

HERITAGE IMPACT ASSESSMENT: PROPOSED PROSPECTING ON FARM 21, BARKLEY WEST Dikgatlong Local Municipality, Northern Cape Province

Required under Section 38(8) of the National Heritage Resources Act (No. 25 of 1999)
as part of a Heritage Impact Assessment.

SAHRA Case No.: 15922

Report for:

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On behalf of:

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SUMMARY

ASHA Consulting (Pty) Ltd was appointed by N.J. van Zyl to conduct a desktop assessment of the potential impacts to heritage resources that might occur as a result of a proposed diamond prospecting program on Farm 21, Barkley West District, Northern Cape. The site lies some 82 km north of Barkley West and 38 km west of Hartswater and is centred on S27° 47' 00" E24° 24' 40".

It lies on the Ghaap Escarpment in an area used largely for livestock grazing.

The desktop survey revealed that many very important archaeological sites occur in the region and the internationally famous Taung Fossil Site is also nearby. The sites include artefacts scattered within the Vaal River gravels as well as rock shelters along the margins of the Ghaap Escarpment.

There are no known heritage resources on Farm 21 but the possibility of such resources occurring cannot be entirely ruled out. The probability, however, is very low for all types of heritage and because of the generally very small physical impacts expected from drilling, no significant impacts to any heritage resources are expected.

It is recommended that the project be allowed to proceed but subject to the following recommendations:

- Each drill site must be carefully examined for any signs of fossils, archaeology or graves prior to the arrival of the drilling rig. If any such materials are found then they should be avoided by at least 30 m; and
- If any previously unknown fossils, archaeological material or human burials are uncovered during the course of drilling then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

Glossary

Acheulean: An archaeological name for the period comprising the later part of the Early Stone Age. This period started about 1.7-1.5 million years ago and ended about 250-200 thousand years ago.

Cleaver: A bifacially flaked tool that has a sharp flat edge opposing the bulb.

Early Stone Age: Period of the Stone Age extending approximately between 2 million and 200 000 years ago.

Handaxe: A bifacially flaked, pointed stone tool type typical of the Early Stone Age Acheulian Industry. It is also referred to as a large cutting tool.

Holocene: The geological period spanning the last approximately 10-12 000 years.

Hominid: a group consisting of all modern and extinct great apes (i.e. gorillas, chimpanzees, orangutans and humans) and their ancestors.

Later Stone Age: Period of the Stone Age extending over the last approximately 20 000 years.

Middle Stone Age: Period of the Stone Age extending approximately between 200 000 and 20 000 years ago.

Pleistocene: The geological period beginning approximately 2.5 million years ago and preceding the Holocene.

Abbreviations

APHP: Association of Professional Heritage Practitioners

ASAPA: Association of Southern African Professional Archaeologists

BA: Basic Assessment

CRM: Cultural Resources Management

DMR: Department of Mineral Resources

EA: Environmental Authorisation

ESA: Early Stone Age

GP: General Protection

GPS: global positioning system

HIA: Heritage Impact Assessment

LSA: Later Stone Age

MSA: Middle Stone Age

NBKB: Ngwao-Boswa Ya Kapa Bokoni

NEMA: National Environmental Management Act (No. 107 of 1998)

NHRA: National Heritage Resources Act (No. 25) of 1999

SAHRA: South African Heritage Resources Agency

SAHRIS: South African Heritage Resources Information System

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1. INTRODUCTION

ASHA Consulting (Pty) Ltd was appointed by N.J. van Zyl to conduct a desktop assessment of the potential impacts to heritage resources that might occur as a result of a proposed diamond prospecting program on Farm 21, Barkley West District, Northern Cape. The site lies some 82 km north of Barkley West and 38 km west of Hartswater, but a number of smaller settlements occur closer by (Figures 1 & 2). The nearest is Rietfontein, some 8.5 km to the southeast of the site. The part of Farm 21 targeted for prospecting is 1085 ha in extent and is centred on S27° 47' 00" E24° 24' 40".

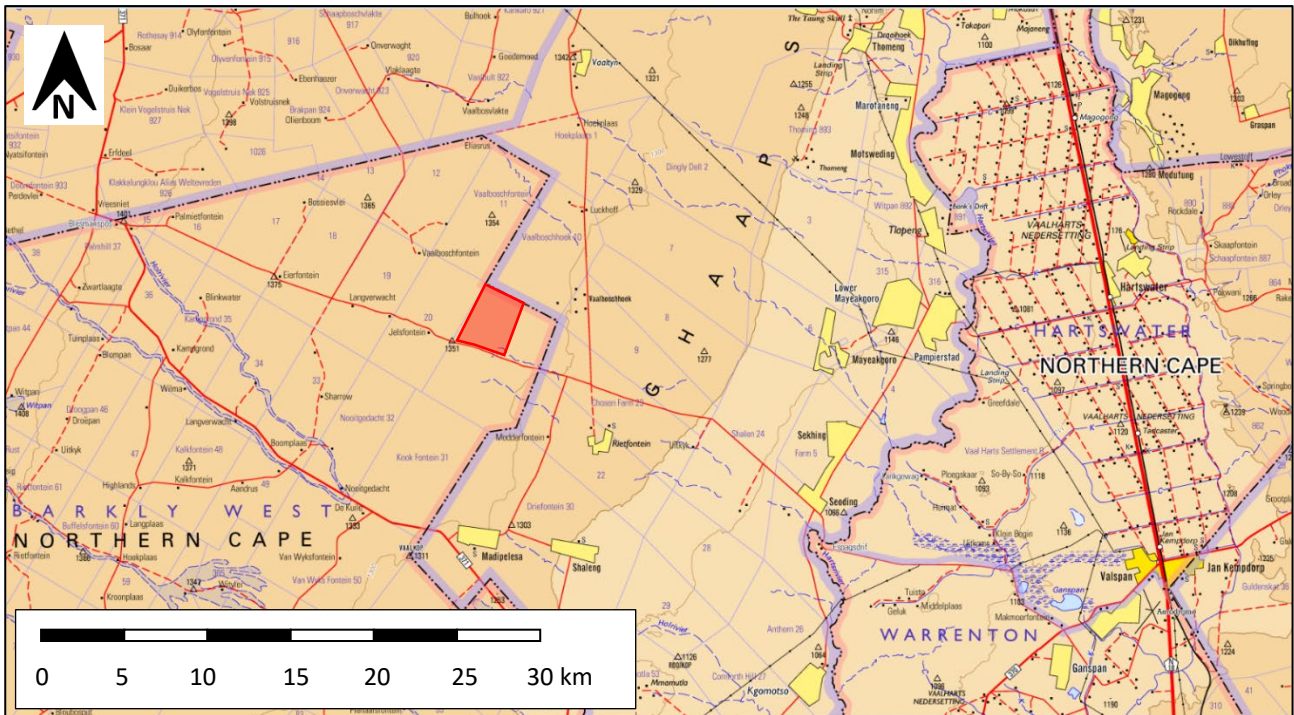


Figure 1: Extract from 1:250 000 topographic map 2724 showing the location of the site (red shaded polygon). Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.

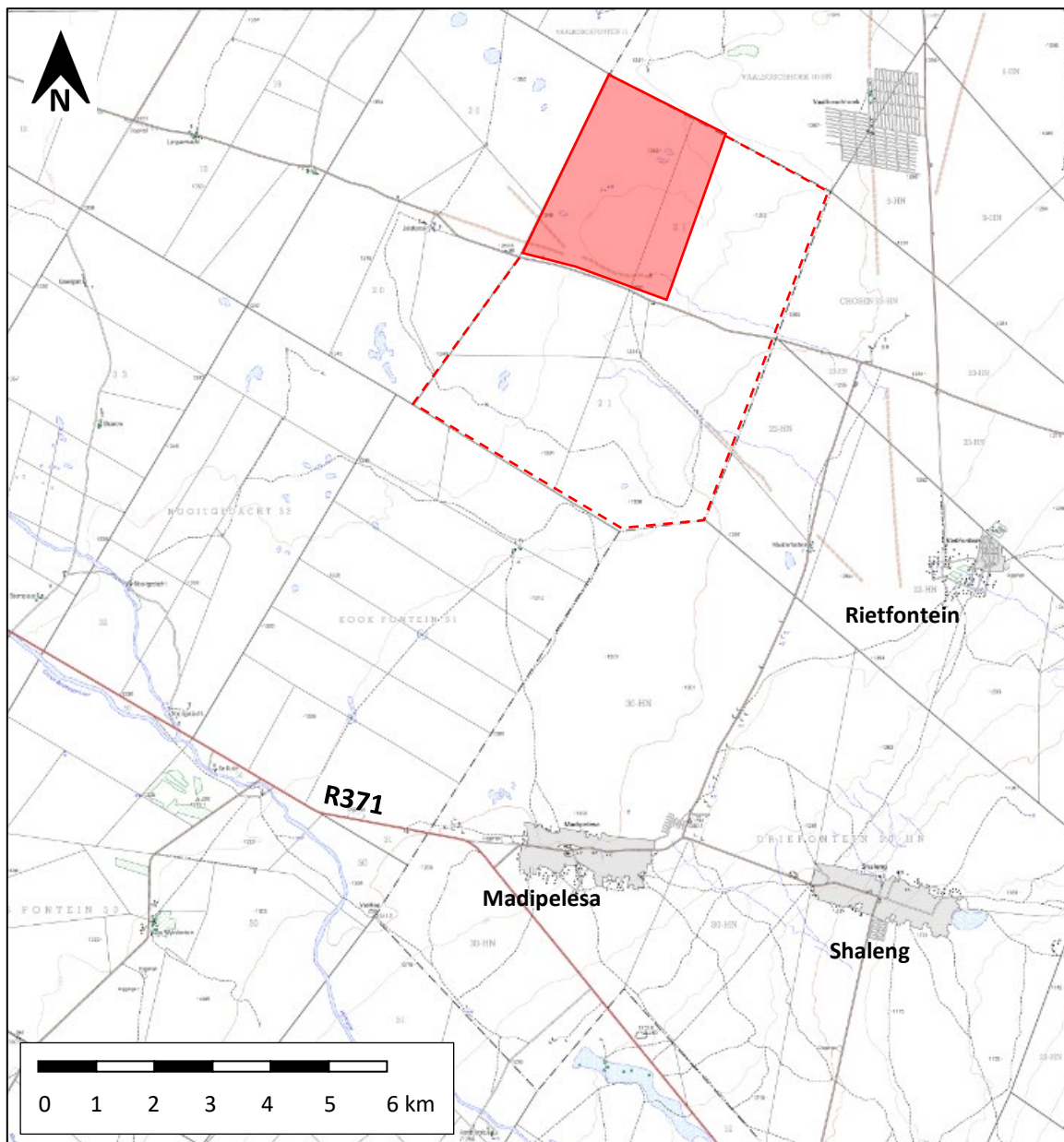


Figure 2: Extract from 1:50 000 topographic map 2724CD showing the location of the site (red shaded polygon) and Farm (red dashed outline). Nearby settlements are labelled (note that the laid out street grid in the northeast is undeveloped). Source of basemap: Chief Directorate: National Geo-Spatial Information. Website: www.ngi.gov.za.

1.1. The proposed project

1.1.1. Project description

The first stages will involve desktop research, surface investigations and geophysical surveys to assist with determining the exact locations for invasive prospecting. The prospecting will be by means of a 165 mm diameter reverse circulation drill. The drill rig is mounted on a truck that will drive along farm tracks and, if needed, through the vegetation to access each drill site. These tracks will be rehabilitated by means of raking the trampled surface. The locations of the drill sites will be determined during the early stages of the project and it is envisaged that approximately five boreholes will be drilled. The drilling program will extend over approximately 24 months.

1.1.2. Identification of alternatives

There are no location or technology alternatives since the site is determined by where the mineral resources are expected to occur and the technology chosen is best suited to the prospecting process. As such only the preferred and No-Go options will be assessed.

1.1.3. Aspects of the project relevant to the heritage study

All aspects of the proposed development are relevant, since excavations for foundations and/or services may impact on archaeological and/or palaeontological remains, while all above-ground aspects (although temporary in this case) create potential visual (contextual) impacts to the cultural landscape and any significant heritage sites that might be visually sensitive.

1.2. Terms of reference

ASHA Consulting was asked to provide a desktop heritage impact assessment (HIA) that included all aspects of heritage.

On application to SAHRA, they provided an interim comment dated 29 January 2021 indicating that a desktop HIA that included specialist assessments of archaeology and palaeontology was required. Any other relevant heritage resources that might be impacted should also be considered.

1.3. Scope and purpose of the report

An HIA is a means of identifying any significant heritage resources before development begins so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This HIA report aims to fulfil the requirements of the heritage authorities such that a comment can be issued by them for consideration by the National Department of Mineral Resources (DMR) who will review the Basic Assessment (BA) and grant or refuse authorisation. The HIA report will outline any management and/or mitigation requirements that will need to be complied with from a heritage point of view and that should be included in the conditions of authorisation should this be granted.

1.4. The author

Dr Jayson Orton has an MA (UCT, 2004) and a D.Phil (Oxford, UK, 2013), both in archaeology, and has been conducting Heritage Impact Assessments and archaeological specialist studies in South Africa (primarily in the Western Cape and Northern Cape provinces) since 2004 (please see curriculum vitae included as Appendix 1). He has also conducted research on aspects of the Later Stone Age in these provinces and published widely on the topic. He is an accredited heritage practitioner with the Association of Professional Heritage Practitioners (APHP; Member #43) and also holds archaeological accreditation with the Association of Southern African Professional Archaeologists (ASAPA) CRM section (Member #233) as follows:

- Principal Investigator: Stone Age, Shell Middens & Grave Relocation; and
- Field Director: Colonial Period & Rock Art.

1.5. Declaration of independence

ASHA Consulting (Pty) Ltd and its consultants have no financial or other interest in the proposed development and will derive no benefits other than fair remuneration for consulting services provided.

2. LEGISLATIVE CONTEXT

The National Heritage Resources Act (NHRA) No. 25 of 1999 protects a variety of heritage resources as follows:

- Section 34: structures older than 60 years;
- Section 35: prehistoric and historical material (including ruins) more than 100 years old as well as military remains more than 75 years old, palaeontological material and meteorites;
- Section 36: graves and human remains older than 60 years and located outside of a formal cemetery administered by a local authority; and
- Section 37: public monuments and memorials.

Following Section 2, the definitions applicable to the above protections are as follows:

- Structures: “any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith”;
- Palaeontological material: “any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace”;
- Archaeological material: a) “material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures”; b) “rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation”; c) “wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation”; and d) “features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found”;
- Grave: “means a place of interment and includes the contents, headstone or other marker of such a place and any other structure on or associated with such place”; and
- Public monuments and memorials: “all monuments and memorials a) “erected on land belonging to any branch of central, provincial or local government, or on land belonging to any organisation funded by or established in terms of the legislation of such a branch of government”; or b) “which were paid for by public subscription, government funds, or a public-spirited or military organisation, and are on land belonging to any private individual.”

Section 3(3) describes the types of cultural significance that a place or object might have in order to be considered part of the national estate. These are as follows:

- a) its importance in the community, or pattern of South Africa's history;
- b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- i) sites of significance relating to the history of slavery in South Africa.

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list "historical settlements and townscapes" and "landscapes and natural features of cultural significance" as part of the National Estate. Furthermore, some of the points in Section 3(3) speak directly to cultural landscapes.

Section 38(8) of the NHRA states that if an impact assessment is required under any legislation other than the NHRA then it must include a heritage component that satisfies the requirements of S.38(3). Furthermore, the comments of the relevant heritage authority must be sought and considered by the consenting authority prior to the issuing of a decision. Under the National Environmental Management Act (No. 107 of 1998; NEMA), as amended, the project is subject to a BA. The present report provides the heritage component. Ngwao-Boswa Ya Kapa Bokoni (Heritage Northern Cape; for built environment and cultural landscapes) and the South African Heritage Resources Agency (SAHRA for archaeology and palaeontology) are required to provide comment on the proposed project in order to facilitate final decision making by the DMR.

3. METHODS

3.1. Literature survey and information sources

A survey of available literature was carried out to assess the general heritage context into which the development would be set. The information sources used in this report are presented in Table 1.

Table 1: Information sources used in this assessment.

Data / Information	Source	Date	Type	Description
Maps	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical and current 1:50 000 topographic maps of the study area and immediate surrounds
Aerial photographs	Chief Directorate: National Geo-Spatial Information	Various	Spatial	Historical aerial photography of the study area and immediate surrounds
Aerial photographs	Google Earth	Various	Spatial	Recent and historical aerial photography of the study area and immediate surrounds
Cadastral data	Chief Directorate: National Geo-Spatial Information	Various	Survey diagrams	Historical and current survey diagrams, property survey and registration dates
Background data	South African Heritage Resources Information System (SAHRIS)	Various	Reports	Previous impact assessments for any developments in the vicinity of the study area
Palaeontological sensitivity	South African Heritage Resources Information System (SAHRIS)	Current	Spatial	Map showing palaeontological sensitivity and required actions based on the sensitivity.
Background data	Books, journals, websites	Various	Books, journals, websites	Historical and current literature describing the study area and any relevant aspects of cultural heritage.

3.2. Specialist studies

One specialist study was commissioned. This was for palaeontology and the assessment was conducted by Dr John Almond. The archaeological specialist component was carried out by the present author and is contained within the HIA.

3.3. Grading

S.7(1) of the NHRA provides for the grading of heritage resources into those of National (Grade I), Provincial (Grade II) and Local (Grade III) significance. Grading is intended to allow for the identification of the appropriate level of management for any given heritage resource. Grade I and II resources are intended to be managed by the national and provincial heritage resources authorities respectively, while Grade III resources would be managed by the relevant local planning authority. These bodies are responsible for grading, but anyone may make recommendations for grading.

It is intended under S.7(2) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance but this is generally yet to happen. SAHRA (2007) has formulated its own system¹ for use in provinces where it has commenting authority. In this system sites of high local significance are given Grade IIIA (with the implication that the site should be preserved in its entirety) and Grade IIIB (with the implication that part of the site could be mitigated and part preserved as appropriate) while sites of lesser significance are referred to as having 'General Protection' (GP) and rated as GP A (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GP C (low significance, requires no further action).

¹ The system is intended for use on archaeological and palaeontological sites only.

3.4. Consultation

The NHRA requires consultation as part of an HIA but, since the present study falls within the context of an EIA which includes a public participation process (PPP), no dedicated consultation was undertaken as part of the HIA. Interested and affected parties would have the opportunity to provide comment on the heritage aspects of the project during the PPP.

3.5. Assumptions and limitations

The study was limited by the lack of fieldwork but it is assumed that the desktop review and examination of aerial photography would provide an adequate overview of the heritage of the area.

4. PHYSICAL ENVIRONMENTAL CONTEXT & DESCRIPTION

The site lies in a rural area, although several settlements do occur in the surrounding area, especially to the east and southeast. The nearest as about 2 km east of the study area. The site itself is undeveloped (Figure 3) and, as shown by a livestock enclosure visible on aerial photography, has been in use for livestock grazing (Figure 4). The site is relatively flat but slopes gently from northwest down towards the southeast (Figure 5). The north-eastern half of the site is slightly higher than the south-eastern half. Humphreys and Thackeray (1983) note that the Ghaap Plateau is largely covered by calcrete and many small pans, which accumulate water after heavy rains, occur on the surface. A few pans are visible in the study area (Figure 4). Along the edge of the escarpment there is much tufa formation and this rock has resulted in cliffs in places which, in turn, house rock shelters and caves.

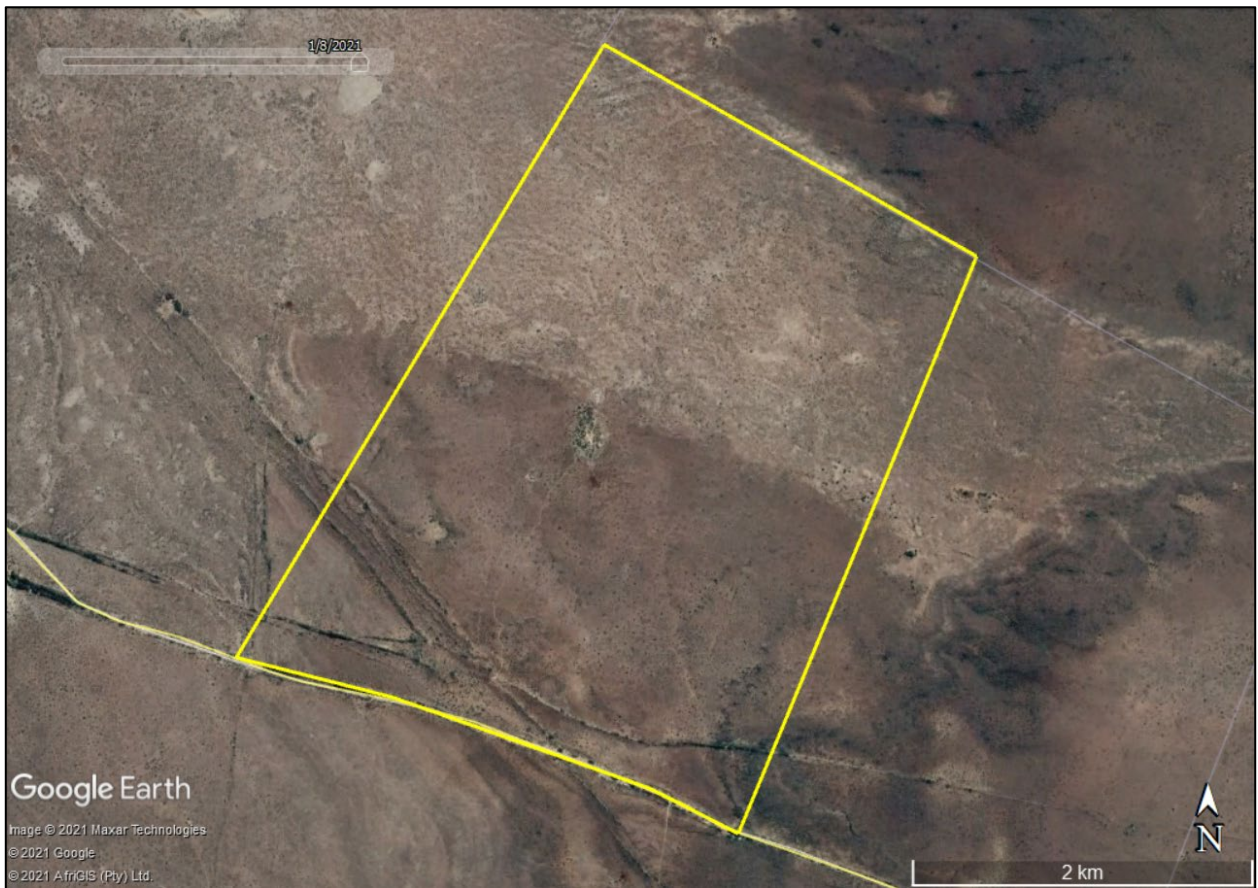


Figure 3: Aerial view of the area proposed for prospecting.

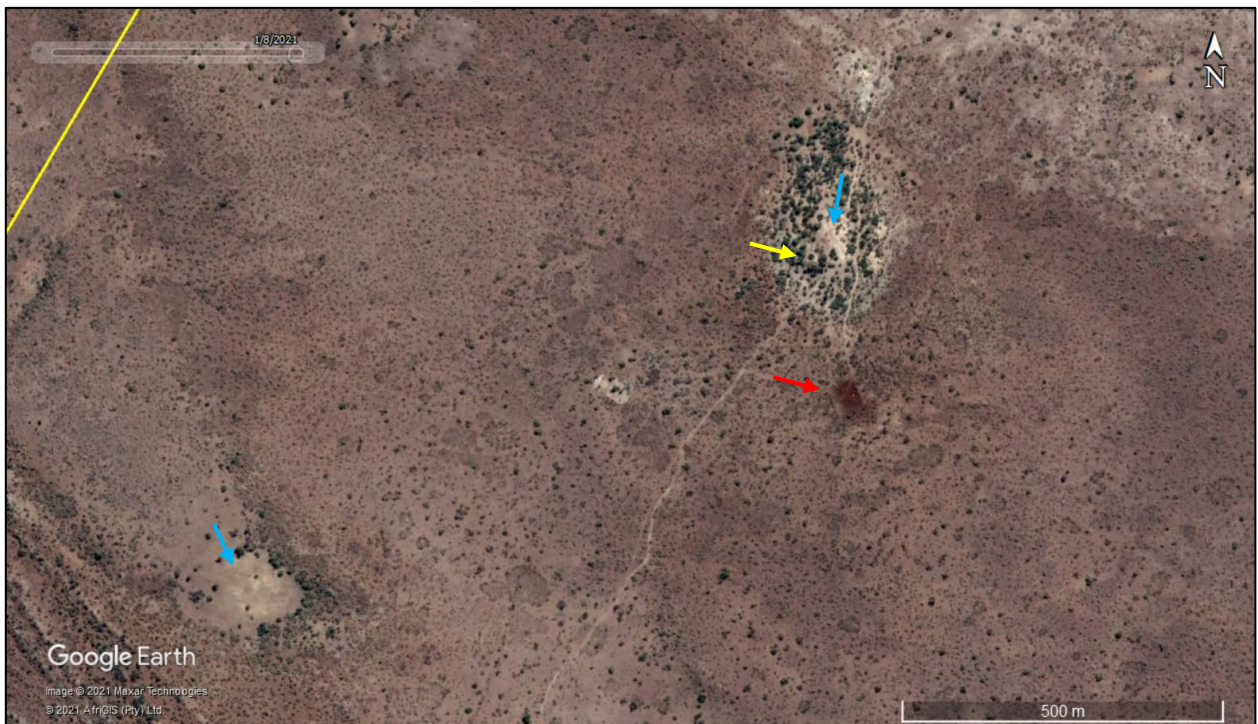


Figure 4: Aerial view of the western part of the study area showing pans (turquoise arrows), a livestock enclosure (red arrow) and a cement reservoir (yellow arrow).

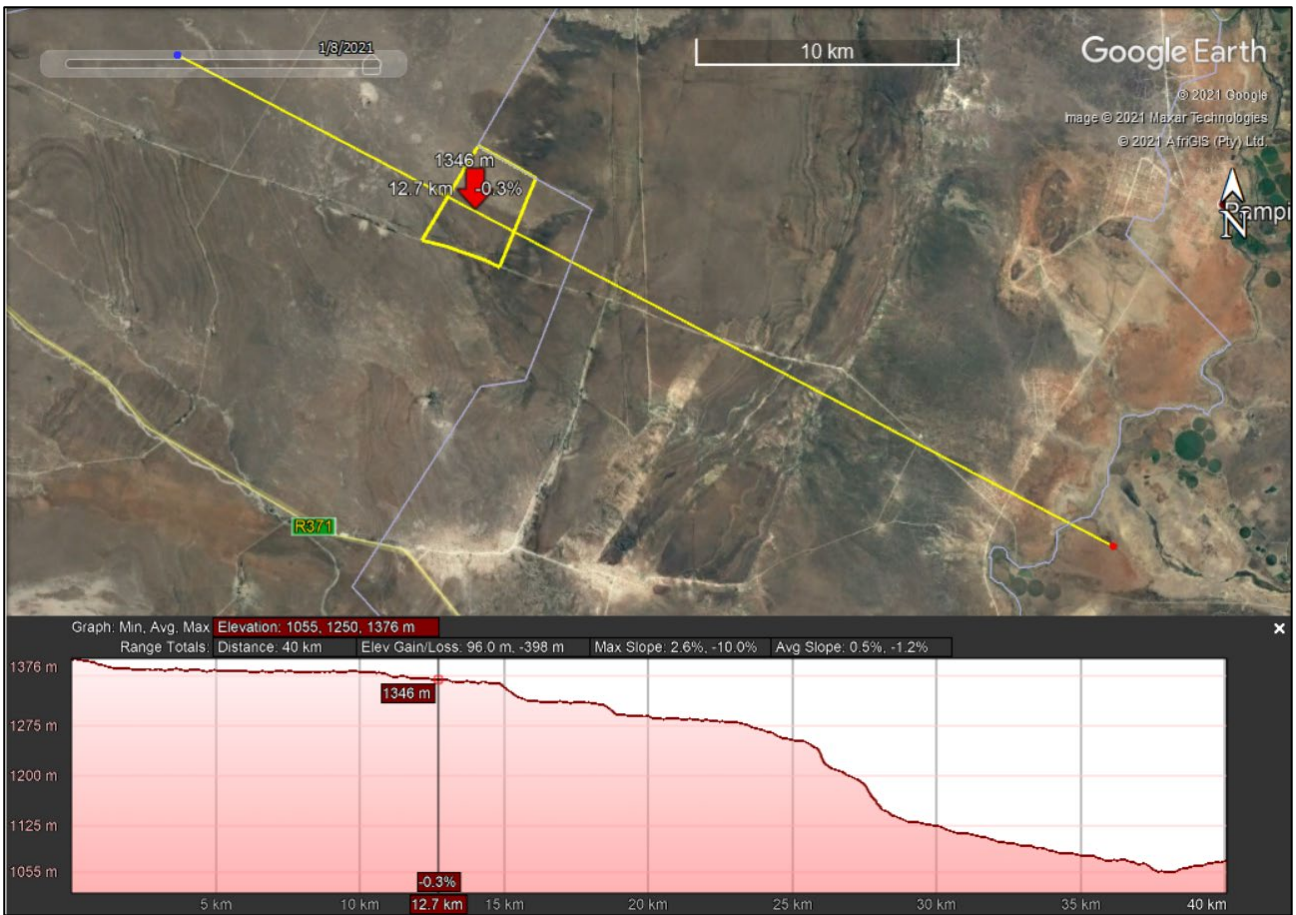


Figure 5: Elevation profile from the Ghaap Plateau (left), through the site, off the Ghaap Escarpment and down to the Harts River (right). It is evident that the site is above the main escarpment on the plateau.

5. FINDINGS OF THE HERITAGE STUDY

This section describes the heritage resources recorded in the study area during the course of the project.

5.1. Palaeontology

The SAHRIS Palaeosensitivity map shows the site to be of high to very high palaeontological sensitivity. A specialist assessment of palaeontological impacts has been compiled by Almond (2021) and should be read in conjunction with this HIA. One fossil site is highlighted here though.

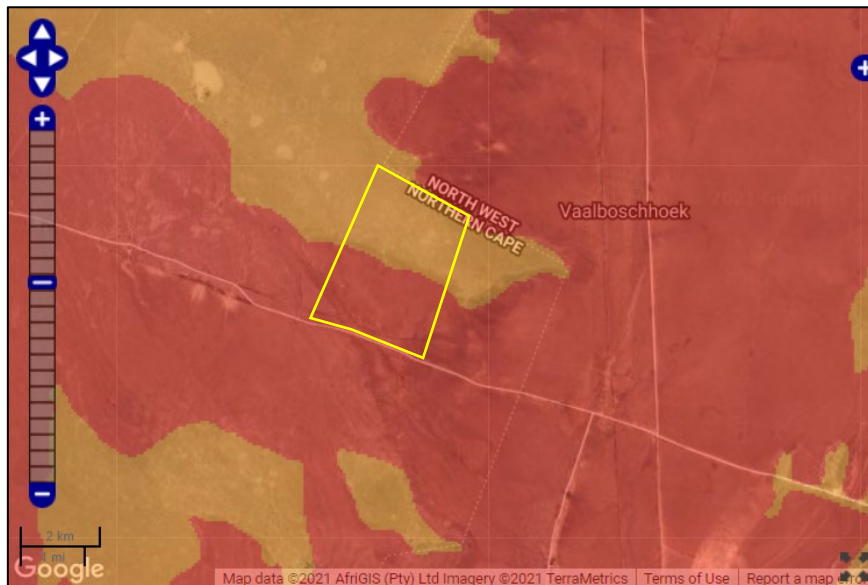


Figure 6: Extract from the SAHRIS Palaeosensitivity map showing the site (yellow polygon) to be of high (orange) and very high (red) palaeontological sensitivity.

The most important palaeontological site in the region is the Taung Fossil Site, previously the Buxton Limeworks. This site, located 26.5 km northeast of the study area, yielded a small hominid skull in 1924. First described by Raymond Dart from the University of the Witwatersrand, the skull became the type specimen of the species *Australopithecus africanus*. Taung has also yielded vast numbers of other animal fossils from a number of different localities and that originated over a vast period of time. These fossils are all located within the limestone/tufa deposits (Hocking 1983). Due to its great importance, the site has also been declared a National Heritage Site.

5.2. Archaeology

A number of very important archaeological sites are located in the region but, because those sites that have been documented are spread through the landscape, reference is made here to a number of sites within about 100 km of the study area. Of greatest concern, given the proposal, is those sites that are part of the gravel deposits of the Vaal River Basin. However, important sites also lie along the Ghaap Escarpment. Figure 7 shows the locations of many of these sites.

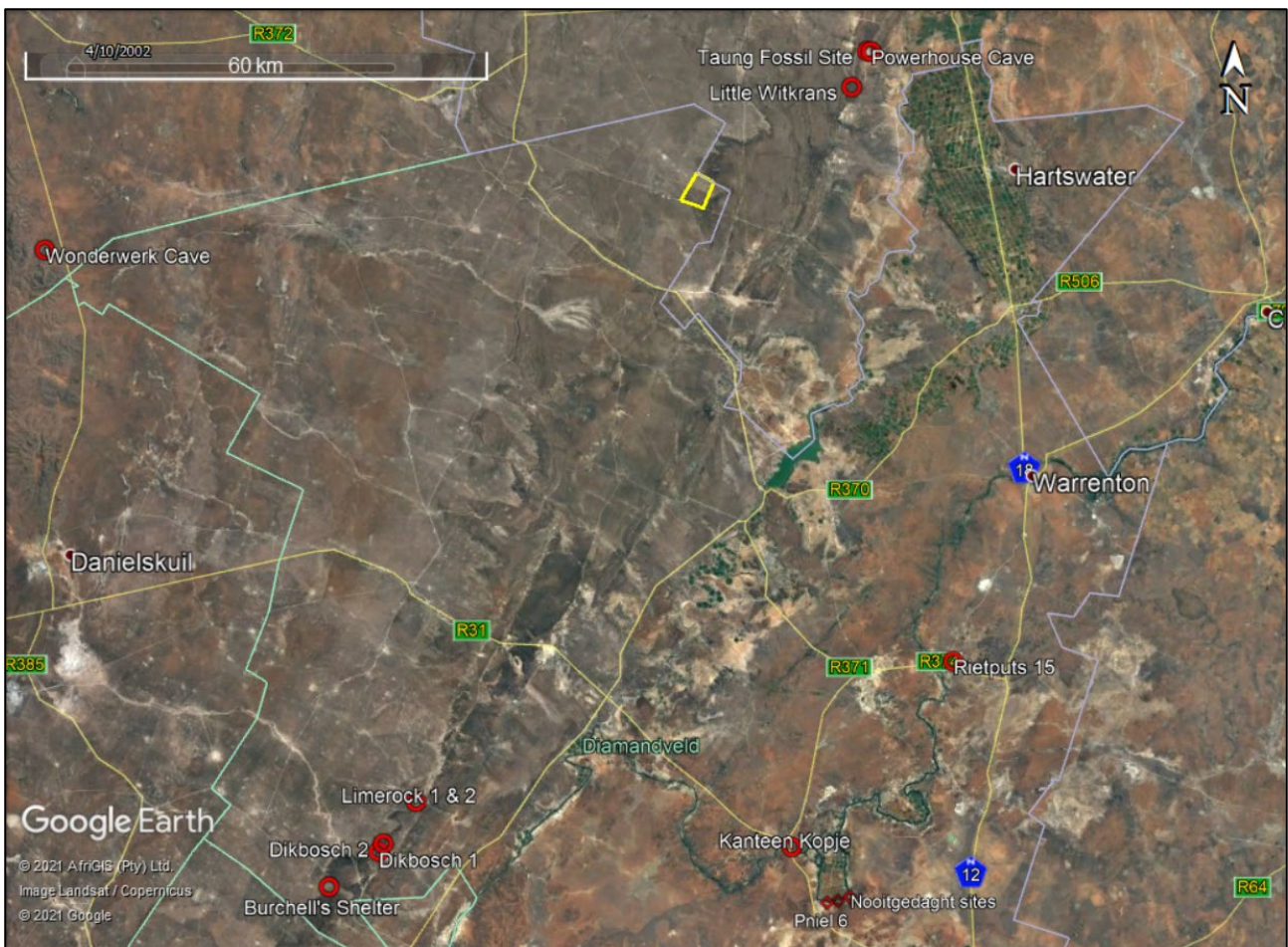


Figure 7: View of the region showing the study area (yellow polygon) and various archaeological sites in the region (red symbols).

The Vaal River gravels have long been recognised as a source of Early Stone Age (ESA) stone artefacts. The earliest amateur archaeological work in South Africa focused on the Cape Town area and the diamond-bearing gravels of the Vaal River (Mitchell 2002). Stow and Jones (1874) made one of the earliest collections of materials from the area with the artefacts now housed in The British Museum. Another collection, also in The British Museum, was made by Andrew Anderson between 1867 and 1885 (Davenport 1978). The discovery of stone artefacts in the gravels of the Vaal River Basin was directly linked to the mining of diamonds from these gravels.

A modern study of materials from these gravels has been conducted by Leader (2009). He studied artefacts from a site called Rietputs 15 near Windsorton. The first materials collected there were found in mine dumps by Van Riet Lowe (1945) and Breuil (1943, 1948). Handaxes were commonly collected (Van Riet Lowe 1948) but Leader (2009) notes that early collections were very selective with only good specimens retained. He also notes that a great difficulty in the study of artefacts from the gravels of the Vaal River Basin is that these gravels occur at depths of between 3 m and 20 m below the modern land surface (Figure 8). Conventional archaeological techniques thus do not work and mine trenches become the primary access points to the archaeology.

Another modern research project looked at dating the gravels and determined that they were deposited between about 1.8 and 1.35 million years ago (Gibbon 2009; Gibbon *et al.* 2009).



Figure 8: A diamond mining pit at Rietputs 15 showing hornfels bedrock overlaid by gravel and alluvial deposits. Source: Leader (2009: fig. 3.1).

Some 84 km south of the study area is Canteen Kopje. This site has been extensively studied (Beaumont & McNabb 2000; Forssman *et al.* 2010; Kuman *et al.* 2020; Leader 2014; Lotter *et al.* 2016; McNabb & Beaumont 2011) and, because of the density of archaeological materials there, it has been declared a National Heritage Site. The deposits there were also exposed by diamond mining and the site remains under pressure from mining. The archaeology includes materials dating to all three Stone Age periods and also include contact period materials from the last few hundred years. Although the ESA material is most famous, work on the younger materials which occur in Hutton sands, has also been published (Chazan *et al.* 2013). A short way to the southeast again are the sites of Pniel 1 (also known as Power's Site) and 6 and a few sites named Nooitgedaght (Beaumont 1990a, 1990b, 1990c; Power 1955). These sites have variably produced ESA and early MSA artefacts, including vast numbers of handaxes and cleavers (Figure 9). Pniel 1 is also well-known for having produced fossil bones and teeth which were likely associated with the ESA artefacts (Klein 1988).

ESA materials are well known from other areas along the Vaal River as well. These include further upstream near Vereeniging (Le Roux 1971). Helgren (1978) considered a number of sites along the river in his analysis of ESA settlement contexts.



Figure 9: A pile of handaxes and cleavers collected from the site of Pniel 1 in 1984. Source: Beaumont (1990b: fig. 3).

A number of other sites occur in the area, especially along the Ghaap Escarpment which runs from northeast to southwest and passes by to the southeast of the study area. Most of these have been studied by Humphreys and Thackeray (1983). They will be briefly mentioned.

Dikbosch 1 (located about 93 km southwest of the study area) revealed a stratigraphy that, from the available radiocarbon dates, seems to have largely accumulated during the very late Pleistocene and early Holocene (14 000 to 8 000 years ago) but with a pulse of late Holocene occupation during the last 3000 years. The upper layers contain many typical Later Stone Age (LSA) scrapers and backed tools, but small numbers of these artefacts occur throughout the deeper layers as well and are assumed by Humphreys and Thackeray (1983) to have migrated through the very soft deposits. Two tiny fragments of bifacial points and a complete bifacial tanged and barbed arrowhead were found. The site is the westernmost location at which such bifacial points have been found. The site also contained organic artefacts of wood, string, bone and ostrich eggshell (beads and engraved pieces). The nearby Dikbosch 2 rock shelter is a smaller site with less archaeology. A single date suggests most of the deposit to be very late Holocene in age (Humphreys & Thackeray 1983).

Limerock 1 and 2 lie about 84 km southwest of the study area. Both sites seem to only contain deposits dating within the last approximately 1700 years. Scrapers, a few backed tools, grindstones, bone points, ostrich eggshell beads, pottery and a freshwater mussel pendant were found.

Little Witkrans Shelter (located 22.5 km northwest of the study area) was first excavated in the 1940s (Peabody 1954). Further excavations and dating show that the deposits in this shelter accumulated throughout the early, middle and late Holocene (Humphreys & Thackeray 1983). Finds included microlithic scrapers and backed artefacts, pottery, engraved ostrich eggshell and a freshwater shell pendant.

Powerhouse Cave lies along the Ghaap Escarpment very close to the Taung Fossil Site. It revealed a late Holocene deposit that accumulated within the last 4000 years and contained typical LSA materials (Humphreys 1978 cited in Morris 1990).

Located in the Kuruman Hills 83 km to the west of the study area, Wonderwerk Cave is one of the most important archaeological sites in South Africa and is also a declared National Heritage Site. The site is a huge solution cavity containing a 6 m deep archaeological reposit with ESA, MSA and LSA layers (Chazan *et al.* 2008; Chazan & Horwitz 2010; Humphreys & Thackeray 1983; Morris 2016). This type of site is not directly relevant to the study area and Wonderwerk is thus not discussed further.

One commercial archaeological survey has occurred on Farm 21, but it only looked at the existing access road and an approximately 10 ha pan where three boreholes were proposed (Miller 2016). No archaeological or other heritage remains were found with the only anthropogenic traces being 20th century and related to cattle farming. Many other applications are lodged on SAHRIS but none in close proximity to the site have heritage reports attached to them.

The above review suggests that surface archaeological resources are unlikely to occur but that the gravels that are the target of the drilling may well contain archaeological artefacts, most likely dating to the ESA. However, because the drilling method is destructive, it is not possible to even determine whether there is archaeology present and, of course, artefacts cannot be rescued.

5.3. Graves

Unmarked precolonial graves or historical graves (marked or unmarked) may occur anywhere on the landscape. The locations of these features cannot be predicted but the chances of their presence are generally low.

5.4. Historical aspects and the Built environment

Much of the history of this general area revolves around the mining of diamonds and limestone. The first diamond was discovered along the Orange River in 1868. This was the 83.5 carat 'Star of South Africa'. A number of other isolated diamonds were later picked up, mostly along the Vaal River, and very soon diamond hunting began in earnest. Because few white men had penetrated the area by that time, most early searches were carried out by local Griqua and Koranna people. However, in late 1869, the first white prospecting party arrived. The Griquas would not allow them to prospect with picks and shovels, so they used pointed sticks. They worked initially at Hebron but, finding nothing there, they moved to Klipdrift (now Barkley West). There they were able to sieve and wash some gravel and met with immediate success (Hocking 1983).

Once the diamond wealth became known, the Koranna tried to evict the white men from the area but, due to their superior weapons, the white men held their ground. Soon afterwards a trader wrote to the newspapers in the Cape inviting people to come and seek their fortunes. Many arrived and mining was soon formalised under a diggers' council. In mid-1870 the Transvaal Republic granted mining rights along the Harts River to two men named Webb and Ponso but, on arriving in the area and announcing the diggers had to pay to work in their concessions, the diggers forced them to abide by the rules of the diggers' council and they abandoned their money-making plans. There was political wrangling over the area but eventually it was annexed by the British as

Griqualand West and the Free State boundary was forced back east of Kimberley. Hostilities continued and only after the Battle of Driefontein was Griqualand West formally made part of the Cape Colony in August 1879 (Hocking 1983). Subsequently, tiger's eye, asbestos and limestone were all mined in the region.

The Buxton Limeworks started in 1907 as Nolan Lime but merged with the Northern Lime Company from the Transvaal in 1917. Later Nolan pulled out and, when the Northern Lime Company closed their Transvaal quarry, the Buxton Limeworks became their sole source of limestone. They exploited an area of limestone along the margins of the Ghaap Escarpment. When the limestone originally formed it sometimes left cavities which may have accumulated fossils. From 1920 onwards, mining opened several such caverns, revealing many fossils. Other limestone mines also occur along the edge of the Ghaap Plateau such as that at Ulco, to the southwest, which was named after the Union Limestone Company (Hocking 1983).

Miller's (2016) very brief survey suggested that the only anthropogenic materials present in the study area were 20th century livestock-related features. A close examination of the site on Google Earth shows no apparent structures and his assessment is likely to be correct.

The elongated features visible on aerial photography in the southern part of the study area (Figures 3 & 10) are noted by Almond (2021) as being dolerite dykes, or possibly even Kimberlite exposures. These features could host some Stone Age archaeology.

Farm 21 itself was first surveyed in 1880 and granted as a Quitrent farm to George de Pass on 15th June 1891. An examination of aerial photography shows no sign of a house anywhere on the farm. None is present on the 1:50 000 map either (Figure 1)

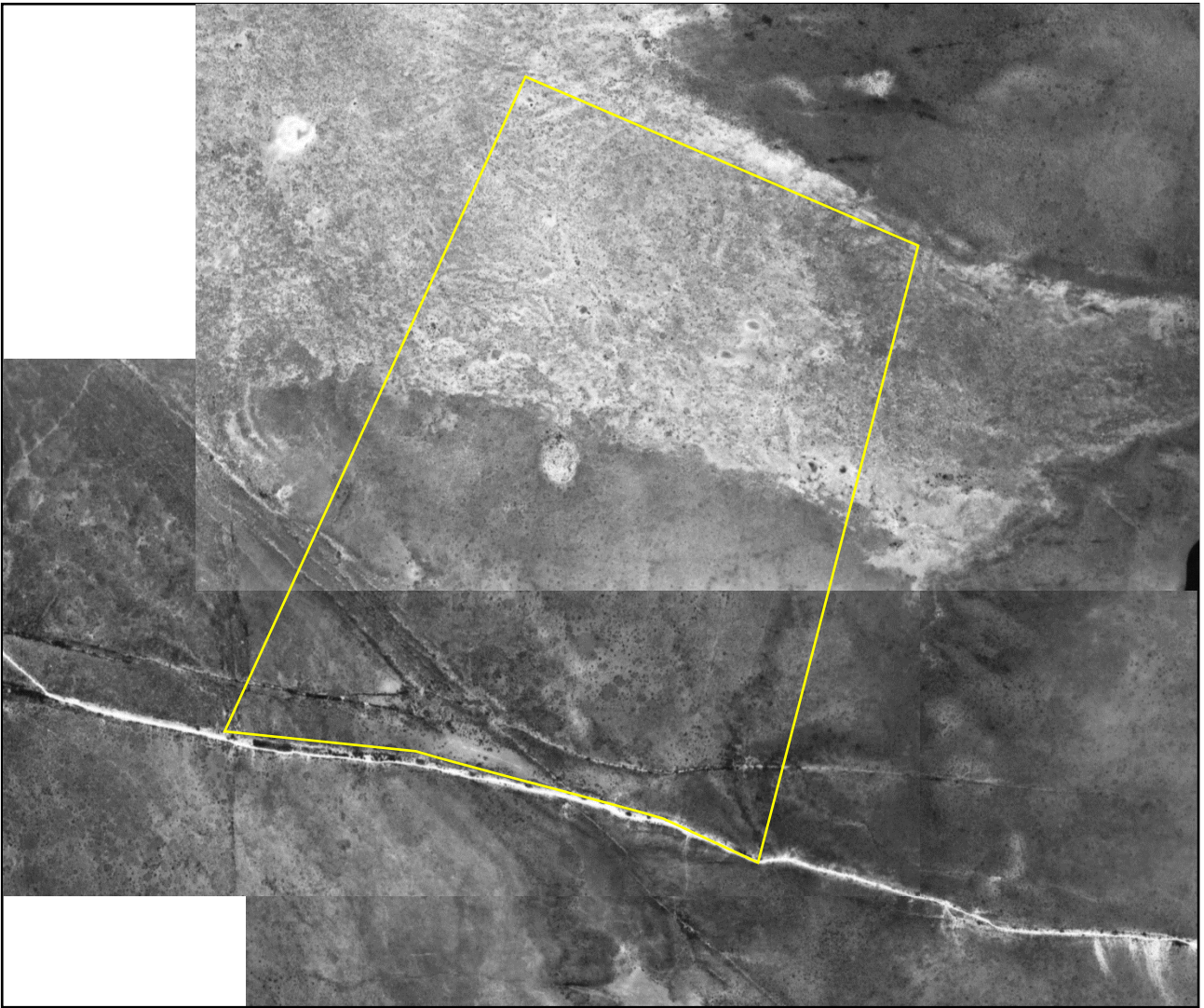


Figure 10: 1959 aerial photography (430_019_06886 & 430_020_06908) showing the outline of the site (yellow polygon).

5.5. Cultural landscapes and scenic routes

Aside from the mining ventures which generally lie at or beyond the actual edge of the Ghaap Escarpment, the landscape is used predominantly for livestock rearing. This leaves few anthropogenic traces with the result that the landscape is largely a natural one.

The site is not along any well-used roads that could be called scenic routes and this aspect is of no further concern.

5.6. Statement of significance and provisional grading

Section 38(3)(b) of the NHRA requires an assessment of the significance of all heritage resources. In terms of Section 2(vi), “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. The reasons that a place may have cultural significance are outlined in Section 3(3) of the NHRA (see Section 2 above).

It is not known what fossils may be present on the site but Almond (2021) considers it highly unlikely that significant palaeontological impacts will occur. It is impossible to allocate a grade since a variety of possible fossils with variable significance (potentially GPC up to IIIA or higher) could be present.

It is completely unknown what archaeological resources might be present but it is possible that highly significant materials could occur within the Vaal River basin gravels if these are indeed found to underlie the study area. If present, the archaeological materials could have low or high cultural significance for their scientific value. Once again, any grading from GPC up to perhaps IIIA (or higher) is possible but cannot be determined without an excavation. It is also possible that there is no buried archaeology on the site.

Graves are deemed to have high cultural significance for their social value but none are known to occur on the site.

5.7. Summary of heritage indicators

There are no known surface or buried heritage resources (including fossils, archaeology and graves) on the site. Nevertheless, although the chances are considered to be small, it is possible that such materials could exist. When locations for the drill sites are chosen a careful examination should be made of the surface to determine whether there are any (1) angular rock fragments that might be stone artefacts, (2) bones that are not obviously a result of recent deaths and (3) any signs of graves in the immediate area.

- Indicator: Archaeological materials and/or fossils and/or graves must be avoided.

Because the visual intrusion into the landscape will be minimal and temporary, no indicators related to the cultural landscape are needed.

6. ASSESSMENT OF IMPACTS

Because it has been determined that there will be no significant impacts to the cultural landscape and historical resources are likely absent from the site, only archaeology, fossils and graves are further assessed in this section.

6.1. Impacts to archaeological and palaeontological resources

Direct, negative impacts to archaeological materials and/or fossils could occur during the operation phase. No construction phase is envisaged, since it is only required to drive the drill rig to the appropriate location. Because of the very minimal surface impacts and relatively narrow diameter of the subsurface drill hole, impacts are expected to be local, and of low intensity. Despite any impacts being permanent, the low probability and intensity mean an impact significance of **low negative** (Table 2). The only mitigation that can be suggested is to examine the surface of the drill site for any obvious signs of stone artefacts or fossils prior to drilling and avoid such materials if found. Due to the nature of the drilling – which crushes the materials in the hole – it is not possible to rescue archaeological materials and/or fossils from the spoils. The significance rating post-mitigation remains **low negative**. There are no fatal flaws and cumulative impacts are of no concern because very little to no impact is expected as a result of this prospecting project.

Table 2: Assessment of archaeological impacts.

Potential impacts on archaeological resources	
Nature and status of impact:	Direct and negative
Extent and duration of impact:	Local and permanent
Intensity	Low
Probability of occurrence:	Low
Degree to which the impact can be reversed:	Low
Degree to which the impact may cause irreplaceable loss of resources:	High
Cumulative impact prior to mitigation:	Low
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be mitigated:	Low
Proposed mitigation:	Avoid visible archaeological materials and fossils.
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low

6.2. Impacts to graves

Direct, negative impacts to graves could occur during the operation phase. No construction phase is envisaged, since it is only required to drive the drill rig to the appropriate location. Because of the very minimal surface impacts and relatively narrow diameter of the subsurface drill hole, impacts are expected to be local, but, if a grave was encountered, they could be of high intensity. Despite any impacts being permanent, the extremely low probability still means an impact significance of **low negative** (Table 3). The only mitigation that can be suggested is to examine the surface of the drill site for any obvious signs of a grave (packed stones, an earth mound, marine shells) prior to drilling and avoid such places if found (moving the drill hole at least 30 m away is preferred). Due to the nature of the drilling – which crushes the materials in the hole – it is not possible to rescue human remains from the spoils if they are not seen on the surface prior to commencement. The significance rating post-mitigation remains **low negative**. There are no fatal flaws and cumulative impacts are of no concern because very little to no impact is expected as a result of this prospecting project.

Table 3: Assessment of impacts to graves.

Potential impacts on the cultural landscape	
Nature and status of impact:	Direct and negative
Extent and duration of impact:	Local and permanent
Intensity	High
Probability of occurrence:	Low
Degree to which the impact can be reversed:	Low
Degree to which the impact may cause irreplaceable loss of resources:	High
Cumulative impact prior to mitigation:	Low
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be mitigated:	Low
Proposed mitigation:	Avoid graves.
Cumulative impact post mitigation:	Low

Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
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6.3. The No-Go alternative

With the No-Go alternative there will be no prospecting work on site and no impacts to any type of heritage resource would be possible. Significance would thus be **neutral**.

6.4. Existing impacts to heritage resources

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering and erosion that will affect fossils and archaeological materials. Trampling from grazing animals and/or farm/other vehicles is also a potential current impact.

6.5. Cumulative impacts

Given the very minimal impact expected as a result of the prospecting, cumulative impacts are not of concern for this project. Nevertheless, it is noted that diamond mining over more than a century has resulted in the loss of much archaeological material. It is also true, however, that without the mining access to the artefacts and fossil-bearing gravels would very seldom be possible.

6.6. Levels of acceptable change

Any impact to an archaeological or palaeontological resource or a grave is deemed unacceptable until such time as the resource has been inspected and studied further if necessary. Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many vantage points is undesirable. Because of the limited and temporary nature of the proposed development, such an impact is not envisaged.

7. EVALUATION OF IMPACTS RELATIVE TO SUSTAINABLE SOCIAL AND ECONOMIC BENEFITS

Section 38(3)(d) of the NHRA requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development. The prospecting project will have little direct socio-economic benefit. However, if the area is found to be promising in terms of its mineral yield, then mining could result in the future and this would bring economic investment and jobs to the area.

8. CONCLUSIONS

The min potential impacts that might occur are to archaeological and palaeontological resources., However, surface resources are not expected to occur and there is nothing that can be done to mitigate subsurface impacts during a drilling operation. Table 4 shows that the only response to the heritage indicator is to look for and avoid surface archaeological sites, fossils or graves.

Table 4: Heritage indicators and project responses.

Indicator	Project Response
Archaeological materials and/or fossils and/or graves must be avoided.	No project response possible but it is recommended that staff be aware of their surroundings and examine the surface of each drill site for any signs of fossils, stone artefacts or graves prior to commencement of drilling.

There are no significant heritage concerns for this prospecting project and no areas are known to require avoidance. However, if any heritage resources are discovered during the course of the project then these should be avoided with a buffer of at least 30 m.

8.1. Reasoned opinion of the specialist

Given the very minimal or even absence of impacts to heritage resources, it is the opinion of the heritage specialist that the project should be authorised in full.

9. RECOMMENDATIONS

It is recommended that the project be allowed to proceed but subject to the following recommendations:

- Each drill site must be carefully examined for any signs of fossils, archaeology or graves prior to the arrival of the drilling rig. If any such materials are found then they should be avoided by at least 30 m; and
- If any previously unknown fossils, archaeological material or human burials are uncovered during the course of drilling then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

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APPENDIX 1 – Curriculum Vitae



Curriculum Vitae

Jayson David John Orton

ARCHAEOLOGIST AND HERITAGE CONSULTANT

Contact Details and personal information:

Address: 40 Brassie Street, Lakeside, 7945
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Birth date and place: 22 June 1976, Cape Town, South Africa
Citizenship: South African
ID no: 760622 522 4085
Driver's License: Code 08
Marital Status: Married to Carol Orton
Languages spoken: English and Afrikaans

Education:

SA College High School	Matric	1994
University of Cape Town	B.A. (Archaeology, Environmental & Geographical Science) 1997	
University of Cape Town	B.A. (Honours) (Archaeology)*	1998
University of Cape Town	M.A. (Archaeology)	2004
University of Oxford	D.Phil. (Archaeology)	2013

*Frank Schweitzer memorial book prize for an outstanding student and the degree in the First Class.

Employment History:

Spatial Archaeology Research Unit, UCT	Research assistant	Jan 1996 – Dec 1998
Department of Archaeology, UCT	Field archaeologist	Jan 1998 – Dec 1998
UCT Archaeology Contracts Office	Field archaeologist	Jan 1999 – May 2004
UCT Archaeology Contracts Office	Heritage & archaeological consultant	Jun 2004 – May 2012
School of Archaeology, University of Oxford	Undergraduate Tutor	Oct 2008 – Dec 2008
ACO Associates cc	Associate, Heritage & archaeological consultant	Jan 2011 – Dec 2013
ASHA Consulting (Pty) Ltd	Director, Heritage & archaeological consultant	Jan 2014 –

Professional Accreditation:

Association of Southern African Professional Archaeologists (ASAPA) membership number: 233

CRM Section member with the following accreditation:

- Principal Investigator: Coastal shell middens (awarded 2007)
Stone Age archaeology (awarded 2007)
Grave relocation (awarded 2014)
- Field Director: Rock art (awarded 2007)
Colonial period archaeology (awarded 2007)

Association of Professional Heritage Practitioners (APHP) membership number: 43

- Accredited Professional Heritage Practitioner

➤ **Memberships and affiliations:**

South African Archaeological Society Council member	2004 – 2016
Assoc. Southern African Professional Archaeologists (ASAPA) member	2006 –
UCT Department of Archaeology Research Associate	2013 –
Heritage Western Cape APM Committee member	2013 –
UNISA Department of Archaeology and Anthropology Research Fellow	2014 –
Fish Hoek Valley Historical Association	2014 –
Kalk Bay Historical Association	2016 –
Association of Professional Heritage Practitioners member	2016 –

Fieldwork and project experience:

Extensive fieldwork and experience as both Field Director and Principle Investigator throughout the Western and Northern Cape, and also in the western parts of the Free State and Eastern Cape as follows:

Feasibility studies:

- Heritage feasibility studies examining all aspects of heritage from the desktop

Phase 1 surveys and impact assessments:

- Project types
 - Notification of Intent to Develop applications (for Heritage Western Cape)
 - Desktop-based Letter of Exemption (for the South African Heritage Resources Agency)
 - Heritage Impact Assessments (largely in the Environmental Impact Assessment or Basic Assessment context under NEMA and Section 38(8) of the NHRA, but also self-standing assessments under Section 38(1) of the NHRA)
 - Archaeological specialist studies
 - Phase 1 archaeological test excavations in historical and prehistoric sites
 - Archaeological research projects
- Development types
 - Mining and borrow pits
 - Roads (new and upgrades)
 - Residential, commercial and industrial development
 - Dams and pipe lines
 - Power lines and substations
 - Renewable energy facilities (wind energy, solar energy and hydro-electric facilities)

Phase 2 mitigation and research excavations:

- ESA open sites
 - Duinefontein, Gouda, Namaqualand
- MSA rock shelters
 - Fish Hoek, Yzerfontein, Cederberg, Namaqualand
- MSA open sites
 - Swartland, Bushmanland, Namaqualand
- LSA rock shelters
 - Cederberg, Namaqualand, Bushmanland
- LSA open sites (inland)
 - Swartland, Franschhoek, Namaqualand, Bushmanland
- LSA coastal shell middens
 - Melkbosstrand, Yzerfontein, Saldanha Bay, Paternoster, Dwarskersbos, Infanta, Knysna, Namaqualand
- LSA burials
 - Melkbosstrand, Saldanha Bay, Namaqualand, Knysna
- Historical sites
 - Franschhoek (farmstead and well), Waterfront (fort, dump and well), Noordhoek (cottage), variety of small excavations in central Cape Town and surrounding suburbs
- Historic burial grounds
 - Green Point (Prestwich Street), V&A Waterfront (Marina Residential), Paarl

Awards:

Western Cape Government Cultural Affairs Awards 2015/2016: Best Heritage Project.