

**Phase 1 Heritage Impact Assessment of the proposed
Slovopark residential development. Brandfort, FS
Province.**

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Summary

A Phase 1 Heritage Impact Assessment was carried out for the proposed Slovopark Residential Development in Brandfort, FS Province. The site is located on open terrain, covering 153 ha of low topography grassland that is situated on the northern outskirts of Brandfort. Except for exposed dolerite intrusions near the north-eastern boundary of the site, the study areas consist of degraded farmland covered by well-developed, superficial Quaternary deposits (trampled residual soil made up of red-brown aeolian sand), where no fossils were observed. A large part of the footprint, covering about 57 ha, has already been affected by informal settlement. A foot survey of the undeveloped terrain in the north-western part of the footprint revealed no evidence of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no aboveground indications of rock art (engravings), prehistoric structures, graves or historically significant buildings older than 60 years within the boundaries of the proposed footprint. As far as the **palaeontological heritage** is concerned, the proposed development may proceed with no further palaeontological assessments required, provided that all development activities are restricted to within the boundaries of the footprint. In the unlikely event that fossils are exposed within the sand overburden during the operational phase of the project, it is advised that a professional palaeontologist be called in to record and remove the material before further excavations takes place. As far as the **archaeological heritage** is concerned, the terrain has been degraded by previous farming activities and informal settlement and is assigned a rating of Generally Protected C (GP.C). It is the opinion of the author of this report that the proposed development may proceed, provided that all development activities are restricted to within the boundaries of the footprint.

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. I have no interest in secondary or downstream developments as a result of the authorization of this project.

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Introduction

A Phase 1 Heritage Impact Assessment was carried out for the proposed Slovopark Residential Development in Brandfort, FS Province. . The site is located on open terrain, covering 153 ha of low topography grassland that is situated on the northern outskirts of Brandfort (**Fig. 1**). The assessment is required as a prerequisite for new development in terms of the National Environmental Management Act and is also called for in terms of the National Heritage Resources Act (NHRA) 25 of 1999. The region's unique and non-renewable palaeontological heritage sites are 'Generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. As many such heritage sites are threatened daily by development, both the environmental and heritage legislation require impact assessment reports that identify all heritage resources including palaeontological sites in the area to be developed, and that make recommendations for protection or mitigation of the impact of the sites.

The NHRA identifies what is defined as a heritage resource, the criteria for establishing its significance and lists specific activities for which a heritage specialist study may be required. In this regard, categories of development listed in Section 38 (1) of the NHR Act are:

- 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 m² 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 m²; or
- Any other category of development provided for in regulations by the South African Heritage Resources Agency (SAHRA).

The task involved identification of possible 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.

Terms of Reference

- 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 heritage impacts associated with the proposed development.

Methodology

The heritage significance of the affected area is evaluated using existing field data, database information and published literature. Geological maps were used to determine fossil-bearing rocks within the study area. 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. Site significance classification standards, as prescribed by SAHRA, were used for the purpose of this report (**Table 1**).

Site Information

Maps: 1:50 000 scale topographical map 2826CB Brandfort.

1:250 000 scale geological map 2826 Winburg.

The site is located on open terrain, covering 153 ha of low topography grassland that is situated on the northern outskirts of Brandfort (**Fig. 2 & 3**).

Site Coordinates:

- A) 28°41'0.18"S 26°26'10.30"E
- B) 28°41'25.98"S 26°27'6.19"E
- C) 28°41'33.44"S 26°27'0.24"E
- D) 28°41'30.61"S 26°26'54.00"E
- E) 28°41'36.96"S 26°26'46.19"E
- F) 28°41'49.66"S 26°26'45.00"E
- G) 28°41'30.03"S 26°25'54.72"E

Background

This segment provides overview of the heritage footprint in the region with the intention to identify potential heritage sites, landscapes and features that may be found within the study area.

Palaeontology

The geology of the region has been described by Nolte (1995) and Johnson (2006). According to the 1:250 000 scale geological map 2826 Winburg the Brandfort area is situated within the Beaufort Group, Adelaide Subgroup (Karoo Supergroup), and is primarily represented by late Permian, Balfour Formation sedimentary rocks, which are made up of alternating sandstone and mudstone layers (*Pa*, **Fig. 4**). These sedimentary rocks form the base on which younger, superficial deposits of Quaternary age have been deposited (Partridge *et al.* 2006). Superficial sediments consist mainly of calcretes (*Qc*) aeolian sand (*Qs*) and well-developed alluvial deposits near river drainages. Dykes and sills of resistant Jurassic dolerite intrusions (*Jd*) are present in the region.

The local palaeontological footprint is primarily represented by Late Permian Karoo vertebrate fauna and Late Cenozoic (Quaternary Period, comprising the Pleistocene and Holocene Epochs) mammalian fossils.

The Karoo geological strata within the affected area are assigned to the *Dicynodon* Assemblage Zone (AZ). Therapsids from this biozone occur generally well-preserved in mudrock horizons and are usually found as dispersed and isolated specimens associated with an abundance of calcareous nodules (Kitching 1995). Other vertebrate fossils include fish, amphibians and amniotes. Molluscs, insects, plant (*Dadoxylon*, *Glossopteris*) and trace fossils (arthropod trails, worm burrows) are also occur in the biozone.

The Modder River is a southern tributary of the Vaal River and its alluvial deposits are associated with abundant Quaternary mammalian fossils. A number of palaeontological localities, such as the ones at Erfkroon, Mitasrust, have been found eroding out of Pleistocene alluvial terraces and dongas along the river (Churchill *et al.* 2000; Rossouw 2006), while pan dunes and artesian springs (e.g. Florisbad) also occasionally yield Quaternary fossil remains (**Fig. 5 no. 1, 2 & Fig. 6**). The river's

fossil-bearing potential has been known for almost 150 years, with a frontlet and horn cores of *Homoioceras qntiquus* recovered as far back as 1839 (Cooke 1955) and the remains of *Megalotragus priscus* discovered around the turn of the previous century (Broom 1909).

Archaeology and History

Stone Age artifacts are generally common as surface material on the South African central plateau, but it lacks high visibility and frequently escapes the attention of the public eye. The central Free State region between Bloemfontein and Kroonstad is generally rich in Stone Age open-site assemblages, the majority of which are linked to floodplain deposits (overbank sediments) associated with the Modder and Vet River systems, as well as pan dunes and artesian springs, such as at Florisbad (Brink 1987; Churchill *et al.* 2001; Rossouw 2006; De Ruiter *et al.* 2011) (**Fig. 5 no. 1 – 3 & Fig. 8**). This may include capped occurrences and surface scatters of long, high-backed blades from the early Middle Stone Age; typical Florisian retouched blades, trimmed points and Levallois core types; the characteristically large sidescrapers, sub-circular and endscrapers from the Lockshoek Industry (terminal Pleistocene); and the Smithfield Industries of the Holocene.

Maggs' classification of settlement patterns (1976) provided the first major contribution to our knowledge of the Iron Age prehistory of the Free State. It showed that the settlement patterns produced huts of different materials in different styles. Type Z settlements are sparsely scattered over a relatively limited area in the vicinity of Doringberg (Maphororong), at Sandrivierspoort (Mariba) adjacent to the main road between Winburg and Ventersburg (**Fig. 5 no. 4 - 7**) and to the northwest along the Vals River in the districts of Kroonstad and Bothaville, including a few sites on the Renoster River, east of Viljoenskroon (Walton 1956; Maggs 1976; Dreyer 1997). Type Z dwellings consisted of a cylindrical hut with stone-walled courtyards at the front and rear, representing a bilobial layout (**Fig. 9**). An excavation conducted at a stone-walled complex on the farm Doornpoort near Winburg, suggest that variations on the arrangement of stone-walled structures as defined for Type V, Type N and Type Z also occurred (Dreyer 1992) (**Fig. 5 no. 4**). Maggs (1976) ascribes the occupation of the sites with bilobial dwellings to early Sotho-speaking Thlaping and

Rolong groups. According to radio-carbon dating and oral history, Type Z sites were occupied from the 16th and 17th to early 19th century (Maggs 1976; Dreyer 1992).

Brandfort was established in 1874. More recently, the Battle of Karee Siding took place on 29 March 1900 during the South African War when Boer forces temporarily resisted the advance of British troops north of the Modder River, with 188 and 21 casualties on the British and Boer sides, respectively (**Fig. 5 no. 9, Fig. 8 & 9**).

Field Assessment

Outcrop visibility at both sites is hampered by the low relief terrain and well developed superficial deposits. Except for exposed dolerite intrusions near the north-eastern boundary of the site, the study areas consist of degraded farmland covered by well-developed, superficial Quaternary deposits (trampled residual soil made up of red-brown aeolian sand), where no fossils were observed (**Fig. 10 & 11**). A large part of the footprint, covering about 57 ha, has already been affected by informal settlement (**Fig. 12 & 13**). A foot survey of the undeveloped terrain in the north-western part of the footprint revealed no evidence of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no aboveground indications of rock art (engravings), prehistoric structures, graves or historically significant buildings older than 60 years within the boundaries of the proposed footprint.

Impact Statement and Recommendations

Summary of potential impacts is listed in Table 2. The proposed development will primarily affect a deposit of geologically recent and palaeontologically insignificant windblown sand.

As far as the **palaeontological heritage** is concerned,

- the proposed development may proceed with no further palaeontological assessments required, provided that all development activities are restricted to within the boundaries of the footprint.
- In the unlikely event that fossils are exposed within the sand overburden during the operational phase of the project, it is advised that a professional

palaeontologist be called in to record and remove the material before further excavations takes place (see **Chance Find Protocol** below).

As far as the **archaeological heritage** is concerned,

- the terrain has been degraded by previous farming activities and informal settlement and is assigned a rating of Generally Protected C (GP.C) (**Table 1**).
- Heritage-significant sites, including the South African War concentration camp memorials and British war grave sites (**Fig. 14 nos. 1-3**), and the Winnie Mandela House Museum (Masiklemo St, Majwemasweu, Brandfort, **Fig. 14 nos. 4**), will not be affected by the proposed development.
- the proposed development may proceed, provided that all development activities are restricted to within the boundaries of the footprint.

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Tables & Figures

Table 1. Field rating categories for archaeology as prescribed by SAHRA.

Field Rating	Grade	Significance	Mitigation
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

Table 2. Summary of Impacts at the proposed footprint.

Geological Unit	Rock types and Age	Potential Palaeontological heritage	Potential Archaeological heritage	Potential Impact pre-site visit	Potential Impact after site visit
Regolith	Residual soils, calcrete (Superficial deposits) Quaternary to Recent	Alluvium, pan dunes & spring mounds: Large-mammal skeletal remains, coprolites; Sediments suitable for preservation of plant microfossils e.g spring mounds, wetlands, alluvium	Stone tools Rock art Prehistoric structures (IA; Stone Age open sites) Historical structures Battlefields Military related remnants, monuments / graveyards	High	Low
Karoo Dolerite (<i>Jd</i>)	Intrusive igneous bedrock. Jurassic	None	Rock engravings; Knapping sites near contact metamorphic zones	Low	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	Low

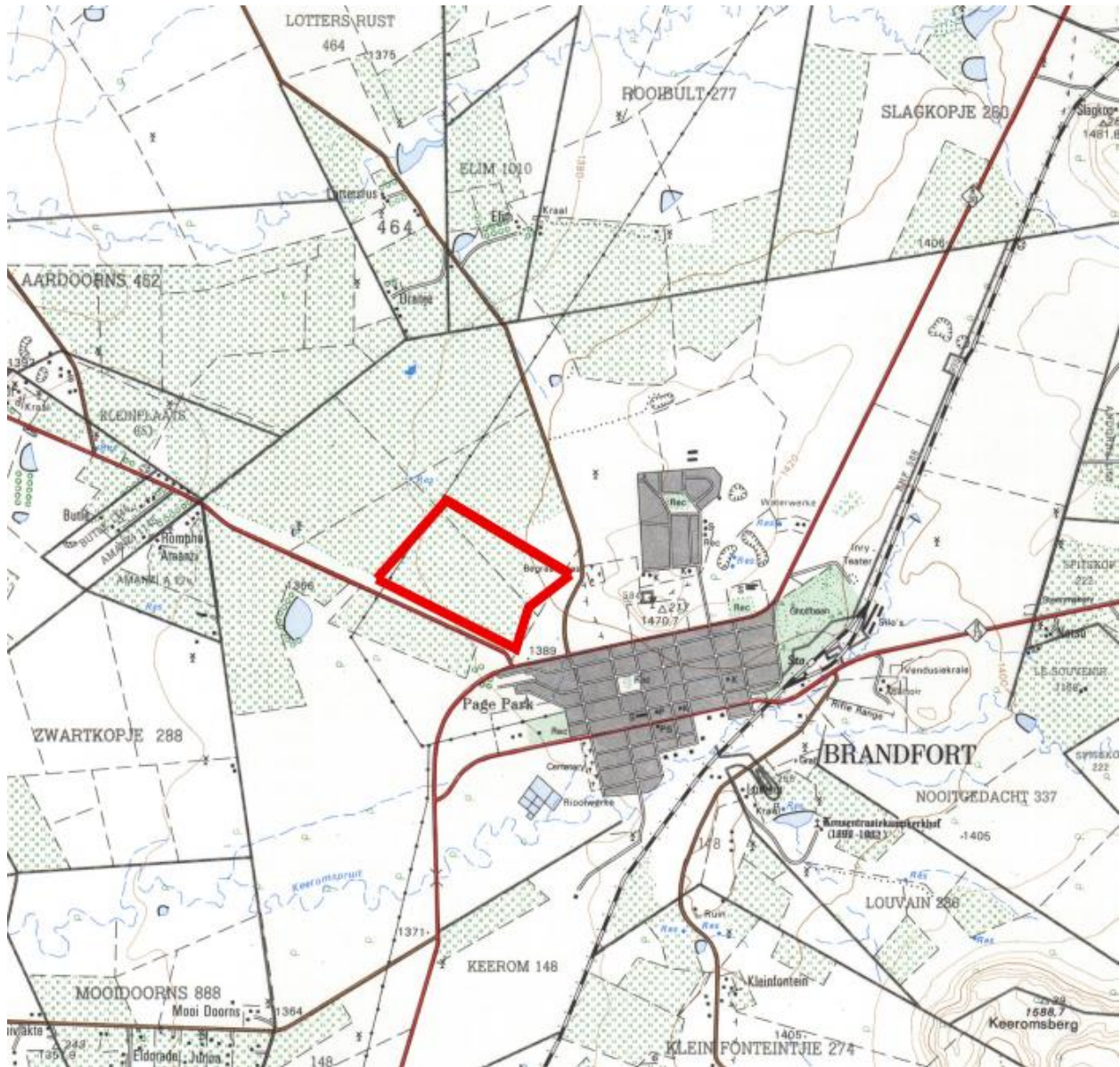


Figure 1. Map of the proposed development area (portion of 1:50 000 topographic map 2826CB Brandfort).

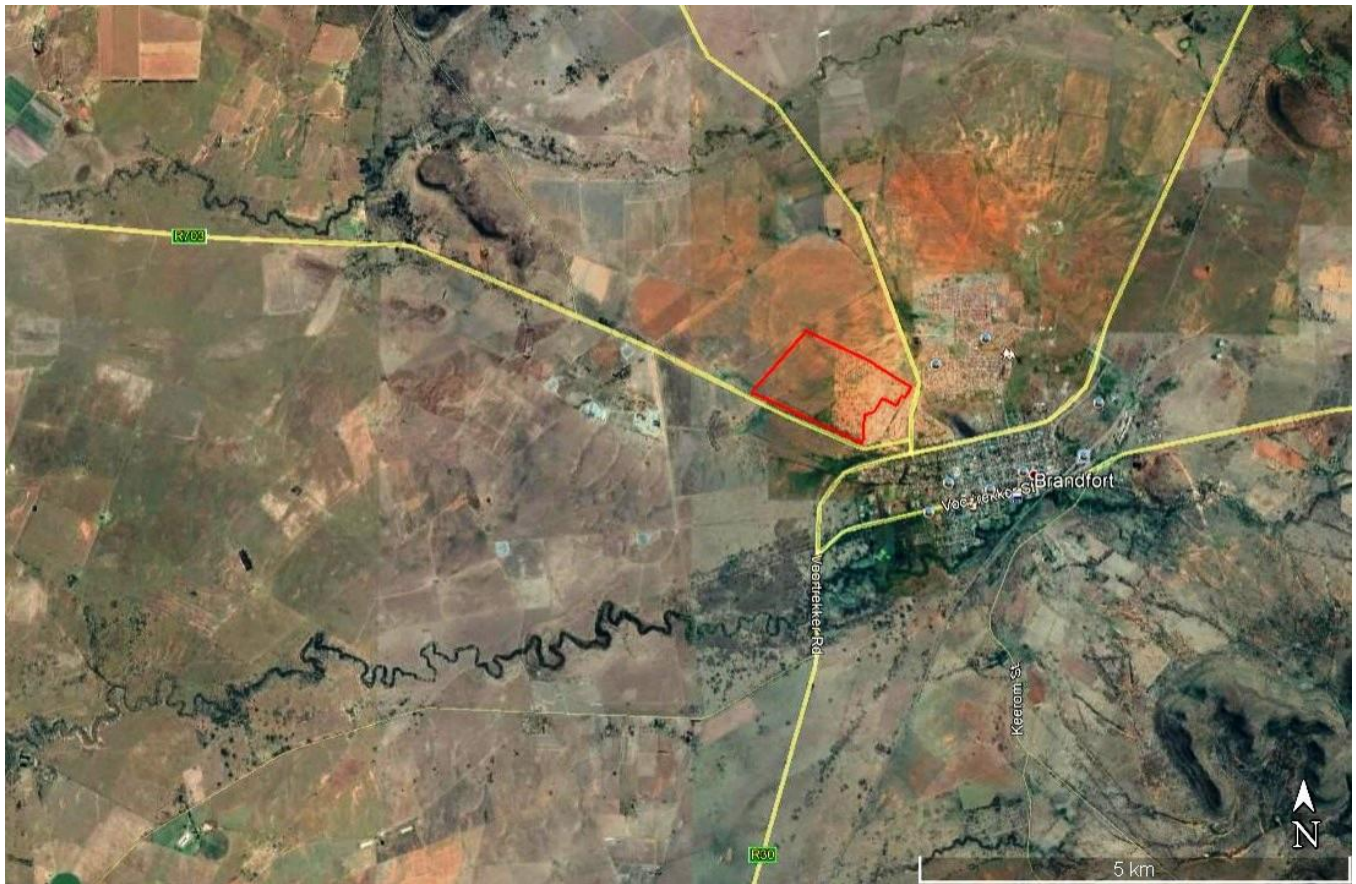


Figure 2. Aerial view of Brandfort and the proposed development area.

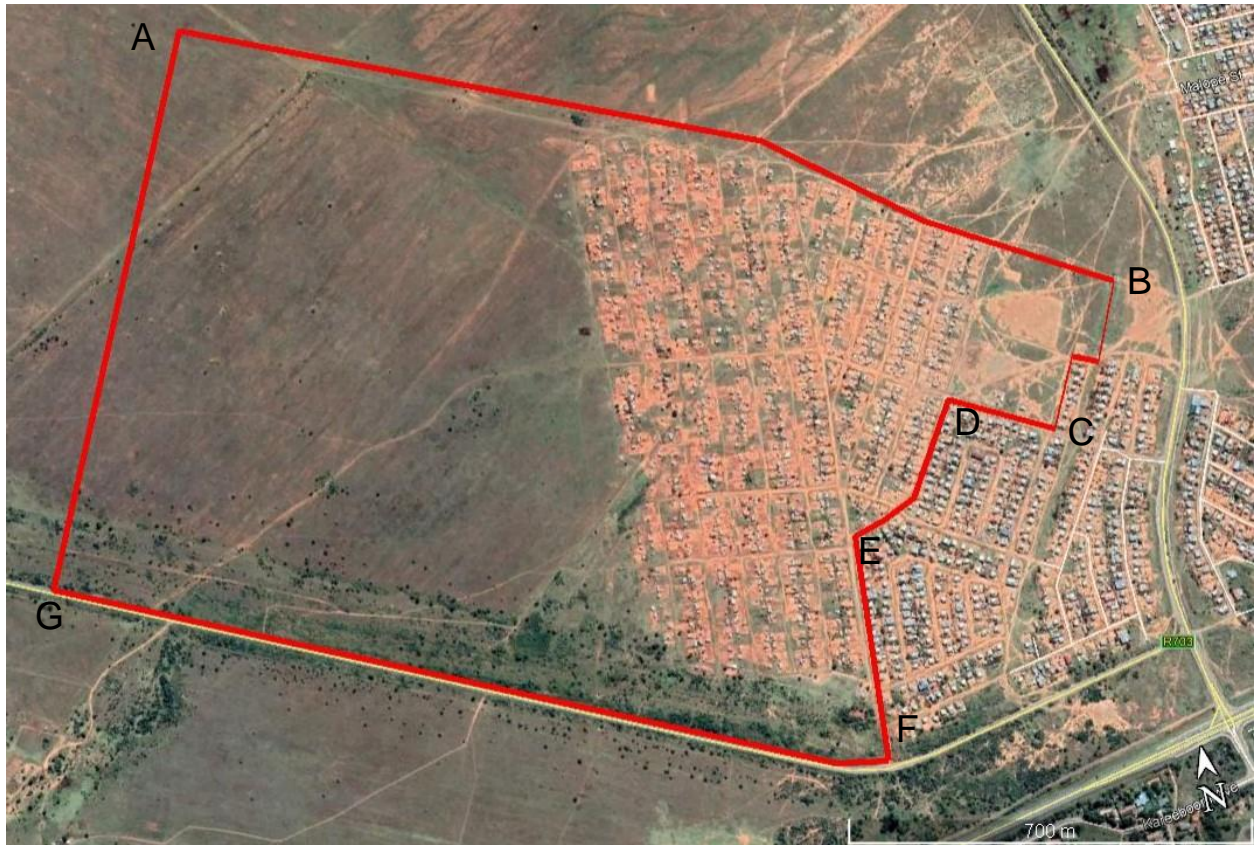
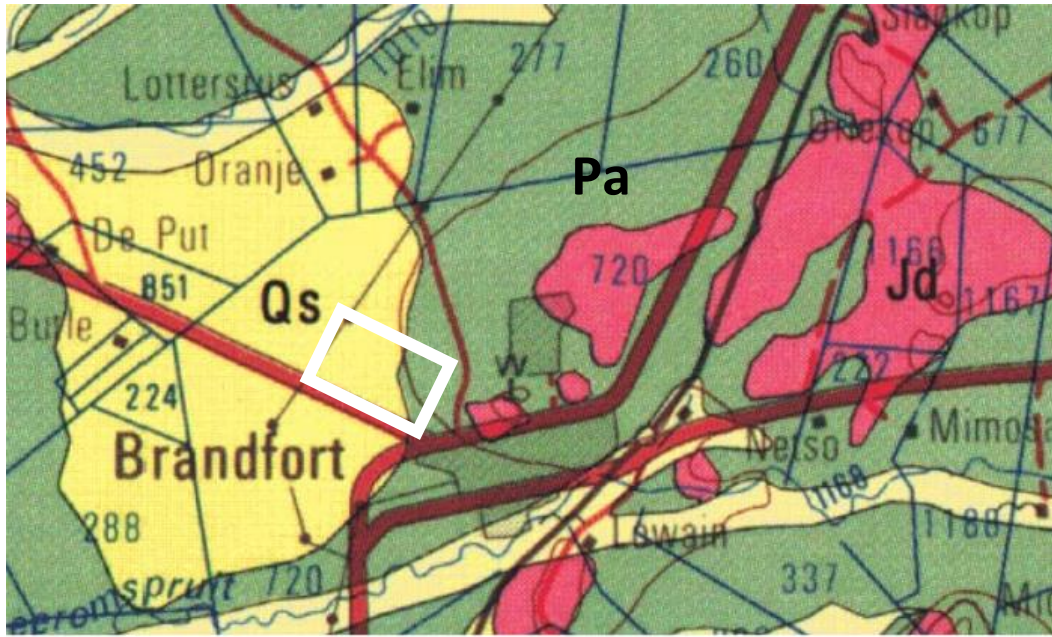


Figure 3. Aerial view of the proposed development area.



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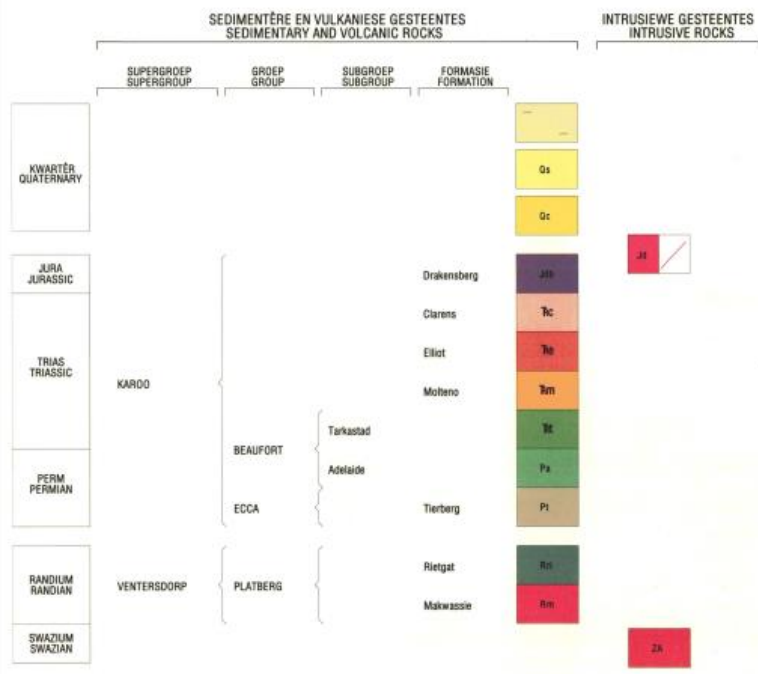


Figure 4. According to the 1:250 000 scale geological map 2826 Winburg, the Brandfort area is situated within the Beaufort Group, Adelaide Subgroup (Karoo Supergroup), and is primarily represented by late Permian, Balfour Formation sedimentary rocks, which are made up of alternating sandstone and mudstone layers (*Pa*). These sedimentary rocks form the base on which younger, superficial deposits of Quaternary age have been deposited. Superficial sediments consist mainly of calcretes (*Qc*) aeolian sand (*Qs*) and well-developed alluvial deposits near river drainages. Dykes and sills of resistant Jurassic dolerite intrusions (*Jd*) are present in the region.

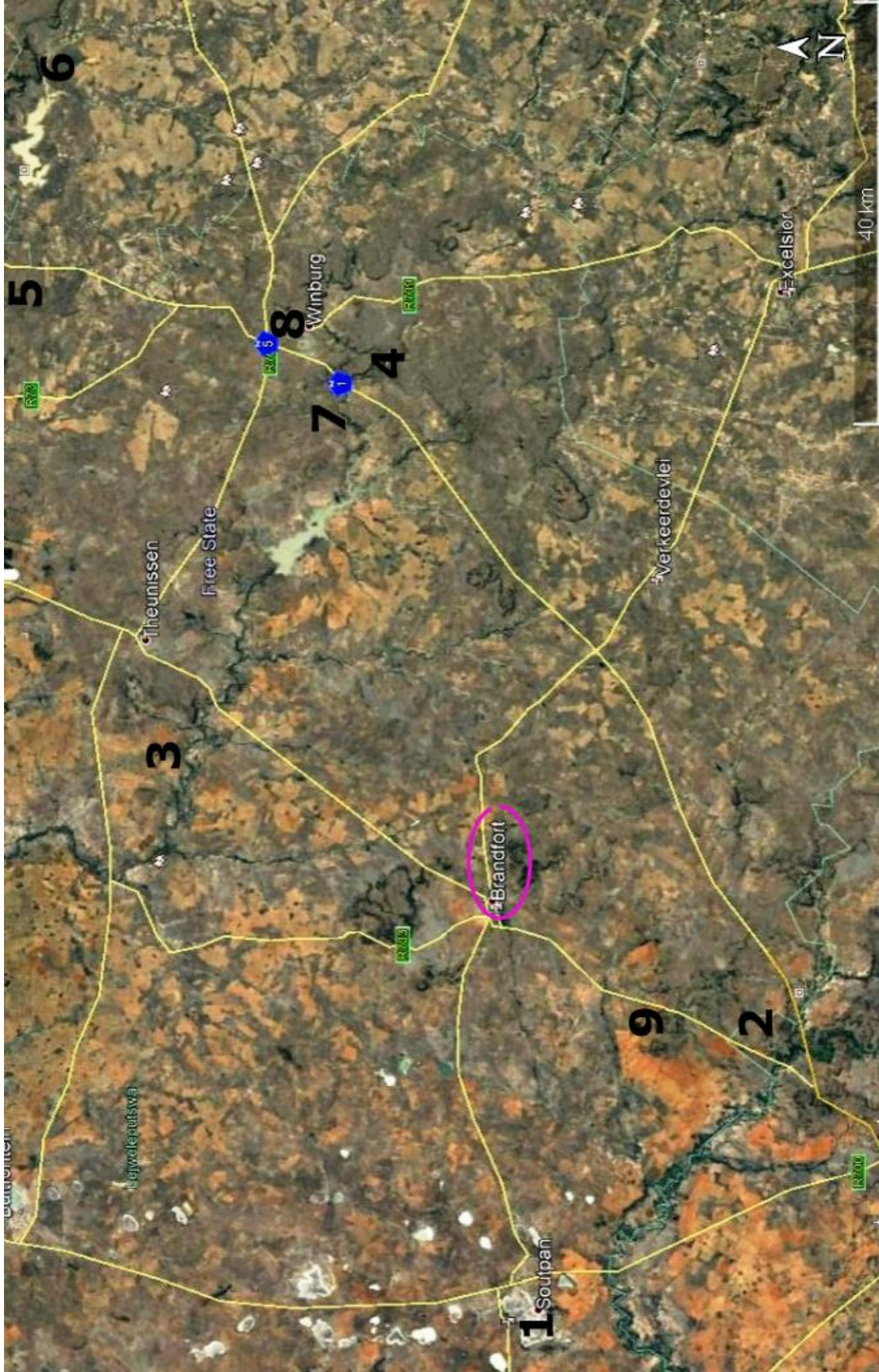


Figure 5. Map of Archaeological and Historical sites discussed in the Background section of the report.



Figure 6. View of palaeontologically and archaeologically important alluvial terraces and dongas on the Modder River at Mitasrust (above) and Erfkroon (below).

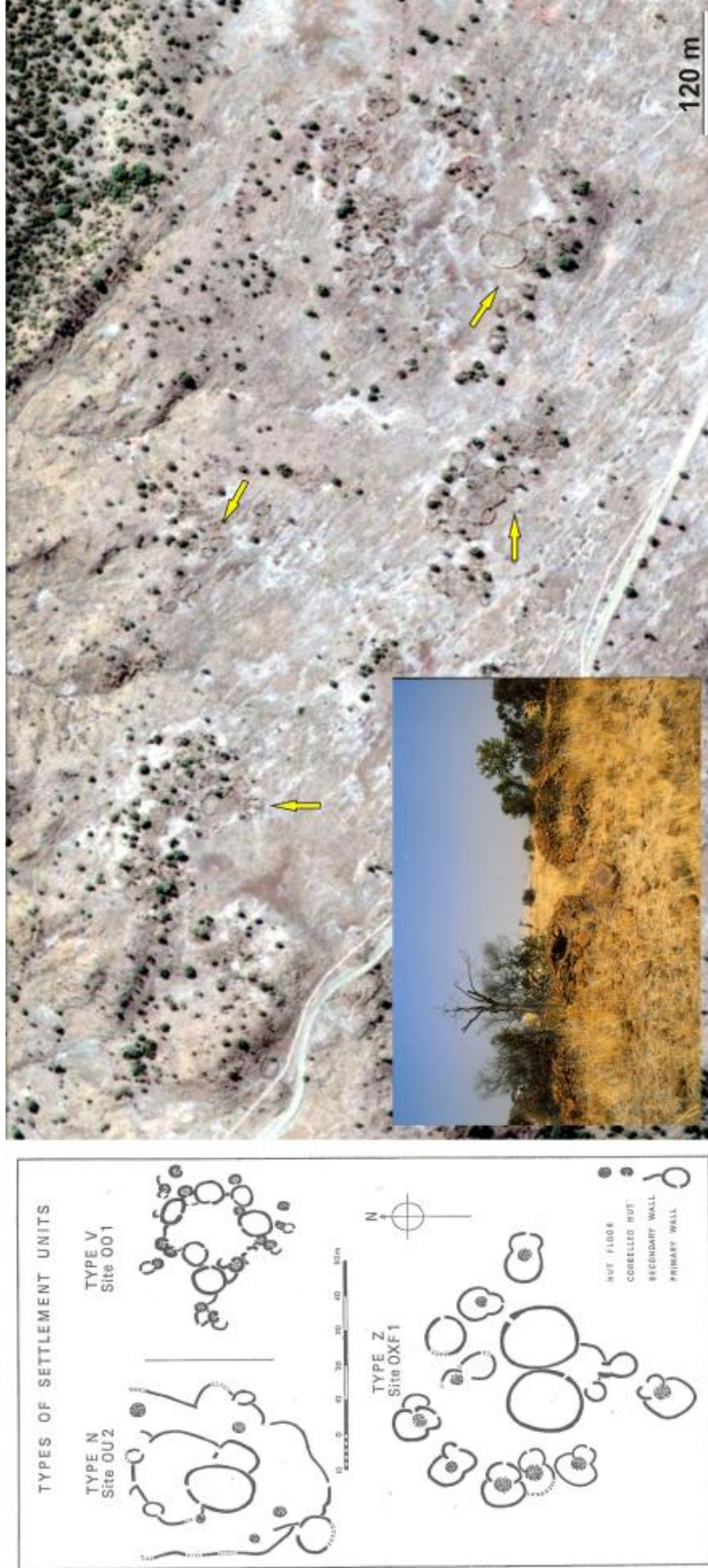


Figure 7. Iron Age settlement types from the southern Highveld according to classification by Maggs (1976). Aerial view of bilobial dwellings at Doringberg arranged around a cluster of central cattle byres.

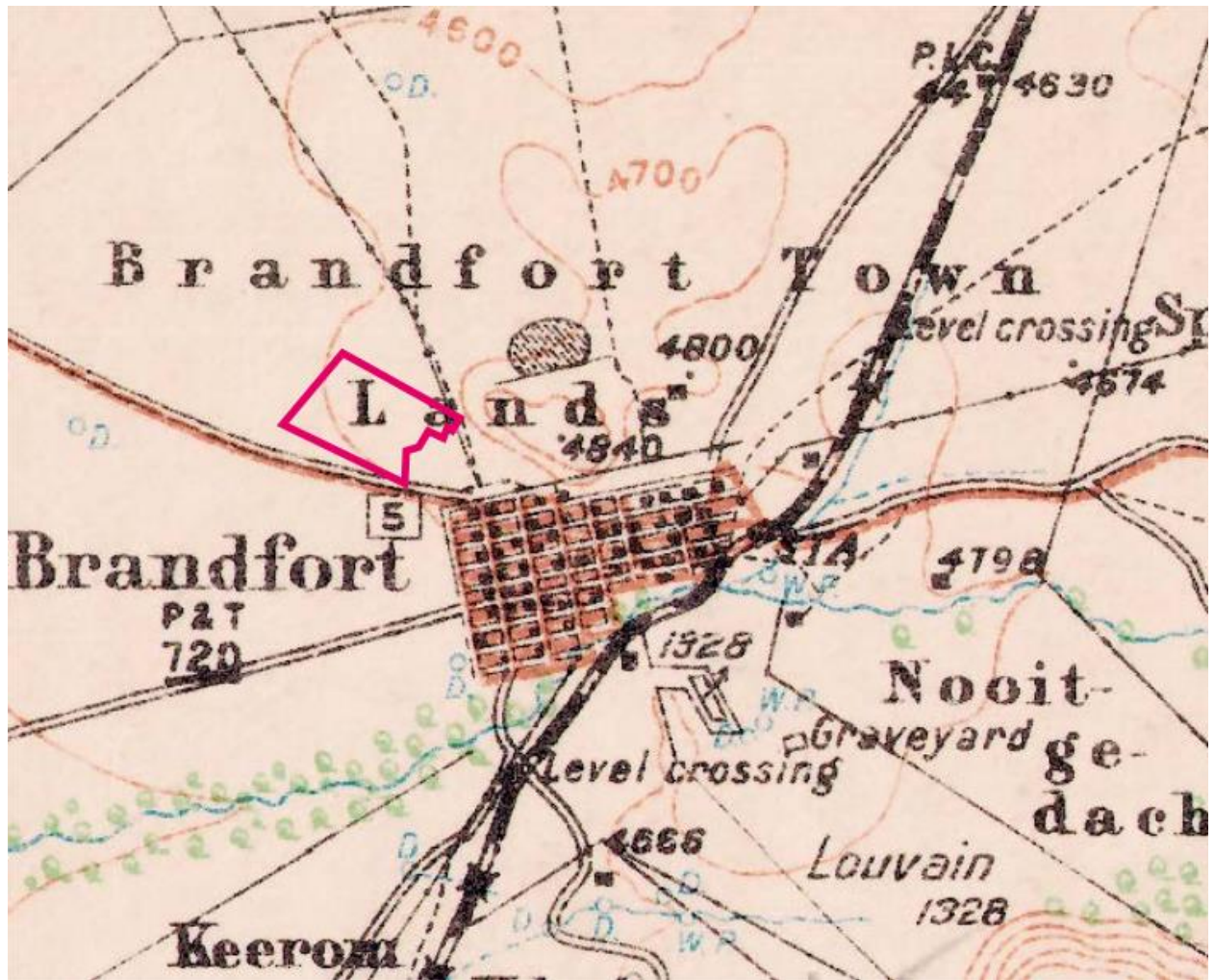


Figure 8. Historical map of Brandfort, dated 1911, with superimposed development area.

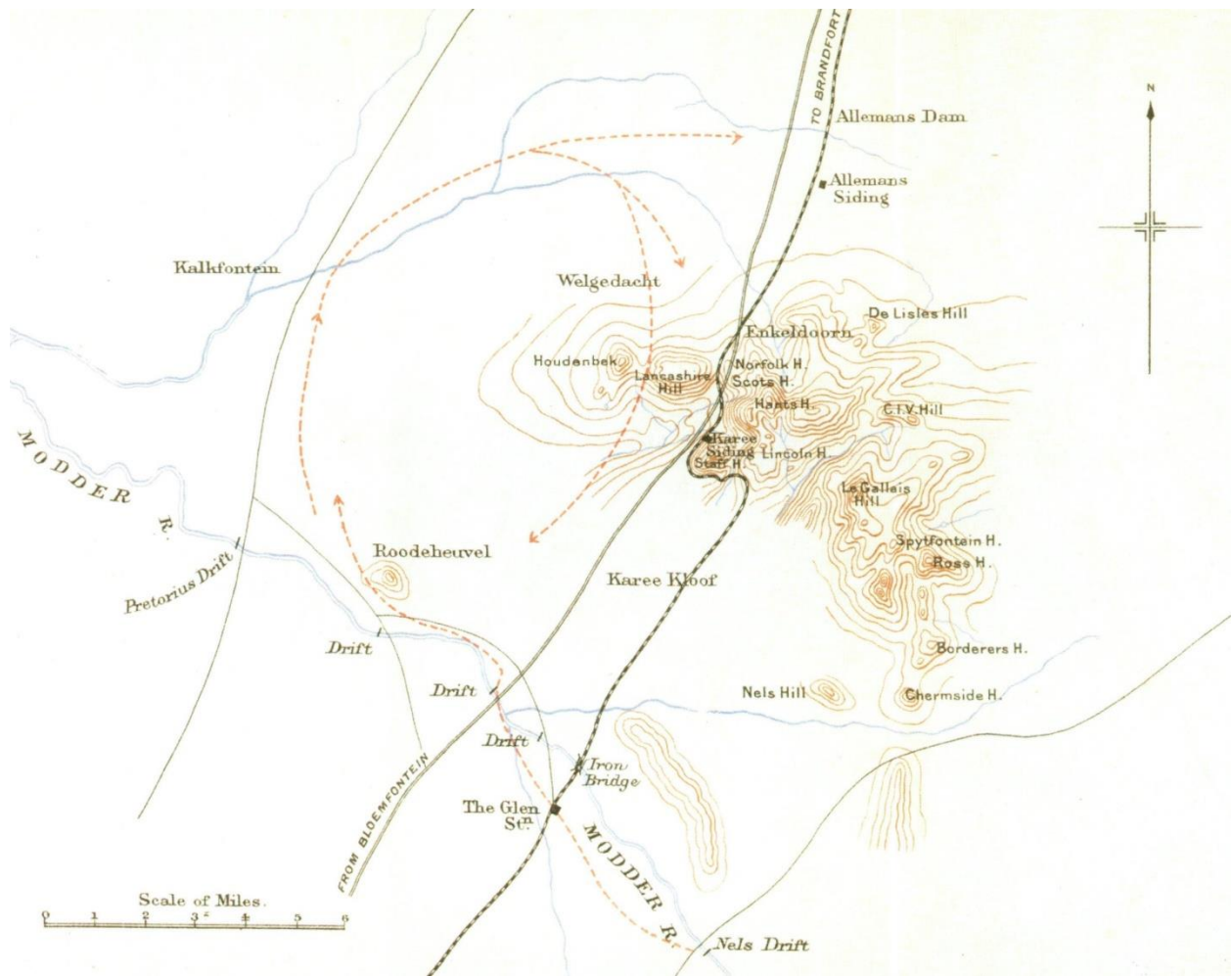


Figure 9. Map of the Battle of Karee Siding, March 1900



Figure 9. A dolerite-sandstone contact metamorphic zone is exposed at the north-eastern boundary of the footprint.



Figure. 10. General views of the study area, looking west (above) and east (below).



Figure 11. The study area is capped by well-developed veneer of wind-blown sand.



Figure 12. A large part of the footprint has already been affected by informal settlement.



Figure 13. General view of the study area, looking north-west from the eastern boundary.



Figure 14. Map of Historically significant sites on the outskirts of Brandfont.

Appendix 1: Chance Finds Protocol for Developer

Palaeontology

Any excavations that *exceeds 1 m into bedrock*, will impact *in situ* sedimentary strata which could be palaeontologically sensitive in terms of potential impact on fossils. . “Fossil” means the remains or traces of plants and animals that lived long ago which has been buried and dug up, and most fossils are found where they became buried in layers of sand or mud a long time ago (**Fig. 1 - 3**). “Strata” means layers. And “stratigraphy” is the study and working out of the sequence of the layers of sediment that settled into low-lying areas long ago. “Sediment” means of sand, mud, etc, which settled down. It may still be loose (**see Fig. 7**) or may have consolidated to form rock (**see Fig. 3**). In some fossils the original bone was not lithified. It disappeared completely but left an impression or mould in the sediment (**Fig. 4**). Sometimes leaf impressions are purely a kind of mould and/or cast of a leaf, but often some of the original leaf is left behind in a carbonized form in the impression (**Fig. 5**). Trace fossils, such as footprints, burrows, and trails footprints and tracks provide information such as animal gait, lifestyle and social behavior (**Fig. 6**).

In this case Dr Ragna Redelsdorf at SAHRA must be alerted accordingly since freshly exposed sedimentary rock will require contracting **a professional palaeontologist for appropriate monitoring for fossil remains by** during the construction phase.

If any newly discovered palaeontological resources prove to be significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;

The decision regarding the EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application.

If, in the event that localized fossil material is discovered exposed or eroding out of *intact superficial overburden* during the construction phase, it will in all probability resemble modern-looking, but more or less lithified animal bones and teeth and it will most likely be those belonging to bovids (Bovidae: the biological family of ruminant mammals that includes wildebeest, buffalo, antelopes, etc.) (**Fig. 7 - 9**).

In the unlikely event of fossil discovery within previously undisturbed Quaternary overburden, a professional palaeontologist must be called in immediately to confirm and record the finds.

If any newly discovered palaeontological resources prove to be significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;

The decision regarding the EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application.

In the meantime, *ex situ* remains must be wrapped in paper towels or heavy duty tin foil and stored in a safe place. The material should not be washed or cleaned in any way. *In situ* material must be kept in place and protected from further damage by covering it with light but rigid object like a box, bucket or metal sheet until further confirmation by the palaeontologist.

Archaeology

If any evidence of archaeological sites or remains, e.g. stone tool artifacts (**Fig. 10 & 11**), ostrich eggshell fragments, charcoal and ash heaps, or remnants of stone-made structures (**Fig. 12**) or unmarked graves (**Fig. 13**) are found during the proposed development, the SAHRA APM Unit (Phillip Hine 021 462 5402) must be alerted.

In the meantime, *potential archaeological structures such as stone-build enclosures, buildings or graves* must be avoided by a no-go buffer zone until further confirmation by the archaeologist. Smaller *in situ* material must be kept in place and protected from further damage by covering it with light but rigid object like a box, bucket or metal sheet.

If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit must be alerted immediately. A professional archaeologist must be contracted as soon as possible to inspect the findings.

If the newly discovered heritage resources prove to be of archaeological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;

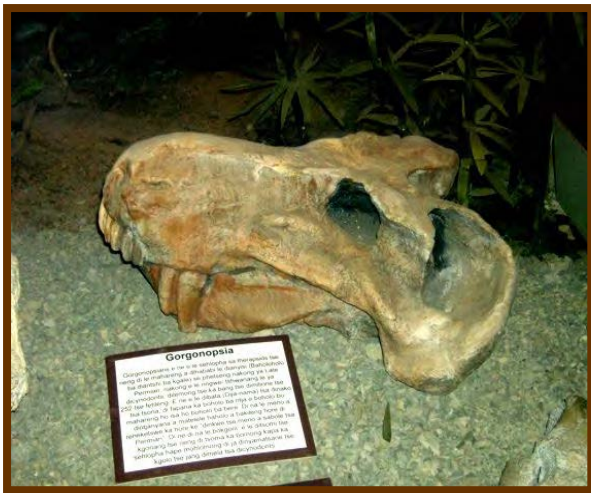


Figure 1. Fossilized skull of a Gorgonopsian, a carnivore which belonged to a large group of animals known as therapsids or “mammal-like reptiles” that died out during the End-Permian extinction about 252 million years ago (top left). Examples of fossilized skeletal remains as they usually appear in rock outcrop (top right & below).



Figure 2. Petrified tree trunks.



Figure 3. World's oldest known dinosaur egg of *Massospondylus* with perfectly preserved fossilized embryo, around 200 Ma years old, Golden Gate.



Figure 4. The original skull decomposed or dissolved, but left its shape in the sediments, forming a mould. Then sand or other minerals filled the mould and hardened to form an exact replica of the original. When the rock was chopped open, both mould and cast were revealed.



Figure 5. Fossilized leaf impression in mudrock.



Figure 6. Fossilized footprints and tracks provide information such as animal gait and social behavior..



Figure 7. Example of intact bovid skeletal remains exposed within Quaternary overbank deposits (alluvium) from the Vaal River.



Figure 8. Side view (buccal view) of bovid lower dentition removed from jaw bone. Dentition is one of the most commonly preserved elements amongst Quaternary fossil remains



Figure 9. Example of post-cranial bovid skeletal elements including from left to right:
femur, humerus, radius, tibia, scapula and vertebrae (x 3).



Figure 10. Example of general appearance of Stone Age artifacts rarely found intact as open sites and largely derived as isolated scatter on the landscape



Figure 11. Example of rare stone tool knapping site occasionally found near dolerite intrusions in the region.



Figure 12. Example of historical stone-build enclosure frequently found in the region.



Figure 13. Typical example of unmarked grave recorded around Bloemfontein - distinctive mound with occasional head markers and a characteristic **dolerite cobble** dome.