

# HERITAGE IMPACT ASSESSMENT

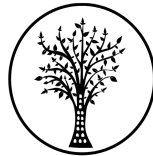
In terms of Section 38(8) of the NHRA for the

## **Proposed establishment of 132kV powerline between Bon Espirange and the existing Komsberg Substation in the Western and Northern Cape**

SAHRIS Ref:

HWC Ref:

**Prepared by CTS Heritage**

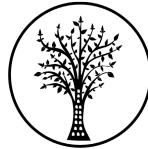


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**For**

**WSP**

**November 2021**



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## EXECUTIVE SUMMARY

1. Site Name:

Bon Espirange to Komsberg Substation 132kv OHL

2. Location:

The OHL is located between Matjiesfontein in the Western Cape and Sutherland in the Northern Cape.

3. Locality Plan:

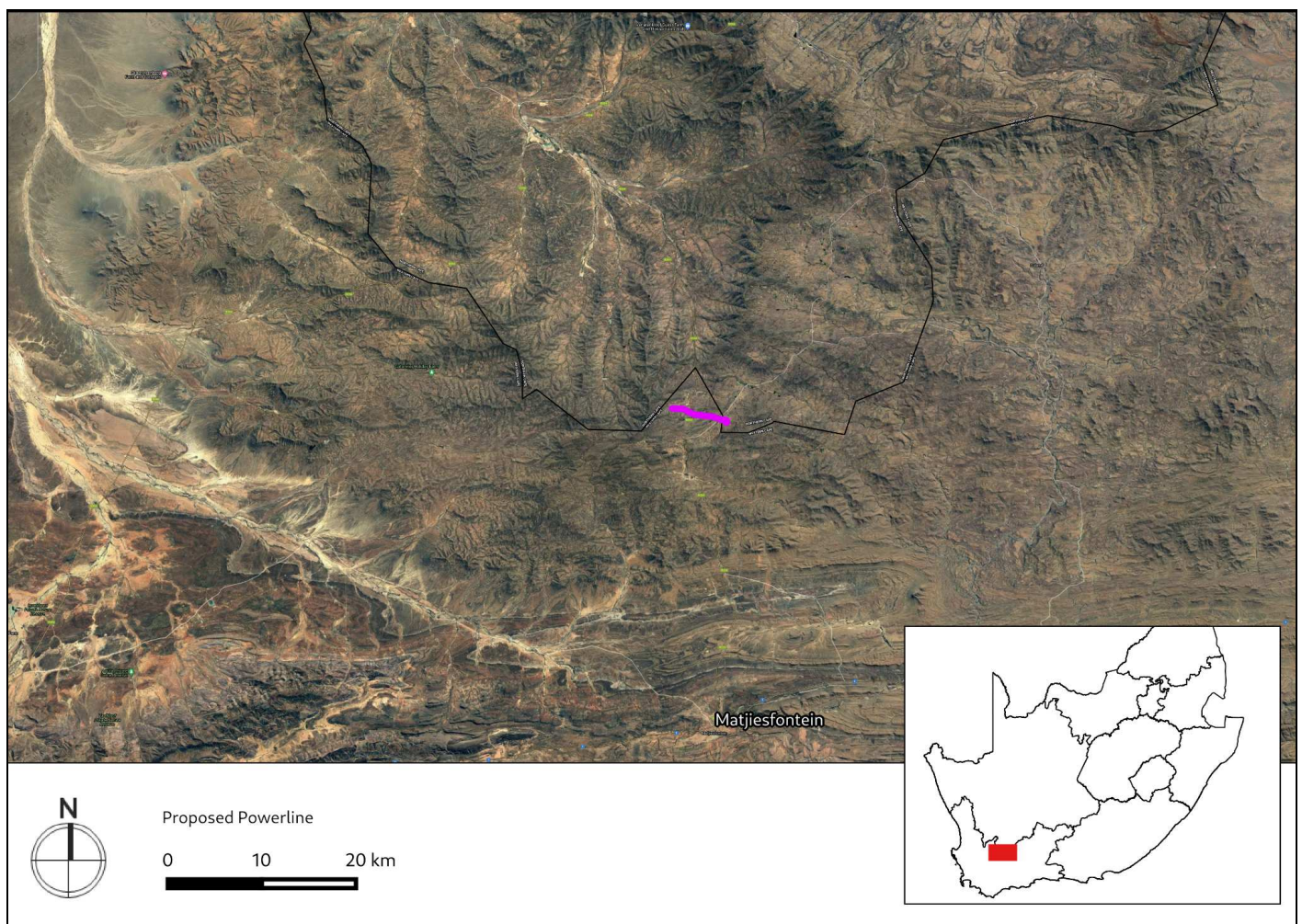
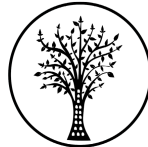


Figure 1: Location of the proposed study area

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4. Description of Proposed Development:

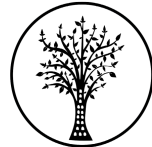
Red Rocket South Africa (Pty) Ltd proposes to develop a 132kV powerline between Bon Espirange and the existing Komsberg Substation. The overhead powerline is approximately 3 km long and is located in the Laingsburg Municipality (LM), Western Cape Province, and Karoo Hoogland Municipality (KHM), Northern Cape Province. No alternative routes are associated with the powerline as it follows existing powerlines from the Bon Espirange substation to the Komsberg substation. The powerline is required in order to evacuate the power generated by the Rietkloof and Brandvalley Wind Energy Facilities (WEFs) to the National Grid.

5. Heritage Resources Identified in the broader study area:

POINT ID	Site Name	Description	Co-ordinates		Grading	Mitigation
<b>Archaeology</b>						
KRB022	Karrebosch 022	Chert flake, LSA	-32.88297	20.517862	NCW	NA
<b>Palaeontology</b>						
PAL_KRBO 07	Palaeo Karrebosch 007	Stream bed and bank exposure of grey-green mudrocks of Abrahamskraal Fm with horizon containing several subcylindrical, vertical lungfish burrow casts up to 9 cm in diameter	32°54'53.65"S	20°30'56.37"E	IIIB	No impact anticipated
PAL_KRBO 08	Palaeo Karrebosch 008	Stream bed exposure of grey-green siltstone or fine-grained wacke covered by purple-brown siltstone veneer and with dense assemblage of rounded traces between 0.5 to 1 cm in diameter – probably reedy plant stem casts (e.g. sphenophytes)	32°54'52.93"S	20°30'58.94"E	IIIC	None
PAL_KRBO 09	Palaeo Karrebosch 009	Stream gully exposure of mottled grey-green to purple-brown sandstone with assemblage of rounded, oval to irregular sand-infilled casts with reduction haloes, either of plant stems or invertebrate burrows	32°54'41.76"S	20°31'10.35"E	IIIC	None
PAL_KRBO 10	Palaeo Karrebosch 010	Sandstone bed top with possible effaced desiccation crack infills, assemblage of reedy plant stem casts.	32°55'11.03"S	20°31'54.90"E	IIIC	None

6. Anticipated Impacts on Heritage Resources:

The findings of this field assessment largely correlate with the findings of the ACO in the HIA completed for the Karrebosch WEF (Kendrick, 2015, SAHRIS Ref 183350) and the Roggeveld WEF (Hart and Webley, 2013, SAHRIS Ref 152531). The archaeological resources identified were all *ex situ* and are of limited scientific and heritage significance.



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Based on the findings of this and other assessments completed in the area, it is unlikely that the proposed development of the OHL will negatively impact significant resources. This is due to the fact that 132kV lines typically have a very small development footprint and can be constructed without the large roads needed to build the WEFs. The routes chosen by the engineers for the various alternatives follow very rugged, mid-slope paths where almost no archaeological material or ruins were found.

It is possible, although unlikely, that archaeological resources may be located beneath the ground surface which may be impacted during the course of development. Recommendations in this regard are included below.

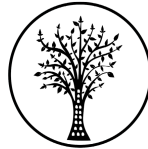
In terms of impacts to palaeontological heritage, Almond (2021) concludes that “There are no objections on palaeontological grounds to authorisation of the proposed 132 kV powerline... No further specialist palaeontological studies or mitigation are recommended for this electrical infrastructure project. These recommendations and the Chance Fossil Finds Protocol appended to this report should be included in the EMPr for the development.”

According to the conclusions in the VIA (2021), a broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that would potentially be impacted by a proposed development. The area is not however typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. The area is traversed by a recognised scenic route, namely the R354 main road, although visual impacts on travelers using this route will be considerably reduced by the presence of existing high voltage power lines and the hilly terrain that screens views from much of this road.”

The VIA (2021) concluded that “impacts associated with the proposed 132kV power line will be of low significance during construction, operation and decommissioning phases” on condition that the recommended mitigation measures are implemented.

## 7. Recommendations:

There is no objection to the proposed development of the overhead powerline in terms of impacts to heritage resources on condition that:



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- The mitigation measures included in Section 9 of the VIA (2021) must be implemented for all phases on the development as indicated.
- The attached Chance Fossil Finds Procedure must be implemented throughout the construction phase of the development
- Should any buried archaeological resources or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The relevant heritage authority (the South African Heritage Resources Agency (SAHRA) in the Northern Cape and Heritage Western Cape (HWC) in the Western Cape) must be contacted immediately in order to determine an appropriate way forward.

8. Author/s and Date:

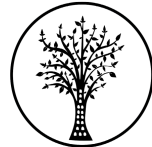
Jenna Lavin and Nic Wiltshire

5 November 2021

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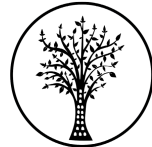
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### **Details of Specialist who prepared the HIA**

**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 on the Executive Committee 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 80 Heritage Impact Assessments throughout South Africa.



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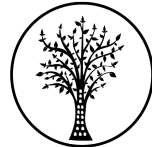
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## 1. INTRODUCTION

### 1.1 Background Information on Project

Red Rocket South Africa (Pty) Ltd proposes to develop a 132kV powerline between Bon Espirange and the existing Komsberg Substation. The overhead powerline is approximately 3 km long and is located in the Laingsburg Municipality (LM), Western Cape Province, and Karoo Hoogland Municipality (KHM), Northern Cape Province. No alternative routes are associated with the powerline as it follows existing powerlines from the Bon Espirange substation to the Komsberg substation. The powerline is required in order to evacuate the power generated by the Rietkloof and Brandvalley Wind Energy Facilities (WEFs) to the National Grid.

The following properties are affected:

- Bon Espirange 73 Portion 1 and Remainder.
- Aprils Kraal 105 Remainder
- Standvastigheid 210 Portion 2 (Komsberg Substation).

The power lines will be a 132kV steel single or double structure with kingbird conductor (between 15 and 20m in height - above ground level). Standard overhead line construction methodology will be employed - drill holes (typically 2 - 3m in depth), plant poles, string conductor. The construction phase will extend over a period of 12 months and create ~30-50 employment opportunities.

### 1.2 Description of Property and Affected Environment

The proposed route for this section of powerline runs from the existing substations at Komsberg and Bon Espirange. Komsberg substation is on the eastern end next to a large gravel road that was upgraded in recent years for the construction of various wind farms intended for the area. It is a large substation and a number of lines run through it, including 765kV powerlines. The Bon Espirange substation is smaller and lies on the western end of the proposed powerline route. Existing 133kV powerlines already run from Bon Espirange to Komsberg and the proposed route follows this corridor, particularly on the Bon Espirange side along the road reserve of a new wind farm access road. The ground is generally uneven and crosses the main R354 road linking Sutherland to Matjiesfontein before continuing over a few more kms over a ridge and down onto the Komsberg substation. All of the farming infrastructure, including a fairly large farm dam, lie to the north of the powerline route and have been previously assessed for the Roggeveld Wind Farm.

The region is regarded as semi-arid as it receives limited precipitation. It is located on the border of the summer and winter rainfall regions. Precipitation is in the form of snow and rain in winter, with occasional thunderstorms

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during the summer. The vegetation cover falls within the Roggeveld Shale Renosterveld of the Karoo Renosterveld Bioregion and consists predominantly of low shrubs and very few trees in this area.

According to the VIA (2021) completed for this project, “The proposed power line is located in the scenic Karoo region of the Western / Northern Cape which is generally associated with wide vistas and mountainous landscapes. The topography in the broader study area is largely dominated by the mountains/hills at the southern end of the Klein Roggeveld range. Significant portions of the study area are therefore dominated by the steep slopes and broad ridges of these mountains and escarpments.” The VIA (2021) goes on to note that “According to the South African National Land Cover dataset (GeoTerra Image 2020), much of the visual assessment area is characterised by natural vegetation which is dominated by Karoo and Fynbos shrubland interspersed with natural grassland. Agricultural activity in the area is restricted by the arid nature of the local climate and areas of cultivation are largely confined to relatively small patches of land distributed along drainage lines. As such, the natural vegetation has been retained across much of the study area. Livestock farming (mostly sheep) is the dominant activity, although the climatic and soil conditions have resulted in low densities of livestock and relatively large farm properties across the area. Thus, the area has a very low density of rural settlement, with relatively few scattered farmsteads in evidence (Figure 16). Built form in much of the study area is limited to isolated farmsteads, including farm worker’s dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences and windmills.

High voltage (400kV) power lines in the study area however form significant man-made features in an otherwise undeveloped landscape. These power lines bisect the study area in a south-west to north-east alignment, linking into the Komsberg 400kV substation, situated at the eastern end of the power line assessment corridors. This substation is a substantial anthropogenic feature with a distinctly more industrial character, resulting in a significant degree of transformation in the landscape. Further human influence is visible in the area in the form of the R354 man road which traverses the study area in a north to south direction.

Much of the western portion of the study area lies within the project area for the Roggeveld WEF. Construction of this facility, including wind turbines on located along ridge-tops, access roads, power lines and the Bon Espirange substation, is nearing completion and the landscape has already undergone significant transformation as a result of the construction activities. The closest built-up area is the small town Matjiesfontein which is situated approximately 34km south of Komsberg Substation while Laingsburg is some 37kms to the south-east. These small towns are well outside the visual assessment zone and thus not expected to have an impact on the visual character of the study area.”

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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).

### 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 the broader study area in order to determine the archaeological resources likely to be disturbed by the proposed development. The archaeologist conducted his site visit on 13 August 2021
- A palaeontologist conducted an assessment of the broader study area in order to determine the palaeontological resources likely to be disturbed by the proposed development. The paleontologist conducted his site visit on 23-24 and 29 September 2021
- The findings of the VIA (2021) were integrated into the HIA.
- The identified resources were assessed to evaluate their heritage significance
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner

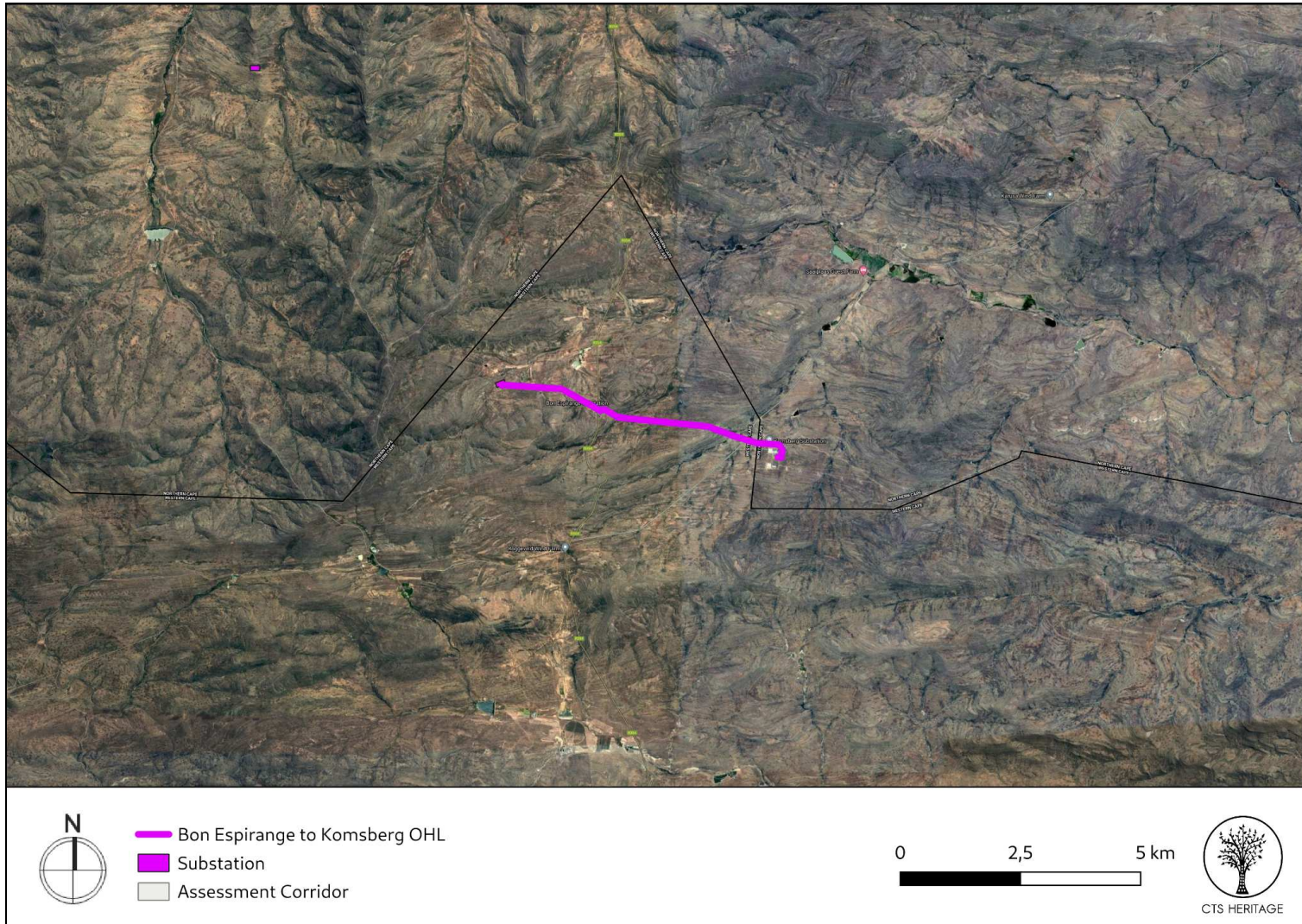
### 2.3 Assumptions and uncertainties

- 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.



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**Map 1a: The proposed study area within which the 132kV OHL will be located**

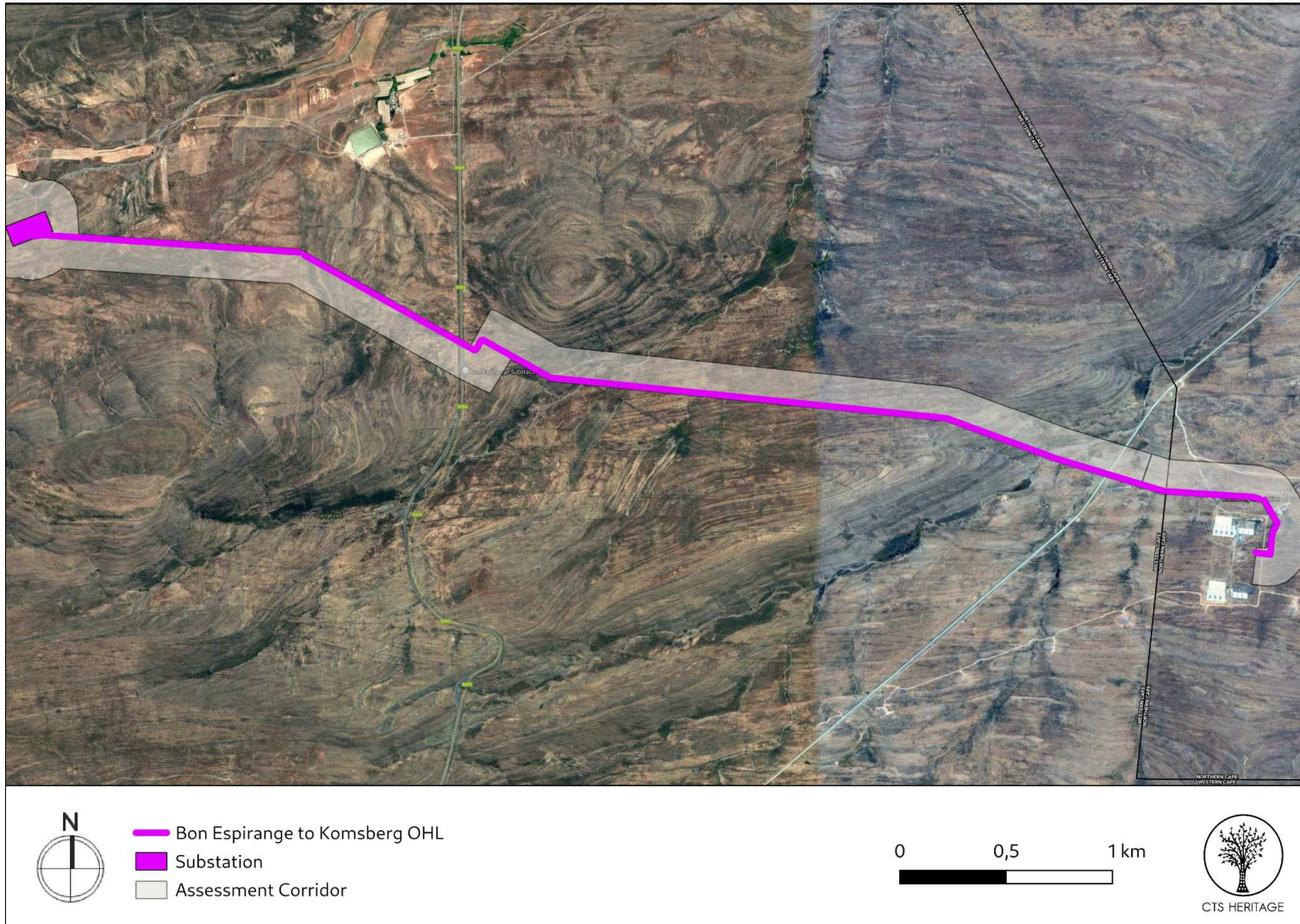
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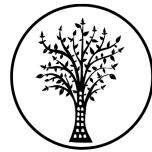
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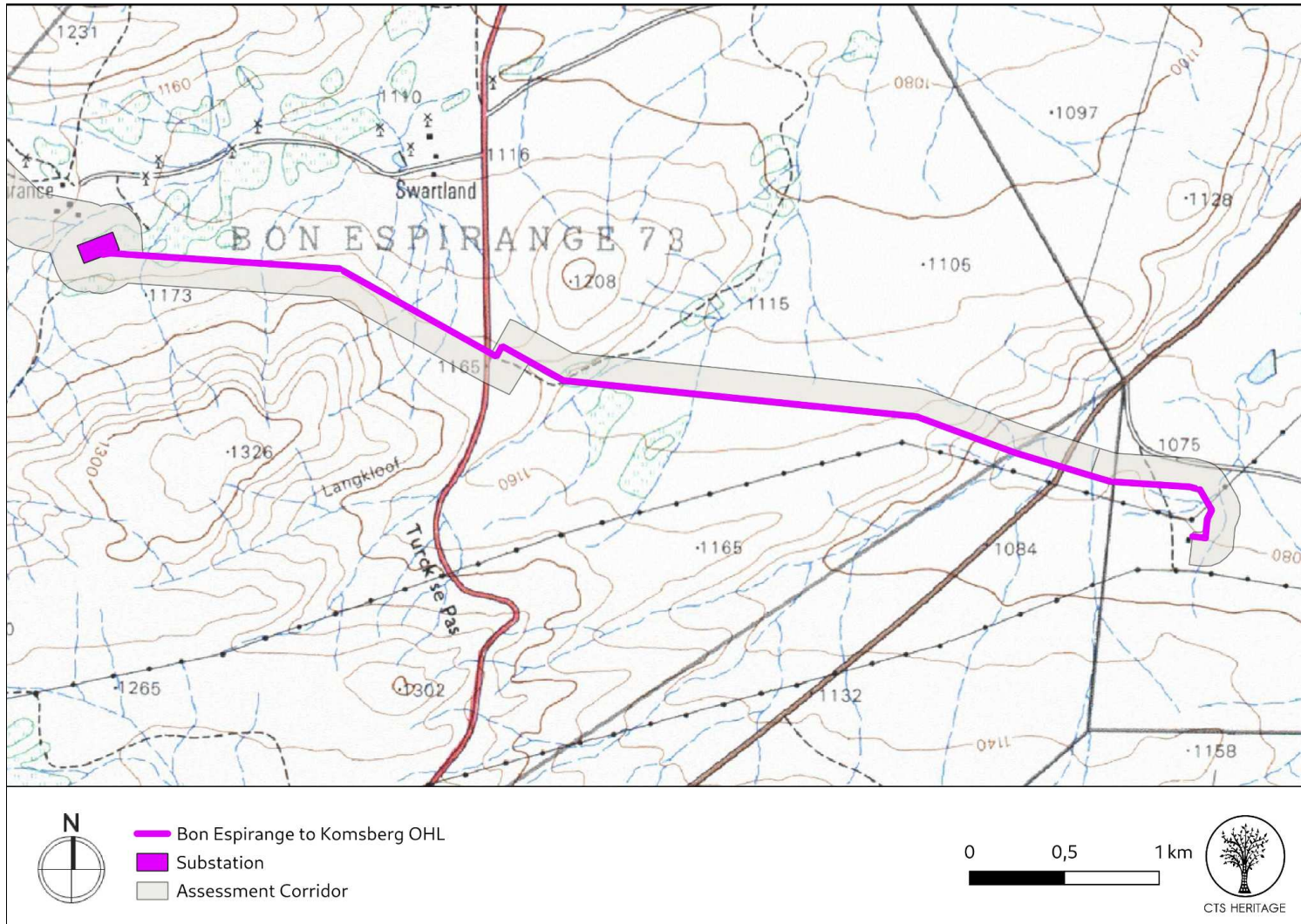
Map 1b: Study Area in the Northern and Western Cape

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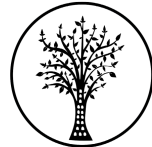
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Map 1b: Study Area in the Northern and Western Cape as reflected on the 1:50 000 Topo Map

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## 2.4 Constraints & Limitations

The vegetation did not pose any challenges to the archaeological survey but much of the ground was covered in broken rock and stone eroding down the slopes of the ridges. The placement of the OHL footings predominantly lie along the middle of the slopes en route to and from the tops of the ridges and this resulted in very few heritage observations.

## 2.5 Impact Assessment Methodology

### Assessments of Impacts and Mitigation

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct<sup>1</sup>, indirect<sup>2</sup>, secondary<sup>3</sup> as well as cumulative impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria presented in Table 1 below.

### Impact Mitigation

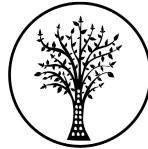
The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the

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impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

**Table 1: Impact Assessment Criteria and Scoring System**

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
<b>Impact Magnitude (M)</b> The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
<b>Impact Extent (E)</b> The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
<b>Impact Reversibility (R)</b> The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
<b>Impact Duration (D)</b> The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
<b>Probability of Occurrence (P)</b> The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
<b>Significance (S) is determined by combining the above criteria:</b>	$S=(E+D+R+M) \times P$ Significance=(Extent+Duration+Reversibility+Magnitude) x Probability				



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IMPACT SIGNIFICANCE RATING					
Total Score	4 to 15	16 to 30	31 to 60	61 to 80	81 to 100
Environmental Significance Rating (Negative (-))	Very low	Low	Moderate	High	Very High
Environmental Significance Rating (Positive (+))	Very low	Low	Moderate	High	Very High

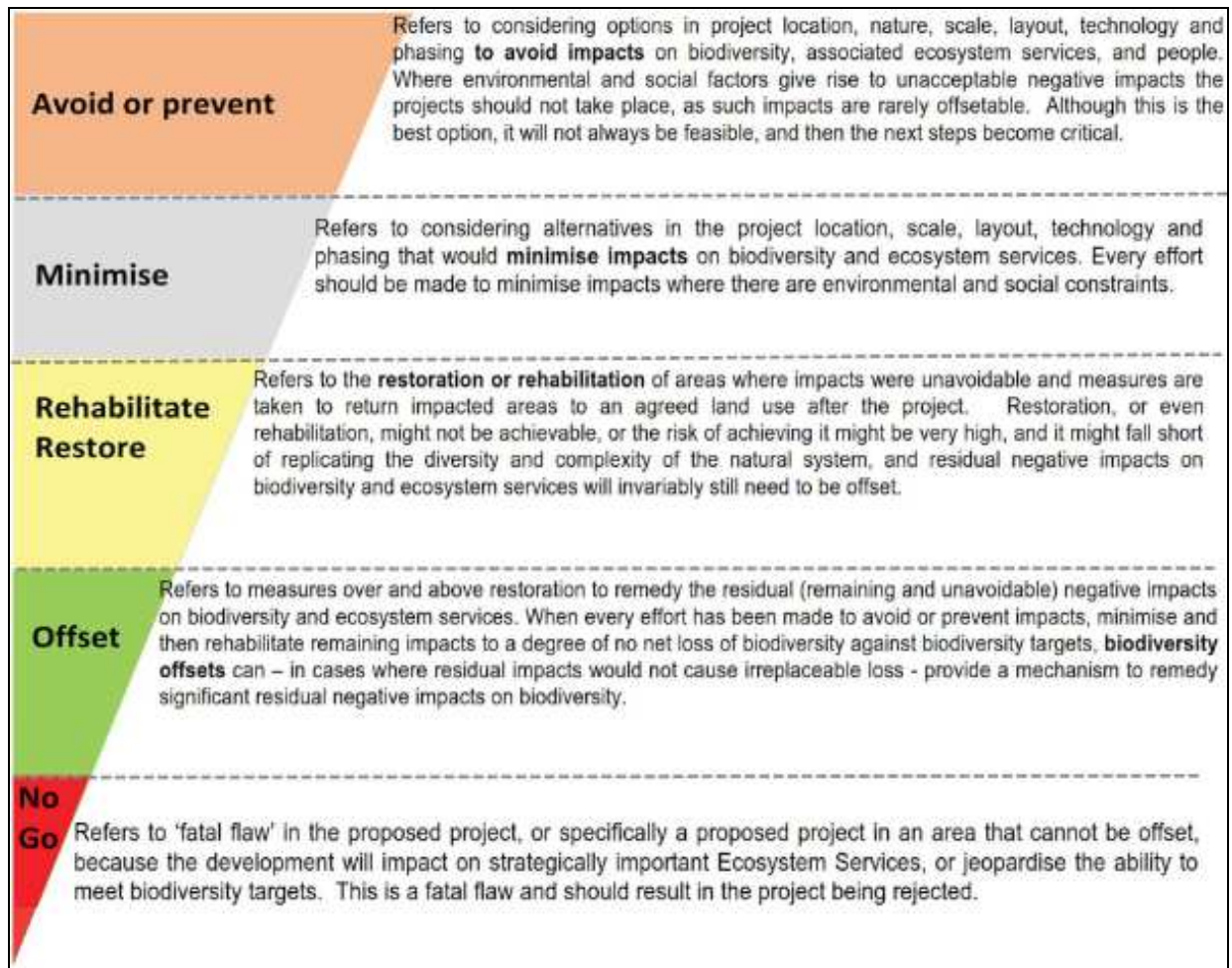
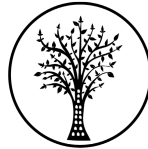


Figure 1: Mitigation Sequence Hierarchy





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

#### **3.1 Desktop Assessment**

This application is for a proposed powerline associated with the Karrebosch, Rietkloof and Brandvalley Wind Energy Facilities located in both the Western and Northern Cape. The Karrebosch WEF was previously referred to as Phase 2 of the Roggeveld WEF. SAHRA has made numerous comments on both the Roggeveld WEF and the Karrebosch WEF from 2013 with the last comment issued on 26 September 2018 (attached). EA was granted for the Karrebosch WEF on 29 January 2016. In the EA, various requirements were stipulated in terms of impacts to Historical, Cultural and Palaeontological sites. Much of the area proposed for the development of the powerline was assessed as part of the HIA completed for the Karrebosch WEF (Figure 2a and 2b) drafted by the ACO (Kendrick, 2015, SAHRIS Ref 183350). The heritage information identified in these reports have been extracted and are mapped in Figure 3, 3a and 3b. These reports are also referred to below in order to provide a contextual analysis of the heritage sensitivity of the area proposed for development.

#### **Archaeology and Built Environment Heritage**

The area proposed for development has been previously assessed, more than once. In addition, the proposed powerline routes lie immediately adjacent to existing grid infrastructure. The original fieldwork conducted for the Roggeveld WEF HIA (2013) which covered the area proposed for development was comprehensive and remains relevant, similarly the fieldwork conducted for the Karrebosch WEF (2015).

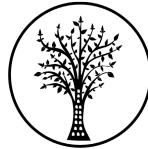
The Karrebosch HIA (2015) “revealed that the study area is relatively austere in terms of pre-colonial heritage, however valley bottoms contain evidence of early trekboer cultural landscapes – ruins, graves and occasional middens. These consist of collections of ruined stone and mud buildings, threshing floors and kraals located exclusively in the valley areas between the high longitudinal ridges that characterise the study area. There are a number of existing farm houses that contain 19th century fabric, however very few of these have anything more than moderate heritage significance. Parts of the study area enjoy very high aesthetic qualities with the area known by locals as “Gods Window” having grade II aesthetic qualities, hence the significance of the study area lies mainly with its undeveloped wilderness qualities. Interestingly, pre-colonial or stone age heritage and archaeology is extremely scarce in the areas that were searched. Very few archaeological sites of these kinds were recorded despite the fact that overall 9 experienced archaeologists were involved in scouring the landscape.”

The HIA for the Karrebosch WEF notes that “The most important colonial archaeological sites in the study area are associated with Ekkraal Valley, the Rietfontein-Wilgebosch River valley and the Krans Kraal-Karrekraal valley. The valley bottoms are archaeologically sensitive...”. Similar findings were made by ACO in their report (2010,

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SAHRIS Ref: 53187) over the development area (Figure 3, 3a and 3b). As the proposed powerline alternatives traverse the valley areas which have been determined to be archaeologically sensitive, it is likely that significant archaeological heritage resources may be impacted by the proposed development.

According to the ACO reports (2011, 2013 and 2015), parts of the study area enjoy very high aesthetic qualities hence the significance of the study area lies mainly with its undeveloped wilderness qualities which may be negatively impacted by the development of the proposed powerline. However, it must be noted that the proposed powerline is located within a Renewable Energy Development Zone which has been identified for this kind of development. In REDZ areas, there is a reasonable expectation that the cultural landscape of an area will be changed to be dominated, or at least heavily altered, by renewable energy development and its associated infrastructure. In fact, this is the intention of the REDZ areas. Furthermore, the proposed powerline is located within a suite of authorised renewable energy facilities (Figure 5) and as such, the impact of this proposed powerline on the cultural landscape is likely to be negligible. No further specialist cultural landscape assessment is therefore recommended.

**Table 2: Sites previously identified in and near the broader study area**

SAHRIS ID	Site No.	Site Name	Site Type	Grading
35141	ROG010	Roggeveld 010	Building	Grade IIIc
35152	ROG012	Roggeveld 012	Building	Grade IIIc
35154	ROG013	Roggeveld 013	Stone walling	Grade IIIc
35157	ROG014	Roggeveld 014	Transport infrastructure	Grade IIIc
35159	ROG015	Roggeveld 015	Building	Grade IIIc
35171	ROG016	Roggeveld 016	Stone walling	Grade IIIc
35172	ROG017	Roggeveld 017	Stone walling	Grade IIIc
35645	GK122	Gamma Kappa 122	Burial Grounds & Graves	Grade IIIa
137200	KWF-015	KAREEBOSCH WIND FARM	Building	
137202	KWF-017	KAREEBOSCH WIND FARM	Building	
137203	KWF-018	KAREEBOSCH WIND FARM	Stone walling	
137204	KWF-019	KAREEBOSCH WIND FARM	Archaeological	

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137205	KWF-020	KAREEBOSCH WIND FARM	Building	
137233	KWF-021	KAREEBOSCH WIND FARM	Stone walling	
137234	KWF-022	KAREEBOSCH WIND FARM	Stone walling	
137091	BWE-001	Brandvalley Wind Energy	Building	
137096	BWE-006	Brandvalley Wind Energy	Artefacts	Grade IIIb
137106	BWE-016	Brandvalley Wind Energy	Stone walling	Grade IIIc
137127	BWE-037	Brandvalley Wind Energy	Structures	

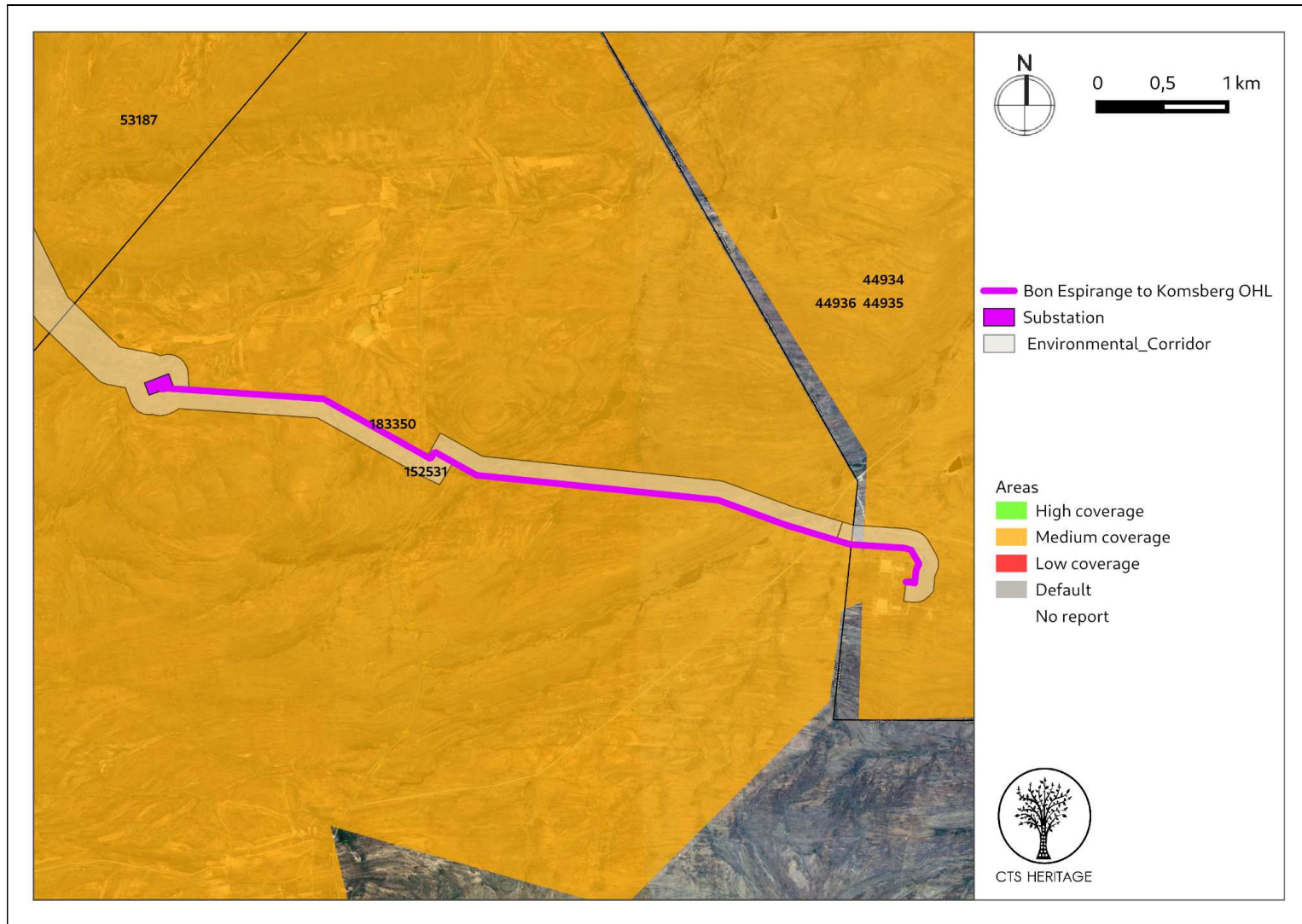
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Map 2.1: Spatialisation of heritage assessments conducted in proximity to the broader study area

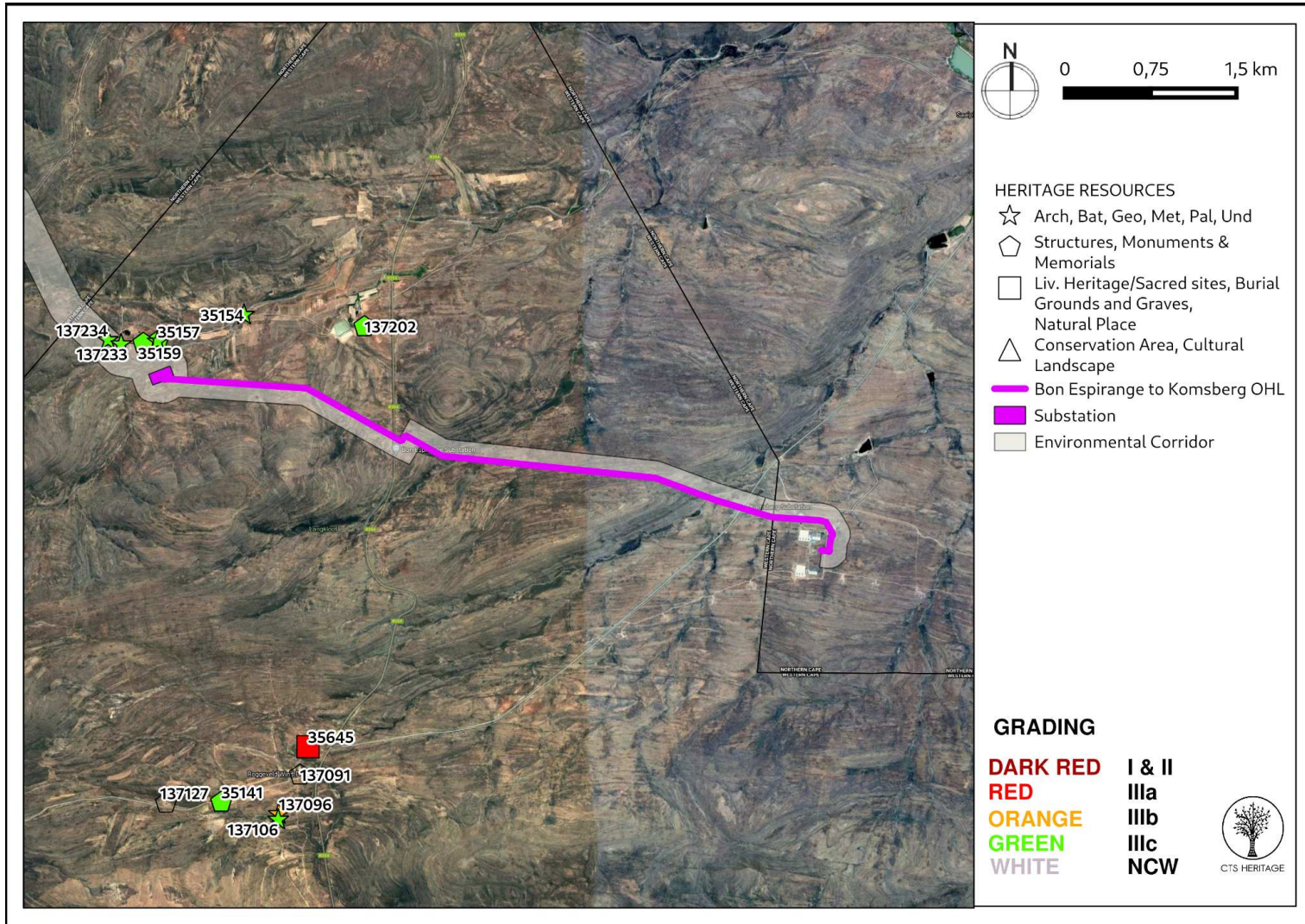
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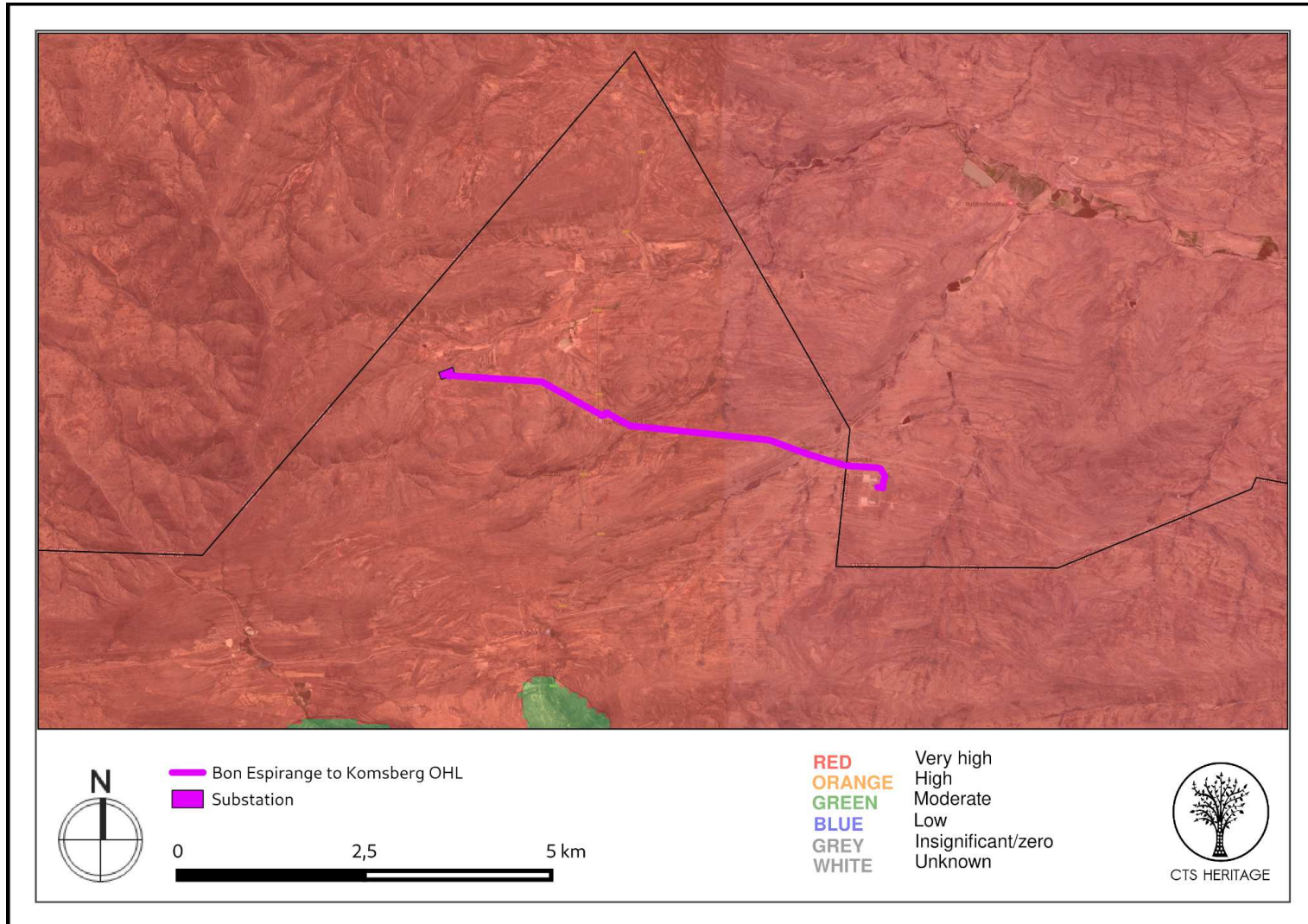
Map 2.2: Spatialisation of heritage resources known in proximity to the broader study area

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Map 3.1: Palaeontological sensitivity of the area surrounding the broader study area

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### 3.2 Palaeontology

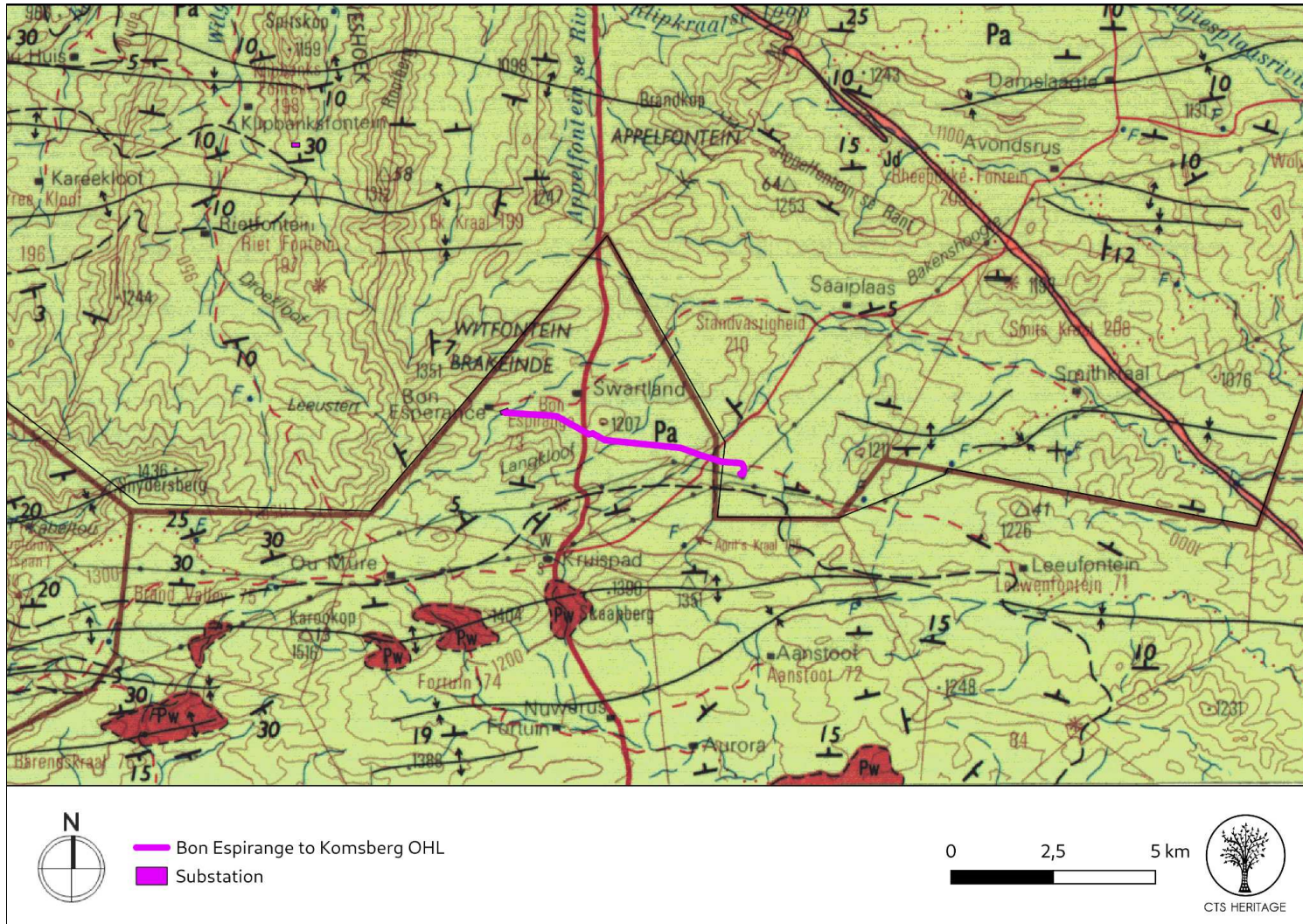
According to the SAHRIS Palaeosensitivity Map (Figure 4), the area proposed for the powerline development is underlain by sediments of very high palaeontological sensitivity belonging to the Abrahamskraal Formation of the Beaufort Group. A Palaeontological Assessment was conducted by Almond (2015) for the Kareebosch WEF which covers a larger portion of the area proposed for the powerline development, and covered the proposed powerline alternatives specifically (Figure 2b, Appendix to the ACO Report 2015, SAHRIS Ref 183350).

According to Almond (2015), “The fluvial Abrahamskraal Formation (Lower Beaufort Group, Karoo Supergroup) that underlies almost the entire wind farm study area is known for its diverse fauna of Permian fossil vertebrates - notably various small- to large-bodied therapsids and reptiles - as well as fossil plants of the *Glossopteris* Flora and low diversity trace fossil assemblages. However, desktop analysis of known fossil distribution within the Main Karoo Basin shows a marked paucity of fossil localities in the study region between Matjiesfontein and Sutherland where sediments belonging only to the lower part of the thick Abrahamskraal Formation succession are represented.

Bedrock exposure levels in the Karreebosch Wind Farm study area are generally very poor due to the pervasive cover by superficial sediments (colluvium, alluvium, soils, calcrete) and vegetation. Nevertheless, a sufficiently large outcrop area of Abrahamskraal Formation sediments, exposed in stream and riverbanks, borrow pits, erosion gullies as well as road cuttings along the R354, has been examined during the present fieldwork to infer that macroscopic fossil remains of any sort are very rare indeed here. Exceptions include common trace fossil assemblages (invertebrate burrows) and occasional fragmentary plant remains (horsetail ferns). Levels of tectonic deformation of the bedrocks are generally low and baking by dolerite intrusions (Early Jurassic Karoo Dolerite Suite) is very minor. It is concluded that the Lower Beaufort Group bedrocks in the study area are generally of low palaeontological sensitivity and this also applies to the overlying Late Caenozoic superficial sediments (colluvium, alluvium, calcrete, soils *etc.*)”



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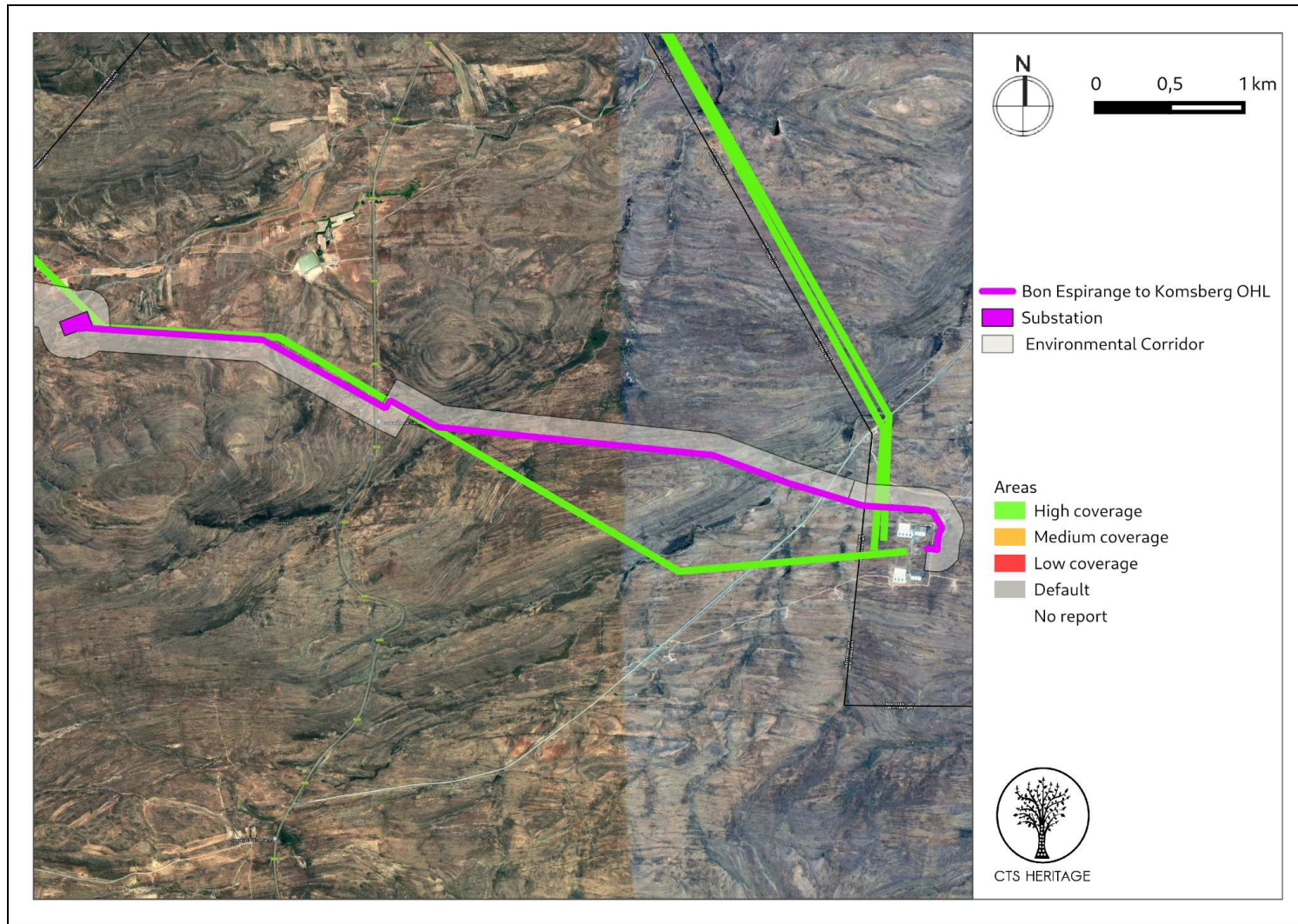
Map 3.2 Geology Map. Extract from the CGS 3220 Sutherland Map indicating that the development area for the proposed powerline is underlain by the Pa: Abrahamskraal Formation of the Beaufort Group

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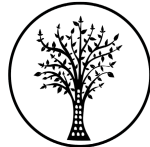
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Map 3.3 The HIA conducted by the ACO including PIA by Dr Almond covered a powerline in the area proposed for development (SAHRIS Ref 183350).

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#### **4. IDENTIFICATION OF HERITAGE RESOURCES**

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

###### *Archaeology*

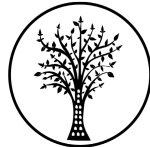
Very few archaeological resources were identified during the archaeological field assessment completed for the proposed OHL development. The resources that were identified were all single artefact occurrences or low density artefact scatters, none of which were determined to have any scientific cultural value.

While the survey of the OHL must be taken in context with the broader assessments of the wind farms that have necessitated the development of the OHL, the findings were particularly limited due to the route taken for the OHL. 132kV lines typically have a very small development footprint and can be constructed without the large roads needed to build the WEFs. The routes chosen by the engineers for the various alternatives follow very rugged, mid-slope paths where almost no archaeological material or ruins were found. Where archaeological material was found, lithics consisted of local quartzites used to manufacture Middle and Later Stone Age flakes as well as cherts that were sourced in the more general region such as the Tanqua and Ceres Karoo by people in the Later Stone Age.

###### *Palaeontology*

The grid connection project area is underlain at depth by potentially fossiliferous continental sediments within the lower part of the Abrahamskraal Formation (Lower Beaufort Group / Adelaide Subgroup, Karoo Supergroup) of Middle Permian age. Sparse fossil assemblages in this sector of the Klein-Roggeveldberge region - including extremely rare vertebrate skeletal remains, tetrapod and lungfish burrows, invertebrate traces and vascular plants - are inferred to belong to the Eodicynodon Assemblage Zone and contribute to our understanding of the earliest terrestrial biotas that colonised the Main Karoo Basin in Middle Permian times (c. 270 Ma / million years ago). The palaeosensitivity of the project area is provisionally rated as High based on the Lower Beaufort Group bedrocks (SAHRIS website / DFFE screening tool).

However, previous field-based palaeontological surveys in the Roggeveld WEF project area have only yielded scrappy plant remains as well as low-diversity trace fossils. With the exception of fragmentary fossil remains of very rare temnospondyl amphibians found on Rietfontein RE/197, additional fossil sites recorded during a recent 2-day palaeontological site visit to the Roggeveld WEF grid connection project area are mostly of low scientific / conservation value and lie outside or on the margins of the grid corridor under investigation.



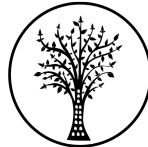
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### ***Visual Impact Assessment (2021)***

The VIA (2021) found that the “study area has a largely natural, untransformed visual character with some elements of rural / pastoral infrastructure and as such, the proposed power line development would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. The level of contrast is however reduced by the presence of the Roggeveld Wind Energy Facility (WEF), associated grid connection infrastructure, Komsberg substation and existing high voltage power lines located in the central and southern sectors of the study area.”

The VIA (2021) found that “a broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that would potentially be impacted by a proposed development. The area is not typically valued for its tourism significance and no formal protected areas were identified within the study area. In addition, there is limited human habitation resulting in relatively few sensitive or potentially sensitive receptors across the entire extent of the study area. The area is however traversed by a recognised scenic route, namely the R354 main road, although visual impacts on travelers using this route will be considerably reduced by the presence of existing high voltage power lines and the hilly terrain that screens views from much of this road.”

The VIA (2021) concluded that “the overall impact rating revealed that impacts associated with the proposed 132kV power line will be of low significance during construction, operation and decommissioning phases with a number of mitigation measures available.”



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## 4.2 Heritage Resources identified

Table 3: Heritage resources identified in the broader study area

POINT ID	Site Name	Description	Co-ordinates		Grading	Mitigation
<b>Archaeology</b>						
KRB022	Karrebosch 022	Chert flake, LSA	-32.88297	20.517862	NCW	NA
<b>Palaeontology</b>						
PAL_KRB007	Palaeo Karrebosch 007	Stream bed and bank exposure of grey-green mudrocks of Abrahamskraal Fm with horizon containing several subcylindrical, vertical lungfish burrow casts up to 9 cm in diameter	32°54'53.65"S	20°30'56.37"E	IIIB	No impact anticipated
PAL_KRB008	Palaeo Karrebosch 008	Stream bed exposure of grey-green siltstone or fine-grained wacke covered by purple-brown siltstone veneer and with dense assemblage of rounded traces between 0.5 to 1 cm in diameter – probably reedy plant stem casts (e.g. sphenophytes)	32°54'52.93"S	20°30'58.94"E	IIIC	None
PAL_KRB009	Palaeo Karrebosch 009	Stream gully exposure of mottled grey-green to purple-brown sandstone with assemblage of rounded, oval to irregular sand-infilled casts with reduction haloes, either of plant stems or invertebrate burrows	32°54'41.76"S	20°31'10.35"E	IIIC	None
PAL_KRB010	Palaeo Karrebosch 010	Sandstone bed top with possible effaced desiccation crack infills, assemblage of reedy plant stem casts.	32°55'11.03"S	20°31'54.90"E	IIIC	None

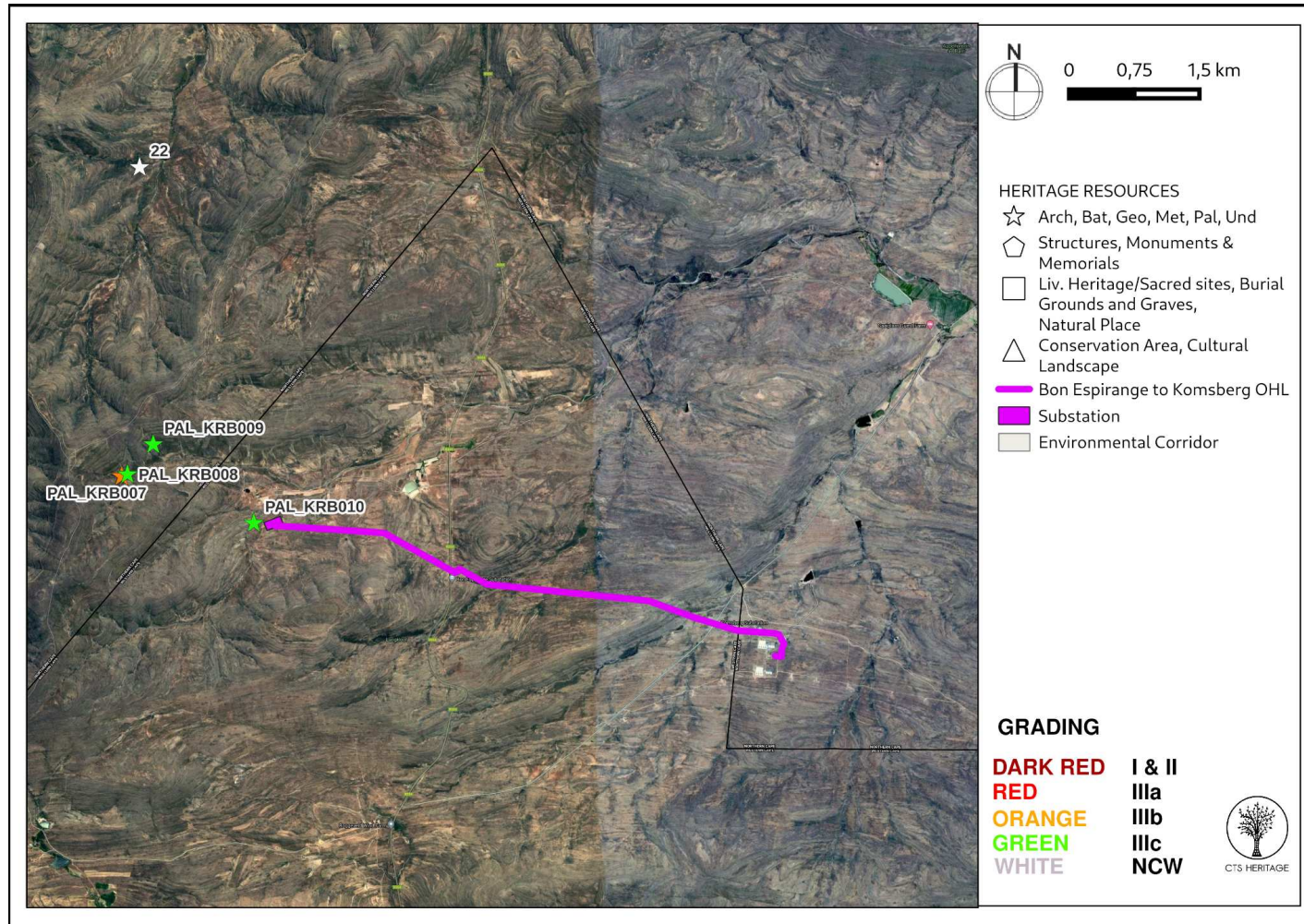
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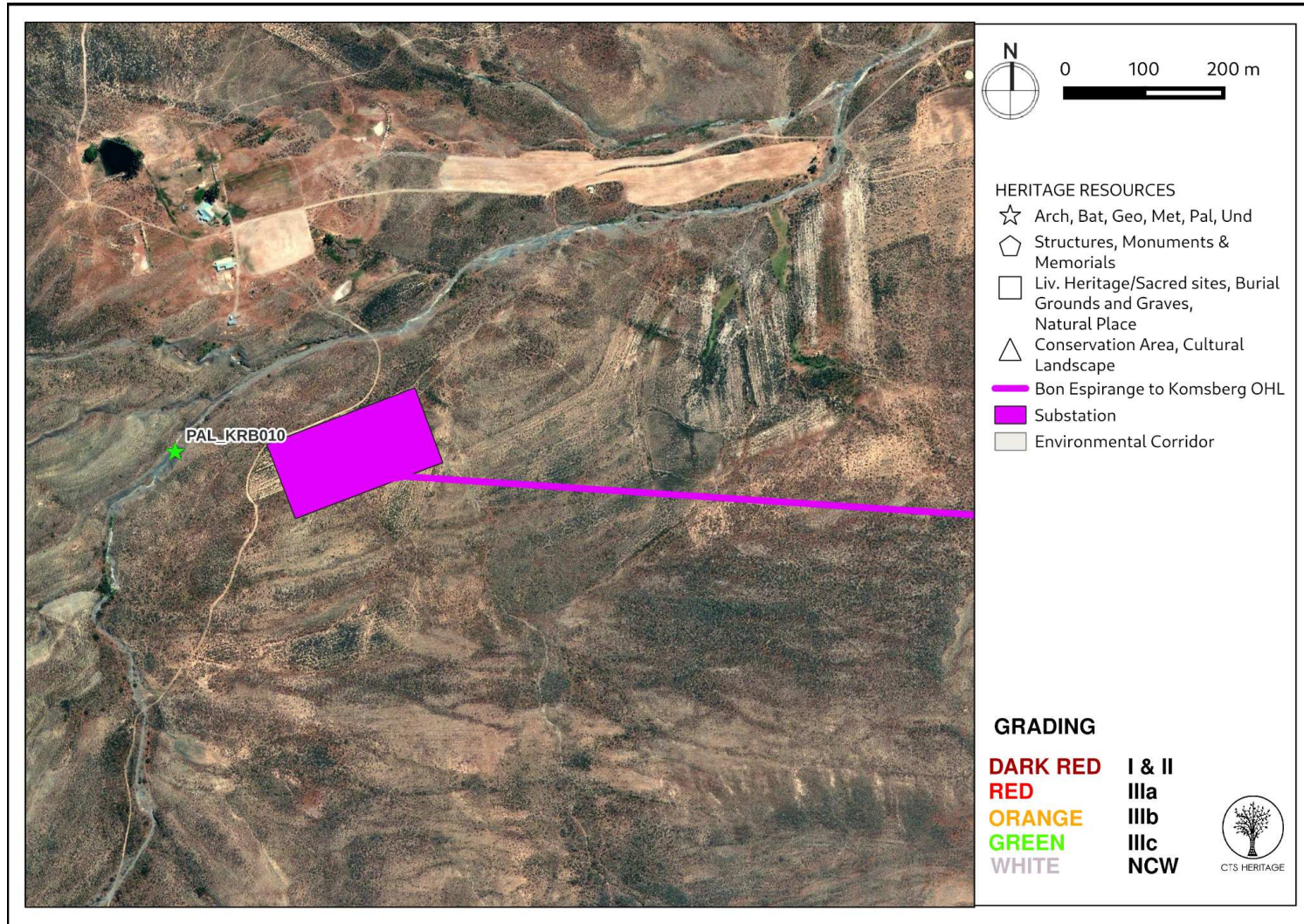
### 4.3 Mapping and spatialisation of heritage resources



Map 4: Map of heritage resources identified during the field assessment, relative to the broader study area

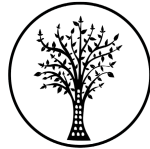


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## **5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT**

### **5.1 Assessment of impact to Heritage Resources**

#### ***Archaeology***

The findings of this field assessment largely correlate with the findings of the Karrebosch HIA (2015) which “revealed that the study area is relatively austere in terms of pre-colonial heritage, however valley bottoms contain evidence of early trekboer cultural landscapes – ruins, graves and occasional middens. These consist of collections of ruined stone and mud buildings, threshing floors and kraals located exclusively in the valley areas between the high longitudinal ridges that characterise the study area.”

No significant heritage resources were identified in the proposed alignment. As such, no negative impact to significant archaeological heritage is anticipated and there is no preferred alternative alignment in terms of impacts to archaeological resources.

#### ***Palaeontology***

Dr Almond notes that “No fossils were recorded within the Late Caenozoic superficial deposits in the region (colluvium, alluvium etc). The overall palaeosensitivity of the grid connection project area is inferred to be Low. However, the potential for isolated vertebrate and other fossil finds of high scientific interest – as recorded elsewhere in the Klein-Roggeveldberge region – cannot be completely discounted.

There are no objections on palaeontological grounds to authorisation of the proposed 132 kV powerline... No further specialist palaeontological studies or mitigation are recommended for this electrical infrastructure project. These recommendations and the Chance Fossil Finds Protocol appended to this report should be included in the EMPr for the development.”

Dr Almond concludes that “Based on combined desktop and field-based palaeontological data an overall LOW palaeosensitivity for the project area is inferred here. However, the potential for isolated vertebrate and other fossil finds of high scientific interest – as occasionally recorded elsewhere in the Klein-Roggeveldberge region – cannot be completely discounted.”

#### ***Visual Impact Assessment (2021)***

*The information below is taken from the VIA completed for this project:*

Agricultural activities in the area have not transformed the natural landscape to any significant degree and there are no towns or built-up areas in the study area influencing the overall visual character. Hence the natural character has been retained across much of the study area. Prominent anthropogenic elements in the study area

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however include a large electrical substation (Komsberg), associated high voltage power lines and the Roggeveld WEF and associated infrastructure. The presence of this infrastructure is an important factor in this context, as the introduction of the proposed power line would result in less visual contrast where other anthropogenic elements are already present.

The construction of the Roggeveld WEF and the associated 132kV power line and substation is a significant factor in the visual character of the study area. WEFs and their associated infrastructure typically consist of very large structures which are highly visible. As such, this facility has already significantly altered the visual character and baseline across the western sector of the study area, resulting in a more industrial-type visual character. It is important to note that several renewable energy facilities (solar and wind) are proposed within relatively close proximity to the proposed power line. These facilities and their associated infrastructure, typically consist of very large structures which are highly visible. As such, these facilities will further alter the visual character and baseline in the study area if constructed towards a more industrial-type visual character. Although this will lessen the degree to which the proposed power line would contrast with the elements and form in the surrounding environment, the cumulative impact on each sensitive receptor location would increase.

The scenic quality of the landscape is also an important factor contributing to the visual character of an area or the inherent sense of place. Visual appeal is often associated with unique natural features or distinct variations in landform. As such, the hilly / mountainous terrain which occurs across much of the study area is considered to be an important feature that increases the scenic appeal and visual interest in the area. The R354 Main Road is in fact considered to have high scenic and rural value.

The greater area surrounding the proposed development is an important component when assessing visual character. The area can be considered to be typical of a Karoo or “platteland” landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa. Much of South Africa’s dry Karoo interior consists of wide open, uninhabited spaces sparsely punctuated by scattered farmsteads and small towns. Over the last couple of decades an increasing number of tourism routes have been established in the Karoo and in a context of increasing urbanisation in South Africa’s major centres, the Karoo is being marketed as an undisturbed getaway. Examples of this may be found in the “Getaway Guide to Karoo, Namaqualand and Kalahari” (Moseley and Naude-Moseley, 2008).

The typical Karoo landscape can be considered a valuable ‘cultural landscape’ in the South African context. Although the cultural landscape concept is relatively new, it is becoming an increasingly important concept in





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terms of the preservation and management of rural and urban settings across the world (Breedlove, 2002). The Karoo landscape, consisting of wide-open plains, and isolated relief, interspersed with isolated farmsteads, windmills and stock holding pens, is an important part of the cultural matrix of the South African environment. The Karoo farmstead is also a representation of how the harsh arid nature of the environment in this part of the country has shaped the predominant land use and economic activity practiced in the area, as well as the patterns of human habitation and interaction. The presence of small towns, such as Matjiesfontein, engulfed by an otherwise rural, almost barren environment, form an integral part of the wider Karoo landscape. As such, the Karoo landscape as it exists today has value as a cultural landscape in the South African context.

In light of this, it is important to assess whether the introduction of a new power line and associated infrastructure into the study area would be a degrading factor in the context of the natural Karoo character of the landscape. Broadly speaking, visual impacts on the cultural landscape in the area around the proposed development would be reduced by the fact that the area is very remote and there are few significant tourism enterprises attracting visitors into the study area. In addition, although a recognised scenic route (R354) traverses the study area, visual impacts on travelers using this route will be considerably reduced by the hilly terrain across the study area and also the presence of highly visible electrical infrastructure. In addition, it could be argued that this type of development is not considered to be a significant degrading factor in the context of the natural Karoo character of the study area, due to the fact that electrical infrastructure is frequently part of the typical form present within the Karoo landscape.

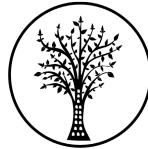
The Visual Impact Assessment (VIA) identified seven (7) potentially sensitive receptors in the study area, i.e. within 5kms from the outer boundary of the power line assessment corridor. One (1) of these receptors is considered to be a sensitive receptor as it is linked to leisure/nature-based tourism activities in the area. The remaining six (6) receptors are all farmsteads that are regarded as potentially sensitive visual receptors as they are located within a mostly natural setting and the proposed development will likely alter natural vistas experienced from these dwellings. Three of these potentially sensitive receptor locations were however found to be outside the viewshed of the proposed development and thus are not expected to experience any visual impacts as a result of the proposed development. These receptors were therefore removed from the assessment, leaving only four (4) potentially sensitive receptors.

According to the receptor impact rating undertaken for this VIA, the only sensitive receptor identified within the study area would experience low levels of visual impact as a result of the proposed development, this being the Saaiplaas Guest Farm. Two (2) potentially sensitive receptors will be subjected to moderate levels of visual impact

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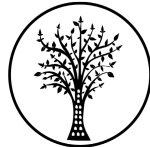


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as a result of the proposed power line development, while two receptors will be subjected to low levels of visual impact. It should be noted however, that many of these receptors are located on farms which are within the project areas for approved renewable energy projects. As such the owners / occupants are not expected to perceive the proposed power line in a negative light.

**Table 4: Heritage resources impact assessment table for archaeology and palaeontology (please see the VIA 2021 for the Impact Tables for Visual Impacts)**

CRITERIA	Archaeology		Palaeontology	
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
<b>Impact Magnitude (M)</b> The degree of alteration of the affected environmental receptor	1	1	4	1
<b>Impact Extent (E)</b> The geographical extent of the impact on a given environmental receptor	1	1	1	1
<b>Impact Reversibility (R)</b> The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	5	5	5	5
<b>Impact Duration (D)</b> The length of permanence of the impact on the environmental receptor	5	5	5	5
<b>Probability of Occurrence (P)</b> The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	1	1	3	1
<b>Significance (S) is determined by combining the above criteria: <math>S=(E+D+R+M) \times P</math></b>	<b>12</b> Very Low	<b>12</b> Very Low	<b>45</b> Moderate	<b>12</b> Very Low
<b>Mitigation Recommendations</b>	None		Chance Fossil Finds Procedure must be implemented throughout the construction phase of the development	



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## 5.2 Sustainable Social and Economic Benefit

According to the Social Impact Assessment (Barbour and van der Merwe, 2021) completed for the proposed development of the powerline, the primary positive impact anticipated from the approval of the OHL is the creation of employment and business opportunities, and the opportunity for skills development and on-site training.

“The construction phase will extend over a period of approximately 3-6 months and create in the region of 20-30 employment opportunities. The total wage bill will be in the region of R 1.5 million (2021 Rand values). Most of the low and semi-skilled employment opportunities are likely to benefit residents from local towns in the area, including Matjiesfontein, Laingsburg and Sutherland. Most the beneficiaries are likely to be historically disadvantaged (HD) members of the community. This would represent a short term positive social benefit in an area with limited employment opportunities. A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in KH and LM.

The capital expenditure associated with the construction of the power line will be ~18 million (2021 Rand values) and will create opportunities for the local and regional and local economy. The sector of the local economy most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site. However, given the relatively small scale of the development and short construction period the benefits will be limited.”

Additional impacts to be derived include:

- Improve energy security and establishment of energy infrastructure.
- Creation of employment opportunities.
- Generate income for landowners.

The SIA (2021) concludes that the energy security benefits associated with the proposed WEF developments are dependent upon them being able to connect to the national grid via the establishment of grid connection infrastructure. The findings of the SIA indicate that the significance of the potential negative social impacts for both the construction and operational phase of the proposed 132 kV overhead power line are Low Negative with mitigation.

Based on the available information, and the finding of this assessment that the impact to heritage resources is likely to be LOW NEGATIVE after mitigation, and acknowledging that the transition to renewable energy is one of



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South Africa's and UNESCO's Sustainable Development Goals, it is noted that the anticipated negative impacts to heritage resources resulting from the development, which are negligible, do not outweigh the anticipated socio-economic benefits to be derived from the approval of the project.

### **5.3 Proposed development alternatives**

There are no alternatives proposed for this project and as there are limited impacts to heritage resources anticipated, no alternative alignments are recommended in this assessment.

### **5.4 Cumulative Impacts**

The proposed grid connection will form part of the infrastructure required for the approved Karreebosch, Rietkloof and Brandvalley WEF developments. Furthermore, the proposed grid connection corridor is located within a belt of approved renewable energy facilities (Map 5). In terms of impacts to heritage resources, it is preferred that this kind of infrastructure development is concentrated in one location and is not sprawled across an otherwise culturally significant landscape. The proposed grid connection is therefore unlikely to result in unacceptable risk or loss, nor will the proposed development result in a complete change to the sense of place of the area or result in an unacceptable increase in impact.

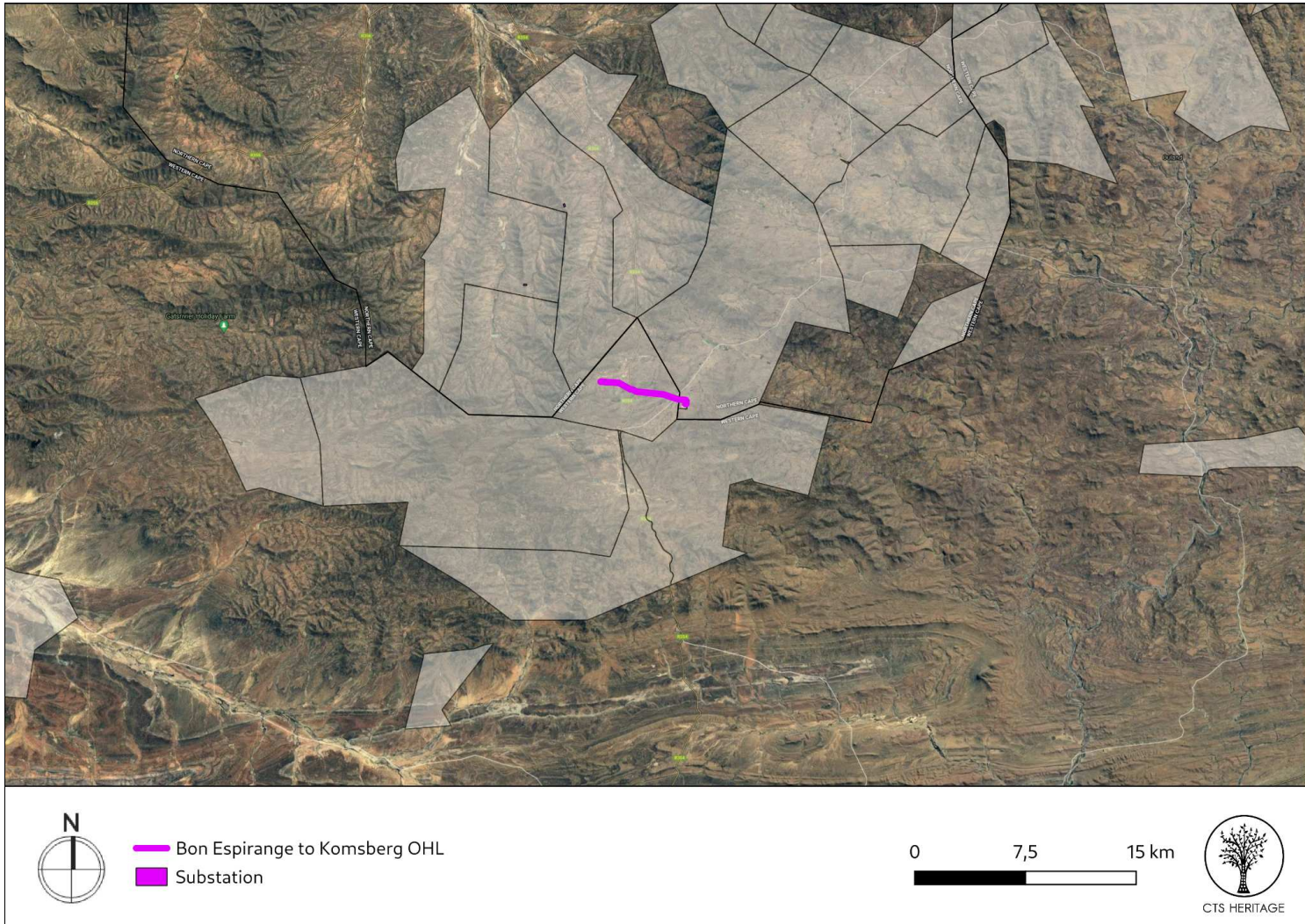
## **6. RESULTS OF PUBLIC CONSULTATION**

There are no registered conservation bodies for this area according to the list on the HWC Website ([www.hwc.org.za](http://www.hwc.org.za) checked September 2021). The local authority will be engaged with as part of the public participation required in terms of NEMA.

The public consultation process will be undertaken by the EAP during the EIA. No heritage-related comments have been received to-date. HWC is required to comment on this HIA and make recommendations prior to the granting of the Environmental Authorisation. All heritage-related comments will be included in the Comments and Responses Table in the Basic Assessment Report.



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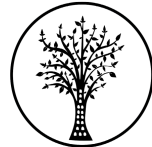


Map 5: Map indicating renewable energy facilities that have existing environmental authorisation in proximity to the proposed development

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## 7. CONCLUSION

The findings of this field assessment largely correlate with the findings of the ACO in the HIA completed for the Karreebosch WEF (Kendrick, 2015, SAHRIS Ref 183350) and the Roggeveld WEF (Hart and Webley, 2013, SAHRIS Ref 152531). The archaeological resources identified were all *ex situ* and are of limited scientific and heritage significance.

Based on the findings of this and other assessments completed in the area, it is unlikely that the proposed development of the OHL will negatively impact significant resources. This is due to the fact that 132kV lines typically have a very small development footprint and can be constructed without the large roads needed to build the WEFs. The routes chosen by the engineers for the various alternatives follow very rugged, mid-slope paths where almost no archaeological material or ruins were found.

It is possible, although unlikely, that archaeological resources may be located beneath the ground surface which may be impacted during the course of development. Recommendations in this regard are included below.

In terms of impacts to palaeontological heritage, Almond (2021) concludes that “There are no objections on palaeontological grounds to authorisation of the proposed 132 kV powerline... No further specialist palaeontological studies or mitigation are recommended for this electrical infrastructure project. These recommendations and the Chance Fossil Finds Protocol appended to this report should be included in the EMP for the development.”

According to the conclusions in the VIA (2021), a broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that would potentially be impacted by a proposed development. The area is not however typically valued for its tourism significance and there is limited human habitation resulting in relatively few potentially sensitive receptors in the area. The area is traversed by a recognised scenic route, namely the R354 main road, although visual impacts on travelers using this route will be considerably reduced by the presence of existing high voltage power lines and the hilly terrain that screens views from much of this road.”

The VIA (2021) concluded that “impacts associated with the proposed 132kV power line will be of low significance during construction, operation and decommissioning phases” on condition that the recommended mitigation measures are implemented.

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## 8. RECOMMENDATIONS

There is no objection to the proposed development of the overhead powerline in terms of impacts to heritage resources on condition that:

- The mitigation measures included in Section 9 of the VIA (2021) must be implemented for all phases on the development as indicated.
- The attached Chance Fossil Finds Procedure must be implemented throughout the construction phase of the development
- Should any buried archaeological resources or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The relevant heritage authority (the South African Heritage Resources Agency (SAHRA) in the Northern Cape and Heritage Western Cape (HWC) in the Western Cape) must be contacted immediately in order to determine an appropriate way forward.



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## 9. REFERENCES

Heritage Impact Assessments				
Nid	Report Type	Author/s	Date	Title
44934	AIA Desktop	Celeste Booth	01/08/2011	An archaeological desktop study for the proposed establishment of the Hidden Valley wind energy facility and associated infrastructure on a site south of Sutherland, Northern Cape Province
44935	AIA Phase 1	Celeste Booth	01/02/2012	A Phase 1 AIA for the proposed Hidden Valley Wind Energy Facility, near Sutherland, Northern cape Province
44936	PIA Desktop	Lloyd Rossouw	01/03/2012	Palaeontological desktop assessment of the proposed Hidden Valley Wind Energy Facility near Sutherland, Northern Cape Province
53187	HIA Phase 1	Timothy Hart, Lita Webley	01/03/2011	HERITAGE IMPACT ASSESSMENT PROPOSED WIND ENERGY FACILITY
152531	HIA Phase 1	Timothy Hart, Lita Webley	20/12/2013	Heritage Impact Assessment Report for the Phase 1 Roggeveld Wind Farm
	PIA Phase 1	John Almond	20/12/2013	Palaeontology Impact Assessment Report for the Phase 1 Roggeveld Wind Farm
183350	HIA Phase 1	Natalie Kendrick	27/10/2014	Heritage Impact Assessment for the Karreebosch Wind Farm (Phase 2 Roggeveld Wind Farm)
	PIA Phase 1	John Almond	27/10/2014	Palaeontology Impact Assessment for the Karreebosch Wind Farm (Phase 2 Roggeveld Wind Farm)
353483	AIA Phase 1	Jonathan Kaplan	1/12/2015	ARCHAEOLOGICAL IMPACT ASSESSMENT Proposed borrow pit (Karusa R354) on the Farm Karreebosch 200/1 near Sutherland, Northern Cape Assessment conducted under Section 38 (3) of the National Heritage Resource Act (No. 25 of 1999)

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## APPENDICES

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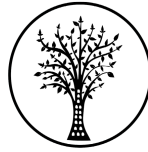
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## APPENDIX 1: Archaeological Assessment (2021)



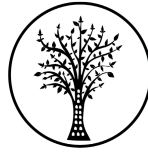
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## APPENDIX 2: Palaeontology Heritage Report (2021)



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### APPENDIX 3: Visual Impact Assessment (2021)



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## APPENDIX 4: Heritage Screening Assessment