

Phase 1 Heritage Impact Assessment for a proposed new Nursing College facility in Kimberley, NC Province.

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Summary

A Phase 1 Heritage Impact Assessment was carried out for the proposed construction of a new nursing college facility on the farm Bultfontein 80 near Kimberley, NC Province. The affected area lies within an outcrop area of dolerite (Karoo Dolerite Suite) surrounded by Quaternary-age surface calcretes and aeolian sand. The terrain has been severely degraded by previous industrial and commercial activities. There are no indications of prehistoric structures or rock engravings within the footprint area. There is also no evidence of informal graves or historical structures older than 60 years within the confines of the footprint. The field assessment indicates that the proposed development will primarily affect degraded topsoils underlain by dolerite bedrock, which are not palaeontologically significant. Very little possibility exists that objects of palaeontological significance may be uncovered during the course of excavation activities into possibly *in situ* Quaternary soils overlying the terrain. In accordance with the types and ranges of heritage resources as outlined in the National Heritage Resources Act (No 25 of 1999), there is no aboveground evidence of historical structures or material of cultural significance, graves or archaeological sites within the demarcated area. The site is assigned a heritage rating of General Protection C.

Introduction

A Phase 1 Heritage Impact Assessment was carried out for the proposed construction of a new nursing college facility on the farm Bultfontein 80 near Kimberley, NC Province (**Fig. 1**). The extent of the proposed development (over 5000 m²) falls within the requirements necessary for a Heritage Impact Assessment (HIA) as required by Section 38 (Heritage Resources Management) of the South African National Heritage Resources Act (Act No. 25 of 1999). The site visit and subsequent assessment took place in February 2014. The task involved identification of possible archaeological and palaeontological sites or occurrences in the proposed zone, an assessment of their significance, possible impact by the proposed development and recommendations for mitigation where relevant.

Methodology

The palaeontological and archaeological significance of the affected area was based on existing field data, database information, published literature and geological maps. This was followed up with a field assessment by means of a pedestrian survey and investigation of exposures and outcrop within the footprint. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera were used for recording purposes.

Locality Data

Maps: 1:50 000 topographical map 2824 DC Spytfontein

1:250 000 geological map 2824 Kimberley

Site Coordinates (**Fig. 2**):

- A) 28°45'56.13"S 24°43'18.06"E
- B) 28°46'4.71"S 24°43'25.46"E
- C) 28°46'6.58"S 24°43'22.13"E
- D) 28°46'1.57"S 24°43'15.02"E
- E) 28°46'3.28"S 24°43'12.39"E
- F) 28°46'1.35"S 24°43'10.16"E

The site is situated next to the N12 national road between Kimberley and Hopetown on the farm Bultfontein 80 (**Fig. 2**). The proposed site lies on a farm portion that is already partially developed (**Fig. 3**).

Geology

The geology of the region has been described by Bosch (1993). The area in question is underlain by sediments of widely different geological ages (**Fig. 4**, portion of 1: 250 000 scale geological map 2924 Koffiefontein, Council for Geoscience, Pretoria, 1991). From oldest to youngest, the geology in and around the affected area is made up of Permian Ecca shales (Whitehall Formation, *Pw*), Jurassic dolerite intrusions (*Jd*, Karoo Dolerite Suite), Quaternary calcretes, surface limestones (*Qc*) and aeolian sands (*Qs*) (Kalahari Group).

Background

Karoo Fossils

Basinal strata of the Prince Albert Formation from the lowermost Ecca Group (*Pw*), outcropping to the north of the development footprint, contains fossil-bearing, laminated mudrocks with petrified wood, invertebrates, fish, coprolites and palynomorphs from calcareous concretions previously recorded near Douglas (McLachlan and Anderson 1973, Visser *et al.*, 1977-78).

Dolerites

Dolerite, in the form of dykes and sills, is common throughout the region. Regarded as feeders of Drakensberg lavas, dolerites are not palaeontologically significant and can be excluded from further consideration in the present evaluation. On the other hand, dolerite outcrop can be regarded as archaeologically significant since Stone Age lithic artifacts in the region are mostly made of hornfels, a fine-grained isotropic rock found in the hot-contact zone between the dolerites and shales in the area. As a result, stone tool factory sites are commonly found near dolerite-shale contact zones. In addition, rock engravings in the region are consistently found on dolerite.

Late Cenozoic Deposits

The occurrence of Plio-Pleistocene fossil remains is largely restricted to the alluvial gravel terraces of the Vaal River northeast of Kimberly and overbank sediments of the Modder and Riet Rivers situated to the east (Cooke 1949; Maglio and Cooke 1978; Partridge and Maud 2000; Churchill *et al.* 2001; Rossouw 2006). Gravel terraces of the Vaal River contain sandy lenses that have yielded several extinct vertebrate taxa.

Stone Age archaeology

The heritage footprint in the region is primarily represented by Stone Age sites and assemblages, either capped or occurring as surface occurrences, rock engraving sites, glacial pavements and structural remnants dating back to the Kimberley Diamond Rush

of the 1870's and the Anglo Boer War (**Fig. 5**). The early exploitation of the Vaal River Gravels by diamond diggers and the resulting development of infrastructure in the region exposed a wealth of archaeological sites that contributed to the development of prehistoric archaeology in southern Africa (Sohnge *et al.* 1937; Helgren 1979; Beaumont and Morris 1990; Forssman *et al.* 2010). As a result, Stone Age archaeological sites in the region are generally associated with, and mostly restricted to a variety of lacustrine contexts as well as the alluvial gravel terraces of the Vaal River. Some important sites located within 40 km of study area include

- an abundance of Fauresmith and Acheulian artifact assemblages found in an andesite cobble and worn exotics matrix capped by a thick layer of red sand at Nooitgedacht near The Bend on the Vaal;
- an abundance of Acheulian artifact assemblages found in thick calcrete deposits at Doornlaagte (a declared national monument), some 20 km east of Schmidtsdrif.
- the famous Nooitgedacht Glacial Pavements situated near the banks of the Vaal River consisting of multiple striations on amygdaloidal Ventersdorp andesite that was produced by an ice age that commenced in early Carboniferous times. In addition to the glacial striations the site is also known for its rock engravings (**Fig. 6**).
- ESA and MSA stone tools uncovered during mining operations between 1930 and 1955 at Pniel (Powers Site) near Nooitgedacht (**Fig. 7**).
- Canteen Koppie, which is the location of the first alluvial diamond diggings in South Africa that continued up until the 1920's. Proclaimed a National Monument in 1948, the alluvial gravels capping the underlying bedrock at the site has yielded a wealth of ESA stone tools while MSA lithics have been recovered from within the layer of red sands overlying the terrain.
- A large number of *Fauresmith* bifaces occur *in situ* within Quaternary-age surface deposits at Kromrand (Lebensraum) 22 km southwest of Boshof (**Fig. 8**).

Historical Heritage

The lower Vaal River basin region was central to the dynamics of colonial expansion along the northern Cape frontier zone and its impact on the Khoisan societies of the

Cape interior (Penn 2005) (**Fig. 9**). The proposed development footprint is located southwest of a historically significant area that also forms part of Kimberley's historical Diamond Route as related to the Kimberley Diamond Rush of the 1870's (Morton 1877; Williams 1902; Van Zyl 1986) (**Fig. 9**). Diamonds were discovered on the farms Dorstfontein and Dutoitspan in 1870 and at Bultfontein and Vooruitzicht in 1871. The first diamond mines on Vooruitzicht became known as Old De Beers. Later that year miners from the Old De Beers Mine discovered what would become the richest diamond mine in the world, namely the Kimberley Mine, known initially as New Rush or Colesberg Kopje. Another rich diamond deposit was discovered on the farm Benaauwdheidsfontein in 1890, later to become known as the Wesselton Mine. Major battles occurred between the British and Boer forces in late 1899 south of the study area (**Fig. 10**). In November 1899, British general Methuen successfully fought the Boers at Belmont, Graspan and Modder River, while the Boers defeated the British forces at Magersfontein in December 1899 (Amery 1905; Von der Heyde 2013).

Field Assessment

The affected area lies within an outcrop area of dolerite (Karoo Dolerite Suite) surrounded by Quaternary-age surface calcretes and well-developed aeolian sand (**Fig. 11**). It has been severely degraded by previous and ongoing industrial and commercial activities. There are no indications of prehistoric structures or rock engravings within the footprint area. There is also no evidence of informal graves or historical structures older than 60 years within the confines of the footprint.

Impact Statement & Recommendation

The proposed project will primarily affect a well-developed (and geologically recent) aeolian sand overburden that is underlain by dolerite bedrock (**Fig 11**). It is therefore considered highly unlikely that the proposed development might negatively affect objects or sites of palaeontological significance.

Although situated within an area that is archaeologically significant as indicated by the prevalence of open site Stone Age accumulations, rock engravings and historical battlefield sites, the site is not archaeologically vulnerable, as it has been severely degraded by previous human disturbance. In accordance with the types and ranges of heritage resources as outlined in the National Heritage Resources Act (No 25 of 1999), there is no aboveground evidence of historical structures, graves or material of cultural

significance, or archaeological sites within the demarcated area. The site is assigned a heritage rating of General Protection C (**Table 1**).

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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 resulting from the authorization of this project.

Tables & Figures

Table 1. Field rating categories 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

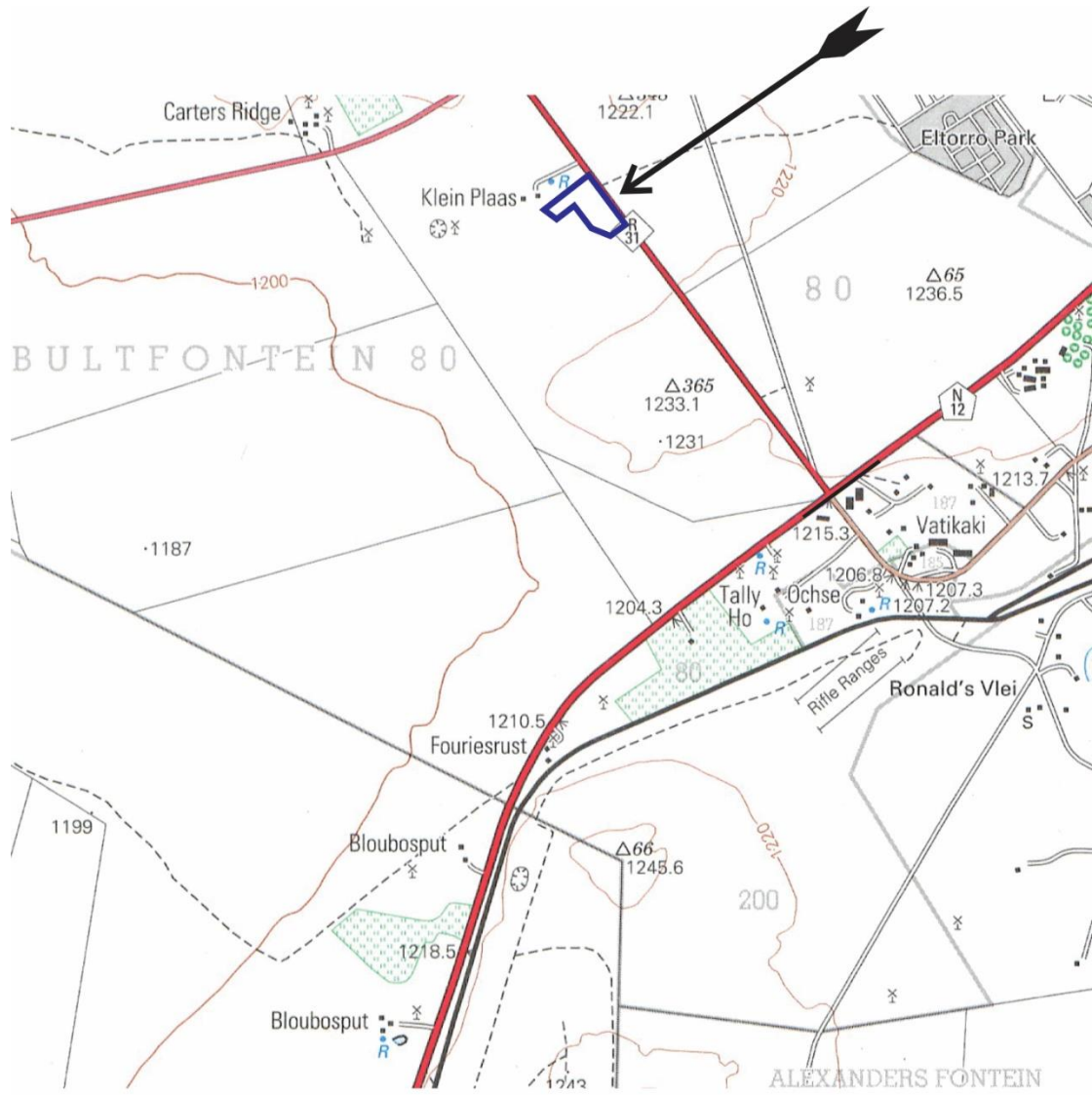


Figure 1. Map of the proposed development area (portion of 1:50 000 scale topographic map 2824 DC Spytfontein).

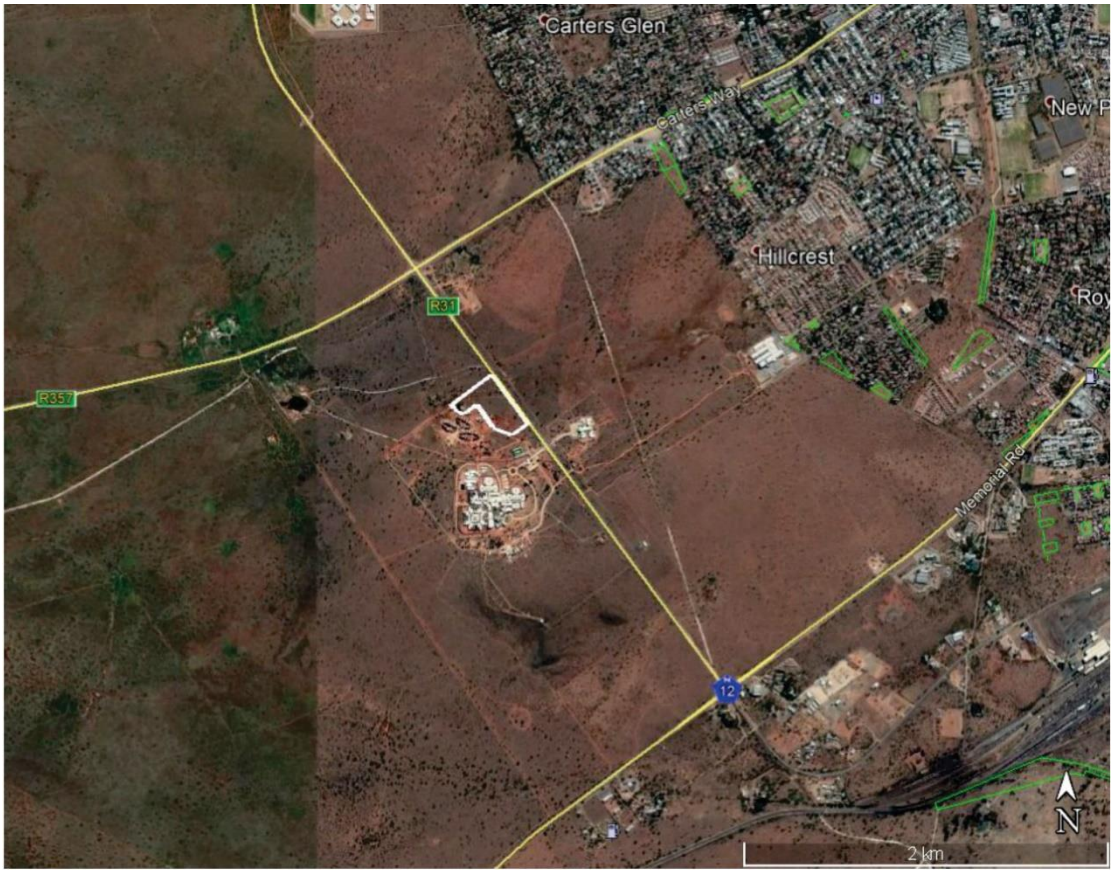


Figure 2. Aerial view and layout of the proposed study area.



Figure 3. General view of the site, looking west (above left), north (above right) east (below left) and south (below right).

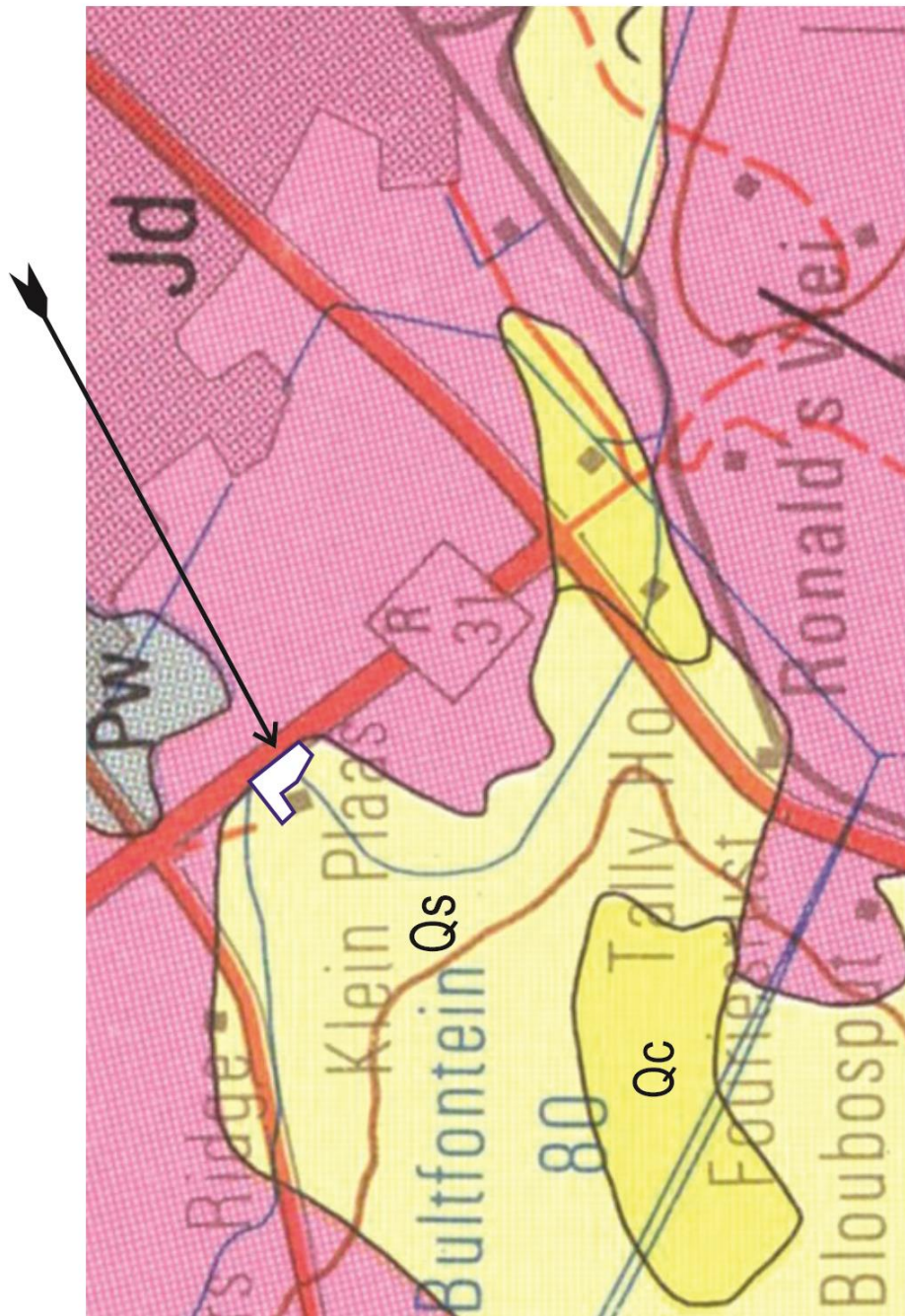
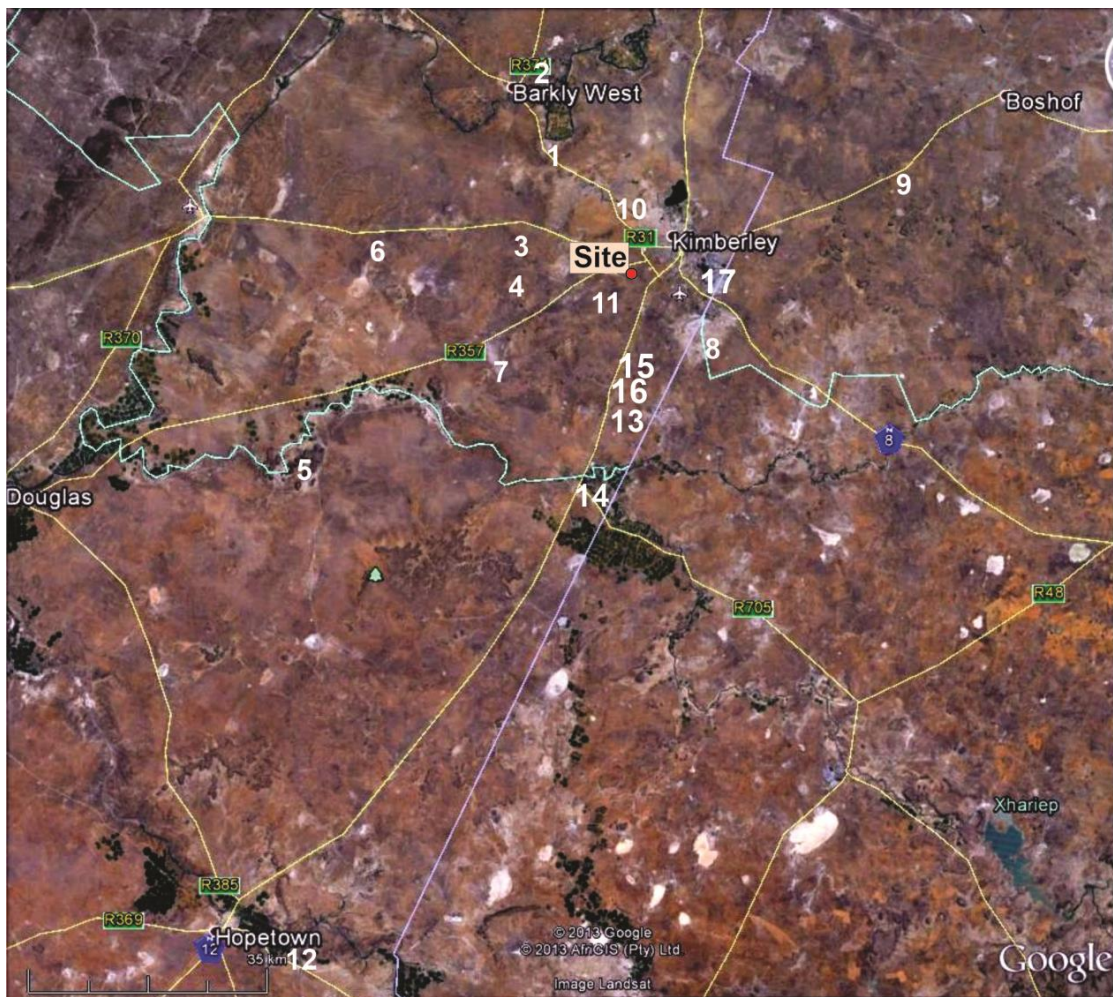


Figure 4. From oldest to youngest, the geology in and around the affected area is made up of Permian Eccla shales (P_w), Jurassic dolerite intrusions (J_d , Karoo Dolerite Suite), Quaternary calcretes, surface limestones (Q_s) and aeolian sands (Q_c) (Kalahari Group). Portion of 1:250 000 scale geological map of the area (2824 Kimberley) with the affected area indicated by white polygon.



1. Pniel, Nooitgedacht & Powers Site - ESA, MSA and LSA
2. Canteen Koppie - ESA
3. Rooddam - ESA
4. Biesiesput - MSA
5. Driekopseiland - Glacial striations, Rock engravings
6. Doornlaagte - ESA
7. Kareevloer - ESA, MSA
8. Alexandersfontein - 'palaeo-lake'
9. Liebensraum - ESA
10. Wildebeestkuil - Rock engravings
11. Witpan - Rock engravings
12. Orange River Station, Blockhouse & Concentration Camp - Anglo-Boer War
13. Battle of Magersfontein - Anglo-Boer War
14. Battle of Modder River - Anglo-Boer War
15. Graveyard - Anglo-Boer War
16. Fortifications - Anglo-Boer War
17. Beaconsfield historical landscape

Figure 5. Heritage sites in the vicinity of the study area.

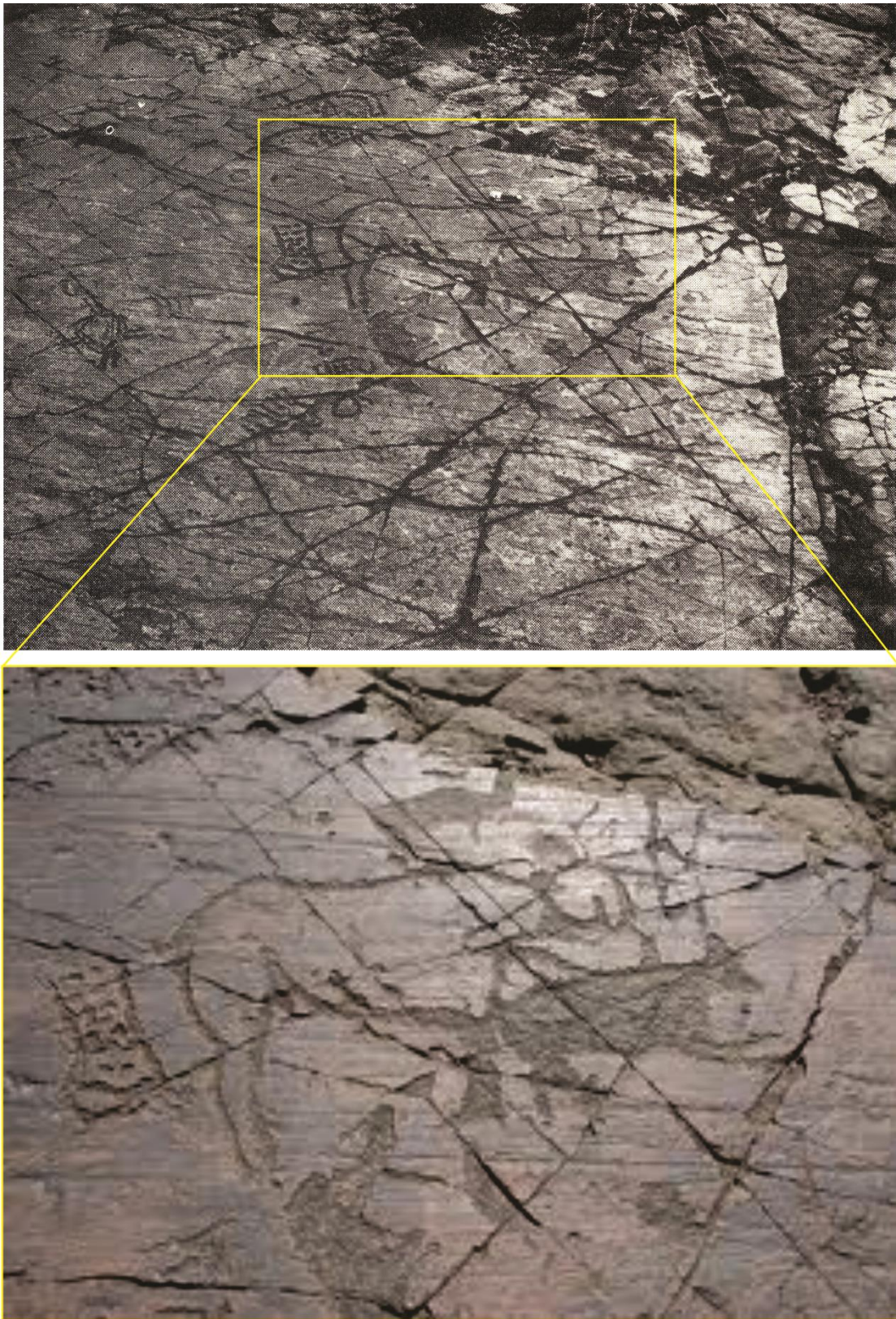


Figure 6. Example of rock engravings found on the glacial pavements at Nooitgedacht.

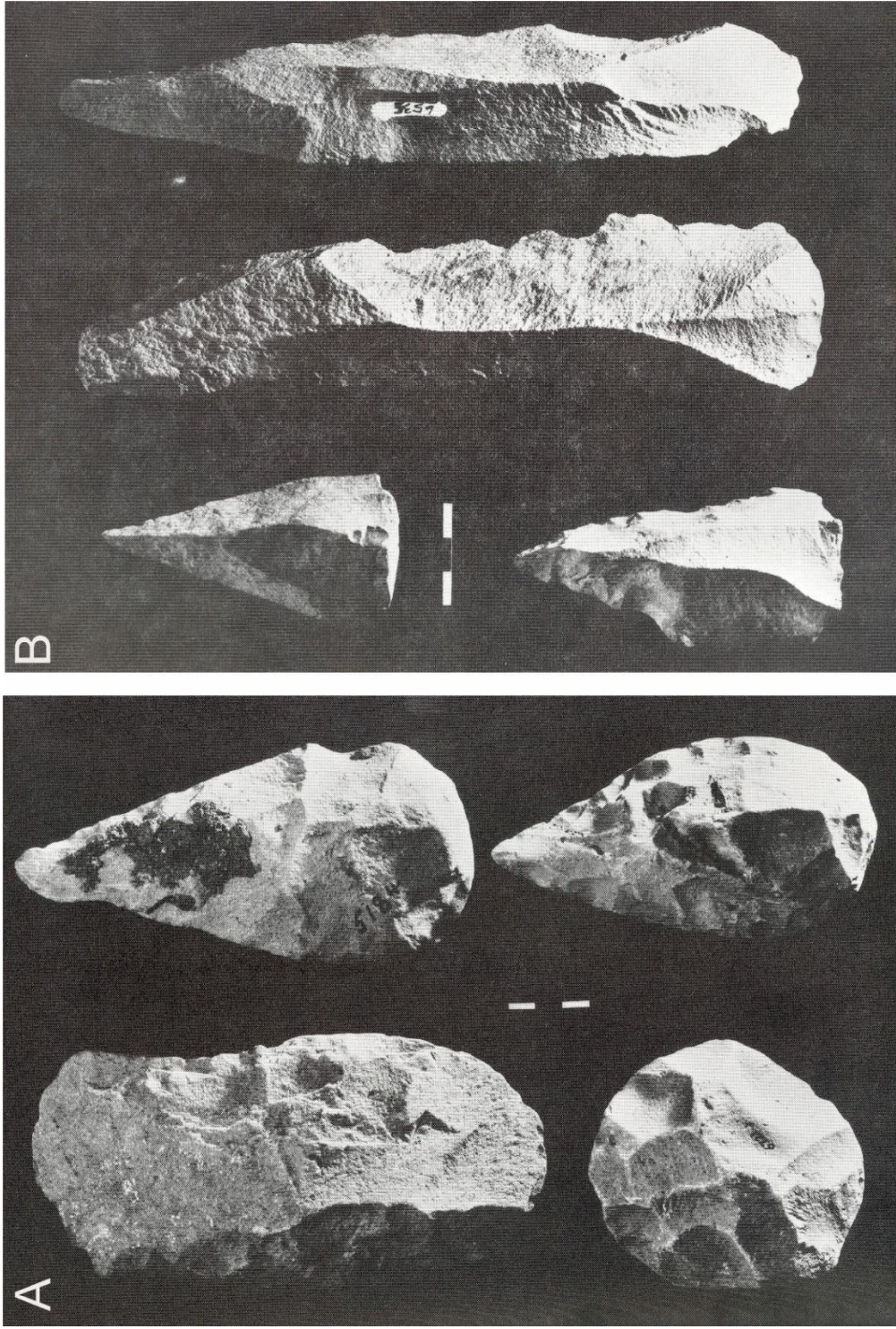


Figure 7. (A) Clockwise from left: a cleaver, 2 x handaxes and a prepared core; (B) Upper and lower left: convergent point; middle and right: parallel and convergent long blades. Raw material = andesite (after Beaumont & Morris 1990).



Figure 8. Surface scatters (left) and *in situ* ESA bifaces (right) at Kromrand, southwest of Boshof.

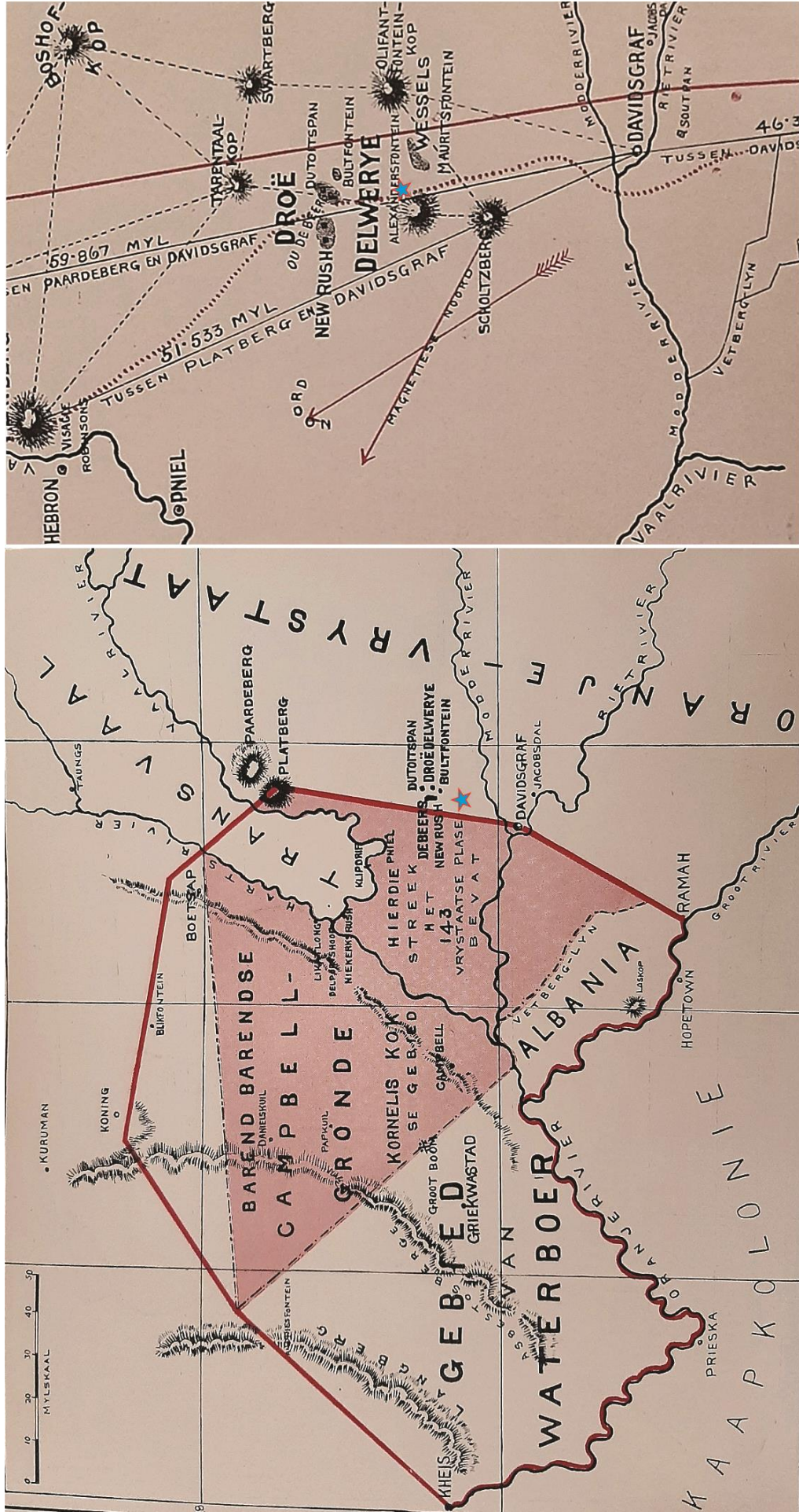


Figure 9. Colonial expansion, territorial fluidity and mining developments in the region during the 19th century. Proposed study area marked by blue star.

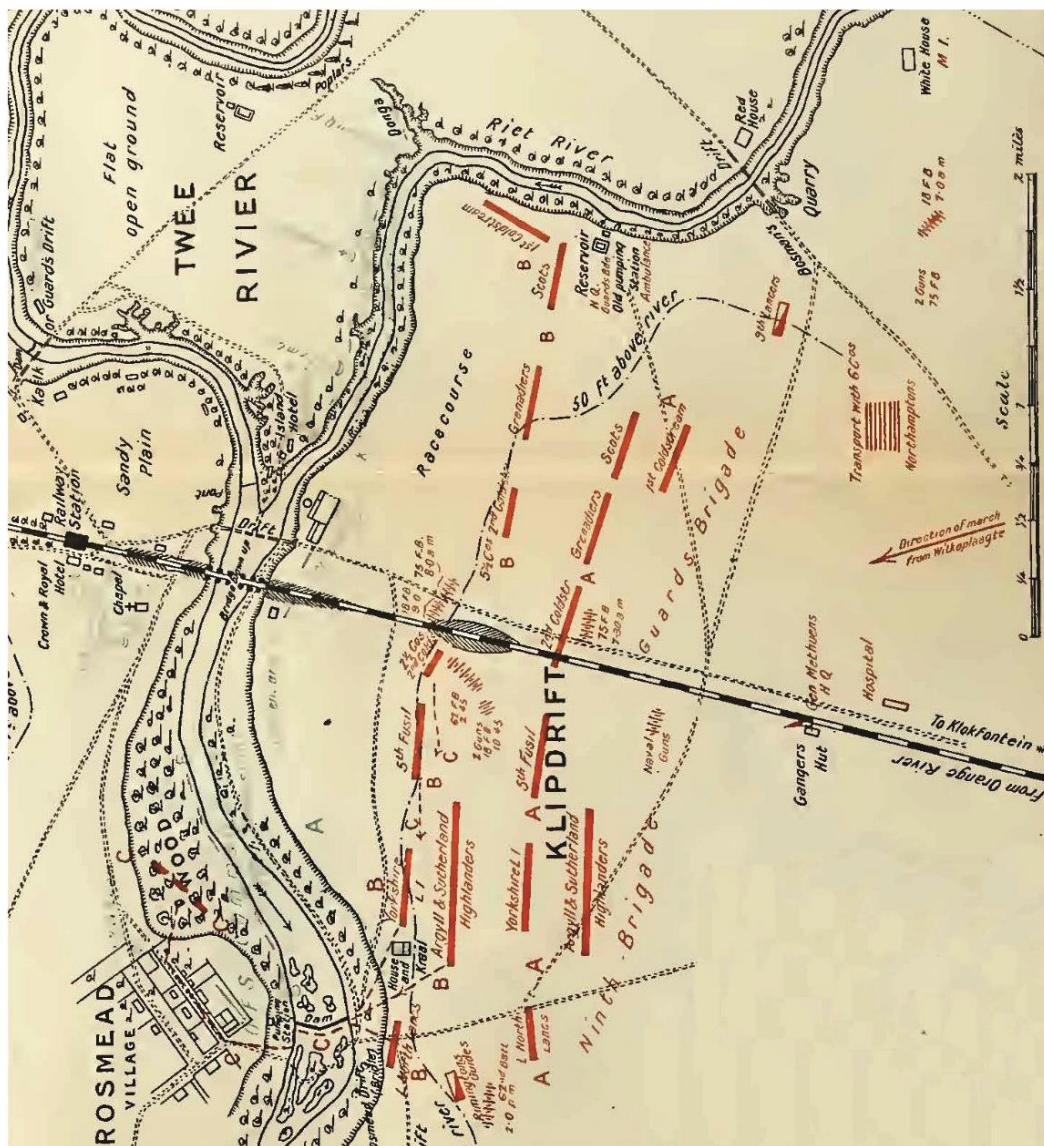
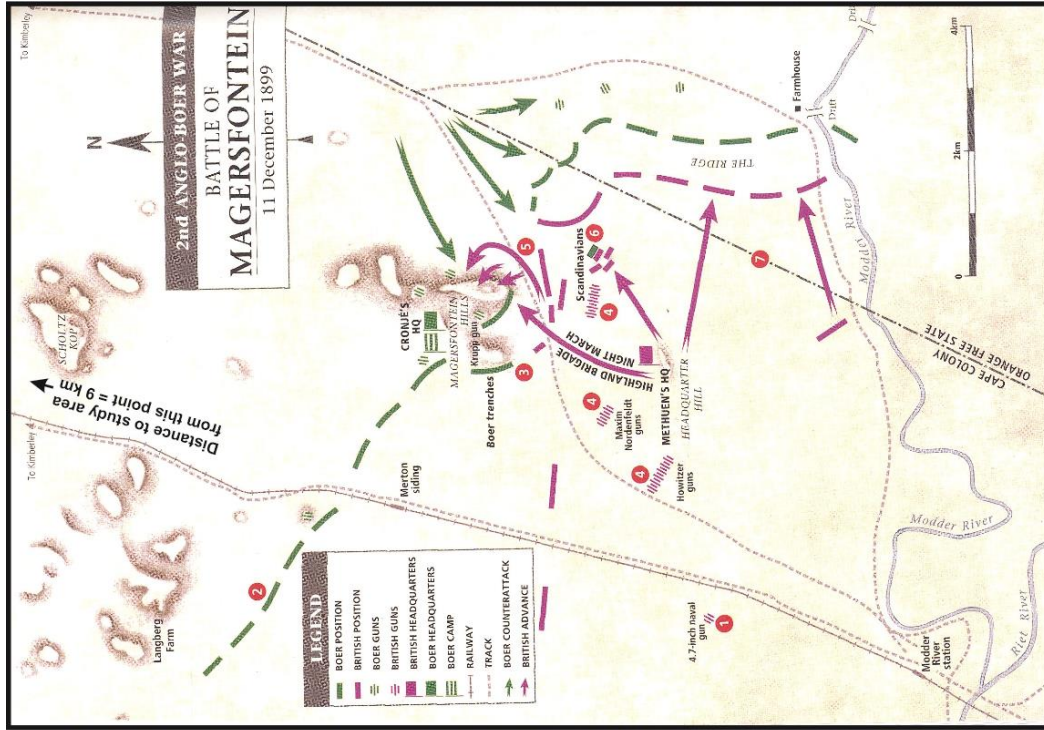


Figure 10. Battle plan of Modder River and Magersfontein (after Amery 1905 and Von der Heyde 2013)



Figure 11. The terrain is capped by thick deposits of late Quaternary, Kalahari Group aeolian sand and calcrete matrix (Scale 1 = 10 cm)