy projects, which includes two adjacent, up to 240MW Wind Energy Facilities (Aberdeen Wind Facility 1 and Aberdeen Wind Facility 3) also located near Aberdeen.

The Aberdeen Wind Facility 2 will have a contracted capacity of up to 240MW and comprise up to 41 wind turbines with a maximum capacity of up to 8MW each. The project will have a preferred project site of approximately 6475 ha, and an estimated disturbance area of up to 62 ha. The Aberdeen Wind Facility 2 project site is proposed to accommodate the following infrastructure:

- » Up to 41 wind turbines with a maximum hub height of up to 200m, rotor diameter of up to 200m and have a rotor tip height of up to 300m. The turbine foundations will have a combined permanent footprint of 6ha and 13ha for all turbine crane hardstands is required.
- » Medium-voltage (MV) power lines internal to the wind farm will be trenched and located adjacent to internal access roads, where feasible.
- » Up to 132kV on-site facility substation up to 2ha in extent.
- » Battery Energy Storage System (BESS) with a footprint of up to 5ha.
- » A main access road of approximately 5.7km in length and up to 10m in width<sup>1</sup>.
- » An internal road network between project components inclusive of stormwater infrastructure. A 12m wide road corridor may be temporarily impacted during construction and rehabilitated to 6m wide after construction

---

<sup>1</sup> Access to the facility will be via an existing gravel road off the R61. The gravel road is well established (~10m wide excluding road reserve), however it's likely upgrades will be required at the access point off the R61 and potentially at water crossings.





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- » Gate house and security: up to 0.5ha
- » Operation and Maintenance buildings (includes Control Centre, Offices, Warehouses, Workshop, Canteen, Visitors Centre, Staff Lockers, etc.): Up to 2ha
- » Site camp up to 1 ha
- » Construction laydown areas up to 9ha

The power generated from the project will be sold to Eskom and will feed into the national electricity grid. Ultimately, the project is intended to be a part of the renewable energy projects portfolio for South Africa, as contemplated in the Integrated Resource Plan.

**Table 1: Project Details**

<b>Infrastructure</b>	<b>Footprint and dimensions</b>
Number of turbines	Up to 41 turbines
Hub Height	Up to 200m
Tower height	Up to 200m
Rotor Diameter	Up to 200m
Length of blade	~100m
Contracted Capacity	Up to 240MW (individual turbines up to 8MW in capacity each)
Tower Type	Full steel, full concrete, or hybrid
Area occupied by the onsite substations	Main Facility Substation of 2ha. The general height of the substation will be a maximum of 10 m, however will include switchgear portals up to 15 m in height and lightning masts up to 25 m in height
Capacity of onsite substations	132 kV
Temporary infrastructure	Up to 51 ha. Temporary infrastructure, including laydown areas and hardstand, will be required during the construction phase. The construction period laydown area will be rehabilitated. The temporary hardstand area (boom erection, storage and assembly area) will also be rehabilitated. The preference for crane hardstands would be to leave them intact for unplanned maintenance/ replacement of the blades or nacelle.



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## 1.2 Description of Property and Affected Environment

The proposed Aberdeen Wind Facility lies to the south of the Kambdebooberge 20km west of the town of Aberdeen. The tarred R61 main road forms the northern boundary and links the area to Beaufort West 140km away in a north-westerly direction from the study area. The majority of the turbines have been positioned in a grid alignment running southwest to northeast to take advantage of the predominant winds sweeping through the open and level ground over which the Wind Facility is proposed. The recent 7 year-long drought impacted the sheep farming activities heavily in this area and a number of ruined farms are being managed centrally as they have no longer been viable to farm as separate businesses. Jeep tracks and a few well-constructed gravel roads connect the farms and many of the Wind Facilities access roads have been planned along these existing routes. Small-scale crop agriculture is also present and clustered along the water courses growing fodder for the stock farming production in the area.

The vegetation observed during the survey had been severely degraded by the multi-year drought and what was left for sheep to graze. At least one small scale wild game enclosure was also found. The vegetation is sparse and falls within the Karoo biome of succulents and shrubs. The Wind Facility is one of many renewable energy projects proposed in the area around Aberdeen as it has reliable winds, abundant sun exposure and direct access to the national grid which passes directly through the study area.

The area proposed for development is characterised as follows in the Cultural Landscape Assessment completed for this project (Winter, 2022);

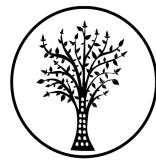
- Mountains: This portion of the vast plains area is contained in the south by the Witberg mountain (peak 1427m), and bound to the north by the Great Escarpment. This includes the Sneeuberg mountain range, which lies north of Graaff-Reinet between Beaufort West and Cradock running roughly east west for 48 km. It curves slightly south at both eastern and western end, with the latter including the “Sleeping Giant” (1777m) section of the Camdeboo Mountain. Wolwekop is topographical landmark lying just north of the R61 and the proposed Wind Facility.
- Plains: Colloquially, the plains area has several names, which describe loosely identified geographic areas such as the Camdeboo south of Graaff-Reinet and the Koup (Die Vlakte), west of Aberdeen towards Beaufort West.
- Water: This is an arid, semi-desert region with a low annual rainfall of 100-200mm. This has dictated low growing karroid shrub vegetation and sparse habitation. The occasional heavy water flow resulting from early summer storms is collected in dams; supply it is augmented by ground water extraction. The Kariega River lying west of the site feeds the Biervlei Dam north of Willowmore, used for flood water retention.
- The Fonteinbos Nature Reserve (1500ha): West of Aberdeen on the seasonal Kraai River, which extends



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west through the proposed development site. A perennial spring in the reserve, “Die Oog”, supplies drinking water and irrigation for Aberdeen agriculture, and is managed through spring-fed water furrows.

- Agriculture: Predominantly small livestock farming including Merino and Dorper sheep and Angora goat farming, and some game farming activities. The recent 7 year-long drought has impacted farming activities heavily in this area and a number of ruined farms are being managed centrally as they have no longer been viable to farm as separate businesses.
- Routes: The development site lies between the R61 and N9. It extends south from the R61. This route connects Beaufort West and Aberdeen, loosely following an early wagon route to Graaff-Reinet. The N9 follows an almost straight line across the plains where it connects Willowmore to Aberdeen. A secondary route to Murrarburg connect to the R61 just west of the topographical landmark of Wolwekop.
- Settlement patterns: A limited settlement footprint with a dispersed pattern of farmsteads and stone kraals, and the historical town of Aberdeen being the only major urban settlement within the local area situated at the intersection of the R61 and N9, and approximately 16km to the east of the proposed Wind Facility. A number of the farmsteads investigated within the site of the proposed Wind Facility and in close proximity thereof are abandoned and in a ruinous state, probably due to the recent 7 year drought severely impacting the agricultural economy of the area.
- Aberdeen: Situated approximately 16km from the proposed Wind Facility. It is a textbook example of a Karoo grid kerkdorp dating to the mid-19th century. It lies on the Kraay Rivier with the primary source of water supplied from the nearby perennial spring. The town has a noteworthy collection of flat roofed Karoo-type houses and turn of the 20th century villas associated the merino-sheep boom. In addition to numerous distinctive streetscapes and townscape qualities, the street plan accommodates an octagonal block occupied by the Dutch Reformed Church and situated on axis with Church, Market and Andries Pretorius Streets. The church steeple is visible from a 25 km distance. The setting of the town within the vast open plains of the Camdeboo is in contrast to the dramatic mountain backdrop of the Camdeboo Mountains to the north. Local topographical conditions shield views from the town towards the proposed Wind Facility.



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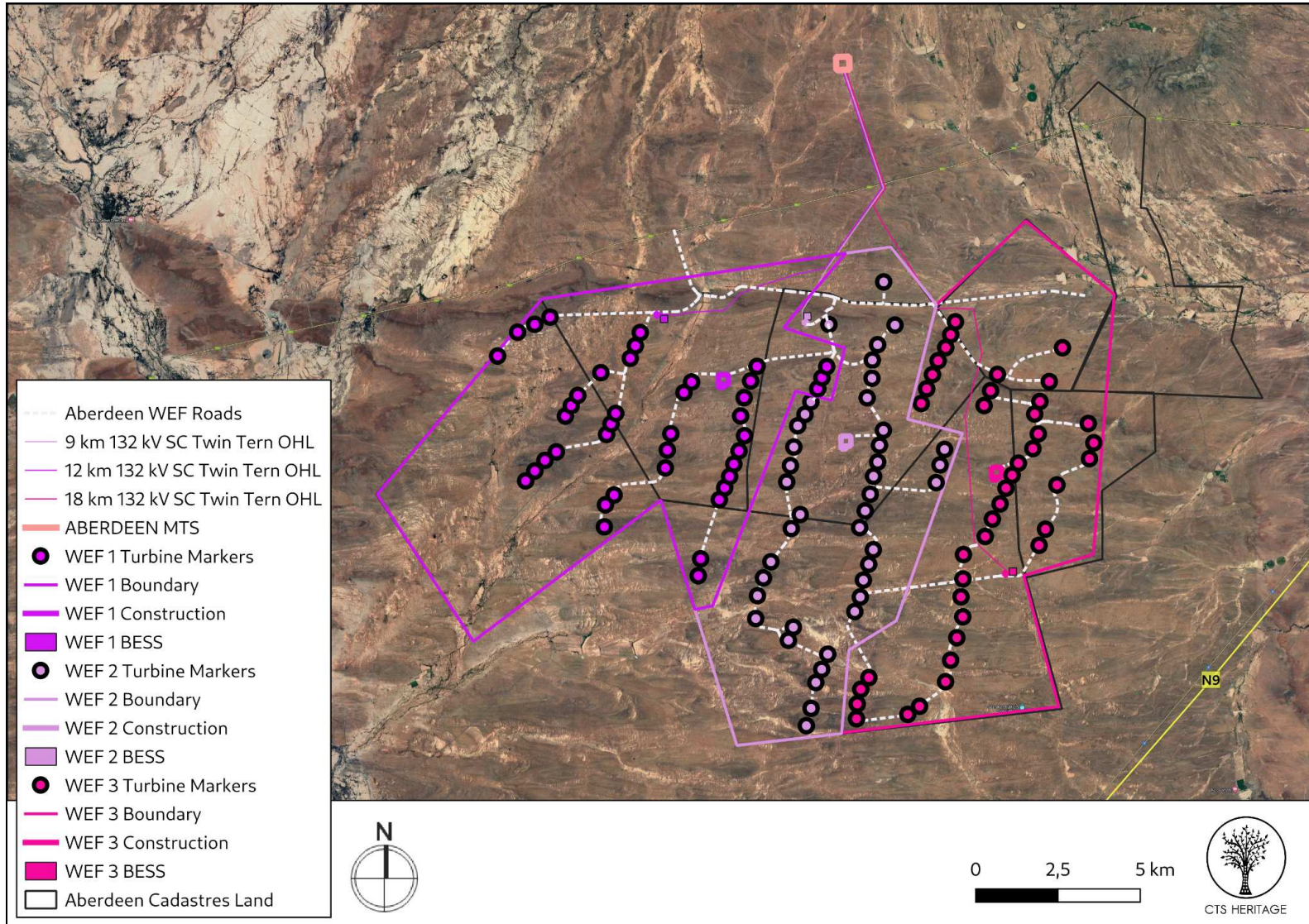


Figure 11: Proposed development layout of Aberdeen WEF Cluster

Cedar Tower Services (Pty) Ltd t/a CTS Heritage  
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Email [info@ctsheritage.com](mailto:info@ctsheritage.com) Web <http://www.ctsheritage.com>



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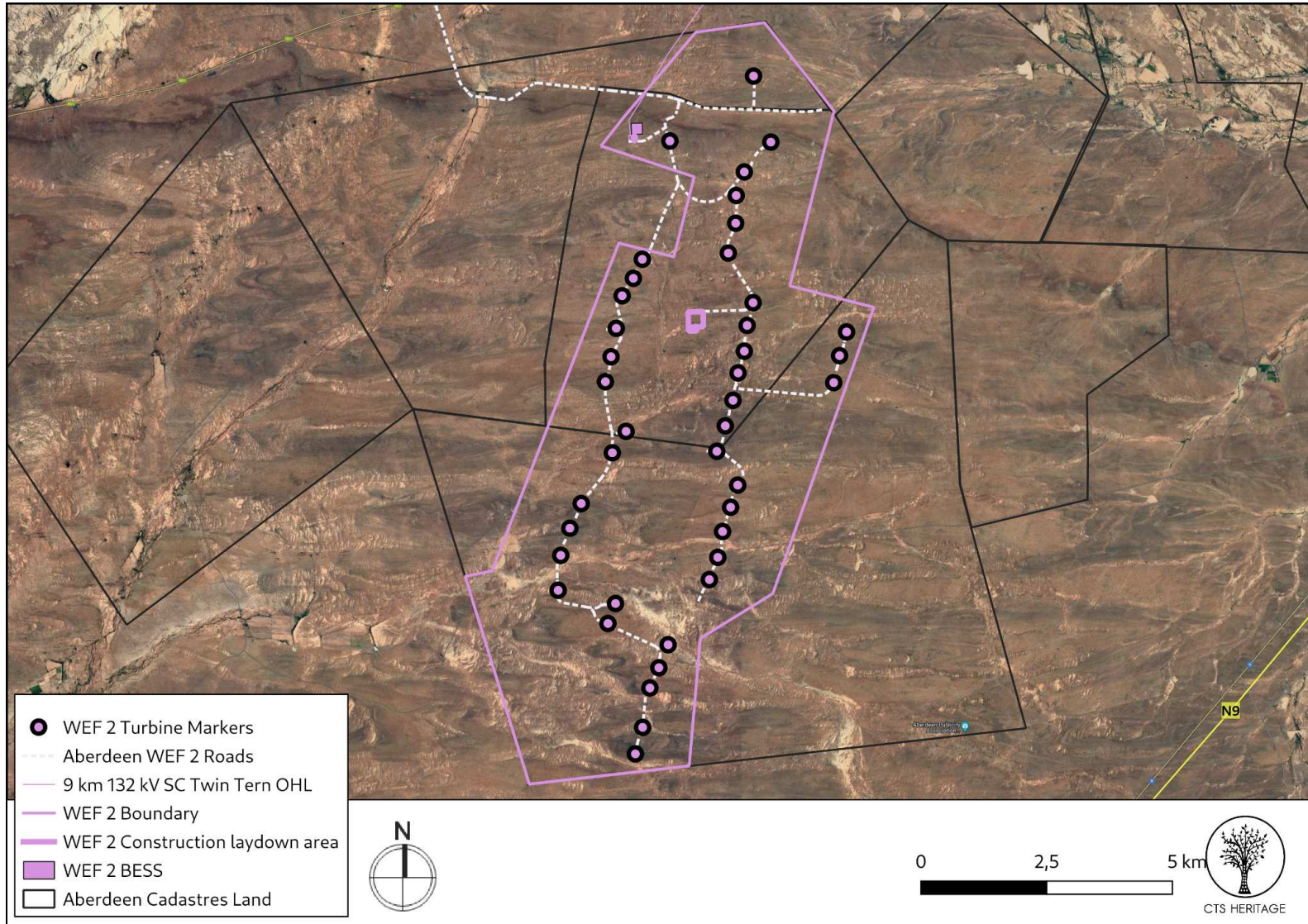
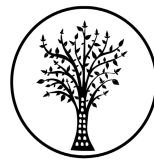


Figure 1.2: Proposed development layout of Aberdeen WEF 2

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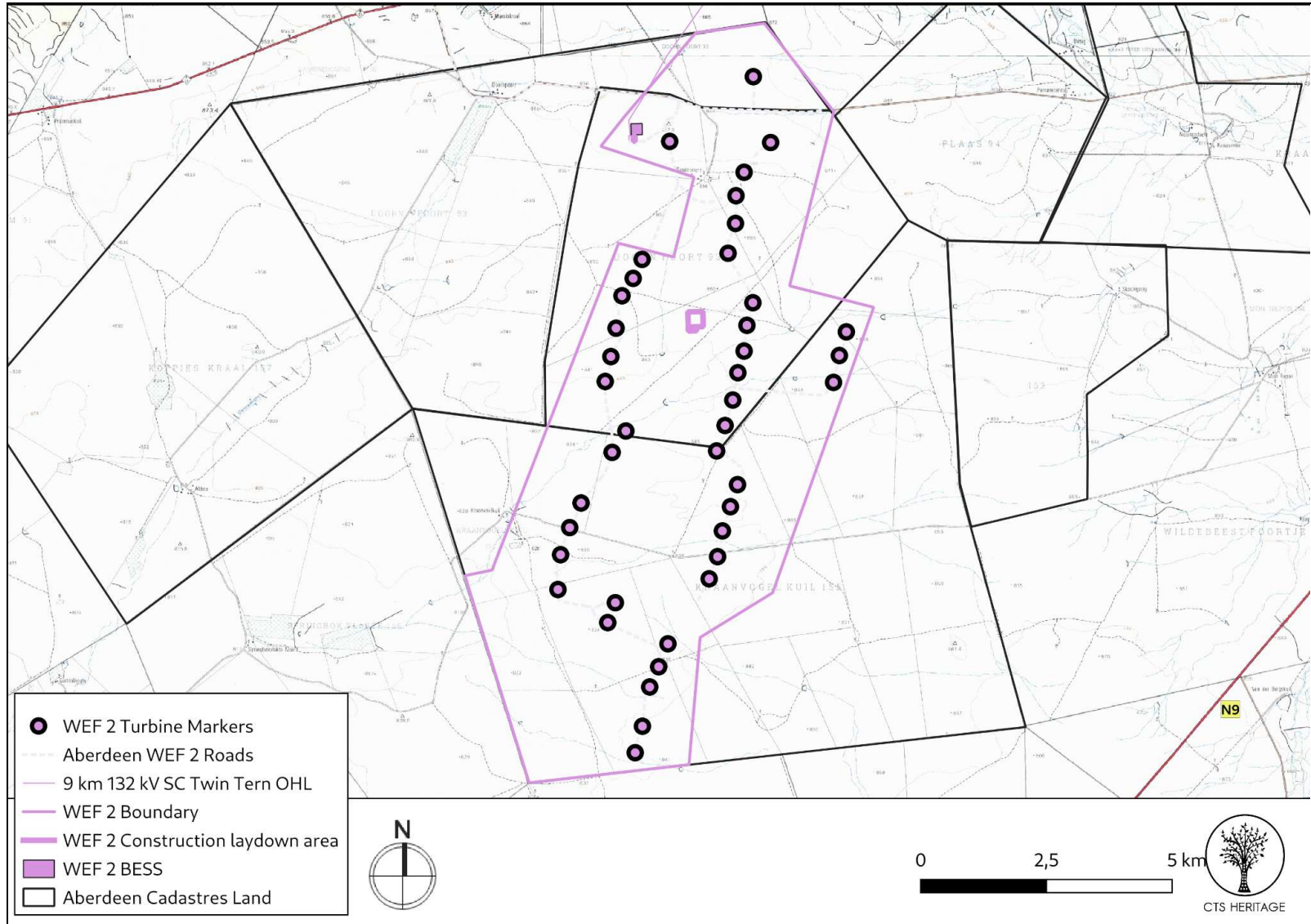


Figure 1.3: The proposed development layout of the WEF 2 Facility

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## 2. METHODOLOGY

### 2.1 Purpose of HIA

The purpose of this Heritage Impact Assessment (HIA) is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999).

The maps presented in this report reflect the Final Layout of the development as informed by the inputs of various specialists throughout the EIA process. Early project layouts have been assessed in the specialist studies attached to this report as Appendices and the recommendations of various specialists, including heritage (archaeology, palaeontology and cultural landscape), have been adopted in the Final Layout assessed in this HIA report.

It must also be noted that the maps included in this report reflect tentative proposals for the grid alignments associated with this project. However, these grid alignments are not finalised and are subject to change. Amended grid alignments will be subject to independent impact assessments in line with relevant legislation.

### 2.2 Summary of steps followed

- A Desktop Study was conducted of relevant reports previously written (please see the reference list for the age and nature of the reports used)
- An archaeologist conducted an assessment of archaeological resources likely to be disturbed by the proposed development. The archaeologist conducted his site visit from 15 to 20 July 2022. The results of this work are reported on in Appendix 1. The maps in Appendix 1 reflect an early development layout.
- A palaeontologist conducted an assessment of palaeontological resources likely to be disturbed by the proposed development. The palaeontologist conducted his site visit in August 2022. The results of this work are reported on in Appendix 2. The maps in Appendix 1 reflect an early development layout.
- A cultural landscape assessment was conducted that covers the proposed development area with fieldwork completed in July 2022. The results of this work are reported on in Appendix 1. The maps in Appendix 3 reflect an early development layout.
- The results of the above assessments were incorporated into this HIA and their findings have been assessed relative to the final development layout in this report.
- The identified resources were assessed to evaluate their heritage significance and impacts to these resources were assessed.



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### 2.3 Assumptions and uncertainties

- The *significance* of the sites and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.
- It should be noted that archaeological and palaeontological deposits often occur below ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted, and it would be required that the heritage consultants are notified for an investigation and evaluation of the find(s) to take place.

However, despite this, sufficient time and expertise was allocated to provide an accurate assessment of the heritage sensitivity of the area.

### 2.4 Constraints & Limitations

The ground was level with very few changes in elevation spread across the study area. No rock shelters or natural outcrops of dolerite boulders were found and the vegetation posed no challenges in terms of survey visibility as the ground was sparsely vegetated.

The experience of the heritage practitioner, and observations made during the study, allow us to predict with some accuracy the archaeological sensitivity of the receiving environment.

### 2.5 Savannah Impact Assessment Methodology

Direct, indirect and cumulative impacts of the issues identified through the Scoping study, as well as all other issues identified in the EIA phase were assessed in terms of the following criteria:

- The 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 a very short duration (0 – 1 years) – assigned a score of 1.
  - The lifetime of the impact will be of a short duration (2 – 5 years) – assigned a score of 2.
  - Medium-term (5 – 15 years) – assigned a score of 3.





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- Long term (> 15 years) – assigned a score of 4.
- Permanent – assigned a score of 5.
- The consequences (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 complete destruction of patterns and permanent cessation of processes.
- The probability of occurrence, which shall describe the likelihood of the impact actually occurring. 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 (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.
- 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).



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### 3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

#### 3.1 Desktop Assessment

##### **Background:**

The area proposed for the Aberdeen Wind Facility 2 is located approximately 20km west of Aberdeen in the Eastern Cape, and is located within the identified Beaufort West REDZ (Figure 2b). With its numerous examples of Victorian architecture, it is one of the architectural conservation areas of the Karoo. The town is some 55 km south-west of Graaff-Reinet, 155 km east-south-east of Beaufort West and 32 km south of the Camdeboo Mountains. Laid out on the farm Brakkefontein as a settlement of the Dutch Reformed Church in 1856, it became a municipality in 1858. It is named after Aberdeen in Scotland, birthplace of the Reverend Andrew Murray of Graaff-Reinet, relieving minister. Aberdeen is filled with examples of Victorian architecture, and the Steeple of the Dutch Reformed Church, with its 50 metre Tower, is the highest in South Africa. There is a Local Authority Nature Reserve found here, as well as The Fonteinbos Nature Reserve which is both beautiful and functional, as its natural spring (Die Oog) supplies the entire town and its agricultural sector with its water.

##### **Historic settlement and the Cultural Landscape (Winter et al. 2021, Appendix 3)**

The name Karoo has its roots in the Khoe word meaning “place of great dryness”. The archaeology shows the area as well-used on a seasonal and nomadic basis with water sources providing sites suited to the needs of hunter-gather San people and pastoralist-herder Khoe people (Anderson 1985: 8). The name Camdeboo (Qamdobowa in isiXhosa) is thought to have evolved from a phonetically similar Khoe word possibly meaning “green hollow” to describe the plains after seasonal rainstorms.

The late 18th century frontier of the colony was edged by two vast administrative regions, the District of Stellenbosch (1679) and the District of Graaff-Reinet (1786). European settlement came slowly to the central Karoo, with the push north by trekboere taking place in the mid- to late-1700s. Like the Khoe, their lifestyle was semi-nomadic, following transhumance routes and taking temporary ownership of land through a system of renewable permits for loan farms. This was a period of uneasy co- habitation between the trekboere, and the San, Khoe and Xhosa alienated from their preferred grazing to the south and east. Further expansion was fiercely opposed by the San, who resisted alienation from water sources, until they were forcibly suppressed in the 1790s.

British colonial rule from 1806 brought a new landownership policy of perpetual quitrent, imposing “settled agriculture”. This dispossessed Khoe, Xhosa and many of the poorer trekboere who were unable to fit the legal system and were pushed beyond the Great Escarpment or subjugated to a life of labour. Wealthy farming burghers, merchants and government officials took over land suitable to sheep farming (Anderson 1985, Guelke Shell 1992). The 1820s to 1860s shows a steady pattern of Karoo land grants, with the later ones in more remote areas often formalising the rights of a pre-existing land user.



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Aberdeen town was established on the farm Brakkefontein, which had been a fairly early grant for the area, signed over in 1817 by the British Governor Lord Charles Somerset. In 1855 the farm was bought by the Graaff-Reinet Dutch Reform church to provide for its congregation, growing as a result of the Marino wool export boom which began in the 1840s. Work began on the Cape Gothic-style Dutch Reform church in 1855 (completed in 1907). Built to seat 2000, it is notable for the unusual height of its steeple, over 50m, which acts as a landmark in the mostly flat landscape. The Methodist church was completed in 1883 and is a simple stone rectangular building, with buttresses and arch top windows. The bell tower is topped with a belfry of cast iron lace-work.

The invention of the ground water pump, the “windmill” (late 1880s) allowed year-round access to water for irrigation and stock, and becoming an identifying feature of the Karoo landscape. By the 1900s the area was well established for wool, mohair and tobacco production.

The South African War (1899-1902) had a negative social impact on the Aberdeen area, pitting families aligned with the Colonial government against those with Boer Republic sympathies, with 139 “Cape Rebels” recorded. However, it was not a significant military base nor the site of major battles and little tangible evidence remains.

Provisional research suggests that the farms affected by the proposed development fall into the mid-19th century period of quitrent grants. In all cases, it is possible that the farm was in use prior to the grant and may have had early structures for shelter/habitation and animal management. However, it is probable that permanent habitation followed later once water management systems, such as the groundwater wind pumps, were readily available.

Surveyor annotations on the early survey diagrams for the affected farms indicate roads, water features, houses and dams. Cadastral meeting points are occasionally identified by “bush”, indicating the rarity of taller vegetation clusters and their capacity to serve as landmark features.

- Doornpoort 93, a very large tract of land granted in 1865 to James Roberts who subsequently purchased it. It was subdivided in the mid-20thC. An 1861 survey shows the historic route running parallel and south of the R61 from Aberdeen towards Beaufort West.
- Kraanvogelkuil surveyed 1869 was granted to JP Pienaar in 1874. The survey diagram notes that it is crossed by the “road to Aberdeen”.
- Neighbouring Koppieskraal 157 was also surveyed in 1869 and granted to JS Pienaar in 1876. The diagram shows a house and dam.
- The Kraayrivier Outspan 150, noted in early surveys as a public outspan on the periodical Kraay River and shown as having a bushy patch, moved into the private ownership of Jacob Johannes Weideman and sons in 1893. This reflects the late 19thC improved road systems and means of transport, reducing the need for outspan places.



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- Kraairivier 149 was granted at the same time to Weideman and sons.
- The settlement of Pretoriuskuil on Farm 91 adjacent to the N61 may include early settlement fabric.

## Archaeology

Very few heritage assessments have been completed within close proximity to the area proposed for development (Figure 2a). According to Nilssen (2014, SAHRIS NID 504763), “The Karoo houses a long and rich archaeological record dating from the earliest stages of Stone Age technology that are over a million years old, to the historic period that consists of the last few hundred years of human occupation (see Nilssen 2011 and references therein). Archaeological sites include caves and rock shelters, open air artefact scatters, rock engravings and historic structures with their associated cultural materials.” According to the ACO (2013, SAHRIS NID 503074), “Because of the scarcity of caves and shelters, more than 90% of Karoo archaeological sites are open sites of stone artefacts, ostrich eggshell fragments and occasionally, pottery. Bone remains are rarely preserved. Artefacts of both the Early and Middle Stone Age are widespread and may generally be described as an ancient litter that occurs at a low frequency across the landscape. Where definable scatters of Early and Middle Stone Age material occur, they are considered to be significant heritage sites.

More intensive occupation of the Karoo started around 13 000 years ago during the Later Stone Age, which is essentially the heritage of Khoisan groups who lived throughout the region. The legacy of the San includes numerous open sites while traces of their presence can also be found in most large rock shelters, often in the form of rock art. They frequently settled a short distance from permanent water sources (springs or waterholes) and made use of natural shelters such as rock outcrops or large boulders or even large bushes. In the Great Karoo, natural elevated features such as dolerite dykes and ridges played a significant role in San settlement patterns” and as such, this broader area is renowned for its well-preserved rock art and other artefacts from this time, including rock engravings and rock gongs. It is likely that similar archaeological heritage exists within the areas proposed for development and as such, impact to these resources must be assessed.

A Heritage Impact Assessment was completed in 2013 for the proposed Aberdeen WEF located immediately north of the area proposed for development (Booth and Sanker, SAHRIS NID 251161). The findings of this assessment therefore provide an indication of the kinds of heritage resources likely to be present within this proposed development area. Booth and Sanker (2013) noted that “Surface scatters of predominantly Middle Stone Age stone artefacts were observed over most of the area proposed for the development, these included isolated as well as dense occurrences. Eight areas / sites have been identified that comprise relatively dense scatters of stone artefacts over large areas with several micro-sites within the demarcated sites. It was observed that denser distributions of stone artefacts occurred in the north and central areas of the study area, filtering out towards the south. No associated archaeological material or organic remains were documented with the stone artefact



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surface scatters. An historical stonewalling farmstead complex is situated adjacent to one of the proposed access roads. The complex comprised the remains of the house and two kraals. Packed stones were identified in the south-central area. The packed stone may resemble a kraal that has now collapsed. Fragments of glass and pottery were found within this area, as well as a No. 2 Musket Eley bullet casing associated with the Second Anglo-Boer War.” All of the resources identified by Booth and Sanker (2013) have been mapped relative to the proposed development in Figure 3.1 and 3.2.

### **Palaeontology**

According to the SAHRIS Palaeosensitivity Map (Figure 4a), the area proposed for development is underlain by sediments of very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 3122 for Victoria West, the development area is underlain by the Abrahamskraal and Teekloof Formations, both of the Adelaide Subgroup of the Beaufort Group of sediments. According to the SAHRIS Fossil Heritage Browser and the Palaeotechnic Report for the Western Cape (Almond and Pether, 2008), the Beaufort Group sediments are known to preserve diverse terrestrial and freshwater tetrapods of *Tapinocephalus* to *Lystrosaurus* Biozones (amphibians, true reptiles, synapsids – especially therapsids), palaeoniscoid fish, freshwater bivalves, trace fossils (including tetrapod trackways) and sparse vascular plants (*Glossopteris* Flora, including petrified wood).

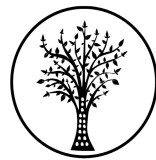
A Palaeontological Impact Assessment was completed in 2014 for the proposed Aberdeen WEF located immediately north of the area proposed for development (Almond, SAHRIS NID 251166). The findings of this assessment therefore provide an indication of the kinds of palaeontological resources likely to be present within this proposed development area. Almond (2014) noted that “The entire wind farm study area is underlain at depth by fluvial sediments assigned to the lowermost part of the Teekloof Formation (Lower Beaufort Group) that are of Late Permian age (c. 260 million years old). The mudstone-rich succession of the Hoedemaker Member represented here is associated with moderately diverse fossil biotas of the *Tropidostoma* Assemblage Zone that include a range of mammal-like reptiles, true reptiles, fish, amphibians as well as plants and trace fossils. To the author’s knowledge there are no previously identified fossil vertebrate finds within the study area, although a small lizard-like specimen was apparently found (probably preserved within a palaeocalcrete nodule) among surface gravels along its northern margin (Mnr Loots, pers. comm., Nov. 2014). The only fossil material recorded during the present field assessment comprises sparse blocks of well-preserved silicified wood that occur widely among surface gravels through much of the study area. Most of the fossil wood specimens have probably been downwasted from channel sandstones within the Hoedemaker Member itself, but some cherty fossil wood clasts may have been introduced from elsewhere within fluvial gravels. The general lack of fossil records in the Aberdeen *vlaktes* may well be due, in large part, to very low levels of bedrock exposure in this low-relief area, as well as due to local development of cleavage, near-surface calcrete veining and weathering. It is concluded that, while there is a significant chance that fossil vertebrate remains will be disturbed, destroyed or sealed-in by the



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proposed wind energy facility development, these are best mitigated by applying a chance find procedure. The operational and decommissioning phases of the wind farm are unlikely to involve further adverse impacts on local palaeontological heritage, however.”

As noted above, the maps included in this report reflect tentative proposals for the grid alignments associated with this project. However, these grid alignments are not finalised and are subject to change. Amended grid alignments will be subject to independent impact assessments in line with relevant legislation.



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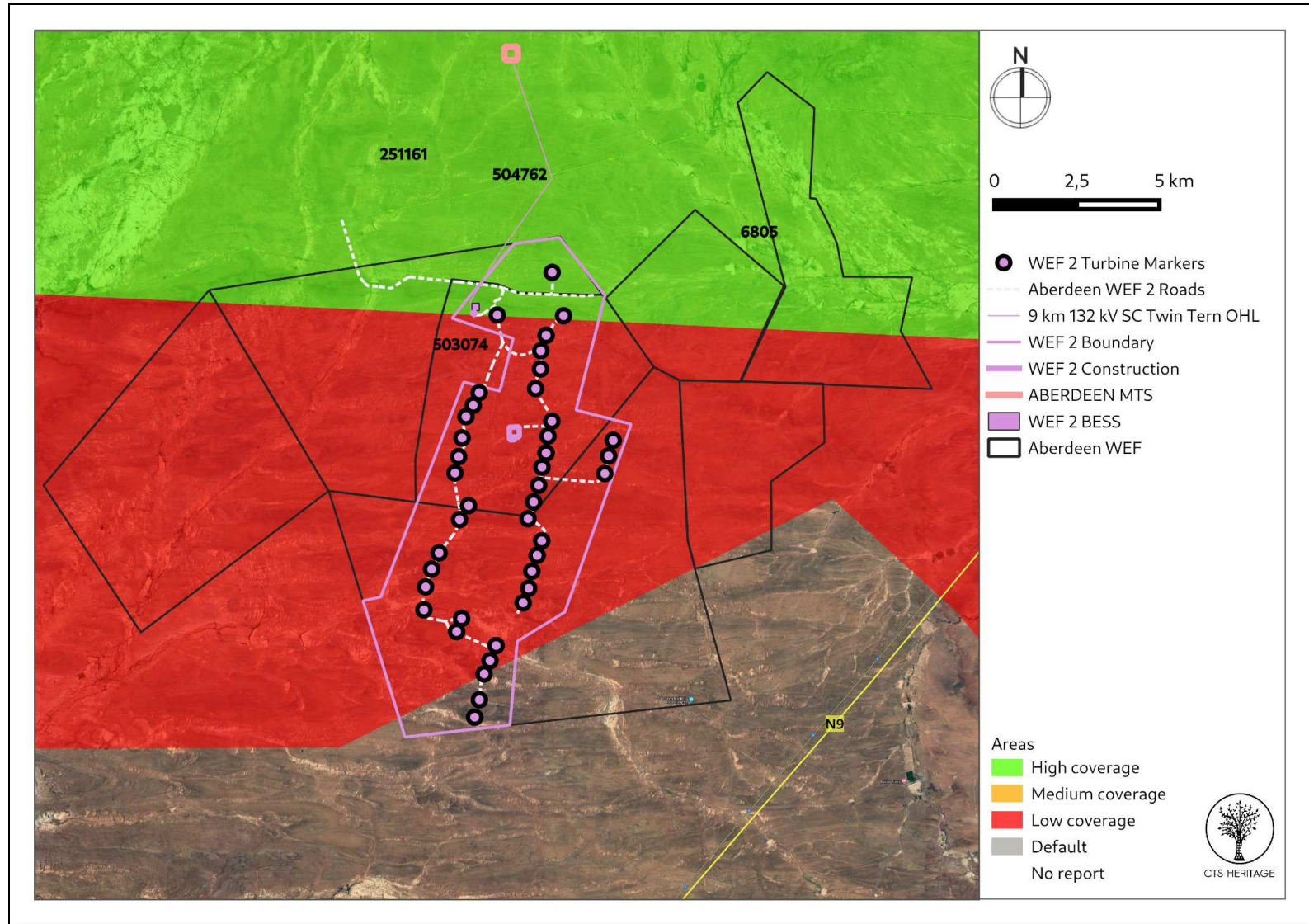
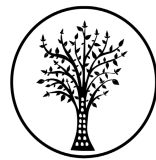


Figure 2: Spatialisation of heritage assessments conducted in proximity to the proposed development of Aberdeen WEF 2



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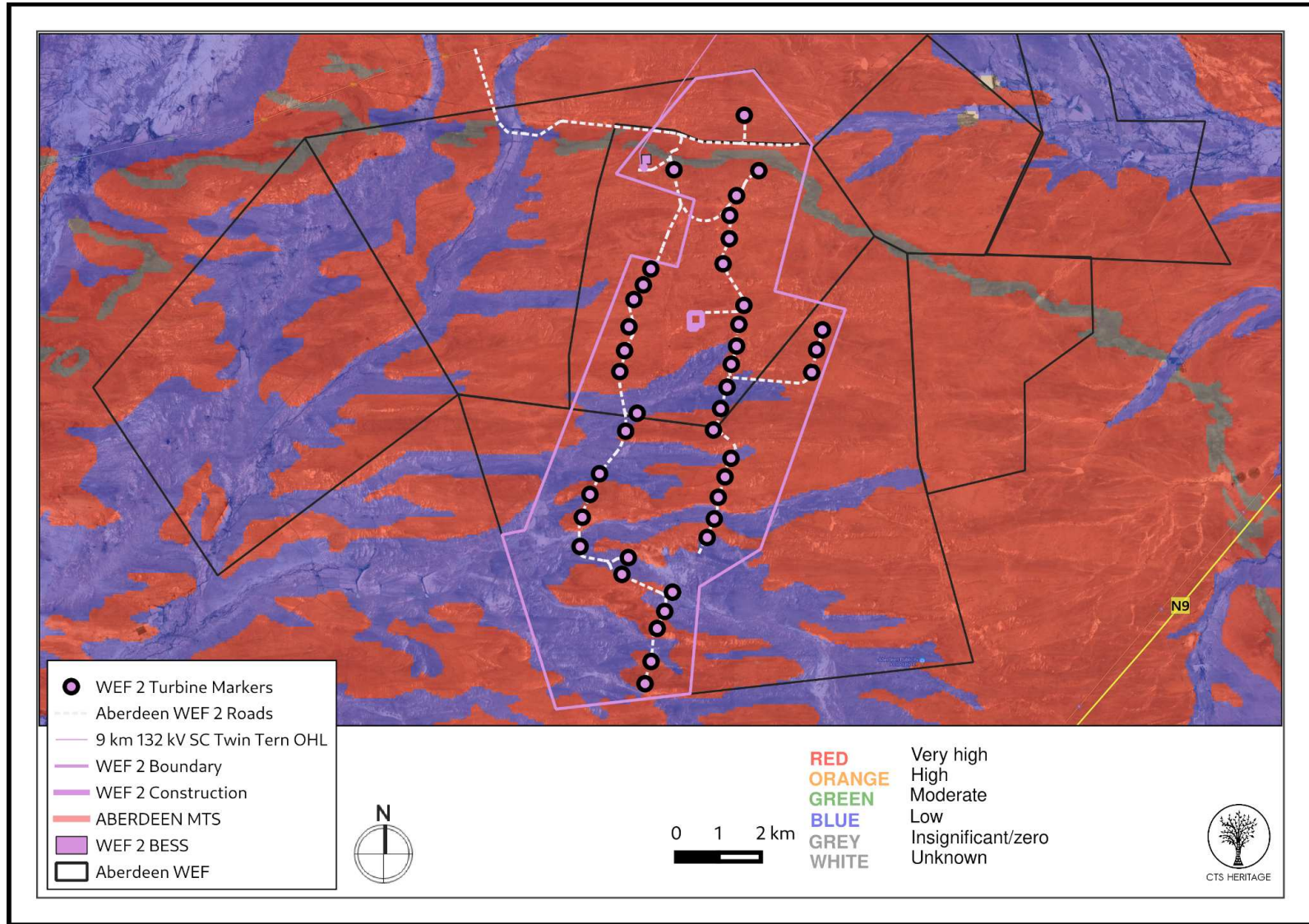
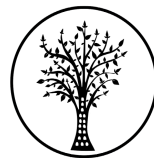


Figure 3.1: Palaeontological sensitivity of the proposed development area of Aberdeen WEF 2





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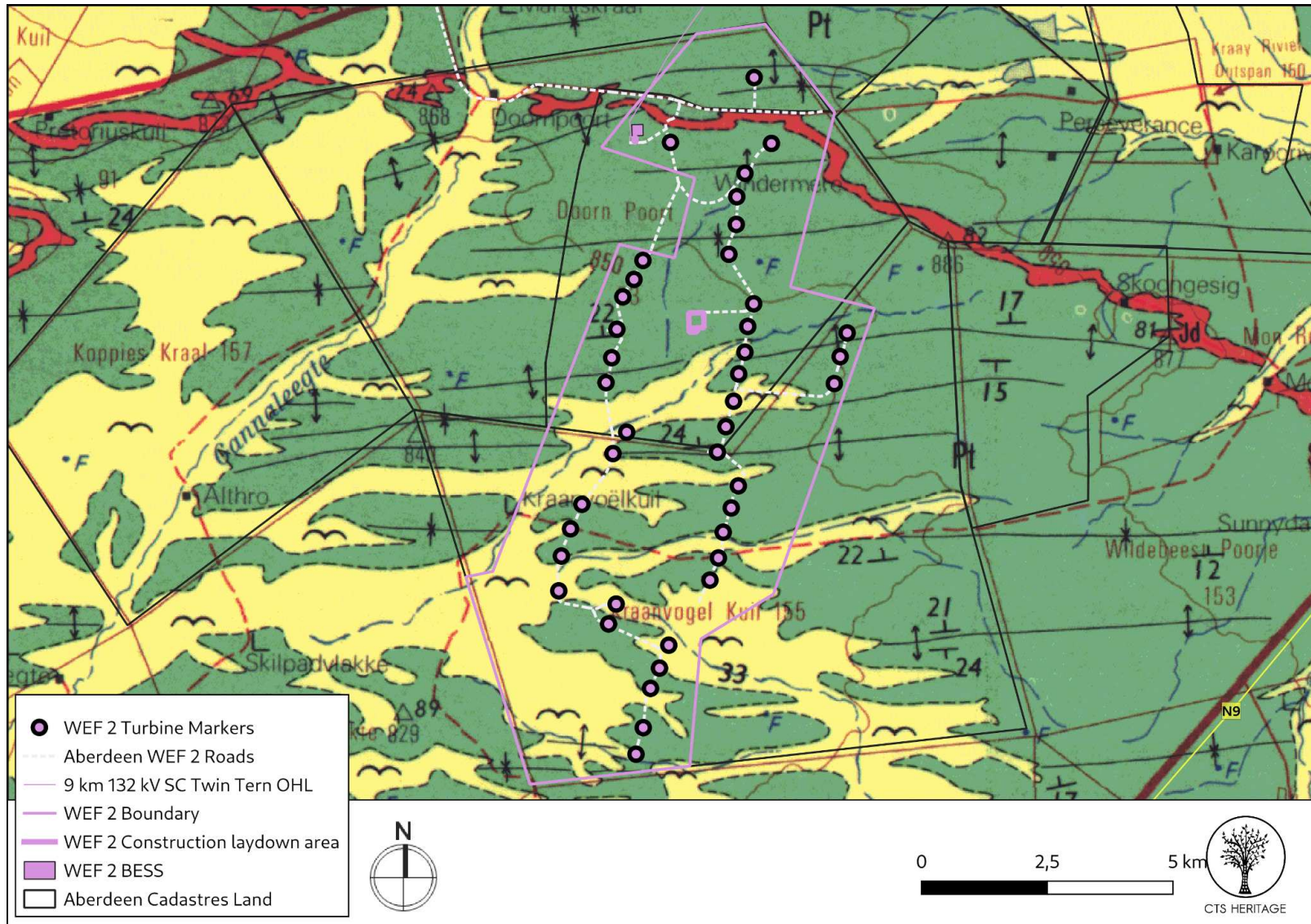


Figure 3.2: Geology Map. Extract from the CGS 3222 Beaufort West Map indicating that the development area for the PV development is underlain by sediments of Pt: Poortjie Member of the Teekloof Formation of the Adelaide Subgroup and Jd: Jurassic Dolerite as well as Qc: Quaternary Sands for Aberdeen WEF 2

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#### 4. IDENTIFICATION OF HERITAGE RESOURCES

##### 4.1 Summary of findings of Specialist Reports

###### ***Cultural Landscape and the Built Environment (Winter et al. 2021, Appendix 3)***

The concept of cultural landscape gives spatial and temporal expression to the processes and products of the interaction between people and the environment. It may thus be conceived as a particular configuration of topography, geology, vegetation, land use and settlement pattern and associations which establishes some coherence of natural and cultural processes.

The overall landscape of the study area is a vast, open, barren, largely featureless plain. It lies to the west of an area of high scenic value framed to the north by the south-west sector of the Camdeboo Mountains, notably the Sleeping Giant. The R61 and N9 are regional linkage routes traversing a representative Karoo landscape and having some scenic heritage value in terms of its sense of remoteness.

The Camdeboo Plains and mountain backdrop, with its core lying east of the proposed development area, is of high local historical, aesthetic architectural and social significance. Of particular heritage significance is the town of Aberdeen, which is worthy of Grade IIIA heritage status in terms of the following:

- Historical value dating to the mid-19th century and including its local role in the South African War.
- Architectural and aesthetic value in terms of its street pattern, streetscape and townscape, concentration of conservation worthy buildings, and its relationship with its setting, notably its mountain backdrop to the north.
- Cultural landscape value as providing a focal and destination point within a vast open flat landscape and at the intersection of two regional routes.

The cultural landscape to the west of Aberdeen and forming part of the landscape affected by the proposed WEF has historical value in terms of forming part of a pattern of land grants dating to the mid-19th century. Natural features and patterns of use over time contribute to its landscape character (watercourses, topographical features, routes, farmsteads, stone kraals). While the landscape itself is not worthy of formal protection in terms of the NHRA, it possesses conservation-worthy landscape elements for aesthetic (visual, place making) and historical reasons.

###### ***Archaeology (Appendix 1)***

The field assessment completed for the Aberdeen WEF should be understood in conjunction with the findings made by Booth to the north of the R61 for the Eskom WEF (not built yet) in 2013. Given the lack of natural rock shelters on the landscape and absence of dolerite boulders favoured by rock engravers during the Later Stone Age, the vast majority of the observations consisted of open air scatters of Middle and Later Stone Age artefact



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scatters. The MSA material found clearly spanned a very wide period of time as many examples of early MSA artefacts were found along with diagnostic pieces such as blade flakes, blanks, unifacial points, radial cores and bifacially retouched flakes. Locally abundant raw materials were extensively utilised as siltstones and hornfels contributed most of the stone used to make artefacts as well as a smaller but significant percentage of chert, particularly in the LSA assemblages. The artefacts are spread thinly but widely throughout the area with no particular focal points other than the slightly elevated ridges that are no more than 10-20m higher than the surrounding landscape.

### ***Palaeontology (Appendix 2)***

The Aberdeen WEF Cluster project area is underlain at depth by potentially fossiliferous continental (fluvial / lacustrine) bedrocks of the Lower Beaufort Group (Adelaide Subgroup) that probably belong to the Middle Permian Abrahamskraal Formation. There are no historical records of fossil vertebrates from this area; this is largely due to the extremely poor levels of bedrock exposure found here. During the recent 4-day palaeontological field assessment only two occurrences of fossil vertebrates were recorded, both comprising material reworked into superficial gravels rather than in situ. Both fossil vertebrate sites have been adequately sampled and do not require further mitigation. Occasional trace fossil assemblages comprise low diversity, small-scale invertebrate burrows of limited scientific interest.

A background scatter of numerous petrified (silicified) wood blocks reworked from the Lower Beaufort Group bedrocks occurs within surface gravels and sands of eluvial and alluvial origin throughout most of the WEF Cluster project area; only a small sample of such occurrences have been recorded here. Much of the fossil wood material is poorly preserved and of limited scientific value. However, a small minority of blocks show well-developed seasonal growth rings and excellent preservation of the original woody fabric; these are potentially identifiable and may be of biostratigraphic and palaeoecological interest. Mitigation of the recorded fossil wood sites in particular is not recommended here, given the abundance and widespread occurrence of the material. However, it is recommended that a representative sample of well-preserved fossil wood material from the WEF project area is collected by a suitably qualified palaeontologist for curation in an approved fossil collection (e.g. Evolutionary Studies institute, Wits University, Johannesburg) once the development is authorised and before the Construction Phase.

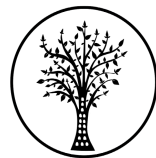


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## 4.2 Heritage Resources identified

Various Landscape Elements of Cultural Value have been identified within the area proposed for development:

- Topographical Features
  - Wolwekop peak situated just north of the R61 near the Murraysburg secondary road. This is a distinctive landmark feature. It is recommended that the nearest turbine be located more than 2.5km from this peak.
  - Camdeboo Mountains and the “Sleeping Giant” formation framing the long views northwards.
- Water courses and infrastructure
  - The route of the periodical Kraai River crossing a portion of the site and informing a pattern of settlement.
  - Dams, wind pumps and water furrows.
- Planting Patterns
  - Clumps of trees typically founds around homesteads as shelter from the sun/wind and as place-making elements.
- Scenic and historic routes
  - The R61 as a regional linkage route of some scenic value with dramatic views towards the mountain backdrop to the north. A 1km no-development buffer on either side of this road is recommended.
  - The combination of the intersection of the R61 and the Murraysberg Road, change in topography and the landmark qualities of the Wolwekop providing a threshold condition.
  - The east-west historic route running parallel to the R61 and through the site, which has structured a historical pattern of settlement. A 500m no development buffer is recommended on either side of this road.
- Settlements
  - Aberdeen town of suggested Grade IIIA heritage value and situated approximately 16 km east of the proposed WEF.
  - A number of farmsteads and stone kraals situated within or adjacent to the proposed WEF of mostly Grade IIIC heritage value and in some instances of suggested Grade IIIB heritage value. A 500m no-development buffer is recommended for these sites.



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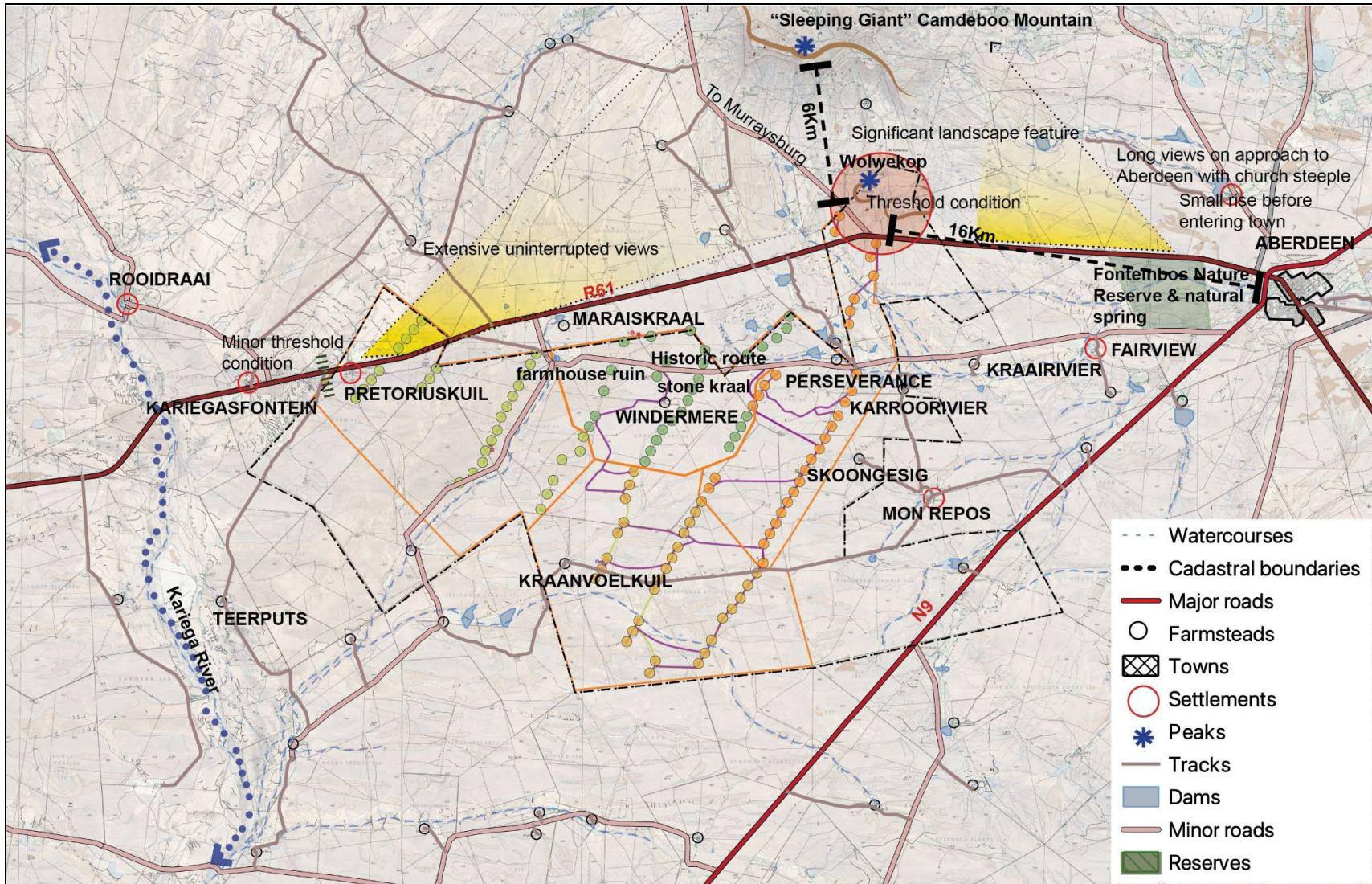


Figure 4: Cultural Landscape Elements Map from Winter et al. 2022 (Appendix 3). This map reflects an early turbine layout. The recommendations of the CL assessment have been adopted in the Final Layout assessed in this report.

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In terms of the heritage resources identified in the archaeological field assessment, see Table 2 below.

**Table 2: Artefacts identified during the field assessment development area**

POINT	Project Name	Description	Density/ m <sup>2</sup>	Period	Co-ordinates		Grading	Mitigation
ABD109	Aberdeen WEF 2	Sandstone walled old kraal	n/a	Historic	-32.514289	23.788289	IIIB	500m Buffer
ABD110	Aberdeen WEF 2	Windermere farmhouse complex	n/a	Historic	-32.52117	23.784322	IIIC	500m Buffer



**Figure 5.1: Observation ABD109 - Sandstone walled old kraal**



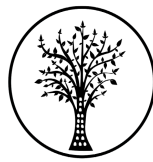
**Figure 5.2: Observation ABD110 - Windermere farmhouse complex**



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Figure 5.3: Observation ABD147 - Kraanvoelkuil farmhouse complex



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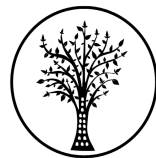
In terms of the heritage resources identified in the palaeontological field assessment, see Table 3 below.

**Table 3: Palaeontological observations made during the field assessment for the proposed Wind Facility**

POINT ID	Project Area	Description	Co-ordinates		Grading	Mitigation
149	Aberdeen 2	Farm Kraanvogel Kuil 155. Blocks of petrified wood among surface gravels. Proposed Field Rating IIIC Local Resource. No mitigation recommended.	-32.62246	23.778256	IIIC	NA
156	Aberdeen 2	Farm Kraanvogel Kuil 155. Blocks of petrified wood with very variable quality of preservation among surface gravels. Proposed Field Rating IIIC Local Resource. No mitigation recommended.	-32.601308	23.751004	IIIC	NA
160	Aberdeen 2	Farm Kraanvogel Kuil 155. Blocks of petrified wood among surface gravels. Proposed Field Rating IIIC Local Resource. No mitigation recommended.	-32.584051	23.760231	IIIC	NA
161	Aberdeen 2	Farm Kraanvogel Kuil 155. Abundant blocks of petrified wood, some substantial and well-preserved, among surface gravels. Proposed Field Rating IIIC Local Resource. No mitigation recommended.	-32.587424	23.767689	IIIC	NA

As noted above, the maps included in this report reflect tentative proposals for the grid alignments associated with this project. However, these grid alignments are not finalised and are subject to change. Amended grid alignments will be subject to independent impact assessments in line with relevant legislation.





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### 4.3 Mapping and spatialisation of heritage resources

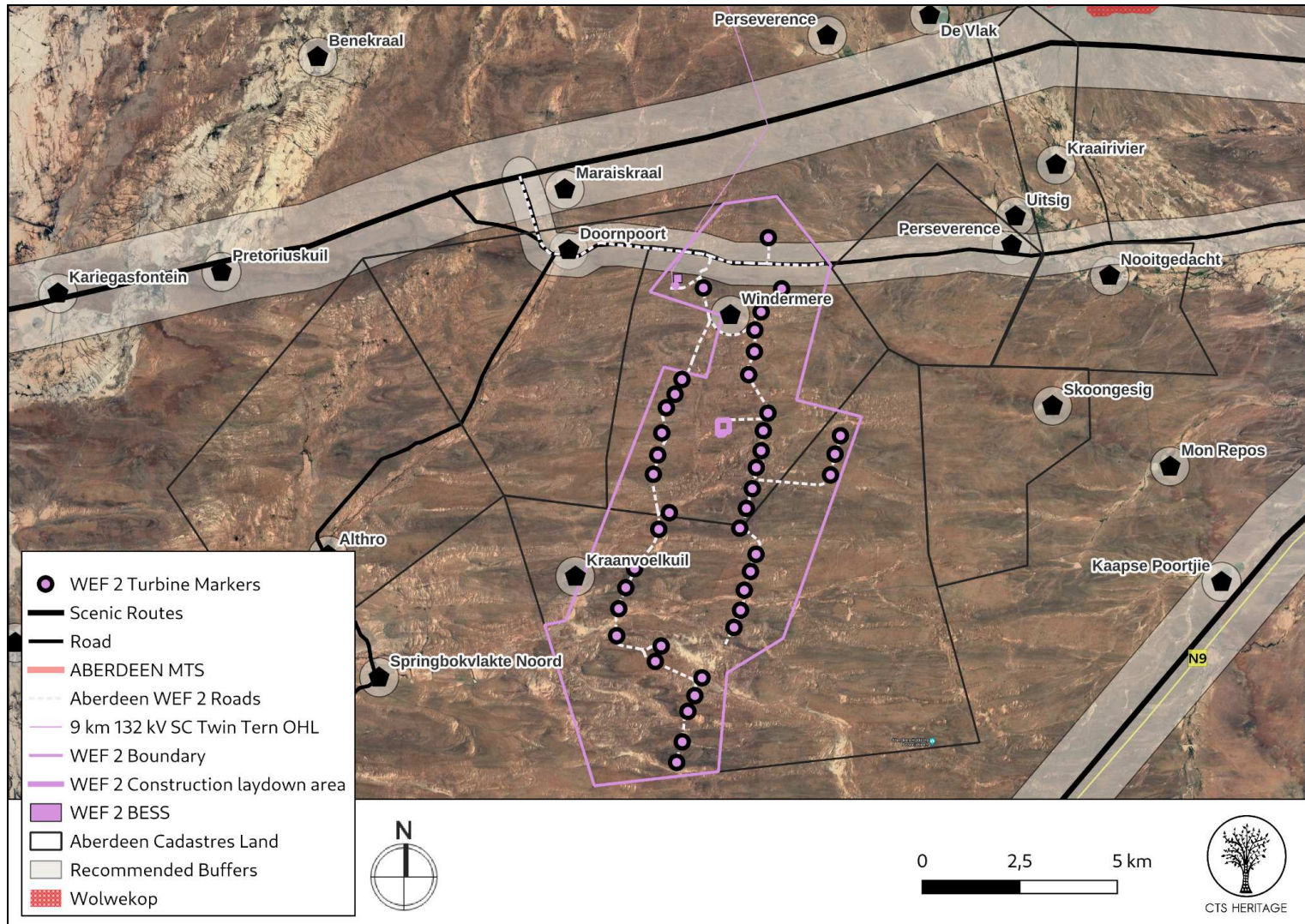
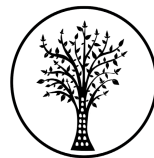


Figure 6.1: Map of landscape elements within the proposed development area

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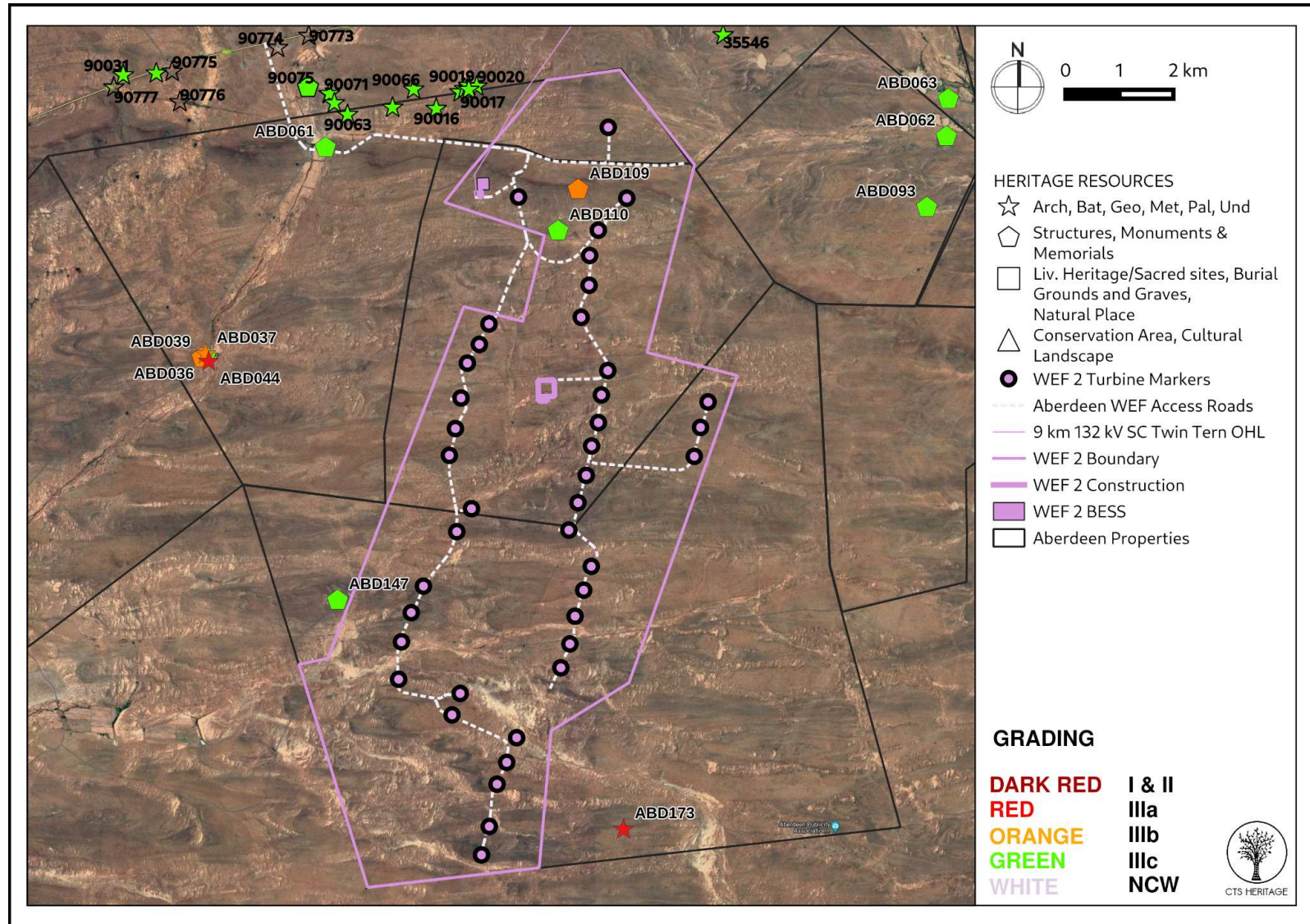
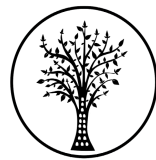


Figure 6.2: Map of archaeological heritage resources within the proposed development area

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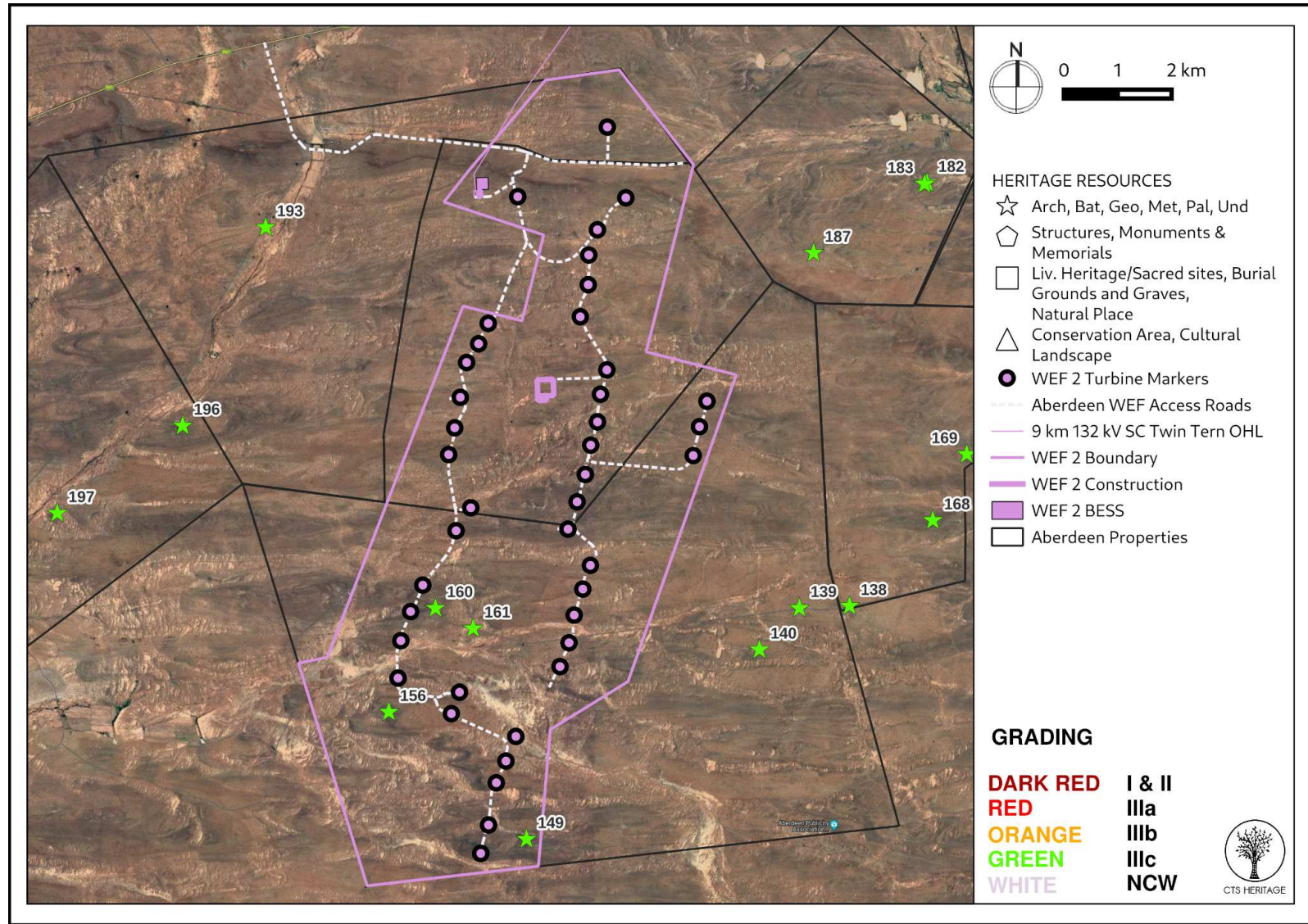


Figure 6.3: Map of palaeontological heritage resources within the proposed development area

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## 5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

### 5.1 Assessment of impact to Heritage Resources

#### 5.1.1 Cultural Landscape

The following recommendations are proposed to guide the development layout in terms of minimising potential impact to the cultural landscape. These recommendations have all been adopted in the Final Layout assessed in this report.

WEF Turbine placement - position (“where”):

The indicators below reflect best practice in terms of conservation of the cultural landscape and are intended to avoid high significance impacts:

- Setback from the N9 and the R61 by at least 1km on either side.
- Avoid steep or elevated topography, ridgelines or koppies, with a no development buffer of at least 2.5km from Wolwekop
- Setback from graded resources and farmstead settlements IIIB and IIIC, by 500m.
- Setback from farmsteads forming part of the settlement pattern by at least 500m
- Concentrate placement in proximity to the existing infrastructure.

Turbine placement - principles (“how”):

The following general principles apply to the turbine layout:

- Avoid an orthogonal pattern in favour of a more organic pattern.
- Turbines should be clustered or read as single elements in the landscape, as opposed to being aligned in a row in visual spatial proximity of each other.
- Avoid continuous or unbroken swathes of infrastructural interventions, especially as viewed from scenic routes
- Avoid a stacking effect of the alignment of turbines, especially as viewed from scenic routes. A staggered setback line is preferable.

Based on the desktop mapping and assessment of potential heritage resources and receptors, and subsequent fieldwork, the principle of a WEF in the proposed location is acceptable from a cultural landscape perspective. There are no red flags, which identify the project to be a fatal flaw from a cultural landscape perspective.

At a regional scale, the project is located to the south of the Great Escarpment, to the west of the distinctive Camdeboo Plains and at considerable distance from the cluster of Nature Reserves around Graaff Reinet.



At the local scale, the project is generally located away from major scenic topographical features and beyond 16km from the town of Aberdeen and beyond 10km from the Fonteimbos Nature Reserve. At a local and site scales, the following sensitive heritage receptors have been identified:

- Historical farmsteads (Grade IIIB and IIIC)
- The scenic qualities of the R61
- The Murraysburg Road and east-west historical access route
- Wolwekop as a distinctive topographical feature adjacent to the R61

No negative impacts to the sensitive heritage receptors identified are anticipated.

**Table 4: Impact table for Cultural Landscape Heritage Resources impacted by the Aberdeen 2 WEF**

<b>NATURE:</b> The broader context of the area proposed for development has cultural significance that may be impacted by the proposed development			
		<b>Before Mitigation</b>	<b>After Mitigation (Final Layout)</b>
<b>MAGNITUDE</b>	<b>H (8)</b>	The cultural value of the pristine Karoo Landscape is very high and the location of the proposed development will impact this significance	<b>H (8)</b> The cultural value of the pristine Karoo Landscape is very high and the location of the proposed development will impact this significance
<b>DURATION</b>	<b>H (4)</b>	Where manifest, the impact will be long term - for the duration of the grid infrastructure lifetime	<b>H (4)</b> Where manifest, the impact will be long term - for the duration of the grid infrastructure lifetime
<b>EXTENT</b>	<b>H (5)</b>	Regional	<b>H (5)</b> Regional
<b>PROBABILITY</b>	<b>H (5)</b>	It is extremely likely that a significant cultural landscape resources will be impacted	<b>L (2)</b> It is extremely unlikely that any significant cultural landscape resources will be impacted
<b>SIGNIFICANCE</b>	<b>H</b>	$(8+4+5) \times 5 = 85$	<b>M</b> $(8+4+5) \times 2 = 34$
<b>STATUS</b>		Neutral	Neutral
<b>REVERSIBILITY</b>	<b>L</b>	Any impacts to heritage resources that do occur are reversible once the infrastructure is removed	<b>L</b> Any impacts to heritage resources that do occur are reversible once the infrastructure is removed
<b>IRREPLACEABLE LOSS OF RESOURCES?</b>	<b>L</b>	Unlikely	<b>L</b> Unlikely
<b>CAN IMPACTS BE MITIGATED</b>		NA	
<b>MITIGATION:</b> Setback from the N9 and the R61 by at least 1km on either side. Avoid steep or elevated topography, ridgelines or koppies, with a no development buffer of at least 2.5km from Wolwekop Setback from graded resources and farmstead settlements IIIB and IIIC, by 500m. Setback from farmsteads forming part of the settlement pattern by at least 500m			
<b>RESIDUAL RISK:</b> NA			



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### 5.1.2 Archaeology

A total of 42 observations were made within the proposed layout for Aberdeen WEF 2. Of these, the majority are low density Middle Stone Age or Later Stone Age artefact scatters that have been determined to have limited scientific value and have been determined to be not conservation-worthy.

Two structures of significance have been identified as having heritage value within the area proposed for the Aberdeen WEF 3 development area - sites ABD109, graded IIIB and ABD110, graded IIIC. Site ABD109 is described as a sandstone walled old kraal. This site is located approximately 150m from an existing road and is located more than 600m from the nearest proposed turbine based on the layout provided. As such, no direct or indirect impact is anticipated from the proposed development, however should the layout be amended, it is recommended that a 500m no-development buffer be implemented around this site in order to retain a sense of place for the kraal. Upgrades to existing roads within the recommended buffers are deemed acceptable provided heritage resources aren't directly affected.

Site ABD110 marks the Windermere farmhouse complex (Graded IIIC). As this site is located more than 900m from the nearest proposed turbines, no direct or indirect impact is anticipated as a result from the proposed turbine infrastructure in the layout provided.

The above recommendations are proposed to guide the development layout in terms of minimising potential impacts to archaeological heritage. These recommendations have all been adopted in the Final Layout assessed in this report.



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**Table 5: Impact table for Archaeological Heritage Resources impacted by the Aberdeen 2 WEF**

<b>NATURE:</b> The area proposed for development is known to conserve heritage resources of archaeological significance that may be impacted by the proposed development				
		<b>Before Mitigation</b>		<b>After Mitigation (Final Layout)</b>
<b>MAGNITUDE</b>	<b>H (7)</b>	Some significant archaeological resources were identified within the development area	<b>H (7)</b>	Some significant archaeological resources were identified within the development area
<b>DURATION</b>	<b>H (5)</b>	Where manifest, the impact will be permanent.	<b>H (5)</b>	Where manifest, the impact will be permanent.
<b>EXTENT</b>	<b>L (1)</b>	Localised within the site boundary	<b>L (1)</b>	Localised within the site boundary
<b>PROBABILITY</b>	<b>H (4)</b>	It is possible that any significant archaeological resources will be impacted	<b>L (1)</b>	It is extremely unlikely that any significant archaeological resources will be impacted
<b>SIGNIFICANCE</b>	<b>M</b>	$(7+5+1) \times 4 = 52$	<b>L</b>	$(7+5+1) \times 1 = 13$
<b>STATUS</b>		Neutral		Neutral
<b>REVERSIBILITY</b>	<b>L</b>	Any impacts to heritage resources that do occur are irreversible	<b>L</b>	Any impacts to heritage resources that do occur are irreversible
<b>IRREPLACEABLE LOSS OF RESOURCES?</b>	<b>L</b>	Unlikely	<b>L</b>	Unlikely
<b>CAN IMPACTS BE MITIGATED</b>		Yes		
<b>MITIGATION:</b> A 500m no development buffer area must be implemented around sites ABD109, and ABD110 Should any significant archaeological resources be uncovered during the course of the construction phase, work must cease in the area of the find and ECPHRA must be contacted regarding an appropriate way forward.				
<b>RESIDUAL RISK:</b> Should any significant archaeological resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources				



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### 5.1.3 Palaeontology

Most of the low-relief WEF Cluster project area is covered by a blanket of Late Caenozoic superficial deposits, including alluvial gravels and sands, eluvial and colluvial surface gravels, calcrete hard pans, pan sediments and gravelly to sandy soils. Apart from the abundant reworked fossil wood blocks and very rare bones reworked from the Permian bedrocks, no fossils of Caenozoic age have been recorded within these younger sediments.

Given the rarity of significant vertebrate and other fossil finds, the overall palaeosensitivity of the Aberdeen WEF Cluster project area is assessed as LOW. The provisional Medium to Very High Palaeosensitivity mapped here by the DFFE Screening Tool is accordingly contested. The potential for occasional fossil vertebrate sites of Very High palaeosensitivity cannot be entirely excluded, however. The distribution of such sites is largely unpredictable and they are best mitigated through a Chance Fossil Finds protocol.

The impact significance of the proposed Aberdeen Wind Energy Facility Cluster is assessed as LOW since fossils of significant scientific and conservation value are so rare here. None of the recorded fossil sites lies directly within the provisional project footprint. The project is not fatally flawed and there are no objections on palaeontological heritage grounds to its authorization. This assessment applies equally to all infrastructure components and layout options currently under consideration.

The Environmental Control Officer (ECO) / Environmental Site Officer (ESO) responsible for the WEF developments should be made aware of the possibility of important fossil remains (vertebrate bones, teeth, burrows, petrified wood, plant-rich horizons etc.) being found or unearthed during the construction phase of the development. Monitoring for fossil material of all major surface clearance and deeper (>1m) excavations by the ECO/ESO on an on-going basis during the construction phase is therefore recommended. Significant fossil finds such as vertebrate bones, teeth and well-preserved petrified logs should be safeguarded and reported at the earliest opportunity to the Eastern Cape Provincial Heritage Resources Authority.

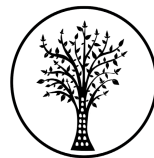




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**Table 6: Impact table for Palaeontological Heritage Resources impacted by the Aberdeen 2 WEF**

<b>NATURE:</b> The area proposed for development is known to conserve heritage resources of palaeontological significance that may be impacted by the proposed development				
		<b>Before Mitigation</b>		<b>After Mitigation (Final Layout)</b>
<b>MAGNITUDE</b>	<b>H (8)</b>	No highly significant palaeontological resources were identified within the development area, however the geology underlying the development area is very sensitive for impacts to significant fossils	<b>H (8)</b>	No highly significant palaeontological resources were identified within the development area, however the geology underlying the development area is very sensitive for impacts to significant fossils
<b>DURATION</b>	<b>H (5)</b>	Where manifest, the impact will be permanent.	<b>H (5)</b>	Where manifest, the impact will be permanent.
<b>EXTENT</b>	<b>L (1)</b>	Localised within the site boundary	<b>L (1)</b>	Localised within the site boundary
<b>PROBABILITY</b>	<b>H (5)</b>	It is extremely likely that significant palaeontological resources will be negatively impacted	<b>L (1)</b>	It is extremely unlikely that any significant paleontological resources will be negatively impacted
<b>SIGNIFICANCE</b>	<b>H</b>	$(1+5+8) \times 5 = 70$	<b>L</b>	$(1+5+8) \times 1 = 14$
<b>STATUS</b>		Neutral		Neutral
<b>REVERSIBILITY</b>	<b>L</b>	Any impacts to heritage resources that do occur are irreversible	<b>L</b>	Any impacts to heritage resources that do occur are irreversible
<b>IRREPLACEABLE LOSS OF RESOURCES?</b>	<b>H</b>	Likely	<b>L</b>	Unlikely
<b>CAN IMPACTS BE MITIGATED</b>		Yes		
<b>MITIGATION:</b> The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities				
<b>RESIDUAL RISK:</b> Should any significant palaeontological resources be impacted (however unlikely) residual impacts may occur, including a negative impact due to the loss of potentially scientific cultural resources				



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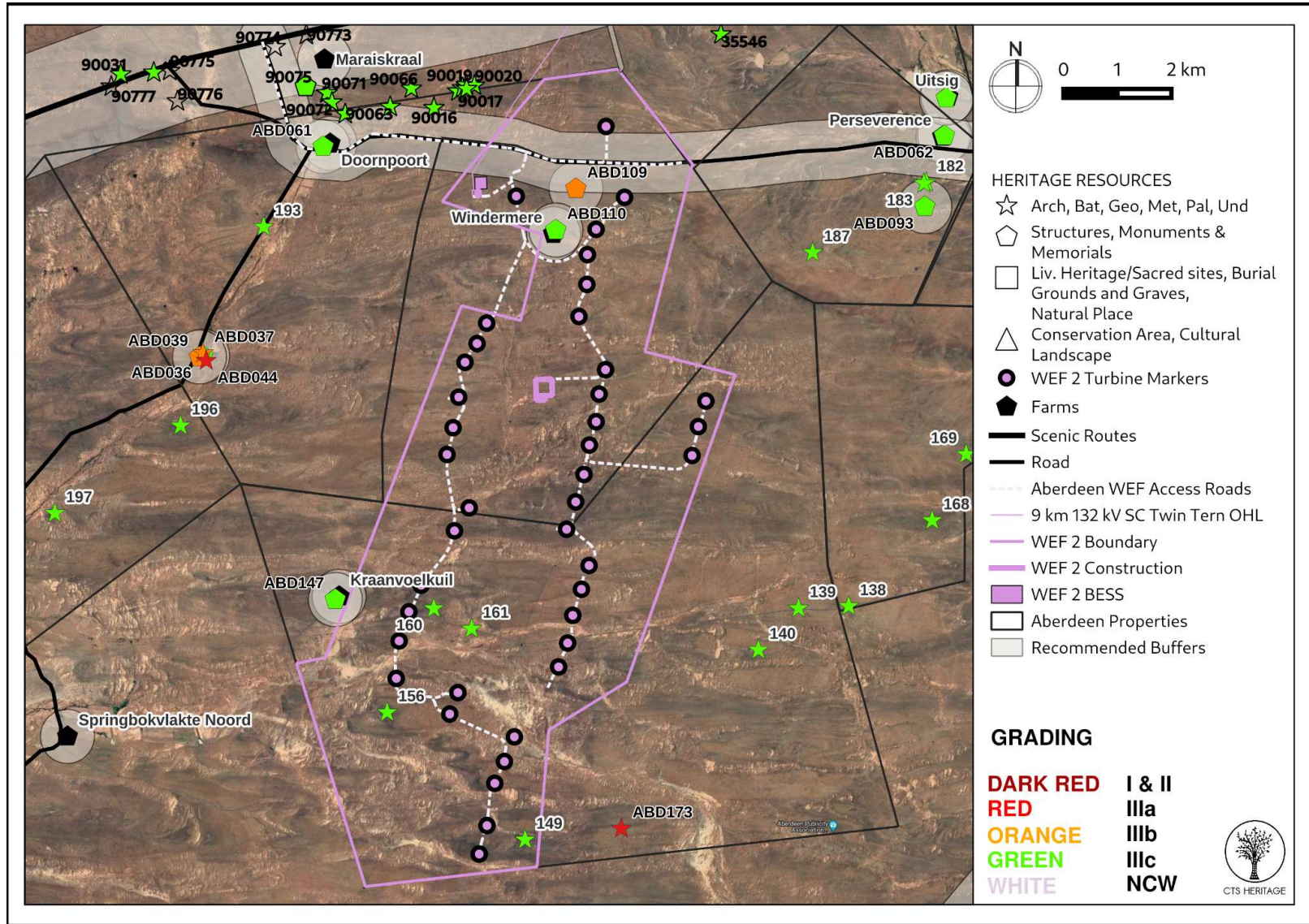


Figure 7: Map indicating the recommended mitigation measures discussed in Section 5.1

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## 5.2 Sustainable Social and Economic Benefit

According to the SIA (2022) completed for this project, “The majority of social impacts associated with the project are anticipated to occur during the construction phase of the development and are typical of the type of social impacts generally associated with construction activities. These impacts will be temporary and short-term ( 24 – 30 months) but could have long-term effects on the surrounding social environment if not planned or managed appropriately. It is therefore necessary that the detailed design phase be conducted in such a manner so as not to result in permanent social impacts associated with the ill-placement of project components or associated infrastructure or result in the mismanagement of the construction phase activities.

The positive and negative social impacts identified at this stage and will be assessed for the construction phase includes:

- Direct and indirect employment opportunities
- Economic multiplier effects
- Influx of jobseekers and change in population.
- Safety and security impacts
- Impacts on daily living and movement patterns.
- Nuisance impacts, including noise and dust.
- Visual impacts and sense of place impacts”

It is anticipated that the primary long-term socio-economic benefit to be derived from this project is its contribution of generation capacity to the National Grid and its contribution to mitigating the negative impacts of load shedding. An additional benefit is the contribution of this project to the shift away from reliance on coal and fossil fuel for South Africa’s energy needs and towards renewable energy sources.

As such, the anticipated benefits of the proposed development outweigh any negative impacts to heritage resources on condition that the recommendations outlined below are implemented.



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### 5.3 Proposed development alternatives

There are no alternatives being considered for this project. Early project layouts have been assessed and the recommendations of various specialists, including heritage (archaeology, palaeontology and cultural landscape), have been adopted in the Final Layout assessed in this HIA report.

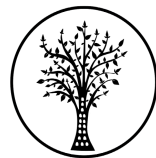
No alternatives are proposed from a heritage perspective as the impacts anticipated have been appropriately mitigated through the inclusion of the recommendations outlined in this report in the Final Layout assessed herein.

### 5.4 Cumulative Impacts

At this stage, there is the potential for the cumulative impact of proposed renewable energy facilities to negatively impact the cultural landscape due to a change in the landscape character from natural wilderness to semi-industrial. This project falls within a REDZ area and it is noted that it is preferable to have renewable energy facility development clustered in an area such as a REDZ.

The exact extent of cumulative impacts is uncertain as the approval status of one of the adjacent projects has not yet been clarified. Refer to Figure 8. However, based on the extent of the proposed Aberdeen WEF and the extent of the known approved WEF to the north, the cumulative visual impact of combined projects will be high. However, this cumulative impact does not represent a fatal flaw from a cultural landscape perspective.

To address concerns about the cumulative impact of RE facilities within the greater Karoo region, a cautious approach is required in terms of assessing the desirability of such development from a cultural landscape perspective. The proposed site is located adjacent to an existing infrastructural corridor associated with the national grid, which suggests a level of suitability of RE facilities which can link in with the grid. Notwithstanding the existing infrastructure, the placement of RE facilities, both PV and WE turbines, must take cognisance of the very high visual impact on a relatively intact and representative cultural landscape, and the extremely limited ability to visually screen this infrastructural development, particularly in the case of the wind turbines.



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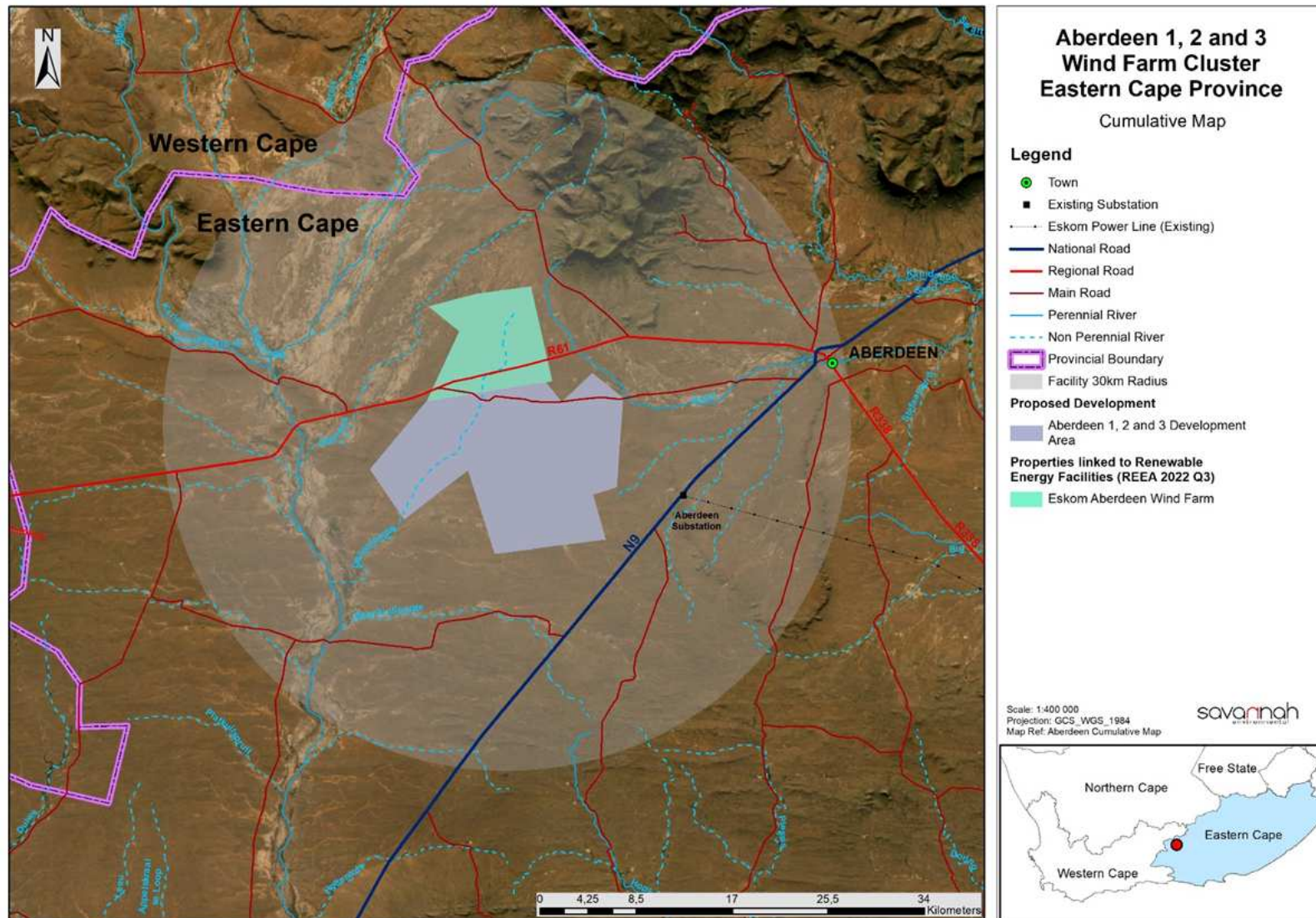


Figure 8: Approved REFs with Environmental Authorisation and the Beaufort West REDZ relative to the proposed development

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**Table 8: Cumulative Impact table for Heritage Resources impacted by the Aberdeen 2 WEF**

<b>Nature:</b> The broader context of the area proposed for development has cultural significance that may be impacted by the proposed development		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects in the area</b>
<b>Extent</b>	Regional	Regional
<b>Duration</b>	Where manifest, the impact will be long term - for the duration of the grid infrastructure lifetime	Where manifest, the impact will be long term - for the duration of the grid infrastructure lifetime
<b>Magnitude</b>	The cultural value of the pristine Karoo Landscape is very high and the location of the proposed development will impact this significance	The cultural value of the pristine Karoo Landscape is very high and the location of the proposed development will impact this significance
<b>Probability</b>	It is extremely likely that a significant cultural landscape resources will be impacted	It is extremely likely that a significant cultural landscape resources will be impacted
<b>Significance</b>	<b>MEDIUM</b>	<b>HIGH</b>
<b>Status (positive or negative)</b>	Negative	Negative
<b>Reversibility</b>	High	Low
<b>Irreplaceable loss of resources?</b>	Yes	Yes
<b>Can impacts be mitigated?</b>	Yes	Yes
<b>Confidence in findings:</b> High.		
<b>Mitigation:</b> Setback from the N9 and the R61 by at least 1km on either side. Avoid steep or elevated topography, ridgelines or koppies, with a no development buffer of at least 2.5km from Wolwekop Setback from graded resources and farmstead settlements IIIB and IIIC, by 500m. Setback from farmsteads forming part of the settlement pattern by at least 500m		

## 5.5 Site Verification

According to the DFFE Screening Tool analysis, the development area has Very High levels of sensitivity for impacts to palaeontological heritage and Low levels of sensitivity for impacts to archaeological and cultural heritage resources. The results of this assessment in terms of site sensitivity are summarised below:

- The cultural value of the pristine Karoo Landscape is very high (Very High)
- Some significant archaeological resources were identified within the development area (High)
- No highly significant palaeontological resources were identified within the development area, however the geology underlying the development area is very sensitive for impacts to significant fossils (Very High)

As per the findings of this assessment, and its supporting documentation, the outcome of the sensitivity verification confirms the results of the DFFE Screening Tool for Palaeontology and disputes the results of the screening tool for archaeology and cultural heritage - this should be considered to be Very High. This evidence is provided in the body of this report and in the appendices (Appendix 1, 2 and 3).



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## 6. RESULTS OF PUBLIC CONSULTATION

As this application is made in terms of NEMA, the public consultation on the HIA will take place with the broader public consultation process required for the Environmental Impact Assessment process and will be managed by the lead environmental consultants on the project.

## 7. CONCLUSION

The site forms part of an intact cultural landscape representative of the Central Plateau of the Great Karoo possessing heritage value for historical, aesthetic, architectural, social and scientific reasons. Based on the desktop mapping and assessment of potential heritage resources and receptors, and subsequent fieldwork, the principle of a WEF in the proposed location is acceptable from a cultural landscape perspective. There are no red flags, which identify the project to be a fatal flaw from a cultural landscape perspective.

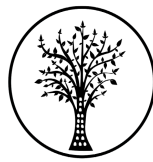
At a regional scale, the project is located to the south of the Great Escarpment, to the west of the distinctive Camdeboo Plains and at considerable distance from the cluster of Nature Reserves around Graaff Reinet. The site possesses a number of landscape elements contributing to a composite cultural landscape including topographical features, open plains, water features, historic scenic routes and farmsteads. Various buffers are recommended in order to mitigate anticipated negative impacts to these significant cultural landscape elements.

There are limited impacts anticipated to archaeological and palaeontological heritage from this proposed development and as such, the principle of a renewable energy facility in this location is supported from a heritage perspective provided that the infrastructure is located in areas able to tolerate the impact of the high degree of change from a cultural landscape perspective.

## 8. RECOMMENDATIONS

Based on the outcomes of this report, it is not anticipated that the proposed development of the Aberdeen Wind Facility 2 will negatively impact on significant heritage resources on condition that the following recommendations are implemented:

- Setback from the N9 and the R61 by at least 1km on either side.
- Avoid steep or elevated topography, ridgelines or koppies, with a no development buffer of at least 2.5km from Wolwekop
- Setback from graded resources and farmstead settlements IIIB and IIIC, by 500m.
- Setback from farmsteads forming part of the settlement pattern by at least 500m
- A no-go development buffer of 500m must be implemented around sites ABD109 and 110
- The attached Chance Fossil Finds Procedure must be implemented for the duration of construction activities



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- Although all possible care has been taken to identify sites of cultural importance during the investigation of the study area, it is always possible that hidden or subsurface sites could be overlooked during the assessment. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils, burials or other categories of heritage resources are found during the proposed development, work must cease in the vicinity of the find and ECPHRA must be alerted immediately to determine an appropriate way forward.



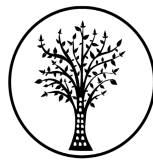


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## 9. REFERENCES

Heritage Impact Assessments				
Nid	Report Type	Author/s	Date	Title
251161	AIA Phase 1	Celeste Booth, Sholeen Shanker	25/03/2013	A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED 200MW ESKOM WIND ENERGY FACILITY, NEAR ABERDEEN, CAMDEBOO LOCAL MUNICIPALITY, EASTERN CAPE PROVINCE.
251166	Palaeontological Specialist Reports	John E Almond	31/12/2014	PALAEONTOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED ABERDEEN 200 MW WIND FARM, CAMDEBOO LOCAL MUNICIPALITY, EASTERN CAPE.
354680	HIA Phase 1	Lita Webley, David Halkett	30/11/2015	Heritage Impact Assessment: Proposed Uranium Mining and Associated infrastructure on portions of the farm Quaggasfontein and Ryst Kuil near Beaufort West in the Western Cape and De Pannen near Aberdeen in the Eastern Cape
354681	AIA Phase 1	Lita Webley	30/11/2015	Archaeological Impact Assessment: Proposed uranium mining and associated infrastructure on portions of the farms Quaggasfontein and Ryst Kuil near Beaufort West in the Western Cape and De Pannen near Aberdeen in the Eastern Cape
354683	PIA Phase 1	Bruce Rubidge	24/04/2008	Palaeontological study of the Rystkuil channel
6805	AIA Phase 1	Len van Schalkwyk, Elizabeth Wahl	01/09/2007	Heritage Impact Assessment of Gamma Grassridge Power Line Corridors and Substation, Eastern, Western and Northern Cape Provinces, South Africa
7852	AIA Phase 1	J Kinahan	03/10/2008	Archaeological Baseline Survey of the Proposed Ryst Kuil Uranium Project

Lavin, Winter, Almond (2022). Heritage Impact Assessment for the proposed development of the Poortjie Cluster of Renewable Energy Facilities near Nelspoort, Western Cape. Section 38(8) HIA submitted to HWC. Unpublished.



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## APPENDICES



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## APPENDIX 1: Archaeological Assessment (2021)



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## APPENDIX 2: Palaeontological Assessment (2021)



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### APPENDIX 3: Cultural Landscape Assessment (2021)



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## APPENDIX 4: Heritage Screening Assessment



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## APPENDIX 5: Chance Fossil Finds Procedure