

**Phase 1 Heritage Impact Assessment for the proposed  
construction of a ±850m long, 11kV overhead power  
line and a Switchyard in Bethlehem, Free State  
Province.**

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## Summary

A Phase 1 Heritage Impact Assessment was carried out for the proposed construction of a ±850m long, 11kV overhead power line and a switchyard in Bethlehem, Free State Province. A pedestrian survey of the footprint revealed severely degraded terrain resulting from modern human activity (mostly pedestrian traffic and littering). There is no above-ground of potential fossil exposures or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There is also no above-ground evidence of graves, prehistoric structures or historically significant building structures older than 60 years within the study area. The area can be considered as of low palaeontological significance with regards to the superficial residual soils capping palaeontologically insignificant dolerite in places (Quaternary overburden). This is mainly due to a lack of suitable alluvial/fluvial deposits along the footprint. In my opinion this development will not negatively affect palaeontological heritage. It is recommended that the proposed development is exempt from a Phase 1 Palaeontological Impact Assessment. In accordance with the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) there is no above-ground evidence of building structures older than 60 years or material of cultural significance or archaeological and palaeontological sites within the demarcated area. The terrain in general is regarded as of low archaeological significance and is assigned a rating of Generally Protected C (GP.C). As far as the archaeological and palaeontological heritage is concerned, the proposed development may proceed with no additional heritage assessments necessary, provided that all excavation activities are restricted to within the boundaries of the development footprint.

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## Introduction

A Phase 1 Heritage Impact Assessment was carried out for the proposed construction of a ±850m long, 11kV overhead power line and a switchyard in Bethlehem, Free State Province (**Fig. 1**). The survey is required as a prerequisite for new development in terms of the National Heritage Resources Act 25 of 1999. In terms of Section 38 of the National Heritage Resources Act 25 of 1999, the survey is required as a prerequisite for any development that will change the character of a site exceeding 5 000 m<sup>2</sup> in extent. The task involved identification of possible archaeological and paleontological sites or occurrences in the proposed zone, an assessment of their significance, possible impact by the proposed development and recommendations for mitigation where relevant.

In this regard, categories relevant to the proposed development are listed in Section 34 (1), Section 35 (4), Section 36 (3) and Section 38 (1) of the NHR Act and are as follows:

34. (1) No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

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

authority—

- 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;

36 (3) 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.

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

- The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- The construction of a bridge or similar structure exceeding 50m in length;
- Any development or other activity which will change the character of the site
  - a) exceeding 5000 m<sup>2</sup> in extent; or
  - b) involving three or more existing erven or subdivisions thereof; or
  - c) involving three or more subdivisions thereof which have been consolidated within the past five years;
- The rezoning of a site exceeding 10 000 m<sup>2</sup>; or
- Any other category of development provided for in regulations by the South African Heritage Resources Agency (SAHRA).

## Terms of Reference

The task involved the following:

- Identify and map possible heritage sites and occurrences using available resources.
- Determine and assess the potential impacts of the proposed development on potential heritage resources;
- Recommend mitigation measures to minimize potential impacts associated with the proposed development.

## Methodology

The heritage significance of the affected area was evaluated on the basis of existing field data, database information and published literature. This was followed by a field assessment by means of a pedestrian survey. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera were used for recording purposes. Maps and aerial photographs (incl. Google Earth) were consulted and integrated with data acquired during the on-site inspection.

## Field Rating

Site significance classification standards prescribed by SAHRA (2005) were used to indicate overall significance and mitigation procedures where relevant (**Table 2**).

## **Site Information**

At present, the Bethlehem Hydro (PTY) Ltd hydroelectric plant is directly connected via a dedicated line to the Dihlabeng/Bethlehem Municipality's Panorama substation in Bethlehem, FS Province. However, Bethlehem Hydro (PTY) Ltd proposes the construction of a  $\pm 850\text{m}$  11kV overhead power line and a switchyard in Bethlehem, in order to connect directly to the Eskom grid (**Fig. 2**). This will involve the following:

- A new switchyard area with a development footprint of  $2000\text{m}^2$  that will accommodate two buildings covering an area of approximately  $20\text{m}^2$  metres each (**Fig. 3**);
- An access road of approximately 1 km in length and 6m in breadth.

1 to 50 000 topographical map: 2828 AB Bethlehem

1: 125 000 geological map Bethlehem and Kestell Area

General coordinates (**Fig. 2**):

Vantage Point A) 28°13'11.59"S 28°19'32.97"E

Vantage Point B) 28°13'29.02"S 28°19'57.25"E

### Geology

The area around Bethlehem is underlain by palaeontologically sensitive sedimentary rocks of the Molteno, Elliot and Clarens Formations (Stormberg Group), with mudstones and sandstones of the Tarkastad Subgroup (Beaufort Group), mostly exposed to the east of the town. These formations are generally horizontal and in places have been intruded by palaeontologically insignificant dolerite sills and dykes, which form long interlocking ridges. The dolerite intrusions coincide with the wide-scale volcanism and outpouring of basaltic lava that covered virtually the whole of southern Africa during the early Jurassic period.

### **Background**

According to the SAHRIS palaeosensitivity map and 1:250 000 geological map 2828 Harrismith, as well as the 1: 125 000 geological map of Bethlehem and Kestell Area the proposed power line and switchyard footprint are underlain by palaeontologically insignificant dolerite intrusions (**Fig. 4**).

The South African central plateau is distinctive in that it supported Stone Age people over thousands of years, who were also prolific makers of stone tools until relatively recent times. This can be seen in the high density of Stone Age archaeological traces visible on the landscape today. The range of archaeological sites encountered in the Free State is extensive, in terms of both typology and chronology. This include Early Stone Age bifaces, and retouched blades and trimmed points from the Middle Stone Age to the microlithic Wilton and Smithfield Complexes from the Holocene.

Surface scatters of Later Stone Age and Middle Stone Age artifacts are frequent archaeological components along erosional gullies (dongas) of rivers and streams in the region. The incidence of surface scatters usually decreases away from localized areas such as riverine sites and dolerite-shale contact zones. Away from riverine contexts, Stone Age artifacts generally occur as contextually derived individual finds in the open veld. Several Later Stone Age sites have been identified near Bethlehem including the

Saulspoort, Poortjie and Trekpad rockshelters. In addition to these shelters, several rock art localities, containing depictions of human figures, have been recorded in the Witteberge southeast of Paul Roux. A variety of stone dagga pipes have been collected in the region, including engraved sandstone and mudstone pipes, as well as a number made of baked clay.

The archaeological footprint in the region is primarily dominated by Late Iron Age stone wall complexes. Stone enclosures found on and around dolerite koppies along the river valley between Rosendal and Bethlehem, exhibit telltale signs of basic structural units including huts, large enclosures, and pieces of walling and stone circles related to Late Iron Age settlements in the area. These sites were occupied from as early as the sixteenth and seventeenth centuries and represent a system that can be broadly attributed to groups ancestral to the Sotho-speaking people of today. Iron Age settlements have been recorded previously on several farms in the region.

### **Field Assessment**

A pedestrian survey of the footprint revealed severely degraded terrain resulting from modern human activity (mostly pedestrian traffic and littering) (**Fig. 3, 5 - 7**). There is no above-ground of potential fossil exposures or *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There is also no above-ground evidence of graves, prehistoric structures or historically significant building structures older than 60 years within the study area.

### **Impact Statement & Recommendation**

A pedestrian survey of the footprint indicates that the area can be considered as of low palaeontological significance with regards to the superficial residual soils capping the dolerite in places (Quaternary overburden). This is mainly due to a lack of suitable alluvial/fluvial deposits along the footprint. In my opinion this development will not negatively affect palaeontological heritage. It is recommended that the proposed development is exempt from a Phase 1 Palaeontological Impact Assessment. In accordance with the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) there is no above-ground evidence of building structures older than 60 years or material of cultural significance or archaeological and palaeontological sites within the demarcated area. The terrain in general is regarded as of low archaeological significance and is assigned a rating of

Generally Protected C (GP.C) (**Table 2**). As far as the archaeological and palaeontological heritage is concerned, the proposed development may proceed with no additional heritage assessments necessary, provided that all excavation activities are restricted to within the boundaries of the development footprint.

## References

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## DECLARATION OF INDEPENDENCE

I, Lloyd Rossouw, declare that I act as an independent specialist consultant. I do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference and have no interest in secondary or downstream developments as a result of the authorization of this project.

Yours truly,



07 /10 / 2018



**Table 1.** Summary of Impacts.

<b>Geological Unit</b>	<b>Rock types and Age</b>	<b>Potential Palaeontological / Archaeological heritage</b>	<b>Archaeological / Palaeontological Significance</b>	<b>Impact by Development</b>	<b>Heritage potential at the site</b>
Regolith	Alluvium, residual soils (Superficial deposits)  Quaternary to Recent	Large vertebrate skeletal remains;  freshwater molluscs,  coprolites, microfossils  Stone tools  Rock art  Prehistoric structures (IA; Stone Age open sites)  Historical structures	High	none	Low
Karoo Dolerite ( <i>Jd</i> )	Intrusive igneous bedrock.  Jurassic	None	Low	none	Low
Adelaide Subgroup ( <i>Pa</i> )	Fluvial and lacustrine mudstones and sandstones.  Late Permian	<i>Dicynodon</i> Assemblage Zone  Therapsids,  amphibians, fish, amniotes, invertebrates, plant fossils, trace fossils.	High	none	Low

**Table 2.** Field rating categories as prescribed by SAHRA.

<b>Field Rating</b>	<b>Grade</b>	<b>Significance</b>	<b>Mitigation</b>
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP.A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

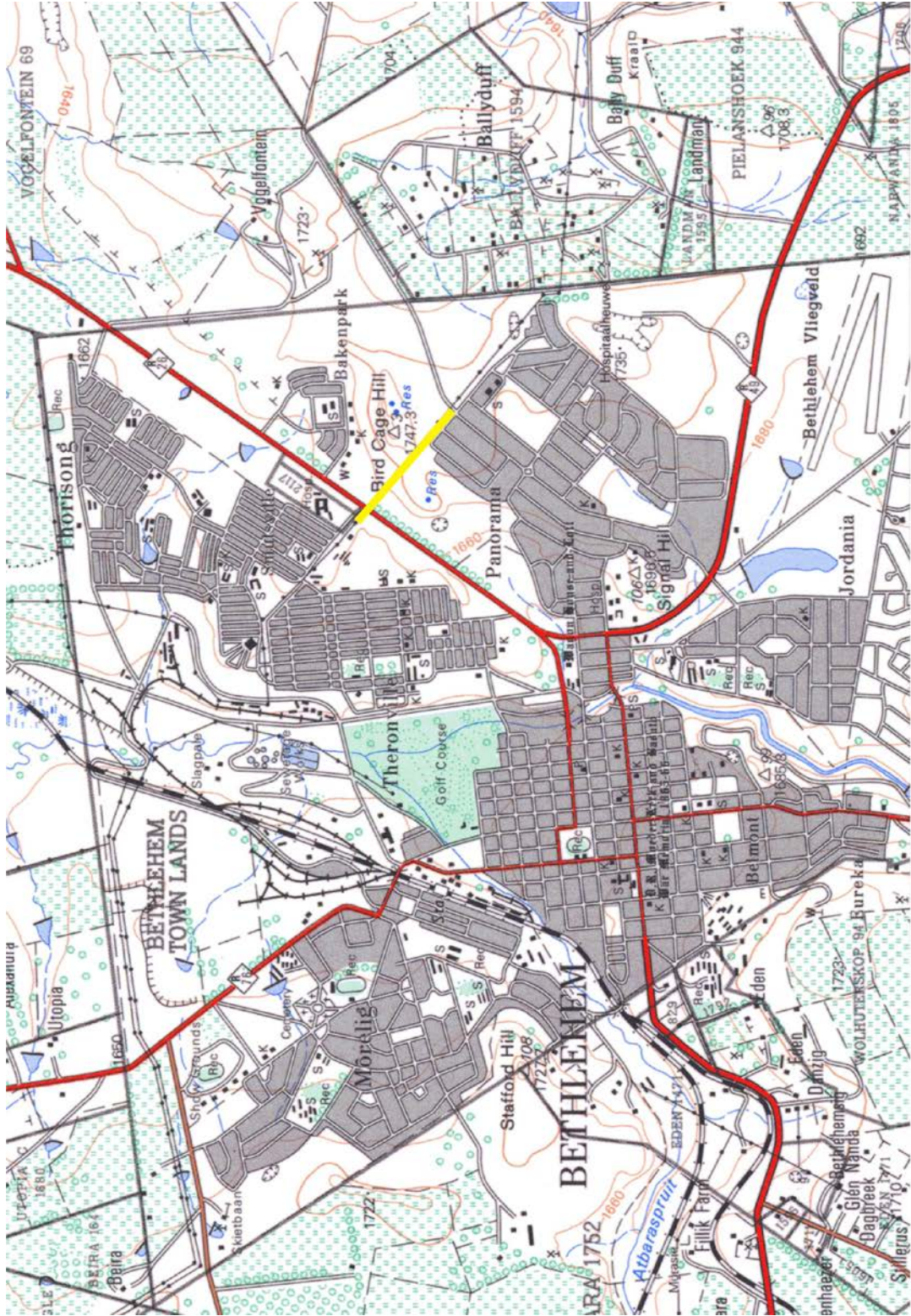


Figure 1. Map of the proposed 11kV overhead power line and a switchyard footprint (yellow line) shown on portion of 1:50 000 scale topographic 2828 AB Bethlehem.





Figure 2. Aerial view of the proposed footprint.





Figure 3. Proposed switchyard site at Vantage point B, looking northwest towards vantage point A (top & bottom left). The area is underlain by intrusive dolerites (center) that are capped by a thin veneer of residual soils that varies in depth (right).  
Scale 1 = 10 cm



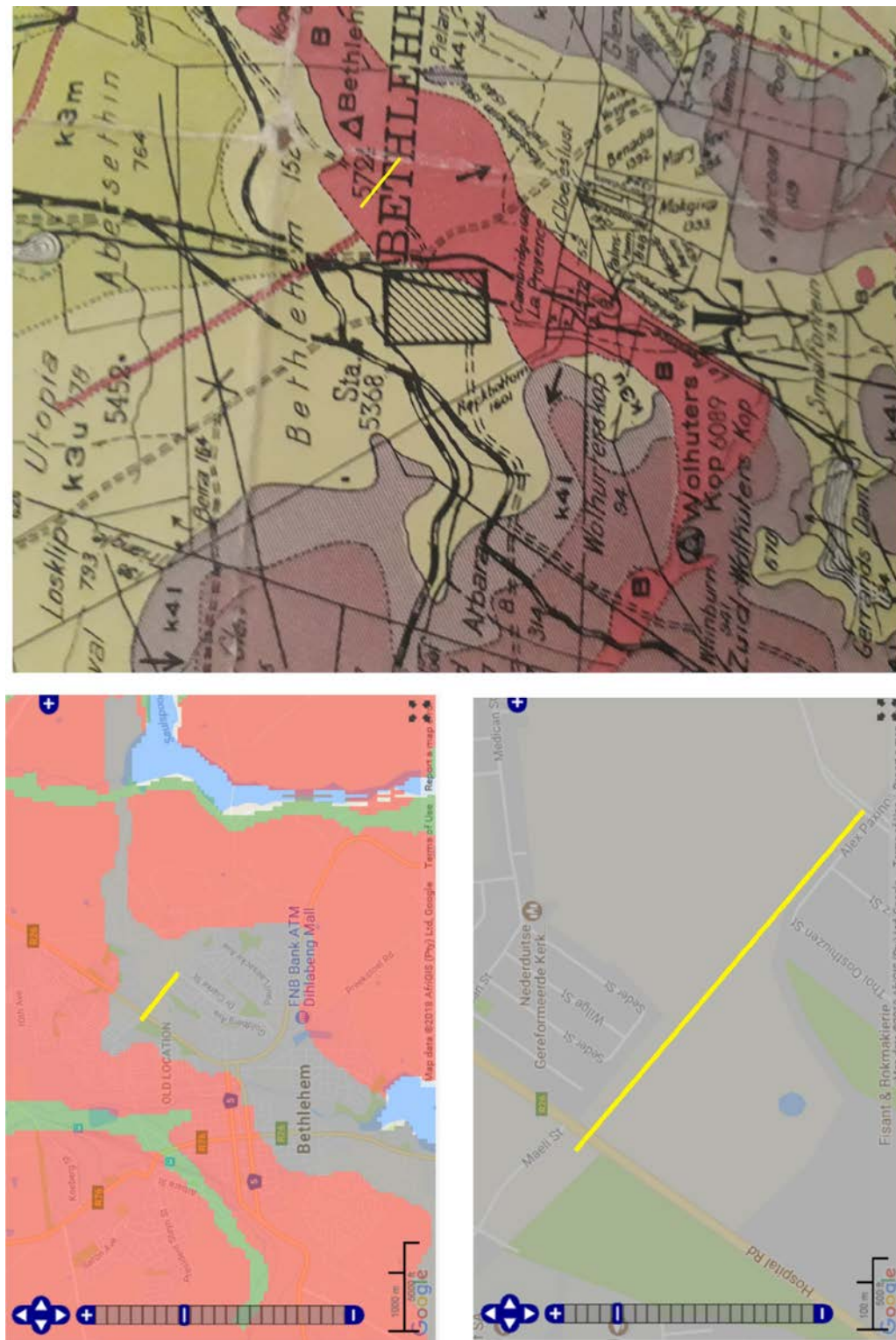


Figure 4. Sahrnis palaeosensitivity maps (left) and 1:125 000 scale geological map of Bethlehem and Kestell Area (right). The proposed development footprint is underlain by palaeontologically insignificant dolerite intrusions respectively indicated by grey and areas on maps.



Figure 5, General view looking southeast from Vantage Point A (Fig. 3) along the proposed powerline footprint.





Figure 6. The proposed powerline footprint looking northwest (top & center) and north (bottom).





Figure 7. The footprint is located on severely degraded terrain resulting from ongoing human activities (pedestrian traffic and littering).  
Scale 1 = 10 cm.