

Phase 1a Archaeological Impact Assessment

Basic Assessment Report in terms of NEMA

Proposed Grid Connection for the Impofu Wind Farms; from Kouga area to Sans Souci and Chatty Substations near Port Elizabeth, Eastern Cape Province.

Conducted in terms of Section 38 of the National Heritage Resource Act (No. 25 of 1999)

prepared for

Aurecon South Africa (Pty) Ltd, PO Box 494, Cape Town, 8000, T: +27 21 526 9400, F: +27 21 526 9500, E: capetown@aurecongroup.com, and **Red Cap Impofu (Pty) Ltd**, C/O Mr Lance Blaine, Unit B2, Mainstream Shopping Centre, Hout Bay, Cape Town, 7806; T: +27 21 790 1392; E: lance@red-cap.co.za

prepared by



Dr. Peter Nilssen, PO Box 176, Great Brak River, 6525
044 620 4936 | 0827835896 | peter@carm.co.za

21 August 2019

Table of Contents

Content	Page
1. Executive Summary _____	3
2. Name, Expertise and Declaration _____	6
3. NEMA Requirements for Specialist Reports _____	7
4. Introduction _____	8
4.1. Background to Development Proposal _____	8
4.2. Proposed Development Infrastructure _____	8
4.3. Purpose & Scope of the Study _____	13
4.4. Study Area _____	15
4.5. Legal Requirements _____	16
4.6. Approach to the Study - Methodology _____	17
4.6.1. Desktop & Literature Review _____	17
4.6.2. Screening and Basic Assessment Phases _____	18
4.6.3. Consultation _____	18
4.7. Assumptions, Limitations and Gaps in Knowledge _____	18
5. Results _____	19
5.1. Archaeological Background _____	19
5.2. Screening and Basic Assessment Surveys and Desktop Study _____	23
5.2. Consultation _____	28
6. Sources of Risk, Impact Identification and Assessment _____	29
7. Conclusions and Recommendations _____	38
8. References _____	40
9. Figures and Plates _____	45
Appendix A: Relevant Heritage Legislation _____	63

1. Executive Summary

Red Cap Impofu (Pty) Ltd is proposing to develop three adjoining wind farms, namely Impofu North, Impofu East and Impofu West. To evacuate the power generated by the proposed Impofu Wind Farms, a grid connection is required in the form of an approximately 120 km long 132 kV overhead power line between the wind farm project area and Port Elizabeth. The Basic Assessment (BA) process for the Grid Connection is being facilitated by Aurecon South Africa (Pty) Ltd.

Presented here is the archaeological component of the Basic Assessment process, as triggered by Section 38 of the National Heritage Resources Act (Act 25 of 1999; NHRA), that is being undertaken in order to ensure compliance with heritage legislation as well as that of the National Environmental Management Act (Act 107 of 1998; NEMA).

The general study area for the project is under rural, agricultural, forestry and urban development. Large parts of the landscape are transformed by a wide variety of development activities. The development site is situated in the Eastern Cape Province between Clarkson in the west and Port Elizabeth in the east. The development site includes several wind farm and grid connection projects, and therefore, portions of it fall within an existing renewable energy landscape. Because of the excellent local wind regime, the wind farms are situated in one of the best areas for wind farming in South Africa. The development aims to assist in meeting the ever-increasing demand for energy through harvesting this renewable resource.

The scope of the impact assessment for the grid connection corridor includes the following:

- The three switching stations associated with the Impofu North, Impofu West and Impofu East Wind Farms, as well as the single Impofu collector switching station in the wind farm project area;
- The three short 132 kV high voltage (HV) lines that link each of the three switching stations to the Impofu collector switching station; and
- The entire length of the approximately 120 km and 2 km wide corridor for the 132 kV HV overhead power line, from the Impofu collector switching station to the Chatty substation in PE.

The 2 km wide and approximately 120 km long assessment corridor was generated as a result of a variety of specialist inputs during the screening phase, as well as adjustments made according to inputs and concerns provided by this author, Eastern Cape Heritage Consultants as well as preliminary conditions of support from the Gamtkwa Khoisan Council.

The Public Participation Process, in terms of the National Heritage Resources Act, will be advertised and run as part of the Basic Assessment (BA) process. Interested & Affected Parties, including the Gamtkwa Khoisan Council, will be provided the opportunity to give feedback regarding this report and others related to the proposed wind farms development.

The overall purpose of a Phase 1a Archaeological Impact Assessment is to evaluate the sensitivity of archaeological resources in the affected area, to determine the potential impacts on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures. Because the proposed power line is over 100 km long and the area of assessment for the grid corridors is so large, it is not feasible to conduct a detailed archaeological foot survey of the whole corridor. A detailed desktop study and

literature review was thus undertaken and the findings of this were then evaluated as best as possible by drive-throughs that were undertaken in September 2017 and then for the adjustment to the alignment in July 2019. The nature of the heritage resources in the corridor outside any defined no-go areas is one where the resources will mostly consist of localised and spatially confined areas that can easily be avoided by micro-siting the final grid alignment and individual pylon placements. Because the impact associated with the grid connection is linear and narrow, it can easily be micro-sited during a final pre-construction walkthrough to avoid sensitive heritage resources if and where necessary.

The impacts and recommendations regarding heritage resources known and expected to occur **within the 2 km grid corridor**, service road and grid connection route are summarised as follows:

1) Historic period structure / cottage and dipping kraal (**IE10**) that is not conservation worthy (Table 1, Figure 5 & Plate 7). **Recommendation:** no further studies or mitigation of these finds is required;

2) stone walling at **IG1** (Table 1, Figure 5 & Plate 8), **Recommendation:** A buffer of 30 m from the stone wall should be observed to ensure that the structure is not damaged by construction activities. If the grid connection straddles this structure, then pylon positions should be micro-sited prior to the construction phase of development to ensure that the 30 m buffer is complied with;

3) old farm house at **IG5** (Table 1, Figure 5 & Plate 9) and historic period structures (**31b** [Binneman & Reichert 2017]), **Recommendation:** a no-go buffer of 100 m should be observed, but if the overhead power line is closer than 250 m then the affected area should be micro-sited to reduce the impact as much as possible, and the overhead power line should not straddle or cross directly over dwellings;

4) fenced graves at **IG6** and NG Kerk cemetery at **IG4** (Table 1, Figures 5 & 6, Plates 10 & 11), graves, grave yards and historic cemetery (**31a**, **28**, **78** and **80** [Binneman & Reichert 2017]), **Recommendation:** some graves are already enclosed and protected by fencing, and if not, then they should be fenced in the event that the power line comes within 100 m of graves, but it is recommended that the overhead power line does not straddle graves or grave yards and that pylons be placed no closer than 50 m from graveyard fences;

5) the narrow gauge railway line that was built between Port Elizabeth and Avontuur (1899 – 1903) - with associated bridges and structures – runs through almost the entire length of the larger study area (Figures 4 through 7 and Plates 1 & 2) and **32** (Binneman & Reichert 2017). **Recommendation:** While it is acceptable for the grid connection to straddle or cross over the railway line, it is recommended that, as far as possible, such crossings should not occur at old railway sidings or stations where associated railway buildings are still intact. If the overhead power line runs alongside the historic railway line, it should be placed no closer than 20 m from the line to ensure that the line is not damaged during construction. No structures (buildings, bridges etc) associated with the railway line may be damaged or destroyed without a permit from the heritage authorities, and therefore it is recommended that they are avoided with a buffer of 50 m around such structures. Any grid connection development activities that encroach upon these buffers must be micro-sited prior to the construction phase;

6) the broad flood plain and adjacent banks of the Gamtoos River (**IG3**, Figure 6 and Plate 5). This is a visually sensitive area and not a no-go zone, where a multitude of developments already exist. Recommendations are made to avoid or minimize further

negative impacts to the general sense of place of the Gamtoos River flood plain. **Recommendations:** The Impofu grid connection should be kept as close as possible to existing developments and impacts such as roads (R102 & N2), bridges (including the pipeline bridge), overhead power lines, etc., and be restricted to the 2 km corridor (Figure 6). This recommendation is made so that the grid connection does not create a new corridor of impact. The areas north of the R102 bridge and south of the N2 bridge should be avoided;

7) Kabeljous River Rock Shelters with Stone Age materials spanning the last 6000 years (68, Binneman 2007). **Recommendations:** Since these are roughly south facing rock shelters, it would be ideal if the grid connection was aligned to the north of this locality. If the overhead power line were to run to the south of the sites, then a buffer of 500 m should be observed. Depending on the circumstances and view sheds, then the buffer zone could be reduced to 300 m if the power line ran to the north and out of sight from the rock shelters. If the grid alignment comes to within 500 m from any side of the rock shelters, then the situation should be re-assessed during the micrositing walkthrough. In any event, the power line should not straddle or cross over the rock shelters regardless of the span length.

In addition to avoiding these medium to high sensitivity heritage resources, it is recommended that wherever possible, the overhead power line and service road should be constructed as close as possible to existing overhead power line servitudes and existing transport infrastructure rather than creating new corridors of disturbance and impact.

Provided that no direct impact results from the installation of pylons, a power line straddling or running for a short distance across heritage resources such as the historic narrow-gauge railway line is acceptable, the same does not apply to significant historic structures, cemeteries, graves, rock shelters and other archaeological sites of medium to high sensitivity. In addition to the avoidance of physical and direct impact to tangible heritage resources, the impact to the visual or aesthetic value of natural and cultural landscapes will be minimized provided that these recommendations are implemented.

The nature of the heritage resources in the corridor outside any defined no-go areas is one where the resources will most likely consist of isolated sites that can easily be avoided by micrositing of the final alignment. In conjunction with this is the fact that the impact of the grid connection is linear and limited to a narrow area, and the alignment can easily be micro sited if required. Given this, it is evident that the final alignment can be adjusted to satisfactorily avoid any sensitive areas during a final pre-construction walkthrough. It is thus a mitigation requirement that once the final alignment of this line has been defined that as part of the micrositing process a walkthrough is undertaken by a suitably qualified archaeologist to ensure that no unforeseen cultural impacts are missed and that the line is micro sited to avoid such impacts.

From this assessment and given the mitigation requirements there are no fatal flaws from an archaeological standpoint and there are no objections to the proposed Impofu Grid Connection project proceeding.

2. Name, Expertise and Declaration

I, Peter Nilssen (PhD in archaeology, University of Cape Town 2000), herewith confirm that I am a Professional member - in good standing - of the Association of South African Professional Archaeologists (ASAPA), including the Cultural Resource Management section of the same association since 1989 (ASAPA professional member # 097). I am an accredited Principal Investigator for archaeozoology (specialist analysis), coastal, shell midden and Stone Age archaeology; Field Director for Colonial Period archaeology; and Field Supervisor for Iron Age archaeology and Rock Art. I have worked as a professional archaeologist in Cultural Resource Management since 1989 and have completed more than 200 heritage-related impact assessments and mitigation projects that were approved by provincial and national heritage authorities. My CV accompanies this report.

As the appointed independent specialist (archaeologist) for this project hereby declare that I:

- act as an independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct;
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 13 of GN No. R. 982) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- am aware that a false declaration is an offence in terms of regulation 48 of GN No. R. 982.



Signature of the specialist:

Name of company: Dr Peter Nilssen

Professional Archaeologist and Specialist Heritage Practitioner

Date: **21 August 2019**

NEMA requirements for Specialist Reports

Appendix 6	Specialist Report content as required by the NEMA 2014 EIA Regulations, as amended	Section
1 (1)(a)	(i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Title page & Section 2; as well as the accompanying CV
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Section 2
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 4.3
(cA)	an indication of the quality and age of the base data used for the specialist report;	desktop study up to 2018 and fieldwork data obtained in September 2017 and July 2019; see Section 4.6 and section 5
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 4.4 & Sections 6 & 7
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 4.6 and Section 5
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process, inclusive of equipment and modelling used;	Section 4.6
(f)	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 4.6 and Section 5
(g)	an identification of any areas to be avoided, including buffers;	Sections 5, 6 & 7
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 5 and associated Figures and Plates
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 4.7
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity, or activities;	Section 5
(k)	any mitigation measures for inclusion in the EMPr;	Sections 5, 6 & 7
(l)	any conditions for inclusion in the environmental authorisation;	Section 7
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 7
(n)	a reasoned opinion- (i) whether the proposed activity or portions thereof should be authorised; and (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 7
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	consultation with Gamtkwa Khoisan Council will be arranged after their review of this report
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not yet done
(q)	any other information requested by the competent authority.	Not at this time
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

4. Introduction

4.1. Background to Development Proposal

Red Cap Impofu (Pty) Ltd (details on title page; hereafter Red Cap) is proposing to develop the Impofu North wind farm which is one of three proposed adjoining wind farms, namely Impofu North, Impofu East and Impofu West (hereafter referred to collectively as the Impofu Wind Farms). To evacuate the power generated by the proposed Impofu Wind Farms, a grid connection is required in the form of an approximately 120 km long 132 kV overhead power line between the wind farm project area and Port Elizabeth (PE). The location and extent of the Impofu Wind Farms and Grid Connection corridors is shown in Figures 1 and 2.

The Basic Assessment (BA) process for the Grid Connection is being facilitated by Aurecon South Africa (Pty) Ltd (details on title page; hereafter Aurecon). All project background information and proposal specifications presented in this report were supplied by Red Cap and Aurecon. Some sections below are taken verbatim from Aurecon's Terms of Reference document for the grid connection application that was issued to participating specialists.

The archaeological component of the BA process, as triggered by Section 38 of the National Heritage Resources Act (Act 25 of 1999; NHRA), is being undertaken by the present author in order to ensure compliance with heritage legislation as well as that of the National Environmental Management Act (Act 107 of 1998; NEMA). The following clauses of the NHRA are relevant to the requirement for a heritage impact assessment for the proposed Impofu Grid Connection development: Section 38(1) (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length; (c) any development or other activity which will change the character of a site (i) exceeding 5 000 m² in extent; or (ii) involving three or more existing Erven or subdivisions thereof. See Appendix A for more information on heritage legislation relevant to this project and to heritage resources discussed in this report.

4.2 Proposed Development Infrastructure

The transmission line includes three short separate 132 kV high voltage (HV) overhead power lines that emanate from the Impofu North, Impofu West and Impofu East substations. Alongside each substation will be a switching station and these will be transferred to Eskom. The three short separate 132 kV HV lines link each of the three switching stations on the wind farms to a combined central "collector switching station" (Impofu collector switching station). The role of the collector switching station is to consolidate the three power lines from the wind farms into one, such that a single line continues from here onwards. This will also allow Eskom more control over the management of the wind farms' connections into the national grid.

From the Impofu collector switching station, a single 132 kV HV power line will continue towards PE via the Eskom Melkhout Substation. Due to the complex nature of navigating linear infrastructure, this assessment considers that a 31 m servitude will be required for the construction of the powerline but may occur within an area demarcated by a 2 km buffer. Within this corridor, a single 132 kV HV power line continues to the existing Eskom Melkhout substation, located to the north of the N2 and north of the town of Humansdorp. An extension of 50m outwards from the existing Melkhout Substation footprint

is included in this assessment. Thereafter, the line continues through or around the Jeffrey's Bay Wind Farm, across the Mondplaas area and Gamtoos River valley (roughly following the existing Eskom 132 kV lines that come down from PE to Melkhout) towards Thornhill. It then passes Thornhill, heads north into the forestry area and then east through the valley behind Lady's Slipper and back down to the R102 where it possibly passes through the St Alban's correctional facility, continuing around the southernmost section of the Hopewell Conservation Estate, and connects into the Nelson Mandela Bay Metropolitan Municipality (NMBM) Sans Souci substation. An extension of 150m on the western side of the existing Sans Souci Substation footprint is considered for this assessment. From Sans Souci substation the line then continues to the NMBM Chatty substation where the grid connection terminates. An extension of 50m outwards from the existing Chatty Substation footprint is included in this assessment.

The reason the power line goes through the Eskom Melkhout substation and the NMBM Sans Souci substation is to improve the evacuation capacity and technical parameters of the grid connection, as well as improving the overall stability and reliability of the Eskom and NMBM networks. The switching stations, short lines, collector switching station and main power line will all be transferred to Eskom once constructed.

From west to east, the line will pass through the Kou-Kamma Local Municipality and the Kouga Local Municipality (both falling within the Sarah Baartman District Municipality) and will terminate in NMBM.

Substations & Switching Stations

Each wind farm application will include an on-site substation with transformer. The transformer will transform / convert the power received from the turbines from either above ground or underground medium voltage (MV) lines (33 kV or lower) to HV (132 kV). The three on-site substations are part of the wind farm applications. Adjacent to each substation will be a switching station. The associated switching stations are part of the grid connection application.

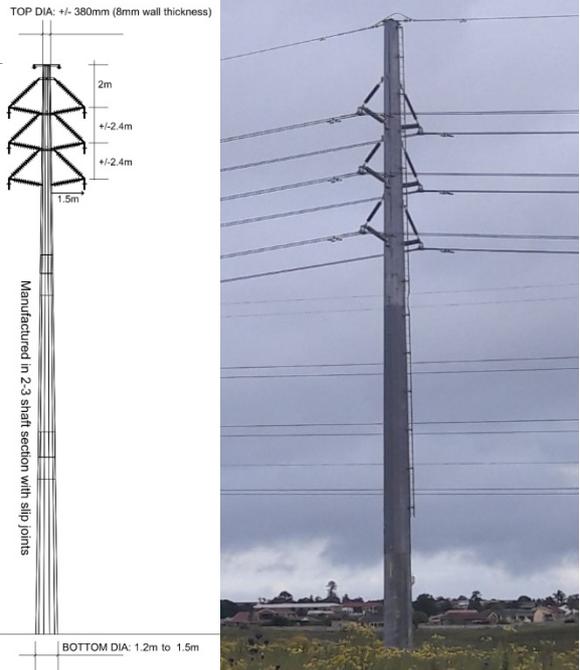
The substation areas will include all the standard substation electrical equipment / components, such as transformers and bus bars and will also house control, operational, workshop and storage buildings / areas. Since the three on-site substations will form part of the wind farm, and the switching component will be owned by Eskom, there will be a physical barrier between the two in the form of a fence. The Eskom switching stations will each have a total footprint of approximately 150 x 75 m (11,250 m²). The single collector switching station will have a total footprint of approximately 150 x 150 m (22,500 m²).

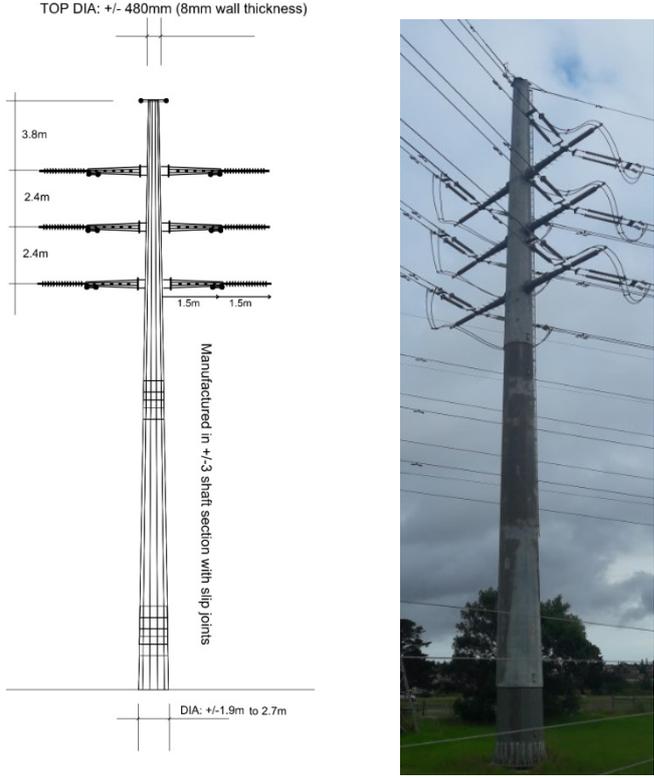
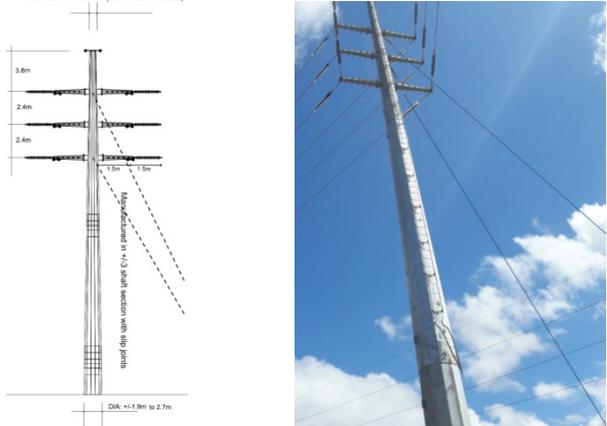
Pylons

There are six potential types of pylons that may be used for the 132 kV HV overhead lines. Descriptions are given in the table below. The spans (distance between pylons) on the monopole structure (without stays) will be on average 260 m, whilst the spans between the triple poles in the case of valley crossings may be up to 500 m and with the lattice structures over 500 m. The type of pylon and distance of the spans depend on the topography and alignment of the line.

These are not alternative 'technology' types as all options may be used along the grid corridor route at some stage or another depending on topography, line alignment and other constraints. However, option 6 (the lattice structure) would only be used if a landowner specifically asked for it or if it is required to get the power line over a significant river crossing or gorge rather than using the triple monopole option. Thus, if the lattice structure is used at all, it will be for very short sections.

Of interest from an archaeological perspective are disturbances to sediments and hence the depths and extents of required excavations for the construction and installation of various pylon types. For the intermediate poles it would be about 1.3 m to 1.7 m deep and about 36 m² to 81 m² in extent. For the Strain versions it would be about 1.8 m to 3.7 m deep and about 36 m² to 81 m² in extent. The lattice structures will have bases covering an area of about 225 m². The depth and extent of required disturbances to sediments for the installation of stays or anchors is not presently known, as this will depend on the soil and stability conditions. A further potential impact to archaeological resources involves the service road for maintenance of the overhead power line.

	Pylon Type	Description and purpose	Graphic
1.	Monopole intermediate Double Circuit with Twin Tern Conductors	<p>Self-supporting galvanised steel Suspension structure with no stays/anchors.</p> <p>For general use as intermediate structures between turning/angle points.</p> <p>Height: 26-32 m Base diameter: 1.2 m to 1.5 m</p>	

	Pylon Type	Description and purpose	Graphic
2.	<p>Monopole strain (0°-30° angle)</p> <p>Double Circuit with Twin Tern Conductor</p>	<p>Self-supporting galvanised steel Strain Angle structure with no stays/anchors.</p> <p>For general use up to 30° turning/angle points</p> <p>Height: 26-32 m</p> <p>Base diameter: 1.9 m to 2.7 m</p>	 <p>TOP DIA: +/- 480mm (8mm wall thickness)</p> <p>3.8m</p> <p>2.4m</p> <p>2.4m</p> <p>1.5m 1.5m</p> <p>Manufactured in +/- 3 shaft section with slip joints</p> <p>DIA: +/- 1.9m to 2.7m</p>
3.	<p>Monopole strain (30°-90° angle)</p> <p>Double Circuit with Twin Tern Conductor</p>	<p>Self-supporting galvanised steel Strain Angle structure with additional stays/anchors.</p> <p>For general use between 30° to 90° at turning/angle points.</p> <p>Height: 26-32 m</p> <p>Base diameter: 1.9 m to 2.7 m</p> <p>5 to 7 stays/anchors</p>	 <p>TOP DIA: +/- 480mm (8mm wall thickness)</p> <p>3.8m</p> <p>2.4m</p> <p>2.4m</p> <p>1.5m 1.5m</p> <p>Manufactured in +/- 3 shaft section with slip joints</p> <p>DIA: +/- 1.9m to 2.7m</p>

	Pylon Type	Description and purpose	Graphic
4.	<p>Monopole strain (30°-90° angle)</p> <p>2 x Single Circuit Twin Tern Conductor</p>	<p>2 x Strain Angle galvanised steel structure with stays/anchors.</p> <p>Two single circuit monopoles installed 10m apart to accommodate a twin Tern Conductor attachment each.</p> <p>For general use between 30° to 90° at turning/angle points and where it is acceptable for the landowner.</p> <p>Height: 20 m – 24 m 5 to 7 stays/anchors</p>	
5.	<p>Triple pole structure.</p> <p>2 x Single circuit with Twin Tern Conductor</p>	<p>For long spans (>350 m to 500 m) across valleys and rivers.</p> <p>Strain structure with three single monopoles per circuit.</p> <p>5-9 stays per triple pole structure depending on angle configuration.</p> <p>Typical 18 to 16 m in length.</p> <p>In a double circuit configuration it will be a triple pole structure per circuit placed at 10m-15m apart</p>	

	Pylon Type	Description and purpose	Graphic
6.	Strain Lattice Tower (247 type) for Double Circuit Twin Tern Conductor	<p>For very long spans (>500 m) across valleys and rivers.</p> <p>Lattice structure with four legs</p> <p>Height: 28 m to 32 m</p> <p>Base of the tower with 4 legs in general 15 m x 15 m area.</p>	

4.3. Purpose and Scope of the Study

The overall purpose of a Phase 1a Archaeological Impact Assessment (AIA) is to assess the sensitivity of archaeological resources in the affected area, to determine the potential impacts on such resources, and to avoid and/or minimize such impacts by means of management and/or mitigation measures. Note that the AIA presented here considers archaeological materials of prehistoric and historic origin as well as the cultural landscape. A separate palaeontological study was undertaken by Dr John Almond. This study was undertaken according to best practice principles and meets standards required by the heritage authorities in terms of the National Heritage Resources Act, No. 25 of 1999.

The objectives of the Archaeological Impact Assessment are:

- To assess the nature and sensitivity of archaeological resources in the affected parts of the receiving environment;
- To identify the impact of the proposed development on such resources as well as options for mitigation and/or management in order to minimize potential negative impacts and to make recommendations for mitigation / management where necessary; and
- To identify archaeological resources and issues that may require further investigation.

This archaeological study also forms the basis for community consultation in terms of Section 38 (3) (e) of the NHRA. The previous draft Basic Assessment Report (before this current report was undertaken due to the adjustment to the alignment) was made available to all Interested and Affected Parties (I&APs) as part of the Public Participation Process undertaken for the BA process and this new Draft Basic Assessment Report will also be

made available. Thus heritage interest groups such as the Gamtkwa Khoisan Council were provided and will still be provided with the opportunity to give feedback as part of the official community consultation to fulfil NHRA requirements.

A detailed screening assessment was undertaken by the BA project team (including specialists). The archaeological input for the screening assessment was informed by this author and by a scoping study undertaken by Eastern Cape Heritage Consultants (Binneman & Reichert 2017). The screening assessment resulted in a 2 km grid connection corridor being identified for the proposed Impofu grid connection (Figure 2). Within this 2 km corridor, the following infrastructure is proposed:

- The three switching stations associated with Impofu North, Impofu West and Impofu East Wind Farms, as well as the single Impofu collector switching station in the wind farm project area;
- The three short 132 kV HV lines that link each of the three switching stations to the Impofu collector switching station; and
- The entire length of the approximately 120 km and 2 km wide corridor for the 132 kV HV overhead power line, from the Impofu collector switching station to the Chatty substation in PE.

The six possible pylon options listed above are also considered. The existing and operational overhead power lines of the Tsitsikamma Community, Kouga and Gibson Bay Wind Farms as well as the existing 132 kV line from Grassridge Substation back to Melkhout and the two 132 kV lines from Melkhout back to PE are considered as part of the baseline conditions.

The three switching stations associated with each of the three wind farms and the Impofu collector switching station associated with the grid connection were assessed in detail at the time of the Impofu Wind Farms assessment. Archaeological assessments ideally require detailed foot surveys of development impact areas, but it is clearly not viable to cover the entire 100 km+ and 2 km wide grid corridor from the Impofu Wind Farms site to Port Elizabeth.

Certain parts of the landscape that are known to be archaeologically sensitive or that have potential to contain archaeological resources have been identified so that they can be avoided in the 2 km wide grid corridor that is being applied for. The nature of the heritage resources in the corridor outside any defined no-go areas is one where the resources will mostly consist of localised and spatially confined areas that can easily be avoided by micrositing the final grid alignment and individual pylon placements. Because the impact associated with the grid connection is linear and narrow, it can easily be micro sited during a final pre-construction walkthrough to avoid sensitive heritage resources where necessary. It is appropriate, therefore, that the final alignment is developed so as to avoid specific heritage resources and No-Go areas identified in this report - and in line with the requirements of the Environmental Authorisation but that a detailed archaeological walkthrough of this final alignment must be undertaken by a suitably qualified archaeologist as part of the final micrositing of the overhead power line route and associated service road prior to the construction phase.

Since archaeological resources occur on ground surfaces or in sub-surface sediments, only those aspects of the grid development that will impact on surface or sub-surface sediments are considered relevant. The pylon types described above, for example, will have no direct impact on archaeological resources, but will have a visual impact on the aesthetic character and value of the surroundings and cultural landscape.

4.4. Study Area

The location and extents of the assessment corridor for the Impofu grid connection is shown in Figures 1 and 2. The three short 132 kV HV lines, three switching station sites and single collector switching station are situated at the western extent of the grid corridor at the proposed Impofu Wind Farms site (Figure 5).

The 2 km corridor, provided by Aurecon, was determined through desktop studies, screening phase and Multi Criteria Decision Making process undertaken in 2017 & 2018 as well as by the adjustment to the alignment around the van Stadens area in 2019. A few examples of the affected environment along the grid connection corridor are shown in Plates 1 through 5.

For descriptive and comparative purposes of this AIA, the larger study area is divided into three sections that in this text are named West Grid, Central Grid and East Grid (Figure 2). The West Grid section comprises the coastal plain and the south-eastern slopes, foothills and hills of the more mountainous terrain to the north (Figure 5). Ancient aeolian sediments on the coastal plain are deeply incised in places by rivers and their associated tributaries revealing the underlying hard rock geological formations described in greater detail by Dr Almond in the palaeontological study. Numerous drainage lines and water sources occur in this area as do man-made dams. Apart from the town of Humansdorp, the bulk of the area is under rural and agricultural development. Large parts of the landscape, particularly along the coastal plain and areas adjacent to water sources are transformed by farming activities. Further human-related impacts of the more recent past include roads, bridges, railway lines, quarries, dams, variety of farming activities, variety of structures and infrastructure, fencing, overhead power lines, transmission/receiver masts, wind turbines and so on.

The West Grid portion of the grid corridor is more than 5 km from the present day shoreline and thus lies inland of the archaeologically sensitive coastal zone and also outside the pre-colonial cultural landscape (Binneman 2010a and Binneman & Reichert 2017). Archaeological resources that may occur in this area include historic period infrastructure, structures, cemeteries, graves and cultural materials, Stone Age artefacts in open air and disturbed contexts of mostly Early Stone Age and Middle Stone Age origin, Stone Age artefacts in sub-surface sediments, and unmarked burials. If present along river valleys, rock shelters may include archaeological remains of Stone Age and pastoralist origin as well as rock art.

The Central Grid section also includes the coastal plain and the south-eastern slopes, foothills and hills of the more mountainous terrain to the north, but in addition includes a coastal strip about 25 km in length (Figures 2 & 6). Along the 25 km strip, the 2 km grid corridor gets as close as 3 km from the present day shoreline. Although the 2 km corridor falls within the archaeologically sensitive 5 km coastal zone, it straddles previously disturbed areas and lies outside the archaeological no-go zone indicated by the polygon IG2 in Figure 6. Based on the literature review and the known presence of numerous archaeological sites along the shoreline, the latter no-go zone was defined during the screening phase of the project. The no-go zone indicated by IG2 in Figure 6 is specifically relevant to previously undisturbed areas.

As in the West Grid section, soft sediments along the Central Grid stretch are eroded and cut by the Kabeljous, Gamtoos and Van Stadens rivers and their associated tributaries. Drainage lines, water sources and dams are common. Overall, this section appears topographically more varied than the West and East Grid sections and a major natural

feature is the broad floodplain of the Gamtoos River roughly in the middle of the Central Grid section and labelled IG3 in Figure 6. Apart from a portion of the coastal town of Jeffreys Bay and the smaller villages of Loerieheuwel and Thornhill, the bulk of this area is under rural and agricultural (including forestry) development. As in the west, large parts of the natural landscape are transformed by agricultural and forestry activities. Other human-related impacts of the more recent past include roads, bridges, railway lines, quarries, dams, a variety of farming activities, a variety of structures and infrastructure, fencing, transmission/receiver masts, overhead power lines, wind turbines and so on.

Apart from the high density of shell middens, pastoralist and other heritage resources in the archaeologically sensitive coastal zone referred to above, the archaeological record in this section of the grid corridor is known and expected to include Stone Age and pastoralist materials and possible rock art in rock shelters, Stone Age and pastoralist artefacts in open and often disturbed contexts, artefacts in sub-surface sediments, unmarked prehistoric graves, historic period infrastructure, structures, cemeteries, graves and cultural materials associated with the historic period.

The East Grid section consists of a combination of coastal plain, undulating low lying hills with slopes and foothills of the more mountainous interior in the north-west (Figure 7). The Elands and Swartkops are the main rivers in this section though numerous drainage lines and water sources are present. Apart from the more mountainous portions in the north-west, this part of the grid assessment corridor is notably more transformed by human related activities, specifically those associated with modern urban developments. The main urban centres include Uitenhage, Despatch and Port Elizabeth. Outside of the urban centres, the most common land use is rural and agricultural (numerous small holdings and numerous chicken farms), and with the exclusion of wind farms, recent human-related impacts are the same as those described above for the other grid sections.

The East Grid portion of the grid connection corridor is more than 5km from the shoreline and thus lies outside the archaeologically sensitive coastal zone. Very few heritage related studies have been done in this area and while some historic period remains as well as Stone Age artefacts have been recorded, no significant archaeological resources are known or expected to occur within the 2 km grid corridor. The most likely heritage resources present in this area are historic period infrastructure, structures, cemeteries, graves and cultural materials associated with the historic period, and to a lesser extent, Stone Age and pastoralist artefacts in open and disturbed contexts. If rock shelters are present, they may contain Stone Age or pastoralist remains as well as rock art.

The operational wind farms and associated grid connections of Tsitsikamma Community, Gibson Bay, Kouga and Jeffery's Bay are located nearby, and the construction of the Oyster Bay Wind Farm immediately to the east of the Impofu Wind Farms site will commence soon (Figure 3). The Ubuntu and Banna Ba Pifhu Wind Farms have received Environmental Authorisation (EA). The EAs for the Deep River and Happy Valley wind farms (Figure 3) have lapsed. The proposed Impofu Wind Farms and grid connection are therefore considered to be an addition to an existing and growing renewable energy landscape.

4.5 Legal Requirements

The following legal requirements - relevant to heritage - apply to the proposed grid connection development:

- The National Environmental Management Act, No. 107 of 1998 (NEMA as amended): An Environmental Authorisation is required for Listed Activities in Regulations pursuant to NEMA, and specialist assessments are required to

inform the Scoping and EIA phases associated with the Application for Environmental Authorisation for the project;

- The National Heritage Resources Act, No. 25 of 1999 (NHRA): A full Heritage Impact Assessment is not required by the Eastern Cape Provincial Heritage Resources Authority for the proposed project. Only archaeological and palaeontological studies are required (ECPHRA e-mail of 22 & 23 August 2017).

The archaeological component of the BA process is being undertaken to comply with the following clauses of Section 38(1) of the NHRA which trigger the requirement for a heritage impact assessment: (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; (c) any development or other activity which will change the character of a site (i) exceeding 5 000 m² in extent; or (ii) involving three or more existing Erven or subdivisions thereof. Because of these triggers, ECPHRA was approached by this author, and ECPHRA confirmed in terms of Section 38(2) (a) that a heritage study was required, and ECPHRA requested in terms of Section 38(3) that archaeological and palaeontological impact assessments be undertaken and that these studies be done by separate specialists, one for the archaeological component, and one for the palaeontological component. See further details required for the heritage study in terms of the NHRA No 25 of 1999 in Section 38(3) in Appendix A.

4.6. Approach to the Study - Methodology

This assessment was conducted according to best practice principles and in accordance with guidelines and minimum standards required by heritage authorities in respect of the NHRA (HWC 2007, 2016a, 2016b, SAHRA 2007, 2010, 2012, 2017, 2018), and as set out in Section 13, GN.R982 of NEMA (General requirements for EAPs and Specialists).

4.6.1. Desktop & Literature Review (see Section 5.1)

This author has considerable work experience in the West Grid section of the Impofu grid connection corridor and is familiar with the main types of heritage resources and issues (Nilssen 2003, 2010, 2013, 2014, 2015 & 2016, Nilssen & Van Ryneveld 2012, and Nilssen & Smith 2015). A desktop study and literature review was undertaken, which relied in part on this author's experience in the area and also focused on the SAHRIS database up to 2018, which is by no means exhaustive. Previous heritage and archaeological studies in the immediate surroundings have already provided detailed descriptions of the history, heritage and archaeological record of the area (see section on Archaeological Background below). While giving a broad overview of the archaeological record presented in the above-named reports as well as those listed in the reference section below, the focus is on presenting key heritage resources and concerns already identified in earlier studies and how they relate to the assessment being conducted here.

The desktop study also involved a detailed inspection of aerial imagery available through Google Earth as well as high resolution aerial photography for the Impofu Wind Farms site supplied by Red Cap. The main aim of examining aerial imagery was to determine which development activities encroached upon previously undisturbed and hence potentially sensitive areas, and to locate man-made structures or ruins.

In addition to this, a desktop study for the Impofu Wind Farms and associated Grid Connection was commissioned by Red Cap and completed by Eastern Cape Heritage

Consultants (Binneman & Reichert 2017) and was invaluable for the generation of the 2 km grid corridor and for the completion of this assessment. The Binneman and Reichert desktop study reports on the most important work and documented archaeological sites in the area up to the year 2017, including archaeological assessments for a wide variety of development activities as well as the existing Tsitsikamma Community, Gibson Bay, Kouga and Jeffery's Bay Wind Farms and their associated grid connections, as well as the proposed Oyster Bay, Ubuntu and Banna Ba Pifhu Wind Farms (Figure 4). Binneman and Reichert also provided Google Earth mapping for 100 archaeological occurrences and sites in the affected area. As alluded to above, the SAHRIS database is not an exhaustive or up to date record of heritage studies, but given Dr Binneman's and Mr Reichert's vast experience and in-depth knowledge of the heritage record of the area, we are very unlikely to have missed any of the important heritage resources recorded in the broader study area (Binneman & Reichert 2017).

4.6.2. Screening and Basic Assessment Phases (see Section 5.2)

The initial Impofu grid corridor was examined using Google Earth imagery to identify parts of the study area that looked relatively undisturbed by more recent human activities and with potential to contain archaeological resources. Accepting that the grid corridor is too large to undergo a detailed archaeological foot survey, these potentially sensitive areas and the general surroundings of the grid corridor were inspected during drive throughs of the grid corridor between the Impofu Wind Farms site and the Chatty substation near Port Elizabeth in September 2017 and again in July 2019 for the adjustment that was made to the grid corridor in the van Stadens area. The focus of this exercise was to establish if any fatal flaws or no-go areas are present, which parts of the grid corridor were likely to contain significant heritage resources and which areas were less sensitive archaeologically and hence more suitable for receiving the grid connection development. It is assumed that a detailed archaeological walkthrough of the grid corridor, including the extended footprints around the existing Melkhout, Sans Souci and Chatty substation footprints, must be conducted to microsite the grid route, pylon positions and service road prior to the construction phase. The 2 km grid corridor shown in Figure 2 was generated as a result of a project team screening workshop held in Cape St Francis in September 2017. This screening workshop included inputs from all project specialists including the desktop study done by Eastern Cape Heritage Consultants as well as the provisional inputs received from the Gamtkwa Khoisan Council (Binneman & Reichert 2017).

4.6.3. Consultation (see Section 5.3)

Mr Kobus Reichert, a representative of the Gamtkwa Khoisan Council (GKC) – a registered I&AP – was consulted informally and advised this author that the GKC will provide feedback after they have reviewed this archaeological report. If considered necessary by the Gamtkwa Khoisan Council, further consultation may be conducted.

The GKC was consulted by Eastern Cape Heritage Consultants on 13 July 2017 regarding their desktop study for the Impofu Wind Farms and Grid Connection projects (Binneman & Reichert 2017). This consultation was an informal preliminary engagement and does not replace the required Public Participation Process of the EIA process or community consultation in terms of section 38(3)(e) of the NHRA (Binneman & Reichert 2017).

4.7. Assumptions, Limitations and Gaps in Knowledge

This assessment assumes that all background information and layout plans provided by Red Cap and Aurecon are correct and current. This assessment is specifically for the 2 km grid assessment corridor as shown in Figure 2.

It is assumed that the location data for heritage resources provided by Binneman and Reichert (2017) and used in the production of Figures 4, 5 and 6 are accurate, and that if the final alignment comes close to them, these localities will be inspected during the archaeological walkthrough micro-siting phase prior to construction. Note that, only archaeological and heritage resources of medium to high significance and sensitivity are included in the maps shown in Figures 4, 5 and 6. The med-high heritage labelled markers and polygons are taken from the Binneman and Reichert (2017) report and from this author's work in the area. Nevertheless, all heritage resources identified through this study are presented here and all heritage resources identified by Binneman and Reichert are presented in their 2017 report.

The most significant limitation of this study is that, due to the very large study area, a detailed archaeological foot survey cannot be conducted. However, the final impact of the grid connection is linear and limited to a narrow area, and the final alignment can be easily adjusted to avoid any sensitive areas. The nature of the heritage resources in the corridor outside any defined no-go areas is one where the resources will mostly consist of localised and spatially confined areas that can easily be avoided by micro-siting the final grid alignment and individual pylon placements. This limitation, therefore, can be overcome by requiring that a detailed archaeological walkthrough of this final alignment be undertaken by a suitably qualified archaeologist as part of the final micro-siting of the overhead power line route, including the extended footprints around the existing Melkhout, Sans Souci and Chatty substation footprints, pylon positions and associated service road prior to the construction phase.

5. Results

5.1. Archaeological Background

Most of the references cited and literature consulted during the desktop study are heritage-related impact assessments for a variety of developments that are relevant to the Impofu grid connection study and are listed in the reference section below. Studies specifically conducted for wind farm and associated grid connection projects in the affected area that are referred to here include Anderson 2010, Binneman 2010a, 2010b, 2011a, 2011b, 2011c, 2011d, 2011e, 2012a, 2012b, Binneman and Reichert 2015, Kaplan 2016, Nilssen 2014, 2015, 2016, 2018, Van Ryneveld 2010a, 2013, Wahl and van Schalkwyk 2013.

Heritage studies for the Thyspunt nuclear grid connection corridors – broadly similar to the corridors investigated here – were also conducted, but no heritage resources were mapped or documented through actual archaeological foot surveys (Van Schalkwyk, J. 2010, Van Schalkwyk, L.O. 2009a, 2009b). Because of the inadequacies of the latter studies and after considerable debate between the Gamtkwa Khoisan Council and SiVEST Pty Ltd, a further study was commissioned by SiVEST and undertaken by Ms Mary Patrick (Binneman & Reichert 2017). Although the Patrick report listed 37 sites as obtained from the Albany Museum database, no coordinates for the sites were given and most of them fall outside of the grid corridor (Binneman & Reichert 2017 and Patrick 2012). Binneman & Reichert noted that one or two sites may be situated near or within the southern boundary of the grid connection corridor (Binneman & Reichert 2017). Nevertheless, the Van Schalkwyk reports recommended that detailed archaeological investigations were required once the power line routes were determined and prior to the construction phase of development.

Archaeological resources mapped by Eastern Cape Heritage Consultants and that lie within or near the proposed Impofu grid connection corridor are discussed in Section 5.2 below (Binneman & Reichert 2017).

Pre-Colonial / Stone Age Period

Several heritage related studies have been conducted along the nearby coastline, which is rich in archaeological resources of Early, Middle and Later Stone Age origin as well as that of the Pastoralist period. A strip along the coast of up to 5 km wide is particularly rich and is considered to be one of the richest archaeological and pre-colonial cultural landscapes in South Africa (ACO 2010, Binneman 2010a, Nilssen 2003, SAHRA 2010). The archaeology of the adjacent interior is not well known due to a lack of research.

Early Stone Age (ESA) materials including Acheulian hand axes, cleavers and chopping tools that date from between about 1.5 million and 300 000 years ago is the earliest evidence for human ancestors occupying this area (e.g., Anderson 2010, 2011, Binneman 2010b, 2011b, 2011c, 2011d, 2012b, 2013b, 2013c, Binneman and Reichert 2015, Booth 2017, Deacon and Geleijnse 1988, Kaplan 2016, Nilssen 2014, 2016, 2018, Van Ryneveld 2010a, Webley 2006). Such artefacts are usually found among ancient river gravels and on old palaeosols exposed within dune fields like those at Geelhoutboom and Brandewynkop (Deacon & Geleijnse 1988 and Binneman's personal observations). While ESA artefacts are common among the dunes immediately east of Thysbaai, they are rare in the dunes a bit further north between Oyster Bay and St Francis Bay and always identified in disturbed or derived contexts where they are usually mixed with artefacts of more recent Stone Age times. Although ESA artefacts were identified in the immediate surroundings, they are relatively rare, and usually found in secondary, derived and mixed contexts, and are therefore considered to be of low significance (also see Van Ryneveld 2010a). More recently, however, during an archaeological assessment near Jeffery's Bay, some *in situ* ESA stone artefacts were identified in a similar context to that described below (Kaplan 2016).

During his palaeontological field investigations for the Impofu Wind Farms project, Dr Almond identified *in situ* ESA artefacts in ancient aeolian deposits at two quarries with exposed geological stratigraphy (Almond 2017). The stone artefacts are bedded in Plio-Pleistocene aged Nanaga aeolianites (Almond 2017). If present in high densities, such *in situ* ESA materials are potentially of greater scientific value than the exposed, displaced and temporally mixed ESA & MSA accumulations at sites like Geelhoutboom (Binneman & Reichert 2017 and Deacon & Geleijnse 1988). The above-mentioned quarries and a newly discovered site with *in situ* MSA and possible ESA artefacts are described in the archaeological investigations for the Impofu Wind Farms (Nilssen 2018a, 2018b).

The Middle Stone Age (MSA) starts at about 300 000 years ago and gives way to the Later Stone Age some 30 000 years ago. MSA stone tools are scattered widely across the landscape, mostly in disturbed and secondary context and devoid of any other cultural remains or fossil bone (ACO 2010, Anderson 2010, 2011, Binneman 2008, 2010a, 2010b, 2011b, 2011c, 2011d, 2011e, 2012a, 2012b, 2013a, 2013b, 2013c, Binneman and Reichert 2015, Booth 2017, Deacon and Geleijnse 1988, Nilssen 2003, 2013, 2015, 2018, Van Ryneveld 2007, 2010a, 2010b, 2013, Webley 2003). MSA stone artefacts are characterised by flake and blade industries where evidence for core preparation - also known as the Levallois technique - is seen on prepared or faceted striking platforms of points, flakes and blades. Convergent flakes or points are also one of the markers of the MSA period. The Klasies River Cave complex - a National Heritage Site some 8 km west of the SW boundary of the Impofu Wind Farms study area - is the most significant MSA site in the area that contains evidence for human occupation spanning the last 120 000 years. Research at the

site has made a significant contribution to our understanding of the origins of modern humans, and therefore, Klasies River Cave is among 5 other South African archaeological sites that are in the process of being nominated for World Heritage Site status with UNESCO.

Stone artefacts of MSA origin occur among the dunes and exposed gravels in the area, with the dunes at Brandewynkop containing numerous MSA stone tools (personal observation). Unfortunately, no other cultural materials or faunal remains are associated with these artefacts at Brandewynkop, but bone and fossil bone is associated with MSA materials in the dunes between Oyster Bay and St Francis Bay (also see Nilssen 2010). SAHRA has declared a delineated area containing Brandewynkop an exclusion area where no wind turbine development is permitted. "At the eastern end of the (St Francis Bay) dune field are most remarkable Middle Stone Age 'factory' sites which consisted of large circular piles of flakes and cores. Most of the flake piles represent unique 'moments in time' where large numbers of flakes were produced from a single core" (Binneman 2010a pg 3). Apart from Brandewynkop, the most significant ESA / MSA site recorded in the vicinity of the study area is site 2.3 at the Kouga Wind Farm (formerly the Central Cluster), which will be conserved in perpetuity (Van Ryneveld 2010a).

The Later Stone Age (LSA) in this area starts about 30 000 years ago and is characterised by substantial technological improvements over the MSA industries. Advancements on previous technologies and new technologies as well as cultural developments include the widespread occurrence of rock art (cave paintings and rock engravings), decorative objects (ostrich egg shell beads, marine shell pendants and beads, ochre), human burials with grave goods including painted stones, an expanded stone tool kit, microlithic stone tool industries (often associated with composite tools such as bow and arrow technology), bone tools, tortoise carapace bowls, ostrich egg shell containers, fire making sticks and so on. Many of the LSA sites in the area are shell middens, and although these usually occur within a few hundred metres of the shoreline, they are also found up to 5 km inland (ACO 2010, Anderson 2010, Binneman 1996, 2008, 2011e, Deacon and Geleijnse 1988, Nilssen 2003, 2010, Nilssen and van Ryneveld 2012, Van Ryneveld 2013, Webley 2003).

Binneman has identified, described and dated the following types of LSA archaeological sites and their contents that occur in the dune systems along the 5 km coastal strip: large stone features associated with cooking (one dated to some 300 years ago); shell middens with pottery only and with pottery and domesticated fauna that represent Khoi pastoralists or herders (dated to about 1800 and 1600 years ago respectively); shell middens, without pottery, associated with a quartzite stone industry that Binneman has named the Kabeljous industry, which represent hunter-collector-fishers who lived along the coastal foreland (dated to between about 4700 and 1800 years ago); shell middens, without pottery, associated with a silcrete or quartz microlithic Wilton Industry that represent hunter gatherers or San who lived mainly in the interior and only visited the coast periodically (dated to between about 5180 and 1900 years ago) (Binneman 2010apg 4-5). Apart from the Kabeljous River Rock Shelter (Binneman 2007), no other significant LSA sites have been recorded by previous studies in the 2 km grid assessment corridor.

Pastoralist / Herder Period

The last 2000 years saw a significant shift in the socio-economic setting with the immigration and settlement of KhoiKhoi peoples in the area from about 1800 years ago. As described above in the Later Stone Age section, the most common archaeological traces of the pastoralist / herder lifestyle in the area include large stone features associated with

cooking, shell middens with pottery only and shell middens with pottery and domesticated animals (ACO 2010, Binneman 2010a, 1996, 2008, 2011e, Nilssen 2003, 2010).

The KhoiKhoi were the first food producing peoples in South Africa who brought domestic stock, pottery / ceramic containers and bowls and associated cultural items into the region. A lifestyle still closely connected with nature would have allowed for likely easy and mutually beneficial relations between KhoiKhoi and hunter-gatherer (San) peoples. Descendants of these first farming peoples, and offspring from converging KhoiKhoi and San families, such as members of the Gamakwa Khoisan Council, still live in the region today.

Colonial / Historic Period

The most recent inhabitants of the area are mostly of European origin and started settling here from around the mid to late 1700s during the Colonial Period. These latest arrivals have had the most dramatic effect on the environment, particularly in more recent years with large scale cattle / dairy farming where large tracts of indigenous vegetation were cleared for ploughing and planting of crops and pastures for cattle feed and grazing. Heritage resources related to this period - older than 60 years or of historic significance - include roads, railway lines and bridges, dwellings and associated structures and material culture as well as cemeteries, marked and unmarked human burials (e.g., Anderson 2010, 2011, Bennie 2008, Binneman 2012c, 2013b, Binneman and Reichert 2015, Booth 2015, 2017, Nilssen 2003, 2018, Van Ryneveld 2007, 2013, 2010a, 2010b, Wahl and van Schalkwyk 2013).

Cultural Landscape

Human occupation and use of the landscape and its features result in a visually more or less evident modification of that landscape. Human use of the environment, however, may have no visually detectible altering effect at all, but nevertheless, this imprinting of human behaviour on the environment, and the relationship between people and the landscape is what is implied by the term “cultural landscape” (see UNESCO 2008 for definitions, significance and preservation of cultural landscapes).

Although this area has been occupied by hominins and humans for at least 1.5 million years, the nomadic hunter-gatherer and, to a lesser extent, early pastoralist lifestyles of pre-historic inhabitants leaves little to no physical evidence of their presence in the landscape and has a negligible modifying effect on it. This is in stark contrast to the significant alteration to the environment made over the past few hundred years by colonial agricultural and urban settlements of the area.

Cultural landscapes are defined and informed by several elements including, but not limited to; natural landscape features, palaeontology, archaeology / anthropology, oral histories, public memory, the built environment and social and written histories. The value of cultural landscapes is determined through professional interpretation and opinion, community and public values as well as environmental and heritage legislation.

The cultural landscape of the affected environment includes three broad layers, with the most recent, colonial settlement and development over the past few hundred years having the most visually evident modifying effect on the landscape. Impacts related to this cultural layer include roads and associated bridges, single vehicle tracks, railway lines and associated bridges and structures, agricultural clearings for grazing and cultivation, variety of farming activities, forestry, variety of farmsteads, structures and infrastructure, quarries, dams, fencing, overhead power lines, transmission/receiver masts, wind turbines and so on.

The second layer underlying the historic period and dating to the last 2000 years is the pastoralist or herder period, which in turn is underlain by the third layer comprised of the three Stone Age periods spanning the period from a few hundred years ago to the early periods of stone tool making archaic humans at least 1.5 million years ago. The physical traces associated with herder and hunter-gatherer or Stone Age occupation of the area are described above.

Although the prehistoric cultural landscape is the least evident and often invisible, temporally, it makes up for the overwhelming bulk of human occupation of the region. Given that most of the archaic human (ESA) and human (MSA to recent) occupation of this area involves the Stone Age era, it can be argued that the most significant cultural layer in this area involves the pre-colonial cultural landscape and its sense of place.

SAHRA has already recognized the significance of the Thyspunt cultural landscape and will not approve any developments that will have a negative impact on it (SAHRA 2010). The Thyspunt cultural landscape, however, is only a fraction of a much larger and equally significant pre-colonial cultural landscape that involves an up to 5km wide coastal strip that extends at least from St Francis Bay in the east to Klasies River in the west (Binneman 2011b & 2011c and ACO 2010). Binneman provides a detailed description of the archaeological riches in this area, which justifies the Gamtkwa Khoisan Council's and scientific significance attributed to the pre-colonial cultural landscape in this area (Binneman 2011b & 2011c). Moreover, large stretches of South Africa's coastline are rich and varied cultural landscapes that house the highest quantity and quality of archaeological Stone Age sites in the world. With ever increasing coastal developments and resulting degradation of the coastal strip, it follows that as much as possible of this cultural landscape should be protected for future generations and scientists.

The renewable energy landscape made up of the existing Kouga, Gibson Bay, Tsitsikamma Community and Jeffery's Bay Wind Farms and their associated transmission lines is the most recent layer of the cultural landscape. These and additional approved wind farms in the surroundings of the study area already encroach on and have a mostly aesthetic impact on the pre-colonial cultural landscape. The avoidance of the archaeologically sensitive areas identified in the screening phase and detailed below will help to reduce the visual and physical impact of the Impofu grid connection on the overall cultural landscape.

5.2. Screening and Basic Assessment Surveys and Desktop Study

Because the area of assessment for the grid connection corridor is so large, it is not feasible to conduct a detailed archaeological foot survey. Nevertheless, a site visit and drive-through of the grid corridors was conducted in September 2017 and again in July 2019 for the adjustment to the grid in the van Stadens area. The approach to the site visit was based on the literature review, desktop study, including the desktop study undertaken by Eastern Cape Heritage Consultants, inspection of Google Earth imagery, knowledge of previously identified heritage sites and sensitive areas, and spatial information of existing electrical and transport infrastructure and other constraints provided by Aurecon. As mentioned earlier, the focus of this exercise was to establish if any fatal flaws or no-go areas are present, which parts of the grid connection corridor were likely to contain significant heritage resources and which areas were less sensitive archaeologically and hence more suitable for receiving the proposed grid connection development.

Based on the site visits and desktop study, it is expected that the nature of heritage resources in the corridor outside any defined no-go areas is one where the resources will mostly consist of localised and spatially confined areas that can be avoided by micro-siting

the grid alignment and individual pylon placements. Because the impact associated with the grid connection is linear and narrow, it can easily be micro sited during a final pre-construction walkthrough to avoid sensitive heritage resources if and where necessary.

Several localities and areas in the larger study area were identified as being more sensitive to development than others and these are avoided by the 2 km grid corridor (Figure 2). The generation of the 2 km grid assessment corridor shown in Figure 2 was based on various specialist inputs during the desktop and screening phases including the Multi Criteria Decision Making process undertaken in September 2017. In addition, at this stage of the assessment and planning process, heritage resources that should be avoided include those reported to be of medium to high sensitivity by Binneman and Reichert (2017). Sites and other areas to be avoided are discussed in more detail below.

Heritage resources and areas of medium to high archaeological sensitivity that were identified during this assessment process along with those reported by Eastern Cape Heritage Consultants (Binneman & Reichert 2017), and that fall within and near the 2 km grid corridor are shown in Figures 4, 5 and 6. The med-high heritage labelled markers and polygons in the fore-mentioned figures are taken from the Binneman and Reichert (2017) report and from this author's work in the area. Nevertheless, all heritage resources identified through this study are presented here, and all heritage resources identified by Binneman and Reichert are presented in their 2017 report. These resources are all protected by the NHRA, and with the exception of a relatively modern structure at **IE10**, the heritage resources in Figures 4, 5 and 6 are considered to be of medium to high sensitivity. The best way to deal with these is to ensure that they are avoided by the proposed overhead power line and associated service road and that they are conserved for I&APs, future generations and scientists. To this end, specifics are given below.

The below deals first with the heritage resources identified by this author and thereafter those considered by Eastern Cape Heritage Consultants to be of medium to high sensitivity (Binneman & Reichert 2017; Table 1).

Stone Age quarrying of quartzite outcrops, as seen at **IN35**, is a common indicator of people inhabiting this area prior to the colonial period and represents the extraction of raw materials for the manufacture of stone tools, and therefore, it is recommended that this locality be conserved. Several distinct flake scars are visible on the exposed quartzite outcrop, but dense vegetation in the immediate surroundings precludes further examination of ground surfaces for flaking debris that could result from quarrying activities (Figure 5, Plate 6). It is noted that this find lies outside the 2 km corridor.

Recommendation: If development activities are within 200 m from the coordinates given in Table 1, then the locality must be micro sited and a buffer of 50 m from the site boundaries should be observed around **IN35**. In the event that the grid alignment straddles this buffer zone, then the pylon placements must be micro sited prior to the construction phase of development to ensure that they are placed outside the buffer zone.

Remnants of the historic or colonial period include (Table 1):

1. Historic period structure / cottage and dipping kraal (**IE10**), that is not conservation worthy (Figure 5, Plate 7). **Recommendation:** no further studies or mitigation of these finds is required;

2. stone walling at **IG1** (Figure 5, Plate 8), **Recommendation:** A buffer of 30 m from the stone wall should be observed to ensure that the structure is not damaged by

construction activities. If the grid connection straddles this structure, then pylon positions should be micro sited prior to the construction phase of development to ensure that the 30 m buffer is complied with;

3. old farm house at **IG5** (Figure 5, Plate 9), **Recommendation:** a no-go buffer of 100 m should be observed, but if the overhead power line is closer than 250 m then the affected area should be micro sited to reduce the impact as much as possible, and the overhead power line should not straddle or cross directly over dwellings;

4. fenced graves at **IG6** and NK Kerk cemetery at **IG4** (Figures 5 & 6, Plates 10 & 11), **Recommendation:** the graves are already enclosed and protected by fencing, but it is recommended that the overhead power line does not straddle the graves or cemetery and that pylons be placed more than 50 m from the graveyard fence; and

5. the narrow gauge railway line that was built between Port Elizabeth and Avontuur (1899 – 1903) - with associated bridges and structures – runs through almost the entire length of the larger study area (Figures 4 through 7 and Plates 1 & 2), **Recommendation:** While it is acceptable for the grid connection to straddle or cross over the railway line, it is recommended that, as far as possible, such crossings should not occur at old railway sidings or stations where associated railway buildings are still intact. If the overhead power line runs alongside the historic railway line, it should be kept more than 20 m from the line to ensure that the line is not damaged during construction. No structures (buildings, bridges etc) associated with the railway line may be damaged or destroyed without a permit from the heritage authorities, and therefore it is recommended that they are avoided with a buffer of 50 m around such structures. Any construction activities associated with the grid connection that encroach upon these buffers must be micro sited prior to the construction phase.

A few areas were identified as being more sensitive to development than others (Figure 3 and Plates 1 through 3). This includes sensitivity to direct impact on tangible heritage resources as well as visual impact on cultural landscapes and sense of place. The sensitive areas are not necessarily no-go zones and include:

1. the stretch along the northern, relatively undeveloped and archaeologically unknown portions of the original grid corridor where more hilly and mountainous landscapes are less disturbed – this area is also known to contain rock art sites (Binneman & Reichert 2017). This northern portion of the original grid corridor has been avoided and lies outside the 2 km grid corridor as shown in Figure 2;

2. the broad flood plain and adjacent banks of the Gamtoos River (**IG3**, Figure 6 and Plate 5). This is a visually sensitive area and not a no-go zone, where a multitude of developments already exist. Recommendations are made to avoid or minimize further negative impacts to the general sense of place of the Gamtoos River flood plain. **Recommendations:** The Impofu grid connection should be kept as close as possible to existing developments and impacts such as roads (R102 & N2), bridges (including the pipeline bridge), overhead power lines, etc., and be restricted to the 2 km corridor (Figure 6). This recommendation is made so that the grid connection does not create a new corridor of impact. The areas north of the R102 bridge and south of the N2 bridge should be avoided; and

3. the archaeologically sensitive coastal zone indicated by a shaded polygon in Figure 6 (**IG2**). This area is likened to the pre-colonial cultural landscape along the shoreline south of the Impofu Wind Farms (ACO 2010, Binneman 2010a, Nilssen 2003, SAHRA 2010).

Recommendations: This should be considered as a no-go area and is avoided by the 2 km corridor layout.

It is recommended that, wherever possible, the overhead power line should be constructed as close as possible to existing electrical and transport servitudes rather than creating new corridors of disturbance and impact (for example, see existing overhead power line pylons in Plate 5).

At the initiation stage of the Impofu Wind Farms and Grid Connection projects, Eastern Cape Heritage Consultants were commissioned by Red Cap to undertake a desktop study (Binneman & Reichert 2017). Their comprehensive study included a review of reports of heritage-related work in the surrounding area from 2006 up to 2017. Dr Binneman, however, has also been involved in archaeological research in this area since the 1980's and headed the archaeology unit at the Albany Museum until recently. The Binneman and Reichert desktop study also includes the findings and assessments of the existing neighbouring wind farms and their transmission lines as well as those with Environmental Authorisation and that are currently being applied for. They produced a Google Earth map with 100 archaeological sites and observations, which has been very valuable in the completion of the assessment presented here.

Their desktop study focused on the original Impofu grid corridor as shown in Figure 2 and also assumed that the grid connection would terminate at the Grassridge substation to the north-east of Port Elizabeth. Several areas that they assessed and discussed have subsequently been excluded from the 2 km grid corridor and are not included here. For a full discussion of the original grid corridor and relevant heritage resources see pages 18 through 20 of their report (Binneman & Reichert 2017).

Listed below are heritage resources that were rated to be of medium to high sensitivity and that fall within or near the 2 km grid corridor (for the list of 100 sites and observations see Table 1 in Binneman & Reichert 2017). Sites of low significance or sensitivity are excluded from this study and from the maps presented below. This is because even though they are protected by the NHRA, sites of low significance do not warrant further mitigation or investigation if they were adequately recorded when initially discovered. For assessment purposes, only sites or observations of medium to high sensitivity and that fall within the 2 km grid corridor were considered. Heritage resources listed below are protected by the NHRA, and as such, it is recommended that they should be avoided by the proposed grid connection development. The location of heritage resources listed in Table 1 are indicated in Figures 4, 5 and 6, and note that no medium to high significance heritage resources have been recorded in the East Grid section of the 2 km corridor as shown in Figure 7.

Heritage resources are numbered according to Table 1 in Binneman & Reichert (2017, pg 11-15) and include:

1) A large rock shelter of unknown heritage value, but that is expected to house Stone Age and/or Pastoralist materials as well as rock art (**LRS**). **Recommendations:** This site is a no-go zone and falls outside the 2 km corridor, but in the event that the grid route is aligned to within 500 m of this locality, then the locality must be micro sited prior to the construction phase to determine a suitable buffer;

2) one of the largest recorded Early Stone Age sites in the region with thousands of stone tools scattered on disturbed surfaces (**13**, Binneman 2010b). **Recommendations:** This site is a no-go zone and falls outside the 2 km corridor, but in the

event that the grid route is aligned to within 500 m of this locality, then the extent of a protective buffer should be determined during the micro-siting walkthrough prior to the construction phase;

3) historic graveyards and graves (**28, 31a, 43, 73, 78 and 80**). **Recommendations:** All graves and grave yards must be avoided with a buffer of 50 m from their fencing and in the event that they are not fenced, then they should be fenced and the same buffer observed. Overhead power lines should not straddle or cross directly over grave yards, while straddling or crossing directly over isolated graves may be acceptable. In the event that the grid route comes within 100 m of a known grave or grave yard, then an assessment of appropriate site-specific buffering or treatment should be determined during the micro-siting walkthrough prior to the construction phase;

4) historic farm houses and farmstead structures (**31b and 42**), **Recommendations:** a no-go buffer of 100 m should be observed, but if the overhead power line is closer than 250 m then the affected area should be micro sited to reduce the impact as much as possible, and the overhead power line should not straddle or cross directly over dwellings;

5) historic narrow-gauge railway line at various localities including (**32 and 44**). **Recommendations:** While it is acceptable for the grid connection to straddle or cross over the railway line, it is recommended that as far as possible, such crossings should not occur at old railway sidings or stations where associated railway buildings are still intact. If the overhead power line runs alongside the historic railway line, it should be kept no closer than 20 m from the line to ensure that the line is not damaged during construction. No structures (buildings, bridges etc) associated with the railway line may be damaged or destroyed without a permit from the heritage authorities, and therefore it is recommended that they are avoided with a buffer of 50 m around such structures. Any grid connection development activities that encroach upon these buffers must be micro sited prior to the construction phase

6) , Early Stone Age stone artefacts (**39, 40 and 41**). **Recommendations:** These finds fall outside the 2 km corridor but are considered as no-go areas, pending further investigation if needed. In the event that the grid route comes to within 500 m of these localities, then their extents and appropriate buffers, or site-specific mitigation or management measures should be determined during the micro-siting walkthrough prior to the construction phase of development; and

7) Kabeljous River Rock Shelters with Stone Age materials spanning the last 6000 years (**68**, Binneman 2007). **Recommendations:** Since these are roughly south facing rock shelters, it would be ideal if the grid connection was aligned to the north of this locality. If the overhead power line were to run to the south of the sites, then a buffer of 500 m should be observed. Depending on the circumstances and view sheds, then the buffer zone could be reduced to 300 m if the power line ran to the north and out of sight from the rock shelters. If the grid alignment comes to within 500 m from any side of the rock shelters, then the situation should be re-assessed during the micro-siting walkthrough. In any event, the power line should not straddle or cross directly over the rock shelters regardless of the span length.

In addition to the above-mentioned heritage resources requiring protection from development, Binneman and Reichert (2017) also recommend that a new power line route should follow existing disturbances and power line servitudes as far and as closely as possible.

Provided that no direct impact results from the installation of pylons, a power line straddling or running for a short distance across heritage resources such as the historic narrow gauge railway line may be acceptable, the same does not apply to significant historic structures, cemeteries, rock shelters and other significant archaeological sites. In addition to the avoidance of physical and direct impact to tangible heritage resources, the impact to the visual or aesthetic value of natural and cultural landscapes should be kept to a minimum.

Table 1. Description, location, rating and recommendations for identified archaeological occurrences (see Figures 5 and 6).

Point Name	Age & Material	Location - WGS 84 Lat/Lon dec.degrees	Rating	Mitigation or Management
IN35	Stone Age quarrying (Nilssen 2018)	S34.06440° E24.61429°	Low	avoid - 50 m buffer
IE10	Historic structure - modern (Nilssen 2018)	S34.11512° E24.61196°	Low	none
IG1	Historic stone walling (Nilssen 2018)	S33.98194° E24.63909°	Low/Med	avoid - 30 m buffer
IG2	archaeological no-go zone (Nilssen 2018)	S33.95932° E25.04439°	High	avoid - no-go zone
IG3	Gamtoos flood plain - visual/aesthetic value (Nilssen 2018)	S33.91578° E24.98777°	Medium	develop along existing disturbances
IG4	Historic NG Kerk formal and fenced Cemetery (Nilssen 2019)	S33.89193° E25.28765°	High	avoid - 50 m buffer
IG5	Historic structure (Nilssen 2018)	S33.98096° E24.64566°	Low/Med	avoid - 100 m buffer
IG6	Historic graves - fenced (Nilssen 2018)	S33.98135° E24.64805°	High	avoid - 50 m buffer
LRS	Large rock shelter - unknown (Binneman 2010b)	S34.02886° E24.58239°	unknown	avoid - microsite if line within 500 m
13	ESA - large site (B & R 2017)	S34.03216° E24.57522°	Low/Med	avoid - microsite if line within 500 m
28	Historic graveyard (B & R 2017)	S34.00057° E24.72122°	High	avoid - 50 m buffer
31a	Historic graves (B & R 2017)	S33.99065° E24.66098°	High	avoid - 50 m buffer
31b	Historic farm house (R & B 2017)	S33.99073° E24.66156°	Medium	avoid - 100 m buffer
32	Historic narrow gauge railway line (B & R 2017)	S33.99220° E24.66527°	Med/High	avoid direct impact to line and associated structures - see text for details
39	ESA tools (B & R 2017)	S34.01755° E24.60162°	Low/Med	avoid - microsite if line within 500 m
40	ESA tools (B & R 2017)	S34.01737° E24.60058°	Low/Med	avoid - microsite if line within 500 m
41	ESA tools (B & R 2017)	S34.01704° E24.59929°	Low/Med	avoid - microsite if line within 500 m
42	Historic farm house (B & R 2017)	S34.01610° E24.59762°	Low/Med	avoid - 100 m buffer
43	Historic grave (B & R 2017)	S34.01683° E24.59770°	High	avoid - 50 m buffer
44	Historic narrow gauge railway bridge (R & B 2017)	S34.01943° E24.59848°	Medium	avoid direct impact to line and associated structures - see text for details
68	Stone Age Rock Shelters (B & R 2017)	S33.97047° E24.91075°	High	avoid - 500 m buffer - see details in text
73	Burial disturbed by earthworks (B & R 2017)	S33.91874° E25.06105°	High	none - this burial already damaged / destroyed
78	Historic Cemetery (B & R 2017)	S33.89146° E25.13736°	High	avoid - 50 m buffer
80	Graves (B & R 2017)	S33.89115° E25.17973°	High	avoid - 50 m buffer

5.3. Consultation

This report was used for the public participation process undertaken for the BA process. In terms of Section 38(3) (e) of the NHRA, and as mentioned above, this report was submitted to the Gamtkwa Khoisan Council for their review. After they have reviewed this report, the Gamtkwa Khoisan Council will provide feedback, and further consultation may be arranged if deemed necessary.

Eastern Cape Heritage Consultants informally consulted the Gamtkwa Khoisan Council with respect to their desktop study (Binneman & Reichert 2017). At this stage the

Gamtkwa Khoisan Council have no objections to the Wind Farms proposal but see their comments and conditions of support below.

Regarding this preliminary consultation, the GKC responded on 21 July 2017 with comments in a letter to Eastern Cape Heritage Consultants, which states the following;

“In terms of our Indigenous Knowledge about the general area identified for the proposed Wind Farms we regard the entire area as of cultural significance to our community and all our comments that formed part of previous Wind Farm applications or socio-cultural consultations related to other projects remains valid and applicable to this project. This is also applicable to the grid servitude from the proposed Wind Farm up to the Van Stadens River that marks the western boundary of our ancestral land.

There are no additional archaeological sites or features that we wish to add to the current list that appears in the desktop study but we reserve the right to provide further comments in this regard after we have studied the Heritage Impact Assessment for the proposed project.

We also considered the fact that several Wind Farms have been approved in the area in the past, and as a result of the impact of these Wind Farms on the cultural landscape as well as the impact of previous and current agricultural activities, we have no objections at this stage if this project proceeds on condition that previous undisturbed areas within archaeological sensitive areas will be avoided for the purpose of this development. If it cannot be avoided this must be addressed in the HIA and we reserve the right to reconsider our provisional support for the project should we disagree with any of the recommendations in this regard” (Gamtobakwa Khoisan Council 2017).

With reference to the last paragraph of the above letter, and in consideration of the recommendations in the desktop study undertaken by Eastern Cape Heritage Consultants, Red Cap removed all wind turbines from the archaeologically sensitive areas in the SE and SW sectors of the Impofu Wind Farms site. Furthermore, the archaeologically sensitive coastal zone east of Jeffrey’s Bay has also been excluded from the 2 km grid connection corridor as an archaeological no-go zone (Figures 4 & 6).

6. Sources of Risk, Impact Identification and Assessment

Vegetation clearing and earthmoving activities associated with the construction phase of development have potential to impact archaeological resources and ultimately the cultural landscape, and therefore, only the construction phase is considered as a potential risk. The exception to this, however, is the visual impact to the Gamtoos flood plain, which will occur during the operational phase. Consequently, and given these exceptions, only known and predicted impacts associated with the construction phase of the Impofu Grid Connection that fall within the 2 km grid corridor are assessed.

Since the no-go option will involve continued and unknown impacts of natural processes and agricultural activities on archaeological resources, and because the proposed development impacts can be controlled and monitored, then the wind farms and grid connection developments may actually be preferred over the no-go option. At this stage, however, there is no preference of one over the other.

Existing and future wind farms with associated grid connections in the area could have a significant negative cumulative impact on archaeological resources. The impact on

the archaeology of the area could be avoided or minimised where the finds are documented, mitigated or conserved according to their significance and to ensure that, where appropriate, representative samples of the archaeological record are conserved for interested and affected parties, future generations and scientists. Through the implementation of management and mitigation measures such as those recommended below in Section 7, the cumulative impact of these developments on the archaeological record is greatly reduced. The positive cumulative impact on heritage resources is that the impact assessments required for these developments have greatly improved our record and understanding of archaeological material in the area and have provided an opportunity to conserve them for present and future generations. This is not possible if uncontrolled piecemeal developments as well as natural processes were to take place. A further cumulative impact of overhead power lines is on the aesthetic and visual value of the natural and cultural landscape. Although the bulk of the proposed Impofu Grid Connection will be situated in an existing and growing renewable energy landscape with numerous wind turbines and evacuation lines in the immediate surroundings, the elimination of developments from sensitive and no-go areas as recommended below will help to reduce this negative impact.

If this project is approved and a final alignment is defined then it is a requirement of this report that a detailed archaeological walkthrough of this final alignment be undertaken by a suitably qualified archaeologist as part of the final micro-siting of the overhead power line route including the extended footprints around the existing Melkhout, Sans Souci and Chatty Substation footprints, pylon positions and associated service road prior to the construction phase. At this stage, if all heritage resources are suitably avoided by the overhead power line, pylons and associated service road, then negative impacts to heritage resources will be limited to visual impacts, which are further assessed by the visual specialist.

Note that a negative impact rating without mitigation can become a positive impact rating with mitigation as the mitigation can have a positive influence on archaeological resources. For example, the mitigation measure of archaeological monitoring during the construction phase may result in the recording of previously undocumented heritage remains, which is a positive impact on the archaeological record and our understanding of it. If mitigation results in an archaeological resource being conserved or if something new is learned about a resource as a result of mitigation, then the impact can go from negative (without mitigation) to positive (with mitigation).

Table 2. Impact table for historic period structure / cottage and dipping kraal (IE10) – not conservation worthy.

Project phase	Construction		
Impact	Historic period structure / cottage and dipping kraal (IE10) - not conservation worthy		
Description of impact	unlikely to be impacted but falls within 2 km grid corridor		
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts	
Potential mitigation	none, no further studies or mitigation required		
Assessment	Without mitigation		With mitigation
Nature	Negative		Neutral
Duration	Permanent	Impact may be permanent, or in excess of 20 years	#N/A
Extent	Very limited	Limited to specific isolated parts of the site	#N/A
Intensity	Negligible	Natural and/ or social functions and/ or processes are negligibly altered	#N/A
Probability	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur	#N/A
Confidence	Medium	Determination is based on common sense and general knowledge	#N/A
Reversibility	High	The affected environmental will be able to recover from the impact	#N/A
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	#N/A
Significance	Negligible - negative		#N/A
Comment on significance	agree with calculated significance - with mitigation impact is negligible to neutral		
Cumulative impacts	low - see text for further details on cumulative impacts		

Table 3. Impact table for Historic period stone walling (IG1)

Project phase	Construction		
Impact	Historic period stone walling (IG1)		
Description of impact	damage or destruction as a result of grid connection construction		
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts	
Potential mitigation	A buffer of 30 m from the stone wall should be observed to ensure that the structure is not damaged by construction activities. If the grid connection straddles this structure, then pylon positions should be micro sited prior to the construction phase of development to ensure that the 30 m buffer is complied with		
Assessment	Without mitigation		With mitigation
Nature	Negative		Neutral
Duration	Permanent	Impact may be permanent, or in excess of 20 years	#N/A
Extent	Limited	Limited to the site and its immediate surroundings	#N/A
Intensity	Very low	Natural and/ or social functions and/ or processes are slightly altered	#N/A
Probability	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere	#N/A
Confidence	Medium	Determination is based on common sense and general knowledge	#N/A
Reversibility	High	The affected environmental will be able to recover from the impact	#N/A
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	#N/A
Significance	Negligible - negative		#N/A
Comment on significance	agree with calculated significance - with mitigation the impact is negligible or neutral and the resource is conserved		
Cumulative impacts	low negative without mitigation and neutral with mitigation - see text for further details on cumulative impacts		

Table 4. Impact table for Historic period structures (IG5, 31b)

Project phase	Construction			
Impact	Historic period structures (IG5, 31b)			
Description of impact	damage or destruction as a result of grid connection construction			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	a no-go buffer of 100 m should be observed, but if the overhead power line is closer than 250 m then the affected area should be micro sited to reduce the impact as much as possible, and the overhead power line should not straddle or cross directly over dwellings			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Neutral	
Duration	Permanent	Impact may be permanent, or in excess of 20 years		#N/A
Extent	Local	Extending across the site and to nearby settlements		#N/A
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered		#N/A
Probability	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur		#N/A
Confidence	Medium	Determination is based on common sense and general knowledge		#N/A
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified		#N/A
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere		#N/A
Significance	Minor - negative		#N/A	
Comment on significance	agree with calculated significance - with mitigation there is no impact (N/A) and resource is conserved			
Cumulative impacts	low negative without mitigation and neutral with mitigation - see text for further details on cumulative impacts			

Table 5. Impact table for Graves, Grave Yards and Cemeteries (IG6, IG4, 31a, 28, 78 & 80)

Project phase	Construction		
Impact	Graves & grave yards (IG6, IG4, 31a, 28, 78 & 80)		
Description of impact	damage or destruction as a result of grid connection construction		
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts	
Potential mitigation	some graves are already enclosed and protected by fencing, and if not, then they should be fenced in the event that the power line comes within 100 m of graves, but it is recommended that the overhead power line does not straddle graves or grave yards and that pylons be placed at least 50 m from graveyard fences		
Assessment	Without mitigation		With mitigation
Nature	Negative		Neutral
Duration	Permanent	Impact may be permanent, or in excess of 20 years	#N/A
Extent	Limited	Limited to the site and its immediate surroundings	#N/A
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	#N/A
Probability	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur	#N/A
Confidence	Medium	Determination is based on common sense and general knowledge	#N/A
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	#N/A
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	#N/A
Significance	Minor - negative		#N/A
Comment on significance	without mitigation the impacts are actually high negative due to legal protection of burials - with mitigation there is no impact (N/A) and resource is conserved		
Cumulative impacts	negative without mitigation and neutral with mitigation - see text for further details on cumulative impacts		

Table 6. Impact table for Historic narrow-gauge railway line and associated structures (32)

Project phase	Construction		
Impact	Historic narrow gauge railway line and associated structures (32)		
Description of impact	damage or destruction as a result of grid connection construction		
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts	
Potential mitigation	<p>While it is acceptable for the grid connection to straddle or cross over the railway line, it is recommended that, as far as possible, such crossings should not occur at old railway sidings or stations where associated railway buildings are still intact. If the overhead power line runs alongside the historic railway line, it should be kept at least 20 m from the line to ensure that the line is not damaged during construction. No structures (buildings, bridges etc) associated with the railway line may be damaged or destroyed without a permit from the heritage authorities, and therefore it is recommended that they are avoided with a buffer of 50 m around such structures. Any grid connection development activities that encroach upon these buffers must be micro sited prior to the construction phase</p>		
Assessment	Without mitigation		With mitigation
Nature	Negative		Neutral
Duration	Permanent	Impact may be permanent, or in excess of 20 years	#N/A
Extent	Local	Extending across the site and to nearby settlements	#N/A
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	#N/A
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	#N/A
Confidence	Medium	Determination is based on common sense and general knowledge	#N/A
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	#N/A
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	#N/A
Significance	Minor - negative		#N/A
Comment on significance	agree with calculated significance - with mitigation there is no impact (N/A) and resource is conserved		
Cumulative impacts	negative without mitigation and neutral with mitigation - see text for further details on cumulative impacts		

Table 7. Impact table for Gamtoos River flood plain (IG3)

Project phase	Operation			
Impact	Gamtoos River flood plain (IG3)			
Description of impact	visual impact of overhead power line on aesthetic value of the landscape			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	The Impofu grid connection should be kept as close as possible to existing developments and impacts such as roads (R102 & N2), bridges (including the pipeline bridge), overhead power lines, etc., and be restricted to the 2 km corridor (Figure 6). This recommendation is made so that the grid connection does not create a new corridor of impact. The areas north of the R102 bridge and south of the N2 bridge should be avoided			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Very limited	Limited to specific isolated parts of the site
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Minor - negative	
Comment on significance	agree with calculated significance			
Cumulative impacts	moderate negative without mitigation and minor negative with mitigation - see text for further details on cumulative impacts			

Table 8. Impact table for Kabeljous River Rock Shelters (68, Binneman & Reichert 2017)

Project phase	Construction		
Impact	Kabeljous River Rock Shelters (68, Binneman & Reichert 2017)		
Description of impact	damage or destruction as a result of grid connection construction		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts	
Potential mitigation	<p>Since these are roughly south facing rock shelters, it would be ideal if the grid connection was aligned to the north of this locality. If the overhead power line were to run to the south of the sites, then a buffer of 500 m should be observed. Depending on the circumstances and view sheds, then the buffer zone could be reduced to 300 m if the power line ran to the north and out of sight from the rock shelters. If the grid alignment comes to within 500 m from any side of the rock shelters, then the situation should be re-assessed during the micrositing walkthrough. In any event, the power line should not straddle or cross over the rock shelters regardless of the span length.</p>		
Assessment	Without mitigation		With mitigation
Nature	Negative		Neutral
Duration	Permanent	Impact may be permanent, or in excess of 20 years	#N/A
Extent	Regional	Impacts felt at a regional / provincial level	#N/A
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	#N/A
Probability	Likely	The impact may occur	#N/A
Confidence	High	Substantive supportive data exists to verify the assessment	#N/A
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	#N/A
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	#N/A
Significance	Moderate - negative		#N/A
Comment on significance	if the site is impacted by construction then the impact would be high negative - with mitigation there is no impact (N/A) and resource is conserved		
Cumulative impacts	high negative without mitigation and no impact with mitigation and neutral due to conservation - see text for further details on cumulative impacts		

7. Conclusions and Recommendations

The impacts and recommendations regarding heritage resources known and expected to occur **within the 2 km grid corridor**, service road and grid connection route are summarised as follows:

1) Historic period structure / cottage and dipping kraal (**IE10**) that is not conservation worthy (Table 1, Figure 5 & Plate 7). **Recommendation:** no further studies or mitigation of these finds is required;

2) stone walling at **IG1** (Table 1, Figure 5 & Plate 8), **Recommendation:** A buffer of 30 m from the stone wall should be observed to ensure that the structure is not damaged by construction activities. If the grid connection straddles this structure, then pylon positions should be micro sited prior to the construction phase of development to ensure that the 30 m buffer is complied with;

3) old farm house at **IG5** (Table 1, Figure 5 & Plate 9) and historic period structures (**31b** [Binneman & Reichert 2017]), **Recommendation:** a no-go buffer of 100 m should be observed, but if the overhead power line is closer than 250 m then the affected area should be micro sited to reduce the impact as much as possible, and the overhead power line should not straddle or cross directly over dwellings;

4) fenced graves at **IG6** and NG Kerk cemetery at **IG4** (Table 1, Figures 5 & 6, Plates 10 & 11), graves, grave yards and historic cemetery (**31a, 28, 78** and **80** [Binneman & Reichert 2017]), **Recommendation:** some graves are already enclosed and protected by fencing, and if not, then they should be fenced in the event that the power line comes within 100 m of graves, but it is recommended that the overhead power line does not straddle graves or grave yards and that pylons be placed no closer than 50 m from graveyard fences;

5) the narrow gauge railway line that was built between Port Elizabeth and Avontuur (1899 – 1903) - with associated bridges and structures – runs through almost the entire length of the larger study area (Figures 4 through 7 and Plates 1 & 2) and **32** (Binneman & Reichert 2017). **Recommendation:** While it is acceptable for the grid connection to straddle or cross over the railway line, it is recommended that, as far as possible, such crossings should not occur at old railway sidings or stations where associated railway buildings are still intact. If the overhead power line runs alongside the historic railway line, it should be placed no closer than 20 m from the line to ensure that the line is not damaged during construction. No structures (buildings, bridges etc) associated with the railway line may be damaged or destroyed without a permit from the heritage authorities, and therefore it is recommended that they are avoided with a buffer of 50 m around such structures. Any grid connection development activities that encroach upon these buffers must be micro sited prior to the construction phase;

6) the broad flood plain and adjacent banks of the Gamtoos River (**IG3**, Figure 6 and Plate 5). This is a visually sensitive area and not a no-go zone, where a multitude of developments already exist. Recommendations are made to avoid or minimize further negative impacts to the general sense of place of the Gamtoos River flood plain. **Recommendations:** The Impofu grid connection should be kept as close as possible to existing developments and impacts such as roads (R102 & N2), bridges (including the pipeline bridge), overhead power lines, etc., and be restricted to the 2 km corridor (Figure 6). This recommendation is made so that the grid connection does not create a new corridor of impact. The areas north of the R102 bridge and south of the N2 bridge should be avoided;

7) Kabeljous River Rock Shelters with Stone Age materials spanning the last 6000 years (68, Binneman 2007). **Recommendations:** Since these are roughly south facing rock shelters, it would be ideal if the grid connection was aligned to the north of this locality. If the overhead power line were to run to the south of the sites, then a buffer of 500 m should be observed. Depending on the circumstances and view sheds, then the buffer zone could be reduced to 300 m if the power line ran to the north and out of sight from the rock shelters. If the grid alignment comes to within 500 m from any side of the rock shelters, then the situation should be re-assessed during the micrositing walkthrough. In any event, the power line should not straddle or cross over the rock shelters regardless of the span length.

In addition to avoiding these medium to high sensitivity heritage resources, it is recommended that wherever possible, the overhead power line and service road should be constructed as close as possible to existing overhead power line servitudes and existing transport infrastructure rather than creating new corridors of disturbance and impact.

Provided that no direct impact results from the installation of pylons, a power line straddling or running for a short distance across heritage resources such as the historic narrow gauge railway line is acceptable, the same does not apply to significant historic structures, cemeteries, graves, rock shelters and other archaeological sites of medium to high sensitivity. In addition to the avoidance of physical and direct impact to tangible heritage resources, the impact to the visual or aesthetic value of natural and cultural landscapes will be minimized provided that these recommendations are implemented.

The nature of the heritage resources in the corridor outside any defined no-go areas is one where the resources will most likely consist of isolated sites that can easily be avoided by micrositing of the final alignment. In conjunction with this is the fact that the impact of the grid connection is linear and limited to a narrow area, and the alignment can easily be micro sited if required. Given this, it is evident that the final alignment can be adjusted to satisfactorily avoid any sensitive areas during a final pre-construction walkthrough. It is thus a mitigation requirement that once the final alignment of this line has been defined that as part of the micrositing process a walkthrough is undertaken by a suitably qualified archaeologist to ensure that no unforeseen cultural impacts are missed and that the line is micro sited to avoid such impacts.

From this assessment and given the mitigation requirements there are no fatal flaws from an archaeological standpoint and there are no objections to the proposed Impofu Grid Connection project proceeding.

8. References

ACO UCT. 2010. Environmental Impact Assessment for three proposed nuclear power station sites and associated infrastructure—Heritage Impact Assessment. Prepared for Arcus Gibb Engineering and Science, Johannesburg.

Almond, J. 2017. Palaeontological Heritage Screening Assessment. Impofu WEF near Humansdorp, Eastern Cape.

Anderson, G. 2010. Heritage Survey of the Proposed Melkhout-Oyster Bay Transmission Line for Coastal Environmental Services. (quarried quartzite outcrops, low density scatters LSA& some MSA& ESA etc, isolated ESA, old farming structure,)

Anderson, G. 2011. Heritage Survey of the Proposed 66 Kv Line between St Francis and Red Cap Kouga Wind Farm, Eastern Cape for Coastal & Environmental Services.

Bennie, J. 2008. Heritage Impact Assessment - Portion 87 of the Farm Cragga Kamma No. 23, Port Elizabeth.

Binneman, J.N.F. 1996. The symbolic construction of communities during the Holocene Later Stone Age in the south-eastern Cape. Unpublished D.Phil. thesis: University of the Witwatersrand.

Binneman, J.N.F. 2007. Archaeological research along the south-eastern Cape coast part2, caves and shelters: Kabeljous River Shelter 1 and associated stone tool industries Southern African Field Archaeology 15 & 16:57-74.

Binneman, J. 2008. Phase 1 Archaeological Heritage Impact Assessment for the Proposed "St Francis Coastal Reserve" on Portions of the Remainder of the Farm New Papiessfontein No. 320, Kouga Municipality, District of Humansdorp, Eastern Cape.

Binneman, J. 2010a. Archaeological Desktop Study for the Proposed Oyster Bay Wind Energy Facility, Local Kouga Municipality, Humansdorp District, Eastern Cape Province.

Binneman, J. 2010b. A Phase 1 Archaeological Heritage Impact Assessment for the Proposed Deep River Wind Energy Project, Kouga Municipality, District of Humansdorp, Eastern Cape Province.

Binneman, J. 2011a. An Archaeological Desktop Study for the Construction of the Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality, Humansdorp District, Eastern Cape Province.

Binneman, J. 2011b. A Phase 1 Archaeological Impact Assessment for the Proposed Oyster Bay Wind Energy Facility, Kouga Local Municipality, Humansdorp District, Eastern Cape Province.

Binneman, J. 2011c. A Phase 1 Archaeological Impact Assessment for the Proposed Tsitsikamma Community Wind Energy Facility, Kouga Local Municipality, Humansdorp District, Eastern Cape Province.

Binneman, J. 2011d. A Phase 1 Archaeological Heritage Impact Assessment for the Proposed Happy Valley Wind Energy Facility near Humansdorp, Kouga Local Municipality, Humansdorp District, Eastern Cape Province.

Binneman, J. 2011e. Archaeological Impact Assessment for the proposed Ubuntu Wind Energy Project near Jeffrey's Bay, Eastern Cape: Chapter 11 of the August 2011 CSIR Draft Environmental Impact Assessment Report.

Binneman, J. 2012a. A Phase 1 Archaeological Impact Assessment for the Proposed 132 kV Power Line Linking the Tsitsikamma Community Wind Energy Facility to the Proposed Extension of the Dieprivier Substation, Kouga Local Municipality, Humansdorp District, Eastern Cape Province.

Binneman, J. 2012b. Archaeological Impact Assessment for the proposed Banna Ba Pifhu Wind Energy Project near Humansdorp, Eastern Cape: Chapter 11 of the April 2012 CSIR Draft Environmental Impact Assessment Report.

Binneman, J. 2012c. A Letter of Recommendation (with conditions) for the Exemption of a Full Phase 1 Archaeological Heritage Impact Assessment for the Proposed Construction of a Petroport and Associated Infrastructure on Portions 86, 147 And 148 of Farm Gedults River N0. 411, Division Uitenhage, Eastern Cape Province.

Binneman, J. 2013a. A Letter of Recommendation (With Conditions) for the Exemption of a Full Phase 1 Archaeological Heritage Impact Assessment for the Proposed Mining of Gravel on Portion 2 of The Farm Klein River No. 713, Kouga Local Municipality, Humansdorp Division, Eastern Cape Province.

Binneman, J. 2013b. A Letter of Recommendation (With Conditions) for the Exemption of a Full Phase 1 Archaeological Heritage Impact Assessment for the Proposed Mining of Gravel on Portion 8 of The Farm Klein River No. 713, Kouga Local Municipality, Humansdorp Division, Eastern Cape Province.

Binneman, J. 2013c. A Letter of Recommendation (With Conditions) for the Exemption of a Full Phase 1 Archaeological Heritage Impact Assessment for the Proposed Mining of Shale on Portion 21 of The Farm Elandsjagt No. 687, Kouga Local Municipality, Humansdorp Division, Eastern Cape Province.

Binneman, J and Reichert, K. 2015. An Archaeological Walkthrough Survey of the Proposed 132 kV Power Line Route from the Melkhout Substation to the Dieprivier Substation Kouga Local Municipality, Sarah Baartman District Municipality, Eastern Cape Province.

Binneman, J and Reichert, K. 2017. An Archaeological Desktop Study for the Proposed Impofu Wind Energy Facility Near Oyster Bay in The Kouga Local Municipality and Potential Power Line Routes to the Grassridge Substation Northeast of Port Elizabeth, Eastern Cape Province.

Booth, C. 2015. Addendum: Archaeological and Heritage Investigation of Proposed Deviations and Repeater Sites for an Environmental Authorisation Amendment for Fibreco Route 4 (George To Port Elizabeth) and 5 (Port Elizabeth To Durban).

Booth, C. 2017. A Phase 1 Archaeological Impact Assessment (AIA) for the Proposed Scarlet Ibis Wind Energy Facility (WEF) on the Farms Grassridge 226 and

Welbedachtsfontein 300, Near Port Elizabeth, Nelson Mandela Metropolitan Municipality (NMMM), Eastern Cape Province.

Brink, J.S. 2015. Field inspection of a palaeontological discovery on the Gibson Bay Wind Farm, Eastern Cape Province. National Museum, Bloemfontein.

Deacon, H.J and V. B. Geleijnse, 1988 The Stratigraphy and Sedimentology of the Main Site Sequence, Klasies River, South Africa. The South African Archaeological Bulletin, Vol. 43, No. 147, pp. 5-14.

DEA&DP, 2005. Guidelines for Involving Specialists in EIA Processes.

De Klerk, W.J. 2010. Palaeontological Heritage Impact Assessment of the proposed wind farms in the coastal region of the Kouga Local Municipality near the villages of Oyster Bay and St Francis Bay. Assessment conducted in terms of Section 38 (8) of the National Heritage Resources Act (Act 25 of 1999). Prepared for: Arcus GIBB, Engineering & Science

Du Plessis, L. 2011. Visual Impact Assessment for the Proposed Happy Valley Wind Energy Facility on a site near Humansdorp, Eastern Cape Province. Prepared for Renewable Energy Investments South Africa, by MetroGIS (Pty) Ltd.

EC PHRA, Mokhanya, S. 2013. The HIA Review Comment for the Proposed Mining of Gravel on Portions 2 and 8 of The Farm Klein River No. 713, Kouga Local Municipality, and Mining of Shale on Portion 21 of The Farm Elandsjagt No. 687, Kouga Local Municipality, Humansdorp Division, Eastern Cape Province.

Gamtobakwa Khoisan Council, 2017. Letter addressed to Eastern Cape Heritage Consultants cc, dated 21 July 2017 with the subject: Draft Archaeological Desktop Study: Proposed Impofu Wind Farms and Grid.

Heritage Western Cape (HWC), 2007 (draft). Minimum Standards for Phase 1 Archaeological Impact Assessment (AIA) Reports.

Heritage Western Cape (HWC), 2016a. Guide For Minimum Standards For Archaeology And Palaeontology Reports Submitted To Heritage Western Cape.

Heritage Western Cape (HWC), 2016b. Guidelines for Heritage Impact Assessments required in terms of Section 38 of the National Heritage Resources Act (Act 25 of 1999)

Kaplan, J. 2016. Archaeological Impact Assessment: Proposed 66 kV Overhead Line Servitudes and Substations Jeffreys Bay, Eastern Cape.

Nilssen, P. 2003. Proposed St. Francis Golf Estate. Phase 1 Heritage Impact Assessment. Final Report.

Nilssen, P. 2010. St Francis Links - Golf Estate. Phase 2 Archaeological Mitigation. Preliminary report prepared for WBHO, and the South African Heritage Resources Agency (SAHRA permit No. 80/04/08/032/51)

Nilssen, P. 2013. Heritage / Archaeological Impact Assessment - Proposed Gibson Bay Wind Farm Grid Connection, Kou-Kamma and Kouga Local Municipalities, Humansdorp District, Eastern Cape Province

Nilssen, P. 2014. Final Revised Heritage / Archaeological Impact Assessment – Including Alternative 3. Proposed Gibson Bay Wind Farm Grid Connection, Kou - Kamma and Kouga Local Municipalities, Humansdorp District, Eastern Cape Province.

Nilssen, P. 2015. Archaeological Micro-Siting of Wind Turbine, Site Camp, Lay-down and Substation Localities. Oyster Bay Wind Farm, Kouga Local Municipality, Humansdorp District, Eastern Cape Province.

Nilssen, P. 2016. Final Report- Archaeological Monitoring at Gibson Bay Wind Farm, Eastern Cape Province For the period 22 April 2015 - 31 May 2016.

Nilssen, P. 2018a. Draft Report - Phase 1a Archaeological Impact Assessment, Scoping Phase, Proposed Impofu West Wind Farm, Kouga Local Municipalities, Sarah Baartman District Municipality, Eastern Cape Province.

Nilssen, P. 2018b. Draft Report - Phase 1a Archaeological Impact Assessment, Scoping Phase, Proposed Impofu East Wind Farm, Kouga Local Municipalities, Sarah Baartman District Municipality, Eastern Cape Province.

Nilssen, P. and Smith, P. 2015. Notification: Discovery and Rescue Collection of Fossil Bearing Deposit at Gibson Bay Wind Farm, Eastern Cape Province.

Nilssen, P.J. and K. van Ryneveld 2012. Phase 1b and Phase 2a Exploratory Archaeological Investigation of Shell Middens. Eastern Cape Provincial Heritage Resources Authority (ECPHRA) Permit – Permit Ref. No: 2/2/APM-Permit/12/10/001 The Development of the MetroWind Van Stadens Wind Energy Facility, Rietfontein 594 and Klein Rietfontein 476, Nelson Mandela Bay Municipality, Eastern Cape Province.

Patrick, M. 2012. Khoisan Heritage Resources Associated with the Thyspunt Transmission Lines Integration Project. Report Prepared for SiVest Environmental Consultancy.

Rubidge, B. 2010. Eskom Thyspunt Nuclear Integration project: Desktop Palaeontological Study.

SAHRA APM, 2007. Guidelines: Minimum Standards for Archaeological & Palaeontological Components of Impact Assessment Reports.

SAHRA APM, 2010. Review comments on the Environmental Impact Assessment for three proposed nuclear power station sites and associated infrastructure: Heritage Impact Assessment: Archaeological Component.

SAHRA APM, 2012. Compliance to SAHRA Minimum Standards for Phase 1 Archaeological Impact Assessments.

SAHRA, 2017. Minutes of the Heritage Impact Assessment Workshop Held on the 23 October 2017 from 09h00 -17h00, at The Castle Of Good Hope Boardroom, Cape Town.

SAHRA APM, 2018. Compliance to SAHRA Minimum Standards, SAHRIS Requirements and Section 38 of the NHRA.

UNESCO, 2008. Operational guidelines for the implementation of the World Heritage Convention, 2008.

Van Ryneveld, K. 2007. Phase 1 Archaeological Impact Assessment, the Hopewell Conservation Project, Greenbushes, Port Elizabeth, Eastern Cape, South Africa.

Van Ryneveld, K. 2010a. Cultural Heritage Impact Assessment: Establishment of a Commercial Wind Farm, Kouga Local Municipality, Eastern Cape, South Africa. Prepared for Arcus Gibb Engineering and Science and the South African Heritage Resources Agency – SAHRA, APM Unit.

Van Ryneveld, K. 2010b. Phase 1 Archaeological Impact Assessment; Development of the Khoedoeskloof Landfill Site, Uitenhage, Eastern Cape, South Africa.

Van Ryneveld, K. 2013. Phase 1b Archaeological Monitoring; The Melkhout – Oyster Bay Power Line: Phase 1b, Humansdorp District, Eastern Cape, South Africa.

Van Schalkwyk, J. 2010. Heritage Impact Assessment for the Eskom Thyspunt Transmission Lines Integration Project 400kV Electricity Transmission Lines, Grassridge to Thyspunt, Port Elizabeth Region, Eastern Cape Province.

Van Schalkwyk, L.O. 2009a. Heritage Impact Assessment of Thyspunt Nuclear 400kV Integration Project: Southern Corridor, Cape St Francis / Port Elizabeth, Eastern Cape Province, South Africa.

Van Schalkwyk, L.O. 2009b. Heritage Impact Assessment of Thyspunt Nuclear 400kV Integration Project: Northern Corridor, Cape St Francis / Uitenhage / Port Elizabeth, Eastern Cape Province, South Africa.

Wahl, E and van Schalkwyk, L. 2013. Phase 1 Archaeological Impact Assessment Report: Proposed 132 kV Power Line and Substation Infrastructure, Melkhout-Dieprivier, Kouga Local Municipality, Cacadu District, Eastern Cape Province, South Africa.

Webley, L. 2003. Maitland River Mouth Strategic Environmental Assessment – Phase 1 Heritage Impact Assessment.

Webley, L. 2006. Phase 1 Heritage Impact Assessment – Portion 2 of the Farm Osbosch 707, St Francis Bay.

9. Figures and Plates (on following pages)

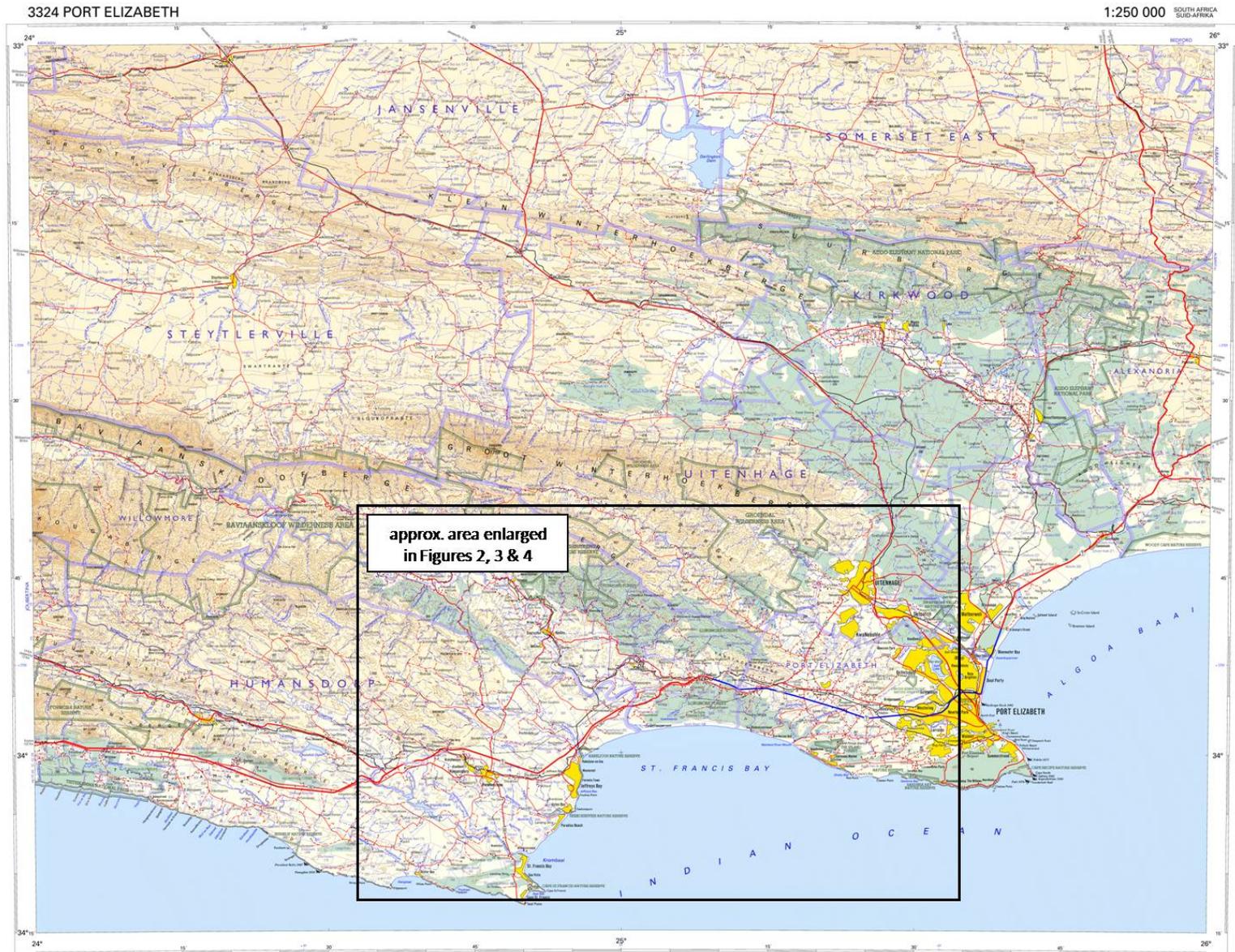


Figure 1. General location of the larger study area for the Impofu WEFs Grid Connection, west of Port Elizabeth, Eastern Cape Province. Map – 3324 Port Elizabeth 1:250 000 - courtesy of The Chief Directorate, Surveys & Mapping, Mowbray.

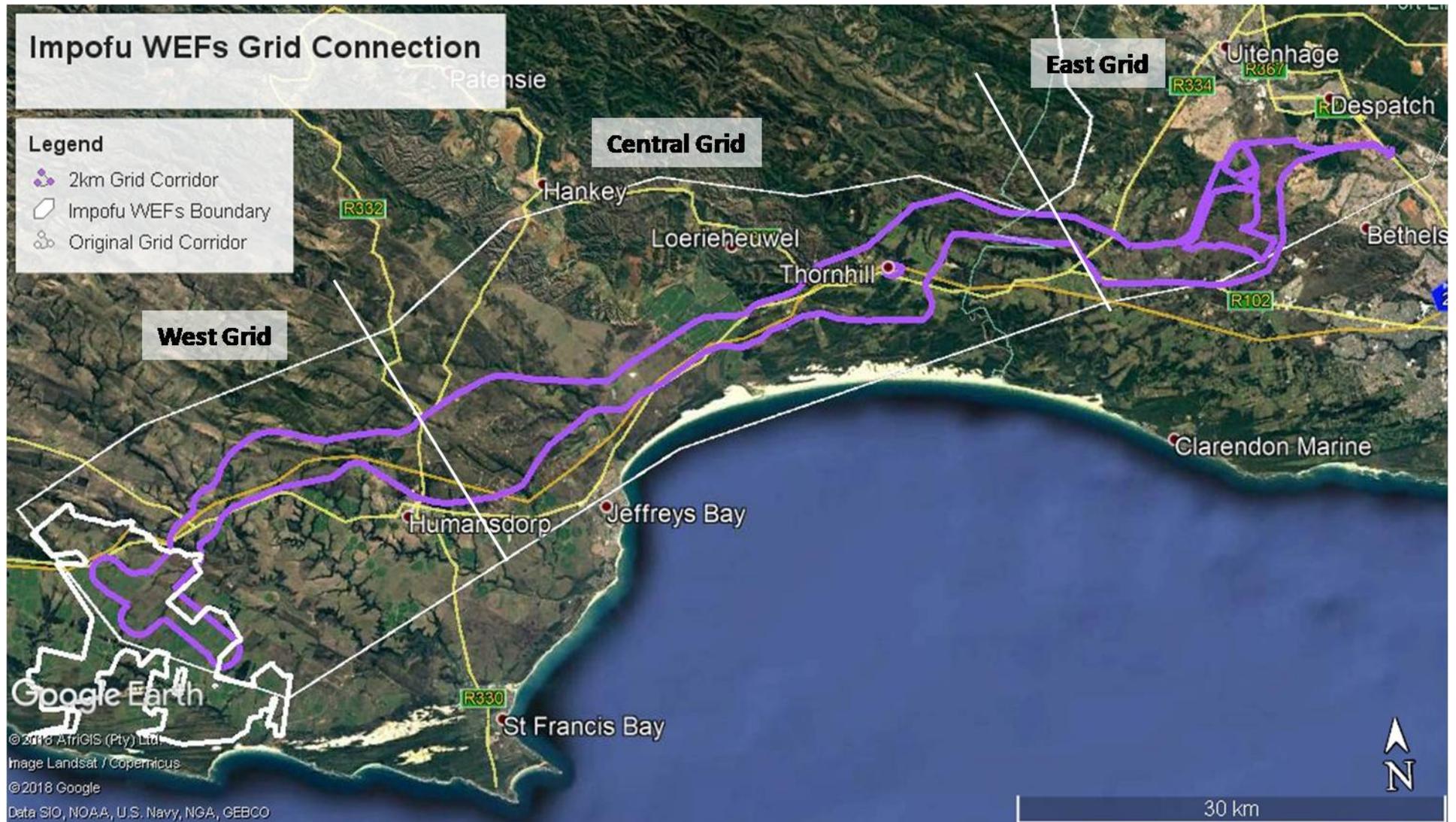


Figure 2. Approximate area enlarged from Figure 1 showing the Impofu Wind Farms boundary (white polygon at lower left of image), the original grid corridor (large white polygon) and the 2 km (large purple polygon) grid corridor stretching from west to east. Courtesy of Red Cap, Aurecon and Google Earth 2018.

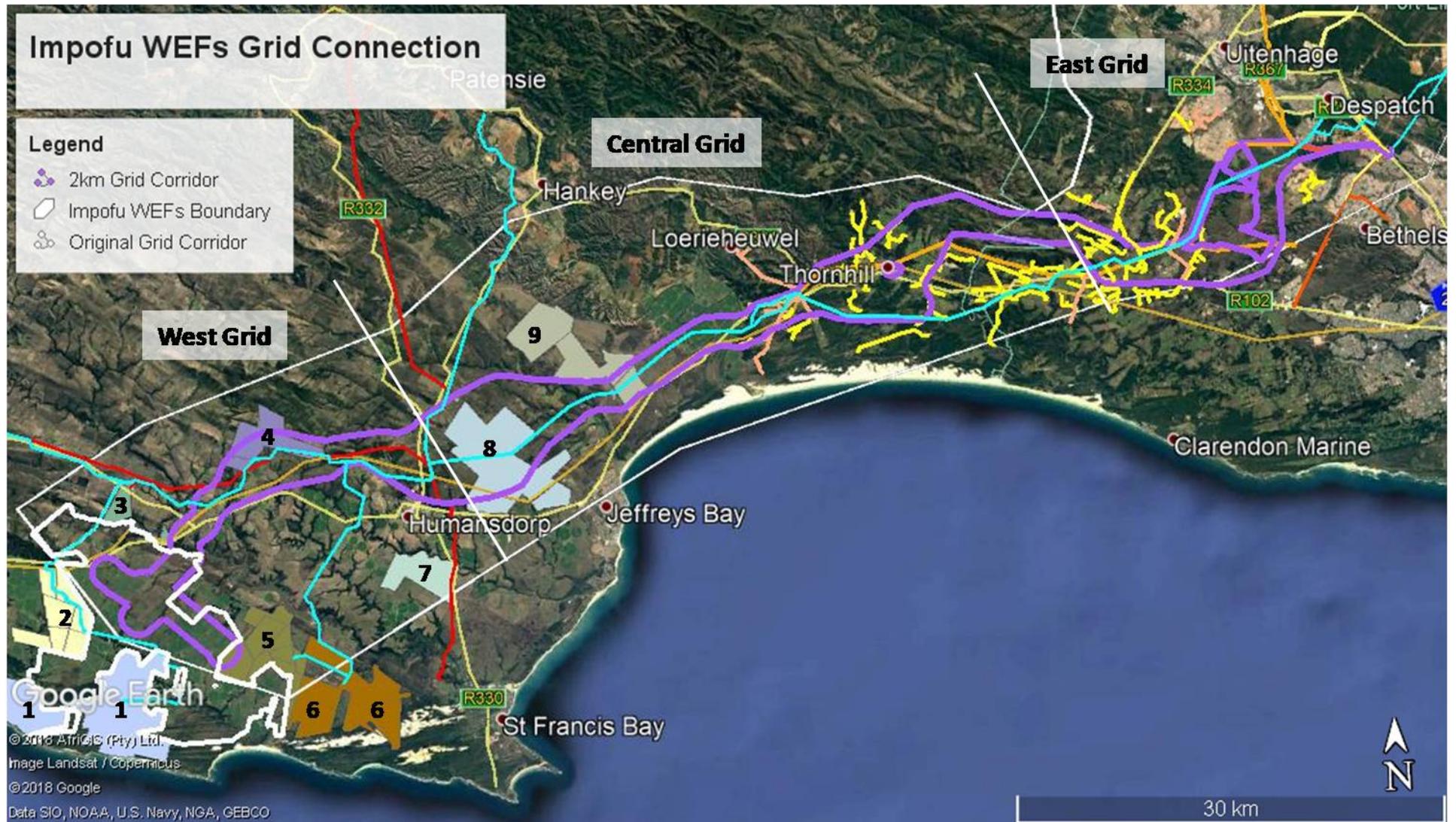


Figure 3. Shaded and numbered polygons represent existing, approved, lapsed and in application Wind Farms while coloured lines represent existing electrical infrastructure in the immediate vicinity and within the grid assessment corridor (purple polygon). 1 = Gibson Bay, 2 = Tsitsikamma Community, 3 = Deep River (lapsed), 4 = Happy Valley (lapsed), 5 = Oyster Bay, 6 = Kouga, 7 = Banna Ba Pifhu, 8 = Jeffery's Bay and 9 = Ubuntu. Courtesy of Red Cap, Aurecon and Google Earth 2018.

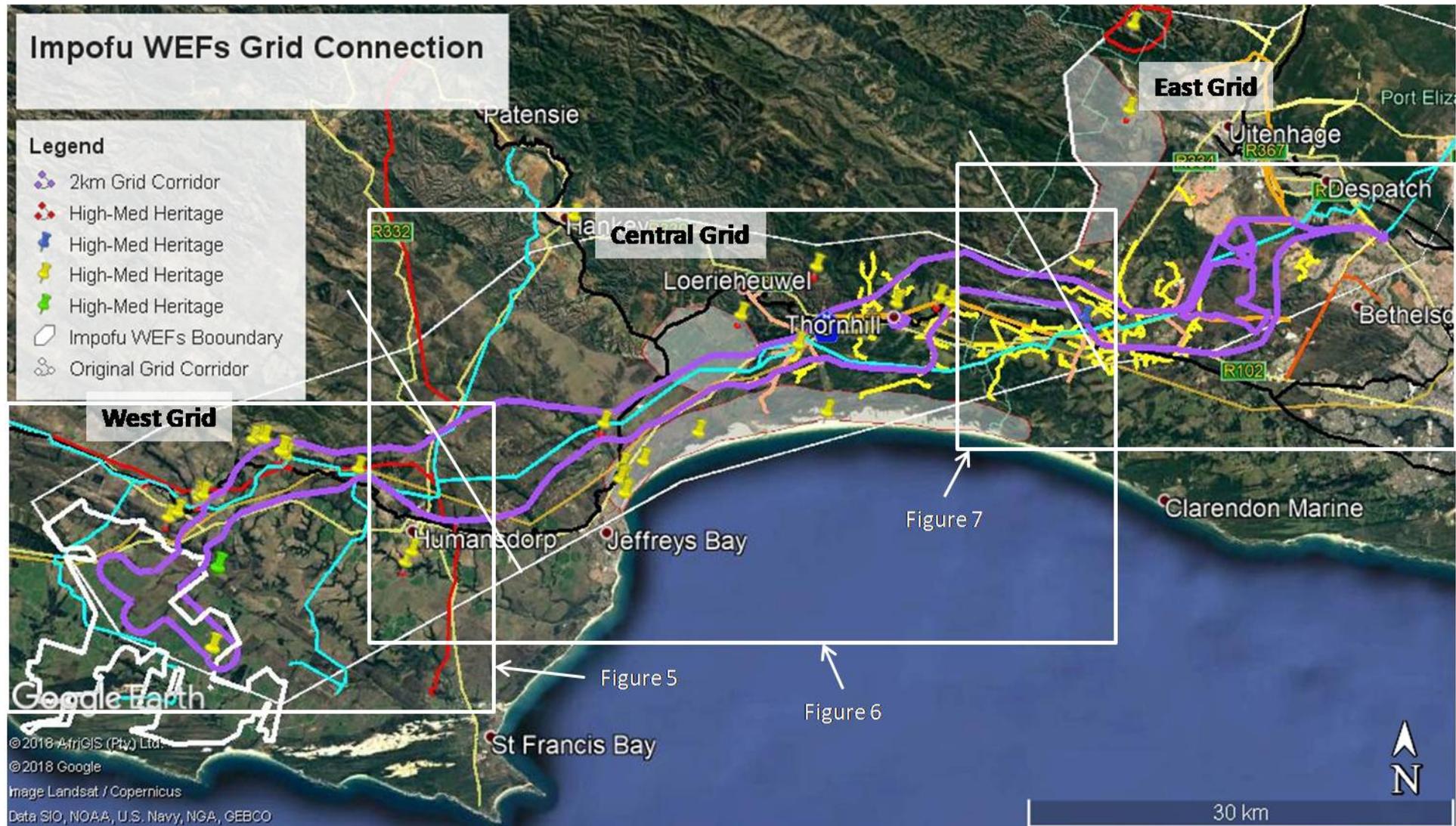


Figure 4. Yellow, green and blue markers with associated red polygons represent heritage resources of medium to high sensitivity that must be avoided (Nilssen field work and Binneman & Reichert 2017). Some of the heritage sensitive areas are represented by shaded polygons. Black lines represent railway lines including the historic narrow gauge railway line running through sections of the grid assessment corridors. The shaded polygon along the coast in the middle of the image represents an archaeologically sensitive no-go zone whose boundaries are rough. Courtesy of Google Earth, Red Cap and Aurecon.

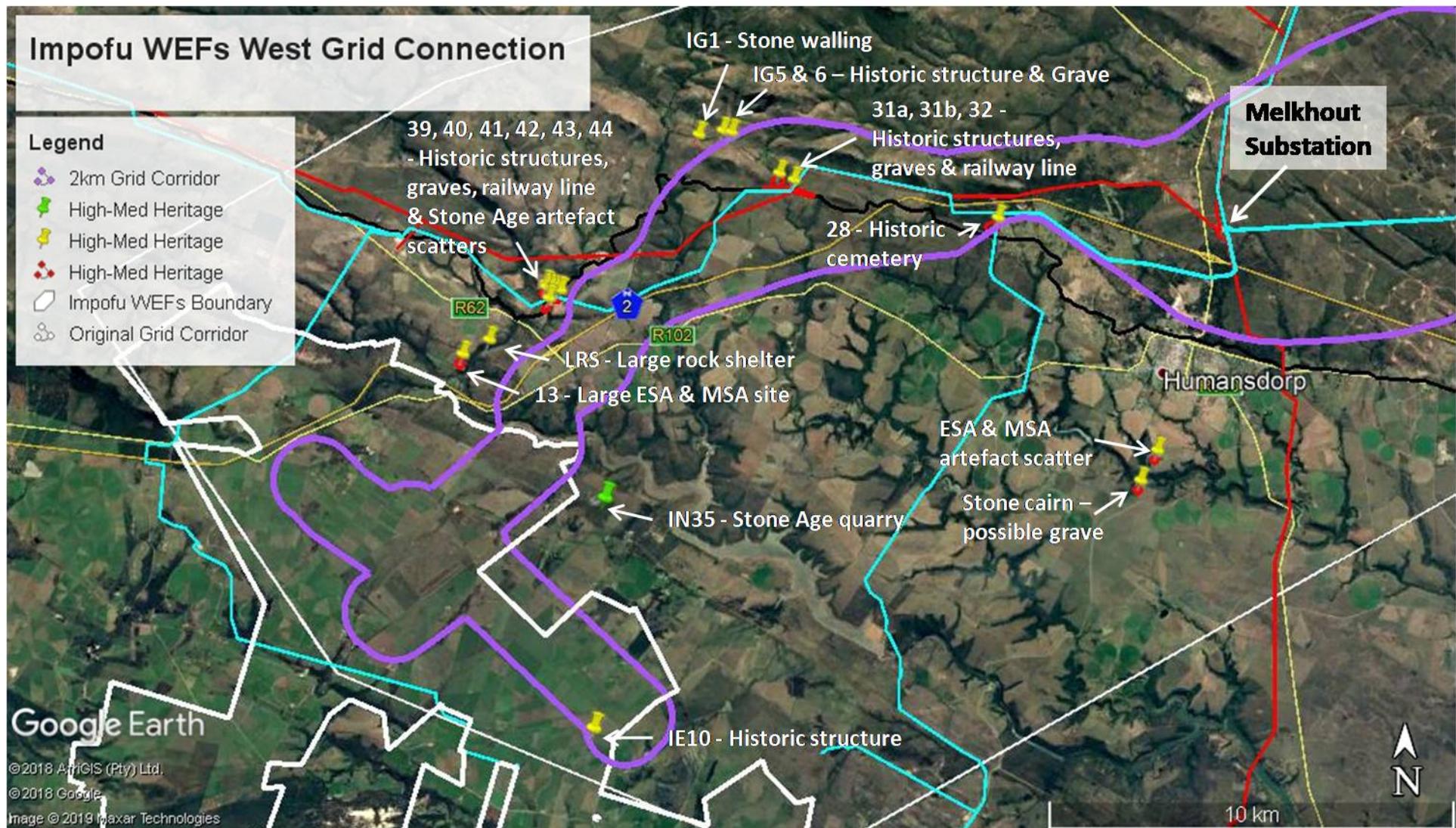


Figure 5. Area enlarged from Figure 4 showing the known heritage resources of medium to high sensitivity (labelled markers) that should be avoided by the overhead power line and associated infrastructure. Archaeological resources include historic structures, stone walling, graves, cemeteries, narrow gauge railway line (black lines), bridge, and Stone Age sites and artefact scatters of mainly ESA & MSA origin (Nilssen field work, Binneman & Reichert 2017, Binneman 2010b). Courtesy of Red Cap, Aurecon and Google Earth 2018.

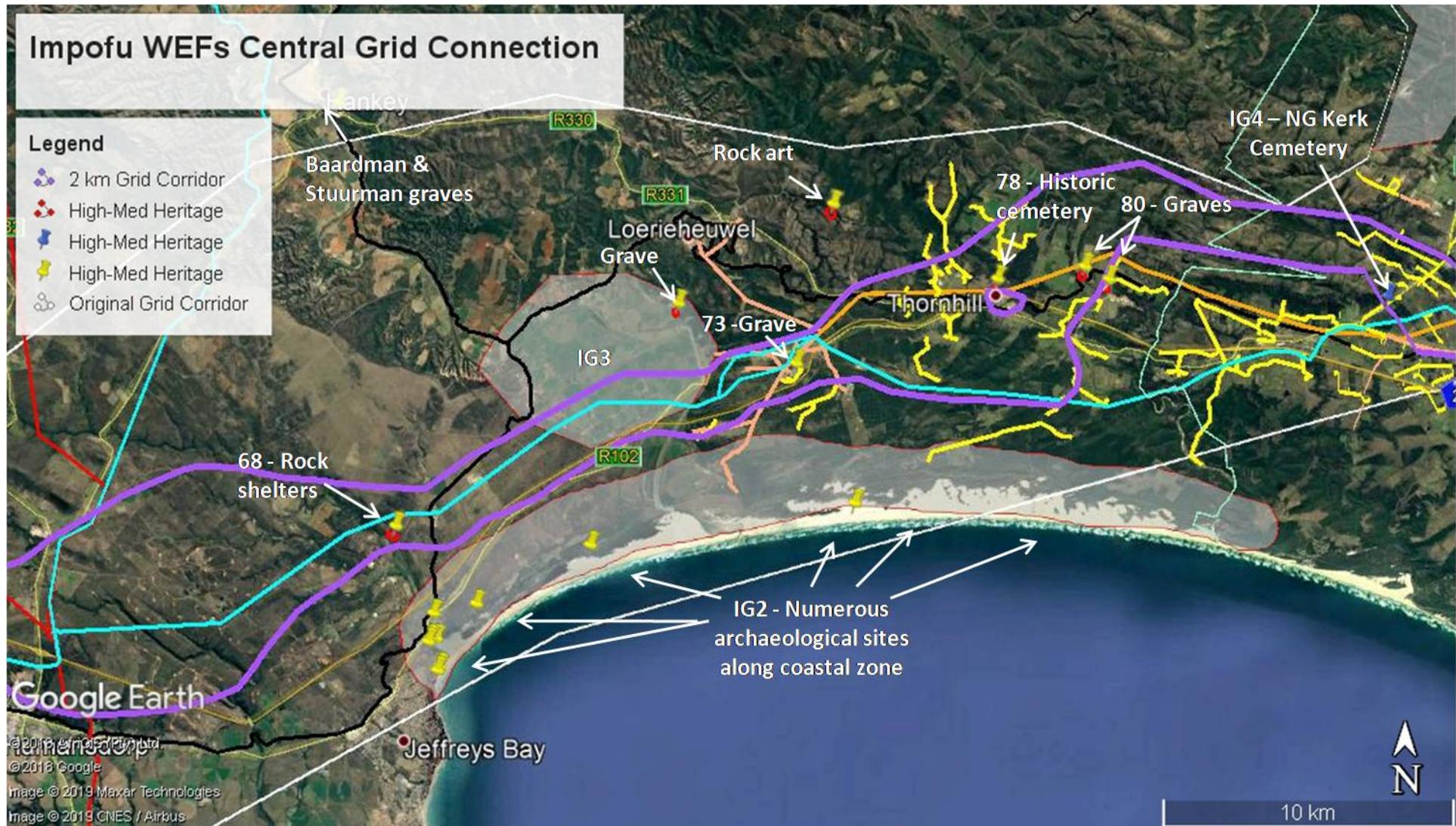


Figure 6. Area enlarged from Figure 4, showing the known heritage resources of medium to high sensitivity (labelled markers) that should be avoided by the overhead power line and associated infrastructure. Archaeological resources include historic structures, graves, cemeteries, railway line (black lines) and Stone Age sites, rock shelters, shell middens, artefact scatters and rock art (Nilssen field work and Binneman & Reichert 2017). Courtesy of Red Cap, Aurecon and Google Earth 2018.

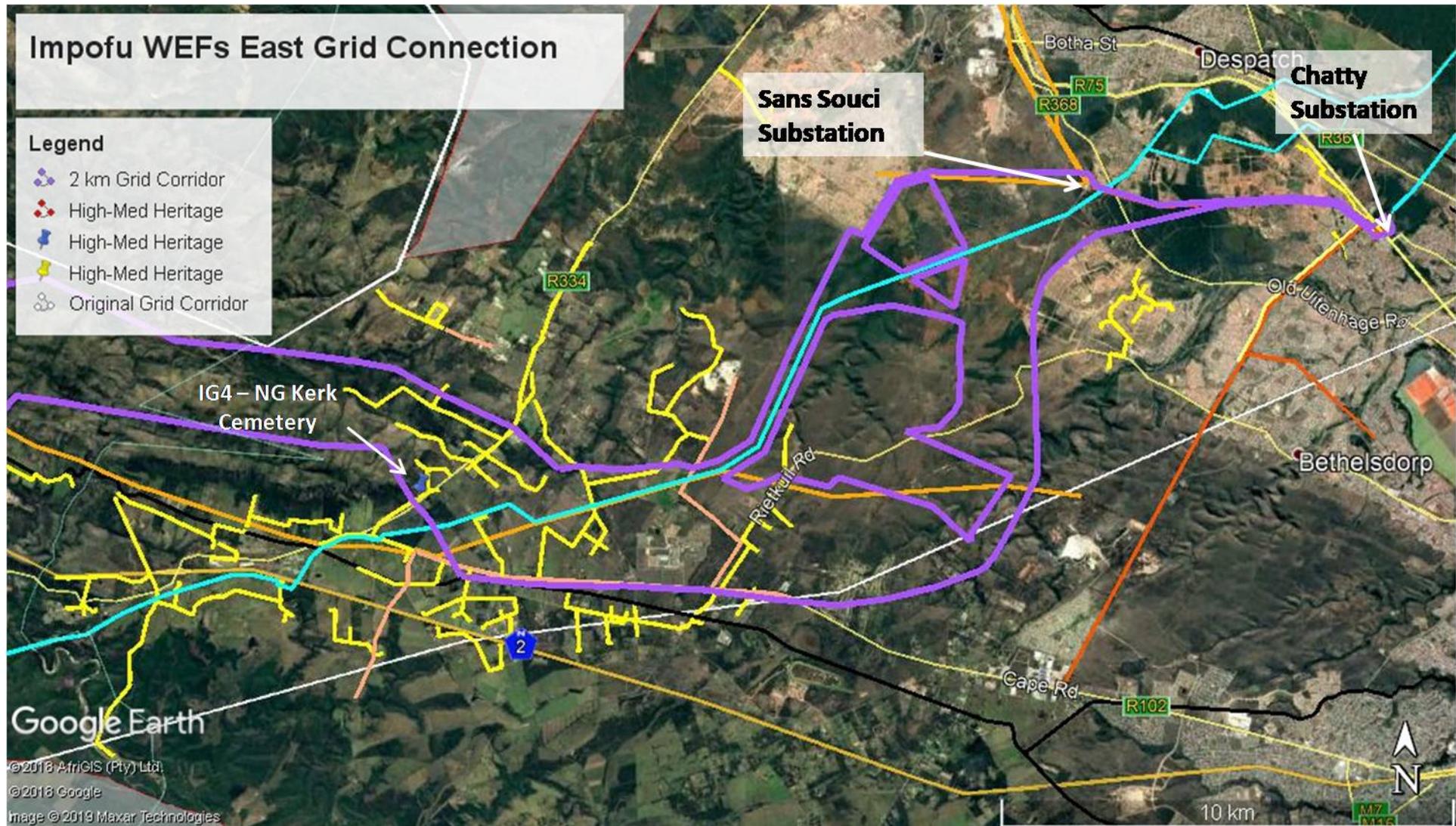


Figure 7. Area enlarged from Figure 4 showing existing electrical infrastructure including overhead power lines (coloured lines), the Sans Souci and Chatty Substations, railway line (black lines) and existing human-related disturbances / developments associated with agricultural, rural and urban settlements. This is the most transformed stretch of the 2 km grid connection corridor and the only known heritage resource of high significance is the NG Kerk Cemetery (IG4) that must be avoided (Nilssen field work and Binneman & Reichert 2017). Courtesy of Red Cap, Aurecon and Google Earth 2018.



Plate 1. Examples of the receiving environment showing topography, vegetation cover and existing developments. Impofu dam (top L), power lines (top R), narrow gauge railway line (bottom L) and historic ruins and structures (bottom R).



Plate 2. Examples of the affected environment showing topography, vegetation cover, historic structures, power lines and agricultural lands.



Plate 3. Examples of the affected environment showing historic structures, Melkhout substation (topR), topography, vegetation cover and view towards PE and Despatch (bottom R).



Plate 4. Examples of the environment showing the Chatty substation (top L), pollution near PE, and the stretch of corridor running through the MTO state forestry (bottom).



Plate 5. Examples of the environment showing the Gamtoos flood plain (top) with existing pylons (white ellipses), view toward Jeffreys Bay from R102 (bottom L) and view toward St Francis from the NE.

IN35



Plate 6. Stone Age quarrying of quartzite outcrop. Fingers pointing to impact points and flake scars. GPS unit is 10cm long.



Plate 7. Non conservation worthy historic period structure with mixture of clay and cast cement bricks, not directly impacted by proposed development.

IG1



Plate 8. Historic period stone walling (IG1).

IG5



Plate 9. Historic period structure (IG5).



Plate 10. Historic period graves (IG6).

IG4

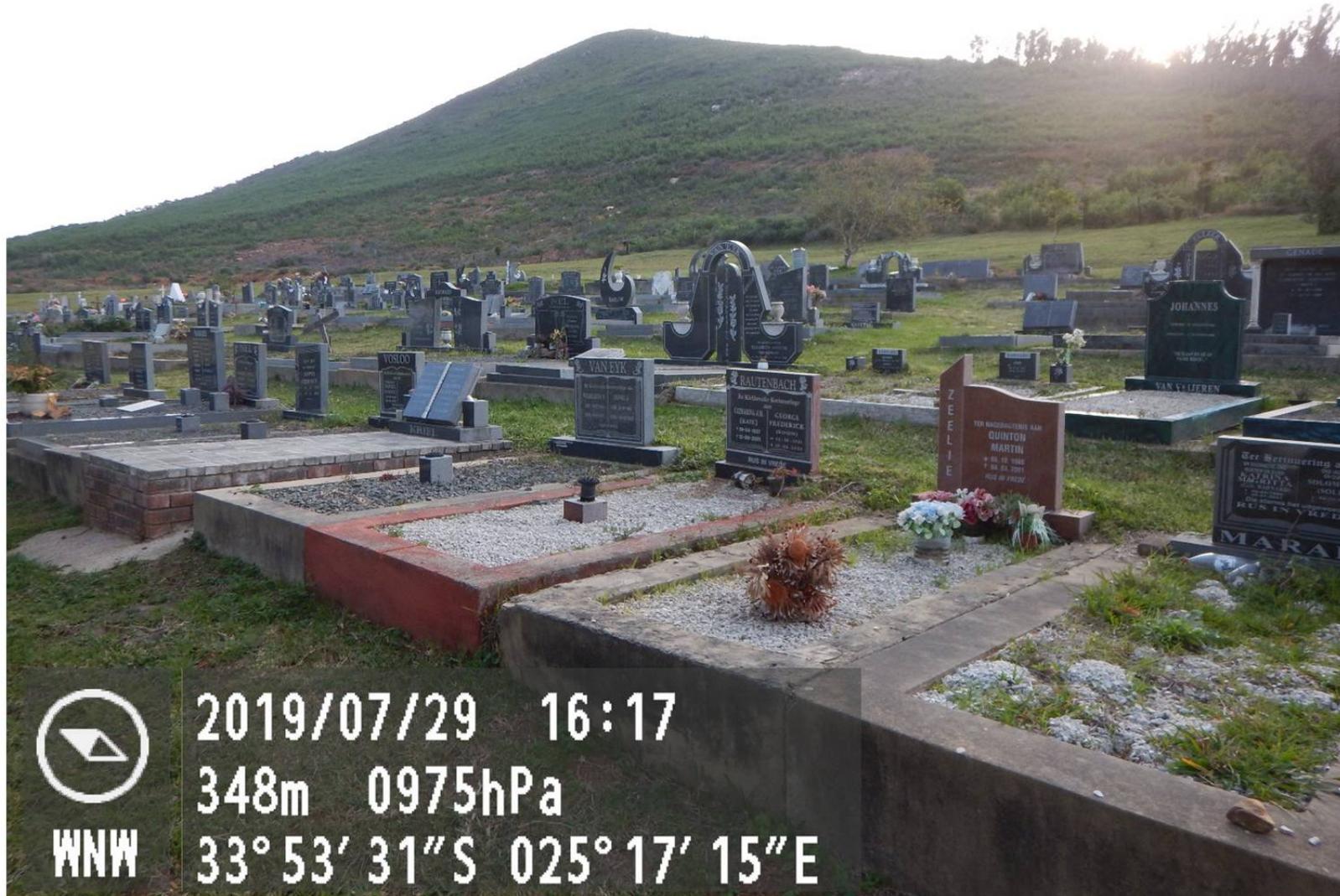


Plate 11. Historic period NG Kerk cemetery (IG4).

Appendix A

Legislation regarding the general protection of heritage resources taken from the National Heritage Resources Act (Act 25 of 1999)

Provisional protection

29. (1) SAHRA, or a provincial heritage resources authority, may, subject to subsection (4), by notice in the Gazette or the Provincial Gazette, as the case may be—

(a) provisionally protect for a maximum period of two years any—

(i) protected area;

(ii) heritage resource, the conservation of which it considers to be threatened and which threat it believes can be alleviated by negotiation and consultation; or

(iii) heritage resource, the protection of which SAHRA or the provincial heritage resources authority wishes to investigate in terms of this Act; and

(b) withdraw any notice published under paragraph (a).

(2) A local authority may, subject to subsection (4), by notice in the Provincial Gazette—

(a) provisionally protect for a maximum period of three months any place which it considers to be conservation-worthy, the conservation of which the local authority considers to be threatened and which threat it believes can be alleviated by negotiation and consultation; and

(b) withdraw any notice published under paragraph (a): Provided that it notifies the provincial heritage resources authority within seven days of such provisional protection.

(3) A provincial heritage resources authority may, by notice in the Provincial Gazette, revoke a provisional protection by a local authority under subsection (2) or provisionally protect a place concerned in accordance with subsection (1).

(4) A heritage resources authority or a local authority may not provisionally protect any heritage resource unless it has notified the owner of the resource in writing of the proposed provisional protection.

(5) A heritage resource shall be deemed to be provisionally protected for 30 days from the date of service of a notice under subsection (4) or until the notice is withdrawn or the resource is provisionally protected by notice in the Gazette or the Provincial Gazette, whichever is the shorter period.

(6) A heritage authority or a local authority may at any time withdraw a notice which it has issued under subsection (4).

(7) SAHRA shall inform the relevant provincial heritage authority and local authority within 30 days of the publication or withdrawal of a notice under subsection (1).

(8) A provincial heritage resources authority shall inform the relevant local authority within 30 days of the publication or withdrawal of a notice under subsection (1).

(9) A local authority shall inform the provincial heritage authority of the withdrawal of a notice under subsection (2)(b).

(10) No person may damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of a provisionally protected place or object without a permit issued by a heritage resources authority or local authority responsible for the provisional protection.

Legislation relevant to Heritage Areas taken from the National Heritage Resources Act (Act 25 of 1999)

Heritage areas

31. (1) A planning authority must at the time of revision of a town or regional planning scheme, or the compilation or revision of a spatial plan, or at the initiative of the provincial heritage resources authority where in the opinion of the provincial heritage resources authority the need exists, investigate the need for the designation of heritage areas to protect any place of environmental or cultural interest.

(2) Where the provincial heritage resources authority is of the opinion that the need exists to protect a place of environmental or cultural interest as a heritage area, it may request a planning authority to investigate its designation in accordance with proposals submitted by the provincial heritage resources authority with its request. The planning authority must inform the provincial heritage resources authority within 60 days of receipt of such a request whether it is willing or able to comply with the request.

(3) Where the planning authority informs the provincial heritage resources authority that it is willing and able, the provincial heritage resources authority must assist the planning authority to investigate the designation of the place as a heritage area.

(4) Where the planning authority does not so inform the provincial heritage resources authority, or informs the provincial heritage resources authority that it is not so willing and able, the provincial heritage resources authority may investigate the designation of the place as a heritage area and, with the approval of the MEC, designate such place to be a heritage area by notice in the Provincial Gazette.

(5) A local authority may, by notice in the Provincial Gazette, designate any area or land to be a heritage area on the grounds of its environmental or cultural interest or the presence of heritage resources, provided that prior to such designation it shall consult—

(a) the provincial heritage resources authority; and

(b) owners of property in the area and any affected community, regarding inter alia the provisions to be established under subsection (7) for the protection of the area.

(6) The MEC may, after consultation with the MEC responsible for local government, publish regulations setting out the process of consultation referred to in subsection (5).

(7) A local authority must provide for the protection of a heritage area through the provisions of its planning scheme or by-laws under this Act, provided that any such protective provisions shall be jointly approved by the provincial heritage resources authority, the provincial planning authority and the local authority, and provided further that—

(a) the special consent of the local authority shall be required for any alteration or development affecting a heritage area;

(b) in assessing an application under paragraph (a) the local authority must consider the significance of the area and how this could be affected by the proposed alteration or development; and

(c) in the event of any alteration or development being undertaken in a heritage area without the consent of the local authority, it shall have the power to require the owner to stop such work instantly and restore the site to its previous condition within a specified period. If the owner fails to comply with the requirements of the local authority, the local authority shall have the right to carry out such restoration work itself and recover the cost thereof from the owner.

(8) A local authority may erect signage indicating its status at or near a heritage area.

(9) Particular places within a heritage area may, in addition to the general provisions governing the area, be afforded further protection in terms of this Act or other heritage legislation.

Legislation relevant to archaeology and palaeontology taken from the National Heritage Resources Act (Act 25 of 1999)

Archaeology, palaeontology and meteorites

35. (1) Subject to the provisions of section 8, the protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority: Provided that the protection of any wreck in the territorial waters and the maritime cultural zone shall be the responsibility of SAHRA.

(2) Subject to the provisions of subsection (8)(a), all archaeological objects, palaeontological material and meteorites are the property of the State. The responsible heritage authority must, on behalf of the State, at its discretion ensure that such objects are lodged with a museum or other public institution that has a collection policy acceptable to the heritage resources authority and may in so doing establish such terms and conditions as it sees fit for the conservation of such objects.

(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

(4) No person may, without a permit issued by the responsible heritage resources authority—

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or

(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

(5) When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is under way, and where no application for a permit has been submitted and no heritage resources management procedure in terms of section 38 has been followed, it may—

(a) serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order;

(b) carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary;

(c) if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph (a) to apply for a permit as required in subsection (4); and

(d) recover the costs of such investigation from the owner or occupier of the land on which it is believed an archaeological or palaeontological site is located or from the person proposing to undertake the development if no application for a permit is received within two weeks of the order being served.

(6) The responsible heritage resources authority may, after consultation with the owner of the land on which an archaeological or palaeontological site or a meteorite is situated, serve a notice on the owner or any other controlling authority, to prevent activities within a specified distance from such site or meteorite.

(7) (a) Within a period of two years from the commencement of this Act, any person in possession of any archaeological or palaeontological material or object or any meteorite which was acquired other than in terms of a permit issued in terms of this Act, equivalent provincial legislation or the National Monuments Act, 1969 (Act No. 28 of 1969), must lodge with the responsible heritage resources authority lists of such objects and other information prescribed by that authority. Any such object which is not listed within the prescribed period shall be deemed to have been recovered after the date on which this Act came into effect.

(b) Paragraph (a) does not apply to any public museum or university.

(c) The responsible authority may at its discretion, by notice in the Gazette or the Provincial Gazette, as the case may be, exempt any institution from the requirements of paragraph (a) subject to such conditions as may be specified in the notice, and may by similar notice withdraw or amend such exemption.

(8) An object or collection listed under subsection (7)—

(a) remains in the ownership of the possessor for the duration of his or her lifetime, and SAHRA must be notified who the successor is; and

(b) must be regularly monitored in accordance with regulations by the responsible heritage authority.

Legislation relevant to burial grounds and graves taken from the National Heritage Resources Act (Act 25 of 1999)

Burial grounds and graves

36. (1) Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit.

(2) SAHRA must identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with the grave referred to in subsection (1), and must maintain such memorials.

(3) (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.

(5) SAHRA or a provincial heritage resources authority may not issue a permit for any activity under subsection (3)(b) unless it is satisfied that the applicant has, in accordance with regulations made by the responsible heritage resources authority—

(a) made a concerted effort to contact and consult communities and individuals who by tradition have an interest in such grave or burial ground; and

(b) reached agreements with such communities and individuals regarding the future of such grave or burial ground.

(6) Subject to the provision of any other law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority—

(a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and

(b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangements as it deems fit.

(7) (a) SAHRA must, over a period of five years from the commencement of this Act, submit to the Minister for his or her approval lists of graves and burial grounds of persons connected with the liberation struggle and who died in exile or as a result of the action of State security forces or agents provocateur and which, after a process of public consultation, it believes should be included among those protected under this section.

(b) The Minister must publish such lists as he or she approves in the Gazette.

(8) Subject to section 56(2), SAHRA has the power, with respect to the graves of victims of conflict outside the Republic, to perform any function of a provincial heritage resources authority in terms of this section.

(9) SAHRA must assist other State Departments in identifying graves in a foreign country of victims of conflict connected with the liberation struggle and, following negotiations with the next of kin, or relevant authorities, it may re-inter the remains of that person in a prominent place in the capital of the Republic.

Legislation relevant to the proposed activity under consideration taken from the National Heritage Resources Act (Act 25 of 1999)

Heritage resources management

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50 m in length;

(c) any development or other activity which will change the character of a site—

(i) exceeding 5 000 m² in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m² in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

(2) The responsible heritage resources authority must, within 14 days of receipt of a notification in terms of subsection (1)—

(a) if there is reason to believe that heritage resources will be affected by such development, notify the person who intends to undertake the development to submit an impact assessment report. Such report must be compiled at the cost of the person proposing the development, by a person or persons approved by the responsible heritage resources authority with relevant qualifications and experience and professional standing in heritage resources management; or

(b) notify the person concerned that this section does not apply.

(3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection

(2)(a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;

(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;

(c) an assessment of the impact of the development on such heritage resources;

(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and

(g) plans for mitigation of any adverse effects during and after the completion of the proposed development.

(4) The report must be considered timeously by the responsible heritage resources authority which must, after consultation with the person proposing the development, decide—

(a) whether or not the development may proceed;

(b) any limitations or conditions to be applied to the development;

(c) what general protections in terms of this Act apply, and what formal protections may be applied, to such heritage resources;

(d) whether compensatory action is required in respect of any heritage resources damaged or destroyed as a result of the development; and

(e) whether the appointment of specialists is required as a condition of approval of the proposal.