

# ARCHAEOLOGICAL/HERITAGE REPORT FOR THE EXPANSION OF THE CURRENT GRANITE MINING AT OERANOEP AND GHAAMS, NORTHERN CAPE PROVINCE.

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

Prepared for

**Red Graniti (Pty) Ltd**

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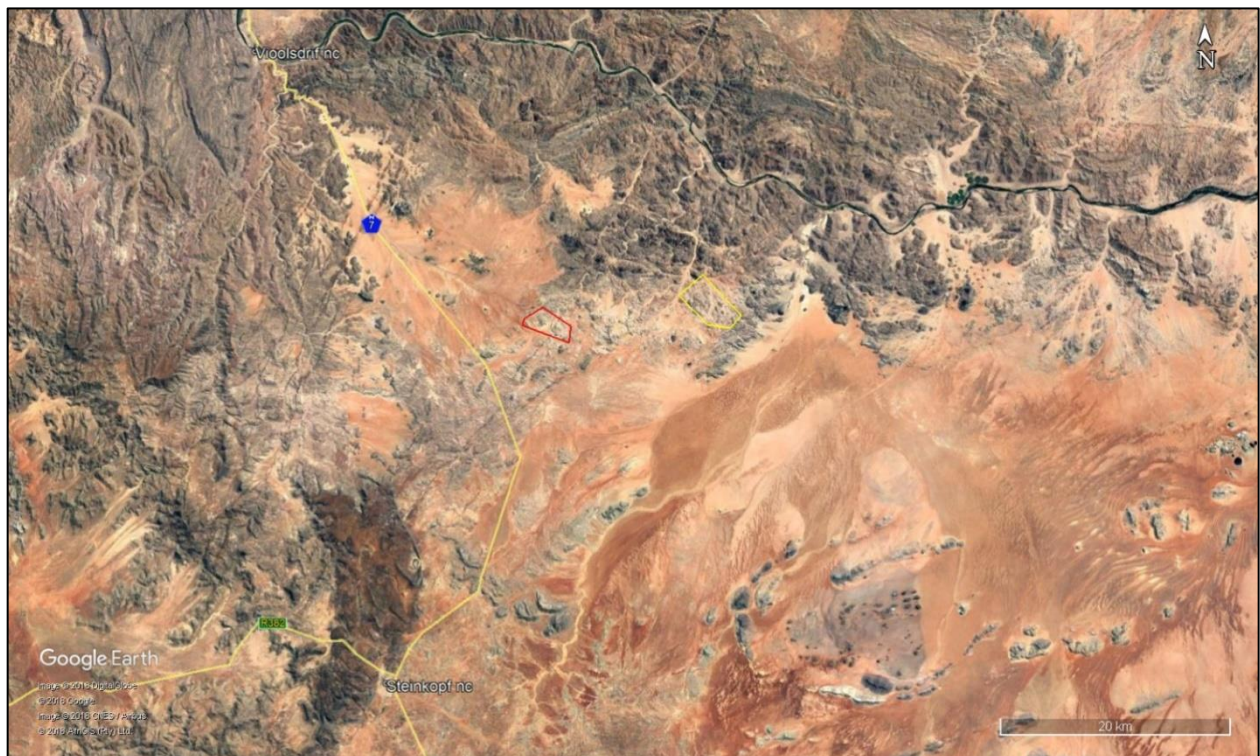
# 1. INTRODUCTION

## 1.1 Scope and purpose of report

ACO Associates cc (ACO) has been requested by Red Graniti (Pty) Ltd to make an archaeological/heritage assessment of the proposed expansion of granite mining in the Oeranoep Prospect (also known as Block A), and the Ghaams Prospect (also known as Block B) ~36 km north east of Steinkopf in the Northern Cape Province (**Figure 1**).

The prospect/mining areas lie within RE Farm 22 which is a large tract of land owned by the Transitional Council of Concordia.

An archaeological survey was undertaken by ACO in November 2018 to assess areas where existing and proposed quarries are situated to establish what heritage resources exist that may be impacted by the proposed prospecting and quarrying activities.



**Figure 1:** The Oeranoep prospect area (red), also known as Block A, and Ghaams Prospect Area (yellow), also known as Block B in regional context of the Northern Cape.

Previously, a heritage baseline (scoping) report for the area had been prepared by Melanie Attwell (Attwell 2015), and was submitted as part of the Environmental Performance Assessment for Farm 22 Steinkopf. Attwell’s heritage report was for areas within an existing mining area on Farm 22, where application was being made for the extension of mining rights at Groenhoekies and for two prospecting rights for the remaining sites. The affected sites are named “Rondeberg”, “Central”, “Groenhoekies”, “Tietkop 1 and 2” and “the Dam”.

Although her report referred to archaeology, it cannot be considered an Archaeological Impact Assessment report as there was little primary field inspection of the affected sites.



## 1.2 Project details

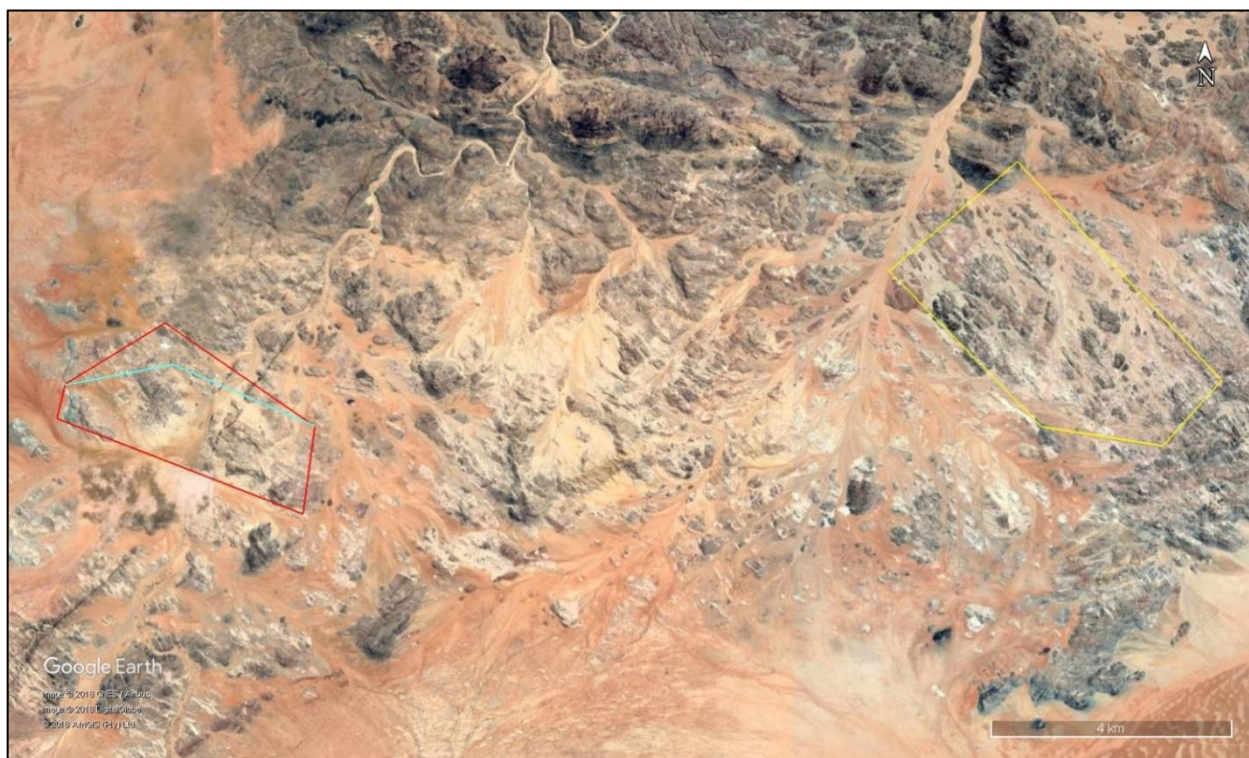
### 1.2.1 Background context of the existing Verde Steinkopf Operations: Prospecting rights and mining permits

The Verde Steinkopf operation is situated over Portions of the Remainder Steinkopf No 22. The operation is carried out under cover of two separate prospecting operations by means of Bulk Sampling. Within this area one mining operation is also taking place.

The details of the three operations are as follows (refer **Figure 2**):

- Mining permit MP 005/2014, File reference NC30/5/1/1/2/10223 MP, issued to Verde Bitterfontein (Pty) Ltd over a 5Ha portion of the Remainder Steinkopf No 22 locally referred to as Groenhoekies;
- Prospecting right MPYRO: 47/2011, File reference NC30/5/1/1/2/11465(800) PR, issued to Verde Bitterfontein (Pty) Ltd over a 407.3650Ha portion of the Remainder Steinkopf No 22 locally referred to as Oeranoep;
- Prospecting right MPYRO: 46/2011, File reference NC30/5/1/1/2/11461(799) PR, issued to Verde Bitterfontein (Pty) Ltd over a 1233.9967Ha portion of the Remainder Steinkopf No 22 locally referred to as Ghaams.

The operations are situated in the Namakwa District Municipality and Nama-Khoi local authority of the Namakwaland administrative district of the Northern Cape. The Remainder of the Farm Steinkopf No 22 is registered in the name of "The Gemeenskap van Concordia" by virtue of title deed G289/1953 with SG code C05300020000002200000. The area is situated off the N7 main road, 31 km north of Steinkopf and 38 km south of Vioolsdrift, with an approximate locality S28.98671° and E17.88609° (Figures 1-3).



**Figure 2:** The Oeranoep prospecting and Groenhoekies Mining areas (Red/blue polygons) and Ghaams prospecting area (yellow polygon)

All three the operations are in the process of being combined into one mining operation and an application for a mining right in terms of Section 22 of the MPRDA, together with an application for an Environmental Authorisation in terms of NEMA EIA Regulations 2014 will be lodged shortly.

At this stage, the three operations are administered separately although most of the resources are shared. As each operation is managed under a separate EMPr and Final Rehabilitation,

Decommissioning and Mine Closure Plan, the environmental performance audits are done on each operation separately, including reviews of the Annual Rehabilitation Plan and Final Rehabilitation, Decommissioning and Mine Closure Plans.

#### **1.2.1.1 Groenhoekies Mining Area Mine design map**

Verde Bitterfontein (Pty) Ltd  
Portion of Remainder Farm Steinkopf No 22, Namaqualand District  
Reference: NC30/5/1/3/2/10223 MP

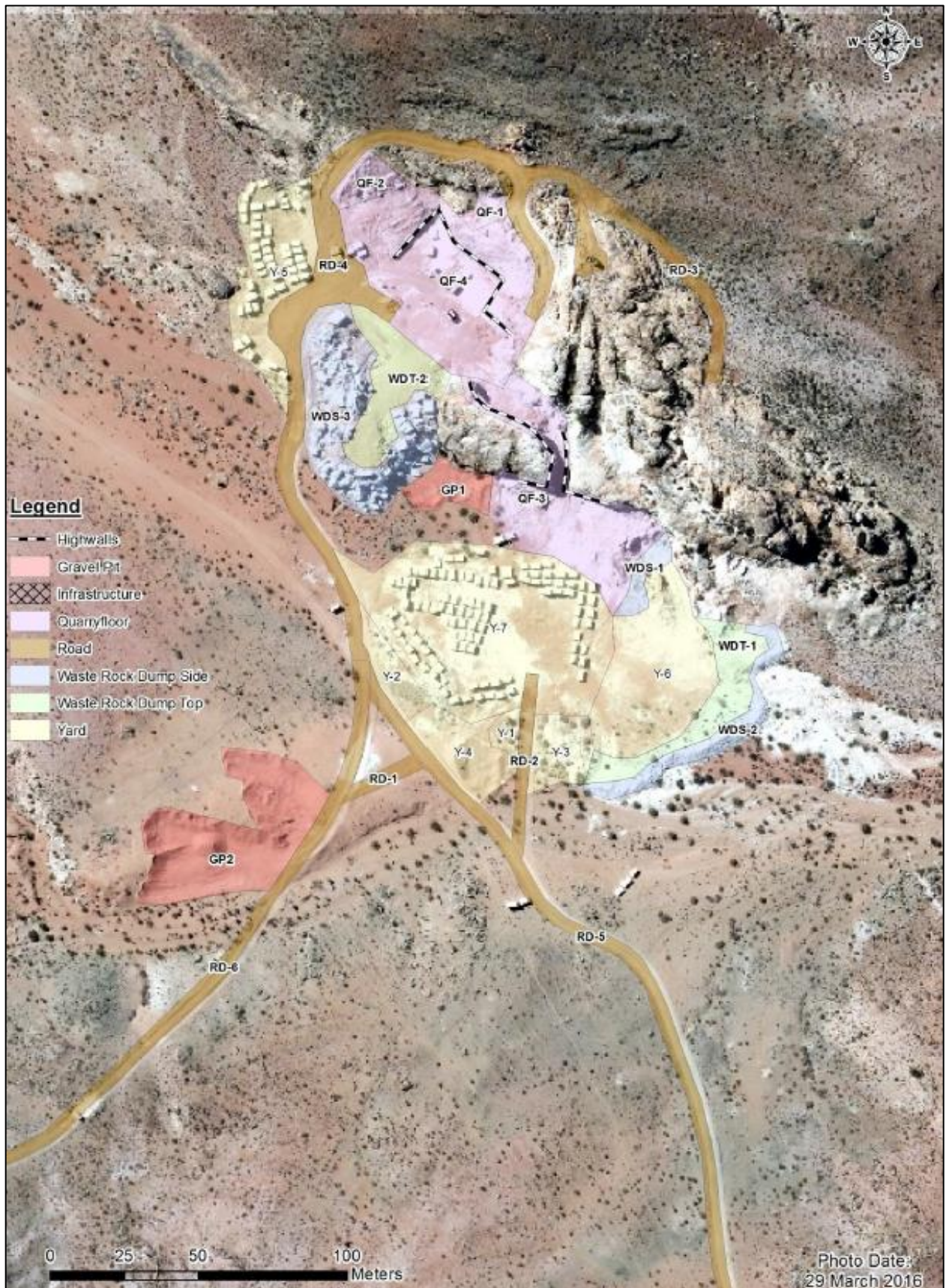
The existing Groenhoekies Mining area consists of a 5Ha portion of the Remainder Farm Steinkopf No 22 (Refer **Figure 3** and **Figure 4**).

The mining block coordinates (WGS 84) (blue polygon on **Figure 4** as follows:

- a. S17.87904° E28.97386°
- b. S17.87906° E28.97550°
- c. S17.87733° E28.97548°
- d. S17.87646° E28.97482°
- e. S17.87645° E28.97386°

A case was logged on SAHRIS on November 22, 2013. No response appears to ever have been issued in response to the application.





**Figure 3:** The existing Groenhoeekies mining area (After Van Zyl 2018a)



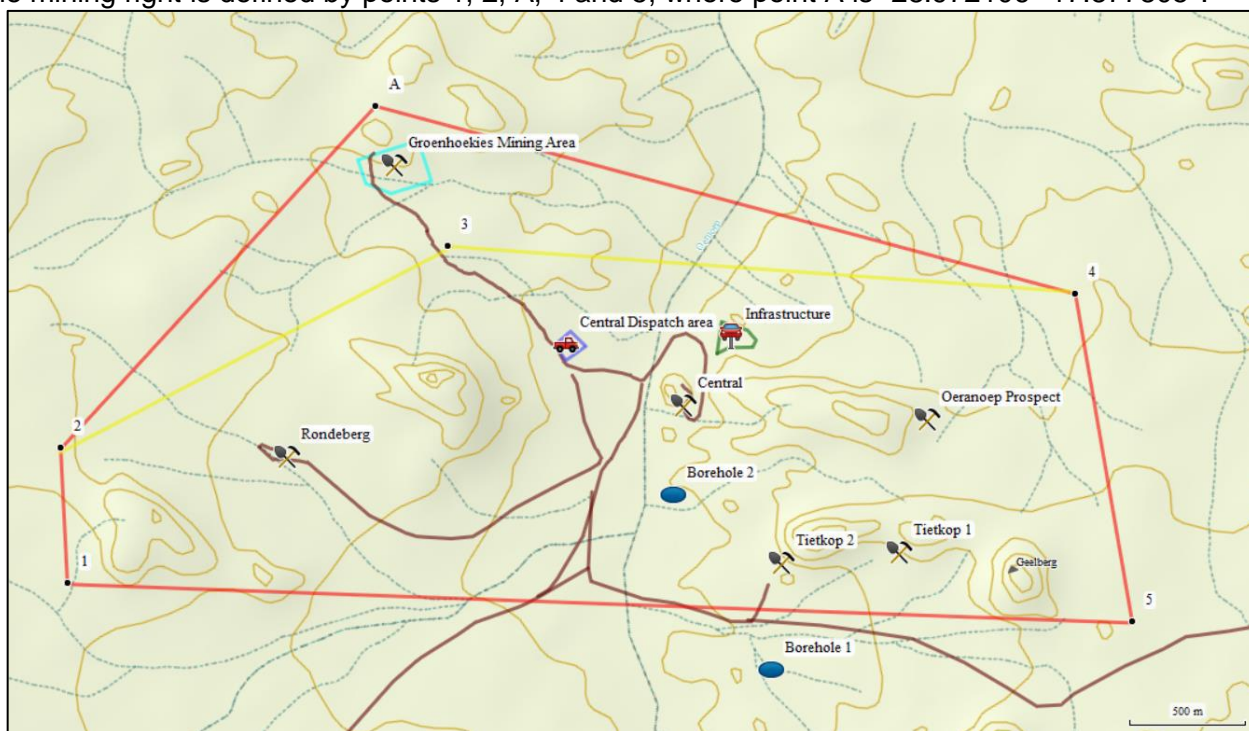
### 1.2.1.2 Oeranoep Prospecting/Mining Area Mine design map

Verde Bitterfontein (Pty) Ltd  
Portion of Remainder Farm Steinkopf No 22, Namaqualand District  
Reference: NC30/5/1/3/2/11465 (800) PR

The Oeranoep prospecting area consists of a 407.3650Ha portion of the Remainder Farm Steinkopf No 22 (Refer **Figure 4**).

Prospecting Area (yellow): Points 1 to 5  
Co-ordinates (WGS 84 Geographic) as follows:  
1. S28.98605° E17.86000°  
2. S28.98105° E17.86123°  
3. S28.97822° E17.87897°  
4. S28.98706° E17.90256°  
5. S28.99964° E17.90085°

The mining right is defined by points 1, 2, A, 4 and 5, where point A is -28.972106° 17.877805°.



**Figure 4:** Layout plan Oeranoep Prospecting area (polygon points 1-5) indicating 6x quarries, an infrastructure area, and including the Groenhoekies Mining Area

Initial prospecting was completed on this area and consisted of non-invasive field investigations that were conducted making use of existing farm tracks and public roads. No rehabilitation was thus necessary and there was no impact on the natural environment.

The following four deposits were identified by the prospecting for further investigation (Refer **Figure 4**):

- Tietkop 1;
- Tietkop 2;
- Central;
- Rondeberg.

During the second phase, prospecting continued on the identified deposits and the following activities in line with the prospecting work program were implemented:

- Core drilling max 0.5m deep 38mm diameter;
- Collecting of butterfly cuts and small samples;
- Mapping and demarcating sample areas.

Decision making stages follow:

- **Tietkop 1** - No further sampling is planned and full-scale mining will continue as part of the mining right. Layout of the existing activities is shown in **Figure 5**;
- **Tietkop 2** - No further sampling is planned and full-scale mining will continue as part of mining right. Layout of the existing activities is shown in **Figure 6**;
- **Central** - Bulk sampling to continue and full-scale mining will continue as part of mining right. Layout of the existing activities is shown in **Figure 7**;
- **Rondeberg** - Bulk sampling to continue and full-scale mining will continue as part of mining right. Layout of the existing activities is shown in **Figure 8**;

At this stage, only preliminary planning for mining the deposits listed above has been done and the following activities that are in line with the prospecting work program will be implemented as part of preparations for full-scale mining:

- Plan and develop infrastructure and logistics area (maintenance, fuel, offices, etc.) as shown on **Figure 9**;
- A central dispatch area for blocks will be established north of the central quarry in a large flat area that is shown in **Figure 10**.
- Mine planning including waste dumps stockpiles and haul roads for identified and potential granite deposits (quarries).

The different prospecting phases as per the approved prospecting work program for the renewal period is provided in **Table 1** below.

The total disturbance to date is 13ha and three of the four quarry sites are currently dormant. This means that 396ha are still in a pristine condition. A detailed description of each of the five development areas with design diagrams is provided below.

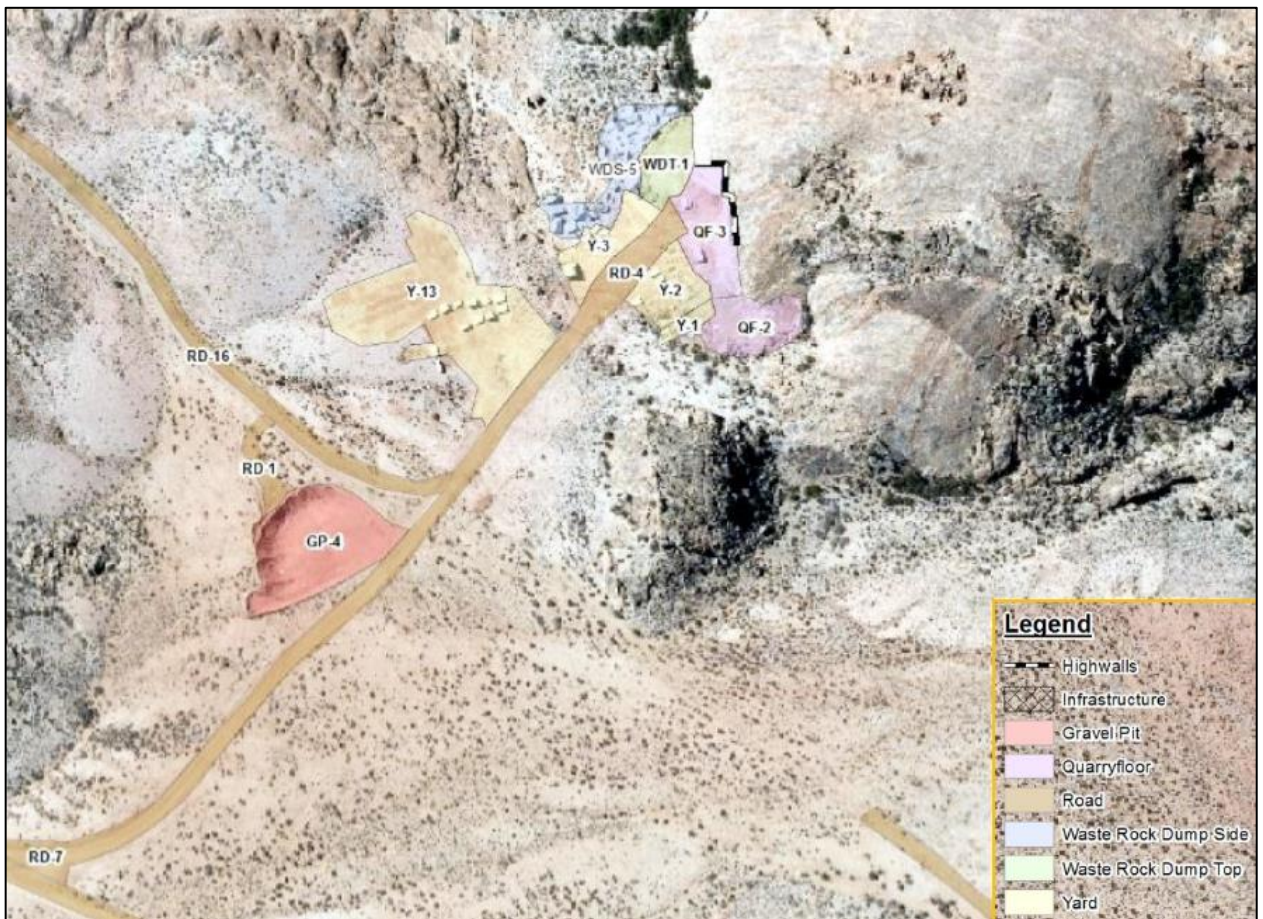
**Table 1:** Approved prospecting work program phases

Phase	Activity	Time frame	Outcome
Phase 1	<ul style="list-style-type: none"> <li>• Installation of diamond wire saws and quarrying equipment;</li> <li>• Cutting of 5m<sup>3</sup> butterfly samples on identified deposits. Cutting of sample blocks 6m<sup>3</sup>-9m<sup>3</sup>;</li> <li>• Market research and sales agreements;</li> <li>• Rehabilitation of sampling areas if unsuccessful or keep open as working bench from where full-scale mining as part of a mining right will continue;</li> <li>• Annual Performance audit with annual rehabilitation plan and review of Final Decommissioning, Rehabilitation and Mine closure plan with update of quantum of financial provision.</li> </ul>	<p>November 2017 to October 2019</p> <p>Annually</p>	<ul style="list-style-type: none"> <li>• Sample Blocks for market acceptability -Bench Mark;</li> <li>• Establish long term market with possibility of fixed orders based on Bulk sampled blocks.</li> </ul>
Phase 2	<ul style="list-style-type: none"> <li>• Feasibility studies;</li> <li>• Investment decision making;</li> <li>• Mine planning and development of infrastructure;</li> <li>• Applying for mining right.</li> </ul>	<p>November 2019 to October 2020</p>	<ul style="list-style-type: none"> <li>• Feasibility study and mining right application.</li> </ul>



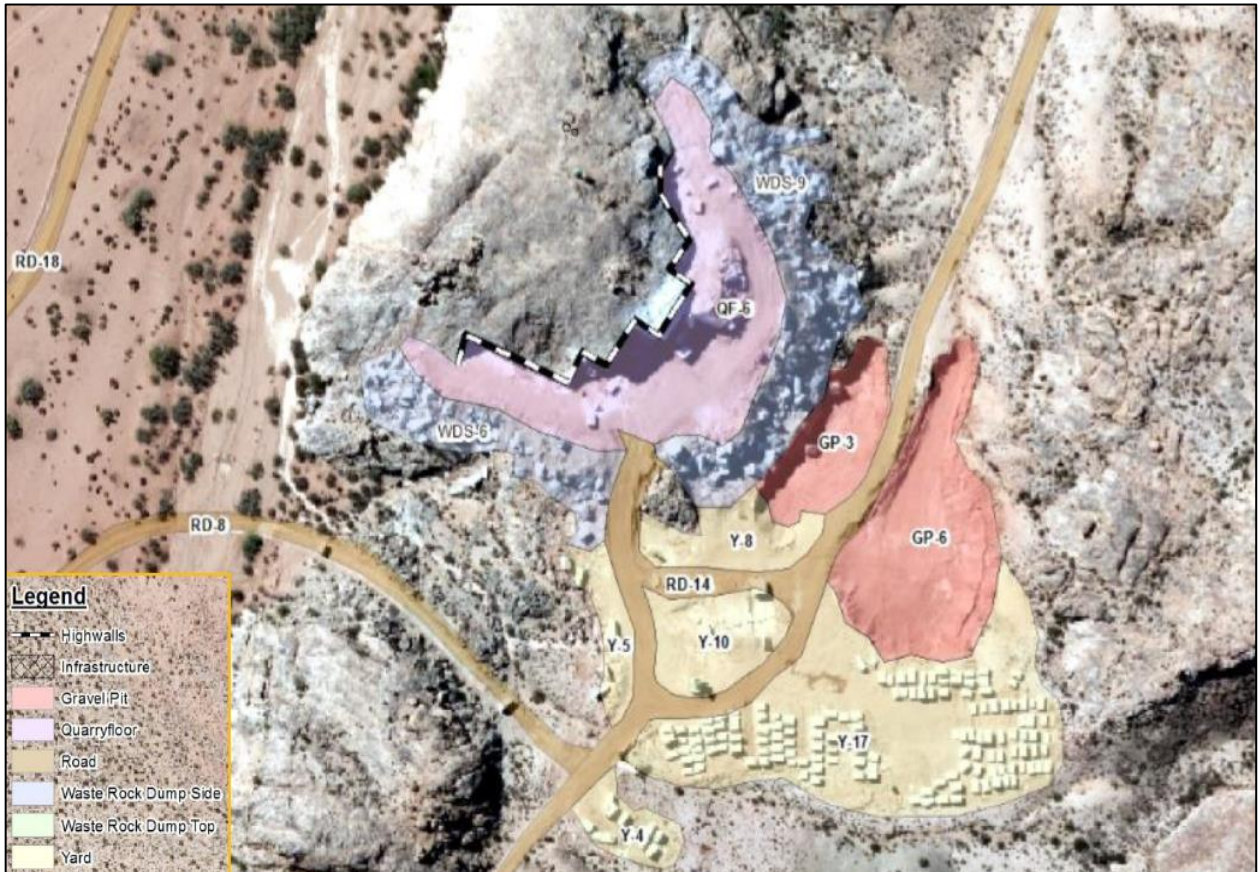


**Figure 5:** Existing Tietkop 1 quarry (After Van Zyl 2018b)



**Figure 6:** Existing Tietkop 2 quarry (After Van Zyl 2018b)





**Figure 7:** Existing Central quarry (After Van Zyl 2018b)



**Figure 8:** Existing Rondeberg quarry (After Van Zyl 2018b)





**Figure 9:** Existing Infrastructure area (After Van Zyl 2018b)



**Figure 10:** The Centralised Dispatch area in relation to existing Infrastructure area and the Central quarry.

### 1.2.1.3 Ghaams Prospecting/Mining Area Mine design map

Verde Bitterfontein (Pty) Ltd

Portion of Remainder Farm Steinkopf No 22, Namaqualand District

Reference: NC30/5/1/3/2/11461 (799) PR

The Ghaams prospecting area consists of a 1236.9967Ha portion of the Remainder Farm Steinkopf No 22 (Refer **Figure 2**). Target area is shown in **Figure 11**.

The prospecting area co-ordinates (WGS 84) (yellow polygon on **Figure 11**) as follows:

- a. S28.96438° E17.99900°
- b. S28.94853° E18.02037°
- c. S28.98042° E18.05421°
- d. S28.98983° E18.04437°
- e. S28.98711° E18.02424°

Between January 2010 and January 2012 initial prospecting took place on this area. Only non-invasive field investigations were conducted making use of existing farm tracks and public roads. No rehabilitation was thus necessary and there was no impact on the natural environment.

Three deposits were identified for further investigation and during 2012 to 2014 the second phase of prospecting continued on the identified deposits. The following activities, which were in line with the prospecting work program, were implemented:

- Core drilling max 0.5m deep 38mm diameter;
- Mapping and demarcating sample areas.

At this stage only preliminary investigation of some of the deposits has been done and the following activities that are in line with the prospecting work program will be implemented:

- Identifying of deposits;
- Mine planning including waste dumps, stockpiles and haul roads for identified deposits;
- Cutting of bulk samples to determine quality and to test the market.

The different prospecting phases, as per the approved prospecting work program for the renewal period, are provided in **Table 2** below. No invasive activities have taken place to date that can be indicated on a mine design map.

**Table 2:** Approved prospecting work program phase

Phase	Activity	Time frame	Outcome
Phase 1	<ul style="list-style-type: none"> <li>• Installation of diamond wire saws and quarrying equipment;</li> <li>• Cutting of 5m<sup>3</sup> butterfly samples on identified deposits;</li> <li>• Cutting of sample blocks 6m<sup>3</sup>-9m<sup>3</sup>.</li> <li>• Market research and sales agreements;</li> <li>• Rehabilitation of sampling areas if unsuccessful or keep open as working bench from where mining will start;</li> <li>• Annual Performance audit and update of quantum of financial provision;</li> </ul>	Month 1-24	<ul style="list-style-type: none"> <li>• Sample Blocks for market acceptability - Bench Mark;</li> <li>• Established long term market with possibility of fixed orders based on Bulk sampled blocks.</li> </ul>
Phase 2	<ul style="list-style-type: none"> <li>• Feasibility studies;</li> <li>• Investment decision making;</li> <li>• Applying for mining right or final rehabilitation and closure.</li> </ul>	Month 25-36	<ul style="list-style-type: none"> <li>• Feasibility study and mining application or closure plan</li> </ul>





**Figure 11:** Ghaams Mining/Prospect area (yellow) showing target area (green).

## 2. PALAEOLOGICAL ASSESSMENT

A desktop palaeontological assessment of the area was provided by Professor Marion Bamford, Director of the WITS Evolutionary Studies Institute to determine the palaeontological sensitivities of the affected areas (see **Appendix 5**).

Professor Bamford states that: “the sites for extensions of mining operations, like the current sites, all lie in the igneous and metamorphic rocks of the Namaqua-Natal Province, in particular in the Bushmanland Terrane. This group of rocks is made up of three types, namely the ca 2000-million-year-old (Ma) granitic gneisses, the 1600-1200 Ma amphibolite to granulite grade supracrustal rocks and the 1200-1000 Ma granitoids. The igneous rocks were metamorphosed during the Namaqua Orogeny and do not contain any fossils”.

The SAHRIS palaeosensitivity map indicates that the area is of low (blue) or insignificant (grey) sensitivity.

Prof Bamford commented: “It is therefore requested that no further palaeontological impact assessments be required for this project.”

## 3. ARCHAEOLOGICAL ASSESSMENT

### 3.1 Season, date and duration of site investigation

An archaeological field survey of identified target areas was conducted by ACO from the 26<sup>th</sup> to 28<sup>th</sup> November 2018. The season had no impact on the outcome of the assessment as surface visibility was good due to the rocky terrain and sparse succulent vegetation. The general area is composed of granite hills surrounded by wide, open plains. The individual quarry areas overlap the rocky granite hills and extend into surrounding sandy plains. In places the sandy plains extend right up to the base of the rock outcrops. The sandy areas often contain dry stream beds that originate in the catchments of the localised granite massifs or further afield.

### 3.2 Details of base data

A survey of available literature was carried out to assess the general heritage context of the area in which the proposed prospecting and mining was to be undertaken. The small amount of information gained was used to inform the field survey.

The SAHRIS<sup>1</sup> database was queried to determine if any previous archaeological assessments of the property were available. We were unable to find any mining/prospecting applications relevant to our study on SAHRIS and no heritage-related studies were indicated on the system for the immediate area. A case was logged for Groenhoekies mining on SAHRIS on November 22, 2013. No response appears to ever have been issued.

As mentioned earlier, a Baseline or Scoping Report (Heritage) undertaken by Melanie Attwell (2015) was submitted as part of the Environmental Performance Assessment for Farm 22. Her survey was for sites within an existing mining area on Farm 22, named Rondeberg, Central, and Groenhoekies, Tietkop 1 and 2 and the Dam. The application was for the extension of mining rights and additional mining rights in terms of a Mining Right Application and extension of mining rights at Groenhoekies and two prospecting rights for the remaining sites. Attwell's study concluded *inter alia* that:

- "There are no heritage resources on the affected sites. No archaeological deposits were noted;
- An archaeological and a specialist palaeontological investigation were not undertaken. Based on the findings of Kaplan (2012) evidence suggested that archaeological finds are unlikely bearing in mind the characteristics of the terrain;
- This report has found that no known heritage resources are affected by the activity and the proposed extension and no further heritage studies need to be undertaken;
- Section 27 and 34 of the National Heritage Resources Act do not apply, as no Provincial Heritage Sites and buildings older than 60 years exist on or near the site;
- There are no heritage constraints presented by the site." (Attwell 2015:18).

While virtually the only heritage assessment listed on SAHRIS for this area, Kaplan's (2012) survey of the replacement of the water supply pipeline between Henkries and Steinkop, lies to the south east of the Oeranoep and Ghaams areas on the sandy plains and in our opinion, is not a good comparative context for areas where granite outcropping is prominent.

Halkett and Robinson (2017a, b, c) investigated similar granite quarrying sites north east of Pofadder where archaeological resources were found in small numbers. Later Stone Age sites there were found in occasional small rockshelters at the base of granite outcrops.

### 3.3 Field assessment procedure

The farm access points, routes across the active and prospective quarries and other points of interest relevant to the field assessment were loaded onto handheld GPS devices to assist with accurately identifying the extent and detail of the survey area. In addition to the GPS guidance, the extent of the site was mapped on GIS and hard copy printouts of this mapping taken into the field to assist with survey position fixing.

The field assessment consisted of a combination of foot and vehicle-based surveying of each active and prospective quarry to identify any archaeological/heritage resources. The GPS tracks recorded for the entirety of the survey for the two areas are shown on **Figure 12** and **Figure 13**. Waypoints were created on the GPS's at the location of any identified heritage resources, notes about the observation were written, and photographs were taken of the resources and surrounding context and landscape where necessary.

More detailed discussion of the individual quarries will be presented below.

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<sup>1</sup> A database maintained by the South African Heritage Resources Agency containing, inter alia, information about development-led heritage projects



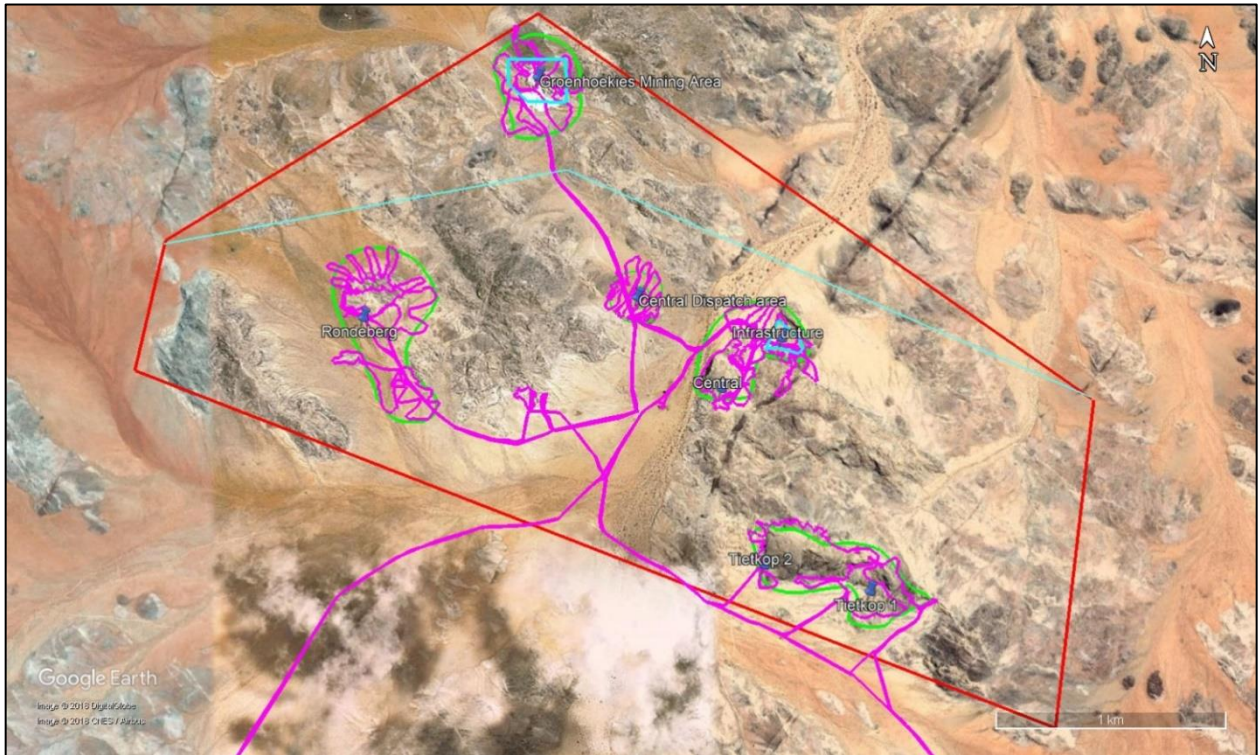


Figure 12: GPS recorded tracks within the Oeranoep area



Figure 13: GPS recorded tracks within the Ghaams area

### 3.4 Observations

#### 3.4.1 Groenhoekies quarry

Centre point: S28.974746° E17.877891°

The Groenhoekies quarry is existing and the status quo modified landscape can be seen on **Figure 3** and **Plate 1** and **Plate 2**. The target area is shown in green in **Figure 18** with other aspects of the survey.

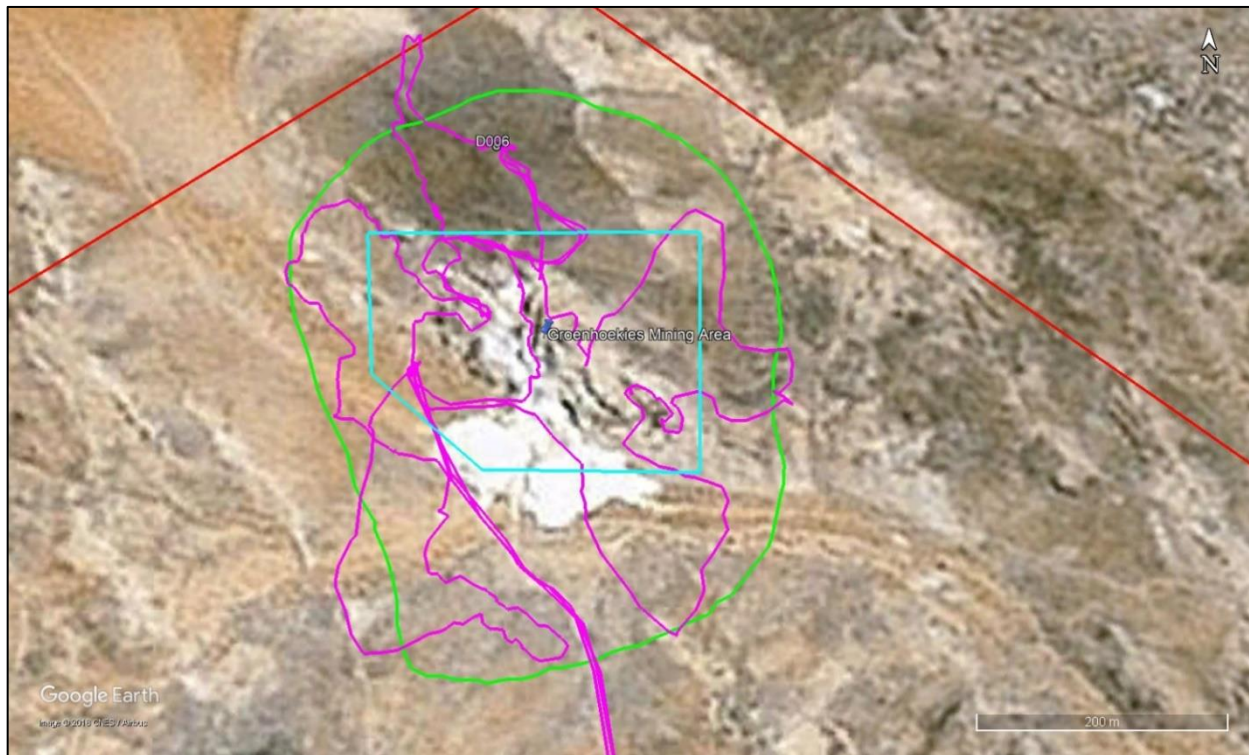


One archaeological occurrence was noted (see **Figure 14** and **Table 11**) for full details:

- D006 is a low-density quartz artefact scatter on top of a dolerite outcrop to the north west of the existing quarry (**Plate 3**).

Occasional isolated quartz flakes of likely MSA age were noted scattered extensively in the landscape, but no concentrated occurrences that could easily be defined as “sites” were found.

The heritage sensitivity of the quarry and surroundings is considered to be very low.



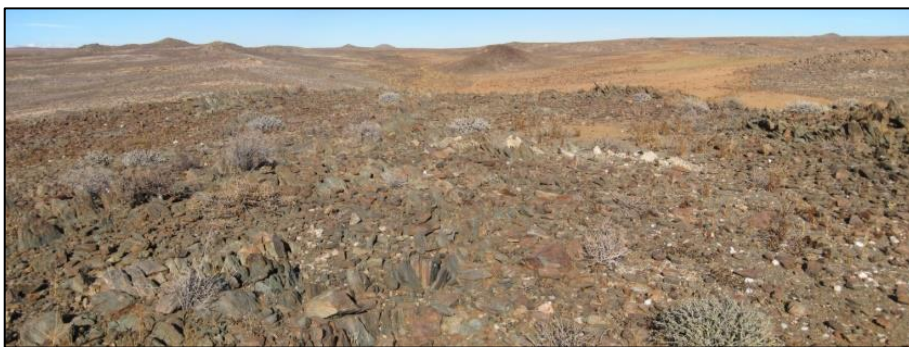
**Figure 14:** Groenhokies Mining area showing target area (green area), mining block (blue polygon), search tracks (purple) and heritage observations (labelled dots)



**Plate 1:** The active Groenhokies quarry face and associated stockpile areas (looking towards the south east) across the typical landscape of the Oeranoep area.



**Plate 2:** Looking to the north east showing typical landscape at the site with granite outcrops.



**Plate 3:** D006 is a small pan-like depression (brown patch to right of photo centre) with associated Middle Stone Age artefacts

### 3.4.2 Central dispatch area

Centre point: S28.983178° E17.882315°

An area where blocks will be brought for dispatch by road, which at present is undeveloped in any way, though disturbed by extensive animal movement though the area (**Plate 4**). Search tracks and isolated archaeological finds are shown on **Figure 15**. The extensive flat, sandy area contains a few isolated archaeological occurrences, none of which can be described as significant.

The heritage sensitivity of the dispatch area and surroundings is considered to be very low.





**Figure 15:** Central dispatch area showing outer target areas (green), actual dispatch area (green square), search tracks (purple) and heritage observations (labelled dots).



**Plate 4:** Looking south across the dispatch area. The western edge of the “Central” quarry can be seen in the distance to right of centre on the prominent granite outcrop, while the “infrastructure” area is to the left of centre.

### 3.4.3 Infrastructure area

Centre point: S28.984735° E17.888811°

The infrastructure area already exists and a few permanent structures are present. The status quo modified landscape can be seen on **Figure 9** and **Figure 10** and **Plate 5** and **Plate 6**. This area will be used for fuel storage, maintenance, site offices etc.

There are two archaeological sites of moderate significance inside the green target area as it relates to the infrastructure area (see **Figure 16** and **Table 11** for full details):

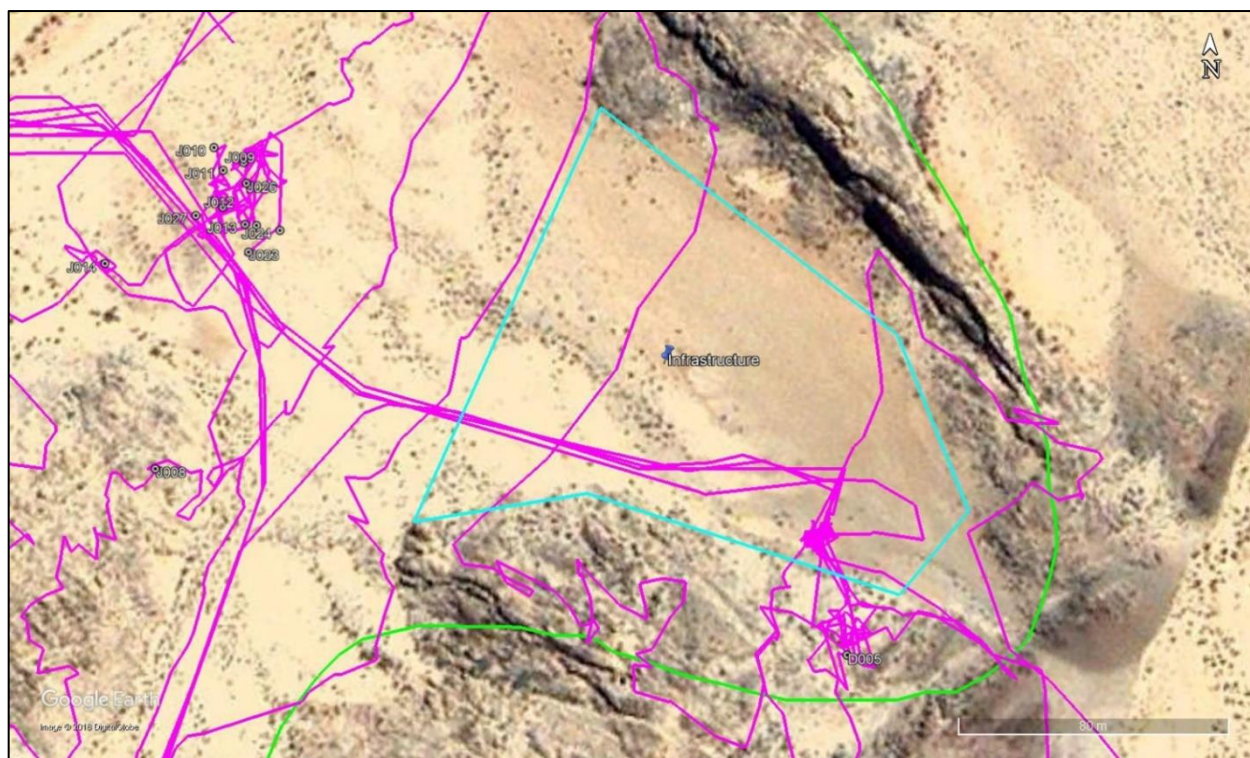
- D005 is a small rock shelter with Late Stone Age archaeological remains both inside and scattered across the talus slope of the shelter. This is not far from the fuel storage area and some disturbance extends close to the front part of the archaeological site. No significant damage has occurred as yet. This site must be protected going forward (**Plate 7** to **Plate 8**).
- J009 - J014 are a set of observations of a more recent shepherds’ encampment to the north west of the core infrastructure area.
  - J009 – J011 are three small, discrete ash heaps with a range of artefactual material, including ceramics, glass, iron, bronze/brass and bone which suggest an age of early to mid-20<sup>th</sup> century. These are clear features on the landscape next to an erosion gully (see **Plate 10**).



- J012 and J013 are located near the ash heaps and are packed stone features which are probably graves (**Plate 11**).
- J014 is a circular arrangement of granite pieces below an outcropping of granite bedrock. The feature is a raised mound with a hollow centre. A thick layer of quartz pebbles lies on the upper edge of circular feature. No associated artefacts were noted (**Plate 12**).

Beyond these sites we noted only occasional isolated quartz flakes of likely MSA age, widely scattered in the landscape, but no concentrated occurrences that could easily be defined as “sites”.

The heritage sensitivity of the Infrastructure area and surroundings is considered to be moderate and requires mitigation in the form of “no go” areas around D005 and J009 – J014. If “no go” areas are not feasible, then collection and sampling of these archaeological sites is required.



**Figure 16:** The infrastructure area already exists and a few permanent structures are present.



**Plate 5:** Looking south across the infrastructure area. The site known as D005 can be seen in the background immediately to the left of the loader



**Plate 6:** Looking north over the existing infrastructure



**Plate 7:** Looking to the east showing the D005 rock shelter at centre, and the proximity of existing disturbance



**Plate 8:** Looking south at the D005 rock shelter and talus slope.





**Plate 9:** Looking south east, the rock shelter site D005 is visible behind existing infrastructure.



**Plate 10:** Ash heap J009 (centre) with erosion gully beyond. Central quarry is visible on the side of the koppie in the distance.



**Plate 11:** Packed stone features J012 (left) and J013 (right) which represent probable graves.





**Plate 12:** Circular stone feature J014.

### 3.4.4 Central quarry

Centre point: S28.986422° E17.886029°

The Central quarry is located immediately to the south west of the infrastructure area (**Figure 10**). This is an existing quarry on the southern edge of a distinctive granite outcrop (**Plate 13 - Plate 15**). The status quo modified landscape can be seen on **Figure 7**.

There are few archaeological occurrences in the target area, as can be seen on **Figure 17**. Most of the occurrences noted were isolated lithics (mainly MSA in age) in erosion gullies or on scree slopes which were assessed not to be conservation worthy. Only one site was graded IIIC:

- D004 - In a narrow sandy “neck” between sections of the granite on the koppie is an area where numerous potsherds are scattered on the surface. These appear to be from one pot and have been affected by slope wash distributing them across ~5m<sup>2</sup>. There are a few quartz flakes associated. There are no rock shelters or overhangs at this location, so the potsherds are considered to be an isolated find (**Plate 16**).

The heritage sensitivity of the Central quarry and surroundings is considered to be low.





**Figure 17:** Central quarry and the infrastructure area showing outer target areas (green), specific infrastructure area (blue polygon), search tracks (purple) and heritage observations (labelled dots).



**Plate 13:** The granite dome of Central quarry looking west.



**Plate 14:** Central quarry looking east.





**Plate 15:** Granite blocks removed from the Central face lie in a borrow pit.



**Plate 16:** Site D004 lies in an open area to the right of the human figure and at the base of the main granite koppie. Secondary impacts occur in the form of discarded granite blocks pushed over the edge lying close to the “site”.

### 3.4.5 Tietkop 1 and 2

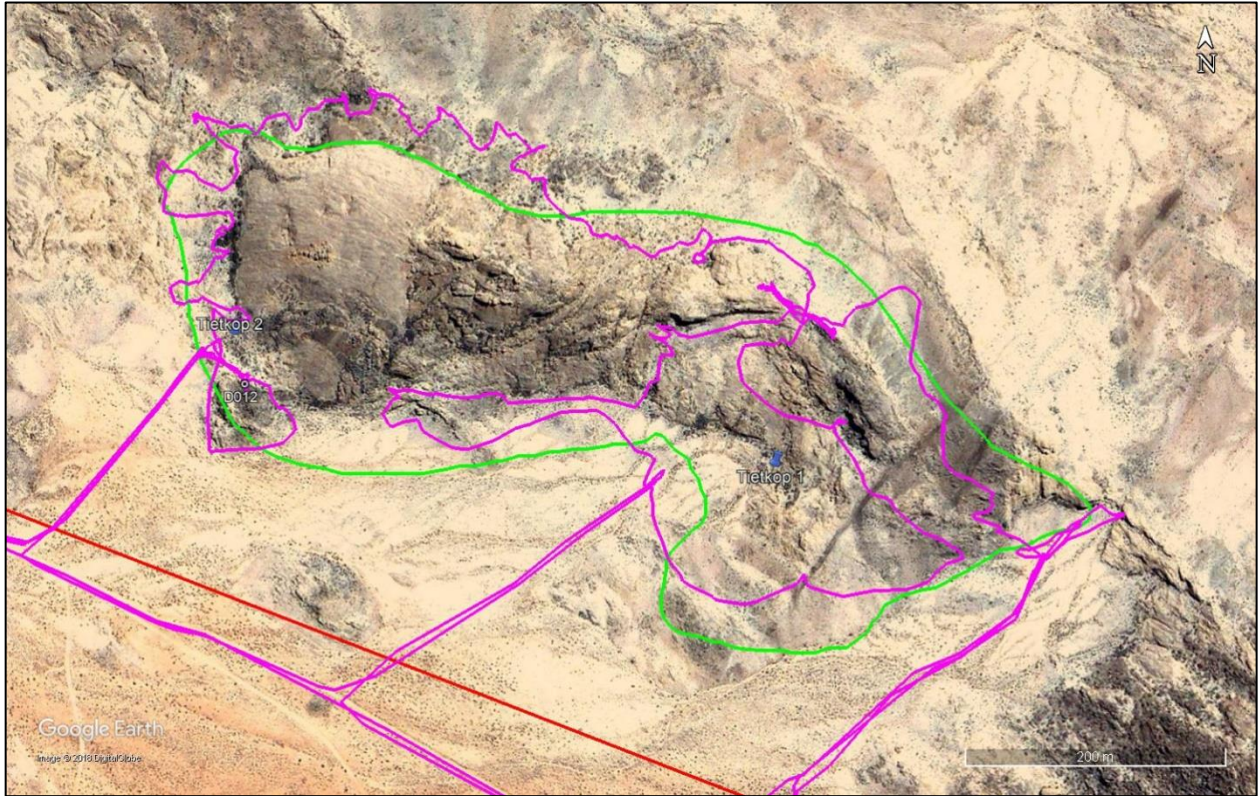
Centre point: S28.993500° E17.891095°

There are existing quarries at both sites and their positions are indicated on **Figure 18**. Because the Google Earth image of the area predates the quarrying, these activities are not visible in the figure. The status quo modified landscape must be seen on **Figure 5** and **Figure 6** (see also **Plate 17** and **Plate 18**), instead, which is based on other aerial imagery.

Only one archaeological occurrence was noted and its position is shown on **Figure 18**, along with search tracks:

- D012 – Is a small north facing rock shelter in a secondary outcrop close to Tietkop 2 quarry opening directly onto a talus slope. Numerous ostrich eggshell fragments were visible on the surface of the talus but no indigenous pottery was observed. Lots of quartz artefacts but no formal tools observed. A few exotic cryptocrystalline silica materials were noted. Mine disturbance comes to within a few meters of the talus. The shelter should be sampled/collected or protected and put off limits (**Plate 19** and **Plate 20**).

The heritage sensitivity of the Tietkop 2 area is considered to be moderate and requires mitigation in the form of a “no go” area around D012. If a “no go” area is not feasible, then collection and sampling of this archaeological site is required.



**Figure 18:** Tietkop quarries 1 and 2 showing outer target areas (green), search tracks (purple) and heritage observations (labelled dots).



**Plate 17:** Looking south east towards the distinctive Tietkop with quarrying (Tietkop 2) visible at the base.





**Plate 18:** Tietkop 2 quarry face looking north.



**Plate 19:** View south showing the rock shelter D012 near Tietkop 2 quarry.



**Plate 20:** Shows the proximity of Tietkop 2 quarrying activities to the shelter D012 and its talus.

### 3.4.6 Rondeberg

Centre point: S28.984054° E17.870760°

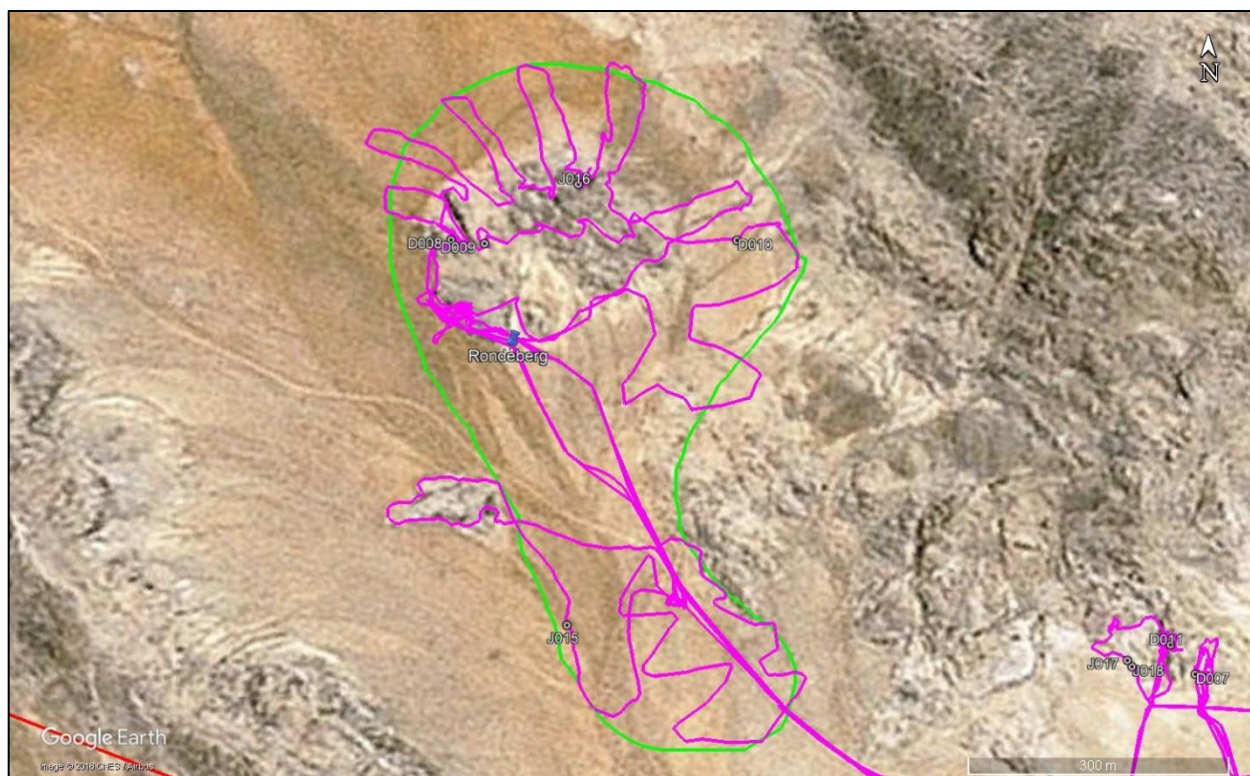
The Rondeberg quarry is located approximately 1.5km west of the Central quarry (see **Figure 4**). This is an existing quarry on the southern edge of an outlying granite outcrop. The status quo modified landscape can be seen on **Figure 8** and **Plate 21** and **Plate 22**.

There are two archaeological sites of moderate significance inside the green target area as it relates to the Rondeberg quarry area (see **Figure 19** and **Table 11** for full details):

- D008 is a north facing small rock shelter containing LSA material (see **Plate 23** and **Plate 24**). The shelter is ~10m wide x 2m deep x 2m high opening onto a narrow flat area in front. It has a sandy floor that may contain shallow deposit. There are numerous ostrich eggshell fragments, one potsherd, and stone artefacts in ccs, quartz and hornfels, mostly cores, flakes and chunks. No formal tools observed. The site should be protected and made a no-go area if this is feasible. If not, the site must be sampled and/or excavated;
- D009 is a north facing rock shelter ~15 wide x 2m deep x 2m high with large flat talus area (see **Plate 25** and **Plate 26**). There is a vestigial deposit of only a few centimetres. Artefacts are few, and mostly on quartz, but some exotic rock has also been used. One ccs scraper was observed. No ostrich eggshell or pottery was noted. The site should be protected and made a no-go area if this is feasible. If not, the site must be sampled and/or excavated.

The only other archaeological material noted during the survey were two isolated lithics of likely MSA age: J015, a quartz flake in a shallow streambed south west of the quarry, and J016, a quartz core in an erosion gully on the northern side of Rondeberg. An isolated Earlier Stone Age biface (sub-classic handaxe?) in quartzite was found on the surface. This is the only unequivocal ESA artefact that we noted.

The heritage sensitivity of the Rondeberg quarry and surroundings is considered to be low - moderate and requires mitigation in the form of “no go” areas around D008 and D009. If “no go” areas are not feasible, then collection and sampling of these archaeological sites is required.



**Figure 19:** Rondeberg quarry showing outer target areas (green), search tracks (purple) and heritage observations (labelled dots).





**Plate 21:** View of Rondeberg quarry looking north east.



**Plate 22:** View of Rondeberg quarry looking north.



**Plate 23:** Small rock shelter D008 containing LSA material.





**Plate 24:** Interior of rock shelter D008.



**Plate 25:** Rock shelter D009.



**Plate 26:** View of rock shelter D009 showing proximity of granite outcrop that is to be mined.



### 3.4.7 Ghaams

Centre point: S28.963881° E18.020472°

There were no obvious modern quarries in the area that we could observe and so the status quo is largely the natural landscape (**Plate 27** and **Plate 28**). **Figure 20** shows the survey tracks overlaid with the prospecting target area.

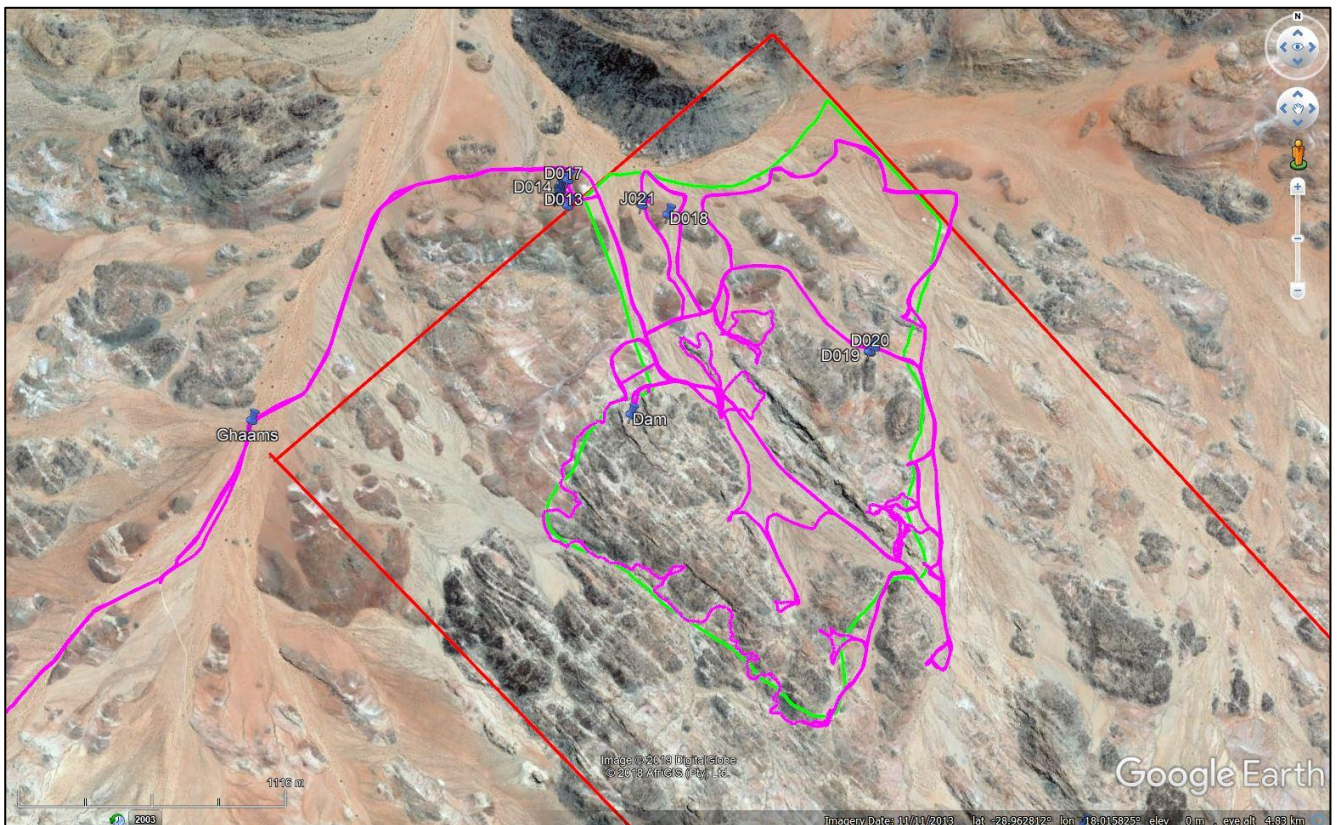
The area consists of a series of granite massifs between which run dry river beds, draining towards the Gariep. The survey noted an almost total absence of archaeological material, with the exception of a handful of a few isolated lithic finds. This may be related to the nature of the landscape, which is extremely harsh and rugged with little natural shelter available, and also to the reworking of the areas between the granite outcrops by fluvial activity.

Only one potential archaeological site (having three components) was noted within the area and its position is shown on **Figure 20**:

- D019/J022 is two possible graves on the edge of a dry stream opposite a small shepherds “skuling” (D020). The reason for assuming these are graves is the rock slabs placed on end at the side of rock piles (**Plate 29**).
- D020 is a small shepherds’ encampment consisting of an informally walled area in a rock overhang and a rock lined “kookskern”. A number of old tin cans and two shoes were noted.

Just outside the north western corner of the Ghaams prospecting area the survey noted a small complex of old copper mining/prospecting structures close to a deep shaft and tailings dump, which we estimated to be of late 19th century date, based on blue and white Willow Pattern refined earthenware ceramics and glass fragments noted around the ruins (D013-D017 and J019, J020) (**Plate 30**).

The heritage sensitivity of the Ghaams prospecting area is considered to be low.



**Figure 20:** Ghaams area showing outer target areas (green) search tracks (purple) and heritage observations (labelled dots).





**Plate 27:** View looking north along the granite massif on the western edge of the Ghaams prospecting area.



**Plate 28:** View of one of the fluvial valley floor between the granite outcrops in the Ghaams prospecting area.



**Plate 29:** Two possible graves (D019/J022) on the edge of a dry stream opposite a small shepherds "skuiling" (D020).





**Plate 30:** View looking west across the old copper mining/prospecting complex northwest of the Ghaams prospecting area. Ruin in the foreground with mine shaft and tailings dump in the distance.

#### 4. IMPACT ASSESSMENT

The impacts of the proposed prospecting, mining, infrastructure and dispatch activities on archaeological resources have been assessed as follows using the impact assessment methodology summarised in **Appendix 6**:

**Table 3:** Potential Impact: Central Dispatch – impacts on archaeological resources during dispatch activities

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Local 1	Low 1	Short-term 1	<b>Very low 3</b>	Improbable	<b>INSIGNIFICANT</b>	neutral	High
<b>Essential mitigation measures:</b>								
<ul style="list-style-type: none"> <li>Archaeological resources are of very low significance and no mitigation is proposed;</li> <li>If any significant unknown archaeological resources (eg human remains) are uncovered during the activity, these should be avoided and reported to the archaeologist for assessment;</li> </ul>								
With mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

**Table 4:** Potential Impact: Infrastructure area - impacts on archaeological resources during use of the area

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Local 1	Medium 2	Long-term 3	<b>Medium 6</b>	Possible	<b>LOW</b>	- ve	High
<b>Essential mitigation measures:</b>								
<ul style="list-style-type: none"> <li>Take note of known archaeological resource co-ordinates and no-go areas when planning and utilising the area;</li> <li>Establish no go areas around archaeological resources (durable markers/fencing);</li> <li>If any significant unknown archaeological resources (eg human remains) are uncovered during the activity, these should be avoided and reported to the archaeologist for assessment;</li> </ul>								
With mitigation	Local 1	Low 1	Short-term 1	<b>Very low 3</b>	Improbable	<b>INSIGNIFICANT</b>	- ve	High

**Table 5: Potential Impact: Groenhoekies - impacts on archaeological resources during mining**

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Local 1	Low 1	Short-term 1	<b>Very low 3</b>	Improbable	<b>INSIGNIFICANT</b>	neutral	High
<b>Essential mitigation measures:</b>								
<ul style="list-style-type: none"> <li>Archaeological resources are of very low significance and no mitigation is proposed;</li> <li>If any significant unknown archaeological resources (eg human remains) are uncovered during the activity, these should be avoided and reported to the archaeologist for assessment;</li> </ul>								
With mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

**Table 6: Potential Impact: Rondeberg Quarry - impacts on archaeological resources during mining**

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Local 1	Medium 2	Long-term 3	<b>Medium 6</b>	Possible	<b>LOW</b>	- ve	High
<b>Essential mitigation measures:</b>								
<ul style="list-style-type: none"> <li>Take note of known archaeological resource co-ordinates and no-go areas when planning and undertaking mining activities;</li> <li>Establish no go areas around archaeological resources (durable markers/fencing);</li> <li>If any significant unknown archaeological resources (eg human remains) are uncovered during the activity, these should be avoided and reported to the archaeologist for assessment;</li> </ul>								
With mitigation	Local 1	Low 1	Short-term 1	<b>Very low 3</b>	Improbable	<b>INSIGNIFICANT</b>	- ve	High

**Table 7: Potential Impact: Central Quarry - impacts on archaeological resources during mining**

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Local 1	Low 1	Short-term 1	<b>Very low 3</b>	Improbable	<b>INSIGNIFICANT</b>	neutral	High
<b>Essential mitigation measures:</b>								
<ul style="list-style-type: none"> <li>Archaeological resources are of very low significance and no mitigation is proposed;</li> <li>If any significant unknown archaeological resources (eg human remains) are uncovered during the activity, these should be avoided and reported to the archaeologist for assessment;</li> </ul>								
With mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

**Table 8: Potential Impact: Tietkop 1 and 2 Quarries - impacts on archaeological resources during mining**

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Local 1	Medium 2	Long-term 3	<b>Medium 6</b>	Possible	<b>LOW</b>	- ve	High
<b>Essential mitigation measures:</b>								
<ul style="list-style-type: none"> <li>Take note of known archaeological resource co-ordinates and no-go areas when planning and undertaking mining activities;</li> <li>Establish no go areas around archaeological resources (durable markers/fencing);</li> <li>If any significant unknown archaeological resources (eg human remains) are uncovered during the activity, these should be avoided and reported to the archaeologist for assessment;</li> </ul>								
With mitigation	Local 1	Low 1	Short-term 1	<b>Very low 3</b>	Improbable	<b>INSIGNIFICANT</b>	- ve	High



**Table 9:** Potential Impact: Die Dam - impacts on archaeological resources during prospecting

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Local 1	Medium 2	Long-term 3	<b>Medium 6</b>	Possible	<b>LOW</b>	- ve	High
<b>Essential mitigation measures:</b> <ul style="list-style-type: none"> <li>• Take note of known archaeological resource co-ordinates and no-go areas when planning and accessing prospecting sites;</li> <li>• Establish no go areas around archaeological resources (durable markers/fencing);</li> <li>• If any significant unknown archaeological resources (eg human remains) are uncovered during the activity, these should be avoided and reported to the archaeologist for assessment;</li> </ul>								
With mitigation	Local 1	Low 1	Short-term 1	<b>Very low 3</b>	Improbable	<b>INSIGNIFICANT</b>	- ve	High

## 5. CONCLUSIONS AND RECOMMENDATIONS

The archaeological resources identified during the ACO field assessment provide evidence of a human presence in this area going back to at least the Earlier/Middle Stone Age. The MSA material identified consists of low density unstratified, surface finds with no associated non-lithic material. Its ephemeral and scattered nature means that its heritage significance is very low.

Later Stone Age material was found in a handful of small rock shelters around the base of granite kopjes. These sites all contained some deposit and scattered archaeological material on the adjacent talus slopes and given the sparse nature of the archaeological resources generally, the rock shelter sites are an important local information resource about the LSA of the area. The heritage significance of these LSA rock shelters is moderate, and if they cannot be avoided during mining, they must be mitigated in some way.

Evidence of more recent, historical period occupation of the area was found in the Infrastructure Area at Oeranoep, and in the broader Ghaams prospecting area. The remains of built structures, ash heaps and possible graves were all identified and their heritage significance is rated as low-moderate. Some mitigation has been proposed.

The geology of the area means that there is no possibility of finding fossils in the affected area.

## 6. RECOMMENDATIONS

The following recommendations are made (see **Table 10**):

- The LSA rock shelters (D008, D009 and D012) must be “no go” areas for any activities associated with the mining. If this is not feasible, these sites must be sampled before mining continues;
- The possible graves in the Infrastructure Area (D005 / J009-014) must be a “no go” area defined by waypoints J023 – J027;
- In general, should any archaeological material, including human burials, be accidentally exposed during the course of mining, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it.
- If the areas examined by ACO should change, or new areas be added to the mining proposals, they must be assessed for heritage resources.

**Table 10:** Archaeological sensitivity and mitigation requirements

Quarry	Heritage Sensitivity	Mitigation required	Mitigation proposed
Groenhoekies	Very Low	No	N/A
Central Dispatch	Very Low	No	N/A
Infrastructure	Moderate	Yes	<p>“No go” areas to be put in place around D005 and J009 – J014 (within the area defined by J023 – J027).</p> <p>If “no go” areas are not feasible, then collection and sampling of these archaeological sites is required.</p>
Central	Low	No	N/A
Tietkop 1	Low	No	N/A
Tietkop 2	Moderate	Yes	<p>“No go” area to be put in place around D012.</p> <p>If a “no go” area is not feasible, then collection and sampling of this archaeological site is required.</p>
Rondekop	Low - Moderate	Yes	<p>“No go” areas to be put in place around D008 and D009.</p> <p>If “no go” areas are not feasible, then collection and sampling of these archaeological sites is required.</p>
Die Dam	Low	No	N/A

### 6.1 Acceptability of the proposed activity with respect to heritage resources

It is our assessment that the current and proposed activities may be authorised provided the necessary mitigation is actioned.



## 7. REFERENCES

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## APPENDIX 1: HERITAGE RESOURCE INVENTORY

The heritage resources observed were mainly isolated finds or low density MSA and LSA artefact scatters. The observed resources are listed by associated active or proposed quarry in **Table 11** and **Table 12** below and are shown on **Figure 14 - Figure 20** above.

**Table 11:** Quarries containing archaeological resources in Oeranoep

Quarry	Waypoint	Lat	Lon	Description	Grading
Central Dispatch area	D001	28.98406704	17.88258104	Isolated quartzite cobble hammerstone on sand plain near kopje. Also, occasional quartz flakes with MSA-like characteristics. Area heavily disturbed by domestic animals	NCW
Central Dispatch area	D002	28.98385003	17.88269696	Isolated banded ironstone MSA flake with denticulate retouch along one edge. There is a lot of quartz in this area as there is a nearby outcrop. There only appear to be a few unequivocal flaked pieces in amongst the natural outcrop debris.	NCW
Central Dispatch area	D003	28.98360603	17.88306803	Outcrop of vein quartz. This might contain some quartz quarrying debris but most is natural. Some possible flakes of uncertain age.	NCW
Central Dispatch area	J001	28.98366496	17.88133699	Isolated quartz core on sand next to river course	NCW
Central Dispatch area	J002	28.98316003	17.88184402	Isolated quartz flake	NCW
Central Dispatch area	J003	28.98272602	17.88206999	1 x quartz core and 2 x quartz flakes. On sandy slope	NCW
Central Dispatch area	J004	28.98156404	17.88223201	Number of fine quality quartz flakes in area of wash beyond the northern edge of the Central Dispatch Area	NCW
Central Quarry	D004	28.98553496	17.88644300	In a narrow sandy "neck" between sections of the granite on the kopje is an area where numerous potsherds are scattered on the surface. These appear to be from one pot and have been affected by slope wash distributing them across ~5m <sup>2</sup> . There are a few quartz flakes associated. There are no rock shelters or overhangs at this location, so the potsherds are considered to be an isolated find.	NCW
Central Quarry	J005	28.98721503	17.88585400	2 x MSA flakes and 1 x core on heavily patinated indurated shale. Quartz flakes. Scatter in area of wash between Central prospecting area and adjacent kopje	NCW
Central Quarry	J006	28.98758601	17.88627603	Isolated indurated shale flake. ESA / MSA? On rocky edge of shallow erosion gully	NCW
Central Quarry	J007	28.98595297	17.88698598	Isolated MSA flakes – 1 x large quartz and 2 x patinated indurated shale - and ironstone pebble with flaking damage. On quartz scree below Central kopje	NCW
Central Quarry	J008	28.98504102	17.88722998	1 x MSA indurated shale flake. Patinated. In scree in erosion gullies on side of hill	NCW
Infrastructure area	D005	28.98551904	17.88934498	A north west facing shallow overhang at the base of the "Central" granite massif ~15m long x 1.5 deep. Variable height. Minimal deposit but low-density artefacts of predominantly LSA age are scattered across the talus slope. Variety of raw materials including ccs, hornfels, agate, quartz, crystal quartz suggesting links to the Orange River. No formal tools observed. Pottery is present in small quantities. Numerous ostrich eggshell fragments. This site is close to the fuel shed in the infrastructure area and some minor disturbance has occurred to the talus edge. <b>The talus area could be sampled. If not, the area should be placed out of bounds.</b>	IIIC
Infrastructure area	J009	28.98420601	17.88748898	Small ash heap approx. 2 x 3 m. Approx. 50 cm high. Clear feature on landscape next to erosion gully. Ash, charcoal, animal bone, copper/brass (incl. wire and flat plate), iron, clear glass bottle fragments (one marked 'Pretoria').	IIIC
Infrastructure area	J010	28.98416402	17.88739401	Small ash heap approx. 1 x 1 m. Purple glass bottle neck	IIIC
Infrastructure area	J011	28.98422697	17.88742402	Ash heap and artefact scatter. Early to mid-20 <sup>th</sup> century? Intact clear glass medicine type bottle, plain white ceramic sherd, moulded porcelain sherd, broken tin pot lid	IIIC



Infrastructure area	J012	28.98432897	17.88742502	Packed stone feature near ash heaps J009 – J011. Possible grave. Approx. 1 x 2 m with stone circle adjacent	IIIA
Infrastructure area	J013	28.98437600	17.88749602	Packed stone feature near ash heaps J009 – J011. Possible grave	IIIA
Infrastructure area	J014	28.98448203	17.88705496	Stone feature. Circular arrangement of granite pieces below outcropping of granite bedrock. Raised into mound with hollow in centre. Thick layer of quartz pebbles on upper edge of circular feature. No artefacts associated	IIIC
Infrastructure area	J023	28.98445202	17.88750800	<b>Points to mark sensitive area around graves</b>	n/a
Infrastructure area	J024	28.98439301	17.88760599		
Infrastructure area	J026	28.98426301	17.88749803		
Infrastructure area	J027	28.98435102	17.88734003		
Groenhoeekies	D006	28.97329696	17.87747797	Small pan-like feature ~20m diameter on top of a dolerite(?) outcrop showing indications of water pooling. An ephemeral quartz artefact scatter including chunks and cores. Although no definitive items, we assume this to be of MA age. While inside the green area around the quarry, it is currently not threatened by activities.	NCW
n/a	D007	28.98728804	17.87790402	Small east facing shelter at the base of a granite outcrop opening onto the surrounding sandy plain, located between "Central" and "Rondeberg" quarries. Talus is covered by an LSA scatter which includes numerous ostrich eggshell fragments, some potsherds. Stone includes ccs, hornfels, quartz, quartz crystal. Formal artefacts include 2 chert scrapers. There are a number of river cobbles/pebbles. There is a vestigial deposit inside the shelter. Not threatened but recorded for future.	IIIC
Rondeberg	D008	28.98294101	17.86934601	To the west of the mined area is a secondary outcrop which has a few rock shelters. One of these in a small gully is north facing and contains LSA material. The shelter is ~10m wide x 2m deep x 2m high opening onto a narrow flat area in front. Sandy floor that may contain shallow deposit. There are numerous ostrich eggshell fragments, 1x potsherd, stone artefacts in ccs, quartz, hornfels mostly cores, flakes and chunks. No formal tools observed. <b>Sample/collect/excavate.</b>	IIIC
Rondeberg	D009	28.98297898	17.86972504	North facing rock shelter ~15 wide x2m deep x2m high with large flat talus area. Vestigial deposit of only a few centimetres. Artefacts are few and mostly quartz but some exotic material present. 1 x scraper on ccs. No ostrich eggshell or pottery observed.	IIIC
Rondeberg	D010	28.98294504	17.87257204	Isolated Early Stone Age biface (sub-classic handaxe?) in quartzite on surface	NCW
Rondeberg	J015	28.98676299	17.87064403	MSA flake on quartz in shallow streambed. Piece of OES nearby but this looks recent	NCW
Rondeberg	J016	28.98239904	17.87078401	Quartz core and 2 x OES in erosion gully below rock shelter on northern side of Rondeberg. No deposit and no other material seen	NCW
n/a	D011	28.98698101	17.87759196	Large west facing rock shelter at the base of a granite outcrop opening onto the surrounding sandy plain, located between "Central" and "Rondeberg" quarries. Appears to be some deposit on the north side. Large talus with many artefacts mostly chunks and flakes. No or pottery observed. Some ostrich eggshell in shelter but numerous on talus. Formal tools limited to a large adze-like tool. There is lots of quartz, and also some exotic material including banded ironstone and agate. There are also more recent artefacts from the 19 <sup>th</sup> century including blue and green glass and undecorated refined earthenware. There is an owl roost at the very northern end of the shelter complex, and a large microfauna midden below. This area is not threatened by the quarrying and is recorded for future reference.	IIIB
n/a	J017	28.98713901	17.87709801	Scatter of MSA lithics on spur opposite D011. Covering approx. 4 x 10 m. Mainly made on indurated shale. Flakes and chunks. Nothing formal or retouched noted.	IIIC
n/a	J018	28.98720397	17.87715401		

Tietkop 2	D012	28.99403103	17.88807697	A small north facing rock shelter in a secondary outcrop close to Tietkop 2 quarry. ~15 m wide x 2.5 m deep x 2 m high opening directly onto a talus slope. Not much deposit in the shelter though floor is sandy. Numerous ostrich eggshell fragments. No pottery observed. Lots of quartz artefactual but no formal tools observed. A few exotic ccs materials were noted. Mine disturbance comes to within a few meters of the talus. <b>The shelter should be protected and put off limits or sampled/collected if this is not feasible.</b>	IIIC
n/a	D021	29.00170902	17.96572097	These are outside mining areas. They mark an old copper prospecting area and stone structure	n/a
n/a	D022	29.00214203	17.96584996		

\* **Note:** NCW – Not conservation worthy. A resource that, after appropriate investigation, has been determined not to have enough heritage significance to be retained as part of the National Estate (see Appendix 3 for other grading categories).

**Table 12: Quarries containing archaeological resources in Ghaams**

Quarry/ Area	Waypoint	Lat	Lon	Description	Grading
North west edge of Ghaams	D013	28.95483398	18.01154600	A small complex of old copper mining/prospecting structures close to a deep shaft and tailings dump at the north western end of the Ghaams prospecting area. Estimated to be late 19 <sup>th</sup> century based on blue and white willow pattern refined earthenware ceramics and glass fragments at the ruin.	IIIC
	D014	28.95399503	18.01129698	Stone walled “kookskerm”	IIIC
	D015	28.95414800	18.01120201	Vernacular stone structure built against the kopje (possible dwelling)	IIIC
	D016	28.95428102	18.01121400	Stone dwelling with 2x rooms. Well-built foundations and lower structure with stone from mine shaft. Odd layout – not vernacular built by person/s doing mining?	IIIC
	D017	28.95385698	18.01154098	Possible grave	IIIA
Ghaams	D018	28.95517102	18.01585598	Traces of old copper prospecting on side of kopje. Some tailings where a seam was followed.	NCW*
	D019	28.96030401	18.02450703	Possible graves x2 on the edge of a dry stream opposite a small shepherds “skuling”. The reason for assuming these are graves is the rock slabs placed on end at the side of rock piles.	IIIA
	D020	28.96011801	18.02470601	Small shepherds’ encampment consisting of an informally walled area in a rock overhang and a rock lined “kookskerm”. A number of old tin cans and 2x shoes.	IIIC/NCW
	J019	28.95452896	18.01108601	Square stone platform with coke and metal slag. Possible forge (?). At abandoned 19 <sup>th</sup> century(?) copper mine complex	IIIC
	J020	28.95449703	18.01111300	Small stone structure adjacent to J019.	IIIC
	J021	28.95480003	18.01473297	Single large quartz MSA flake on floodplain between rocky kopjes	NCW
	J022	28.96031097	18.02450703	Possible graves. Associated with packed stone herder (?) shelters (see D019 and D020)	IIIC

\* **Note:** NCW – Not conservation worthy. A resource that, after appropriate investigation, has been determined not to have enough heritage significance to be retained as part of the National Estate (see Appendix 3 for other grading categories).



## APPENDIX 2: SPECIALIST CV

### PERSONAL DETAILS

Name: Halkett, David John  
Home Address: 6 Overton Court  
151 High Level Road  
Green Point  
Cape Town 8005  
Telephone: 073 141 8606

Previous work Address: **Archaeology Contracts Office**  
Department of Archaeology, University of Cape Town, Private Bag  
Rondebosch, 7701

Current work address: **ACO Associates cc**  
Unit D17, Prime Park, 21 Mocke Road, Diep River 7800  
Telephone (w): (021) 706 4104  
Fax to e-mail (w): 086 603 7195

Date of Birth: 23.07.1958  
Marital Status: Married  
Nationality: South African  
Home Language: English  
Other Languages: Afrikaans  
ID Number: 5807235148080

### FORMAL QUALIFICATIONS

Matriculated	Pinelands High (matric exemption)	1976
Graduated	B.A. University of Cape Town	1980
	B.A. (Hons) (Archaeology) University of Cape Town	1982
	M.A. (Archaeology) University of Cape Town	1991

### EXPERIENCE

Employment		
Part time research asst	South African Museum (archaeology)	Nov-Feb 1978,1979
Student Ranger	Cape of Good Hope Nature Reserve	Dec-Feb 1980
National Service	SA Navy Rank: Sub-Lieutenant	1982-1984
Part time research asst	Spatial Archaeology Research Unit, UCT	1984
Junior Research Officer	Paleoanthropology Research Unit, Wits	1997(part time appt.)
Principal Investigator	Archaeology Contracts Office, UCT	1988-2012
Director	ACO Associates cc.	2008-present

### Other experience and professional memberships

- Secretary, Archaeology Field Club, UCT. 1979
- Chairperson, Archaeology Field Club, UCT. 1980
- Co-organizer of the Spatial Archaeology Research Unit workshop: Environments and Prehistory in the western Cape. 1984
- Archaeological advisor, National Monuments Council, Western Cape Regional Plans Committee. 1993 - 1999
- Member: Association of Southern African Professional Archaeologists (ASAPA)
- Member: Association of Southern African Professional Archaeologists (ASAPA): CRM section (PI level with accreditation for Stone Age, Coastal Shell Middens, Colonial Period, Rock Paintings, Industrial, Bone Accumulations)
- Committee member: Archaeology Standards Generating Body (SGB) for SAQA
- Member: South African Archaeological Society
- Committee member: Heritage Western Cape, Archaeology, Palaeontology and Meteorites Committee appointed 2003 - 2007, re-appointed 2007 – 2013
- Member: Heritage Western Cape, Integrated Assessment Review Committee, 2009 - 2013

- Forensic consultant: Missing Persons Unit: National Prosecuting Authority 2007

## Awards

Dept. of Cultural Affairs and Sport award for the Best Heritage Impact Assessment in the Western Cape for 2013/14.

## Long term commercial projects

1997-2008 Directed all ACO cultural resource management activities for De Beers Namaqualand Mines

## Peer Reviews

1997 Archaeological report prepared for Alpha Saldanha Cement project.

1999 Archaeological reports prepared for Namdeb.

## Published Articles (relevant selection)

Avery, G., Halkett, D., Orton, J., Steele, T. & Klein, R. 2009. The Ysterfontein 1 Middle Stone Age Rock shelter and the Evolution of Coastal Foraging. *South African Archaeological Society Goodwin Series* 10: 66–89

Cruz-Uribe, K., Klein, R.G., Avery, G., Avery, D.M., Halkett, D., Hart, T., Milo, R.G., Sampson, C.G. & Volman, T.P. 2003. Excavation of buried late Acheulean (mid-Quaternary) land surfaces at Duinefontein 2, western Cape province, South Africa. *Journal of Archaeological Science* 30, 559-575

Dewar, G, Halkett, D, Hart, T., Orton, J. & Sealy, J. 2006. Implications of a mass kill site of springbok (*Antidorcas marsupialis*) in South Africa: hunting practices, gender relations, and sharing in the later stone age. *Journal of Archaeological Science* 33, 1266-1275

Halkett, D., Hart, T., Yates, R., Volman, T.P., Parkington, J.E., Klein, R.J., Cruz-Uribe, K. & Avery, G. 2003. First excavation of intact Middle Stone Age layers at Ysterfontein, western Cape province, South Africa: implications for Middle Stone Age ecology. *Journal of Archaeological Science* 30, 955-971

Hine, P., Sealy, J., Halkett D. & Hart T. 2010. Antiquity of stone-walled tidal fish traps on the Cape coast, South Africa. *South African Archaeological Bulletin* 65 (191): 35–44

Jerardino, A., Wiltshire, N., Webley, L., Tusenius, M., Halkett, D., Hoffman, M.T. & Maggs, T. 2014. Site distribution and chronology at Soutpansklipheuwel, a rocky outcrop on the West Coast of South Africa. *Journal of Island & Coastal Archaeology*.

Klein, R.G., Avery, G., Cruz-Uribe, K., Halkett, D., Hart, T., Milo, R.G., Volman, T.P. 1999. Duinefontein 2: An Acheulean Site in the Western Cape Province of South Africa. *Journal of Human Evolution* 37, 153-190

Klein, R.G., Cruz-Uribe, K., Halkett, D., Hart, T., Parkington, J.E. 1999. palaeoenvironmental and human behavioural implications of the Boegoeberg 1 late Pleistocene hyena den, northern Cape province, South Africa. *Quaternary Research* 52, 393-403

Klein, R.G., Avery, G., Cruz-Uribe, K., Halkett, D.J., Parkington, J.E., Steele, T., Volman, T.P. & Yates, R.J. 2004. The Ysterfontein 1 Middle Stone Age site, South Africa, and early human exploitation of coastal resources. *Proceedings of the National Academy of Sciences of the United States of America* 101: 5708–5715

Malan, A., Webley, L., Halkett, D. & Hart, T. 2013. People and places on the West Coast since AD 1600. In: Jerardino, A., Malan, A., & Braun, D. eds. *The Archaeology of the West Coast of South Africa*. BAR International Series 2526, 124-142

Orton, J., Hart, T.J.G. and Halkett, D.J. 2005. Shell middens in Namaqualand: Two Later Stone Age sites at Rooiwalbaai, Northern Cape Province, South Africa. *South African Archaeological Bulletin*, 60 (181): 24-32

Orton, J. & Halkett, D. 2001. Microlithic denticulates on a mid-Holocene open site near Jakkalsberg in the Richtersveld, northern Cape province, South Africa. *Southern African Field Archaeology* 10, 19-22

Orton, J. & Halkett, D. 2010. Stone tools, beads and a river: two Holocene microlithic sites at Jakkalsberg in the northwestern Richtersveld, northern Cape, South Africa. *South African Archaeological Bulletin*, 65 (191):13-25



Orton, J., Halkett, D., Hart, T., Patrick, M. and Pfeiffer. 2015. An unusual pre-colonial burial from Bloubergstrand, Table Bay, South Africa. *South African Archaeological Bulletin*, 70 (201): 106–112,

Parkington, J.E., Poggenpoel, C., Halkett, D. and Hart, T. 2004. Initial observations on the middle stone age coastal settlement in the western Cape, South Africa. In: Conard N.J. ed. *Settlement Dynamics of the Middle Palaeolithic and Middle Stone Age Vol II*: 5-21. Kerns Verlag, Tübingen.

Parkington, J.E., Yates, R., Manhire, A. & Halkett, D. 1986. The social impact of pastoralism in the south-western Cape. *Journal of Anthropological Archaeology* 5: 313-329

Smith, A., Halkett, D., Hart, T. & Mütti, B. 2001. Spatial patterning, cultural identity and site integrity on open sites: evidence from Bloeddrift 23, a pre-colonial herder camp in the Richtersveld, northern Cape province, South Africa. *South African Archaeological Bulletin* 56 (173&174): 23-33

Wilson, M.L. & Halkett, D.J. 1981. The use of marine shell for decorating Cape coastal (Khoisan) pottery. *South African Archaeological Bulletin* 36: 43-44

Yates, R.J., Miller, D.E., Halkett, D.J., Manhire, A.H., Parkington, J.E. & Vogel J.C. 1986. A late mid-Holocene high sea level: a preliminary report on geo-archaeology at Elands Bay, western Cape Province, South Africa. *South African Journal of Science* 82: 164-165

### Presentations and lectures (recent)

2007. In at the deep end. Lecture presented at the annual one-day lecture series of the Archaeological Society of the Western Cape and the Friends of the Stellenbosch Museum.

2008. The landscape of early colonial burial in Cape Town: a walking tour of excavation sites and buildings of interest in Green Point. Presented during the ASAPA, Mid-conference excursion. With a guidebook compiled by Dave Halkett, Tim Hart, Liesbet Schietecatte, Erin Finnegan & Katie Smuts.

2009-2016. In at the deep end. Contract archaeology: a case study of mitigation a pre-colonial heritage site to be impacted by development. Presented as part of APG5066F - Conservation Disciplines and Practices, MPhil in Conservation of the Built Environment, University of Cape Town.

2009/2010. "In at the deep end" and "Middens of steel". Contract archaeology: case studies of mitigation of stone age and colonial heritage sites to be impacted by development. Presented as part of APG5066F - Conservation Disciplines and Practices, MPhil in Conservation of the Built Environment, University of Cape Town.

2009/2010/2011. Surveying, Measuring and Recording Archaeological Resources. Presented as part of APG5066F - Surveying, Measuring and Recording Heritage Resources, MPhil in Conservation of the Built Environment, University of Cape Town.

2011. ...Blowing in The Wind: Renewable energy projects - Challenges and opportunities for heritage resource management. Lecture presented at the annual one-day lecture series of the Archaeological Society of the Western Cape and the Friends of the Stellenbosch Museum.

2012 "My Career in Archaeology". Part of the Centre for Higher Education and Development series on careers, UCT.

### Referees

#### **Prof. J. E. Parkington**

Dept of Archaeology  
University of Cape Town  
Private Bag  
Rondebosch 7701  
E-mail: john.parkington@uct.ac.za

#### **Prof. R. G. Klein**

Dept of Anthropology  
Stanford University  
Stanford

### Field/Consulting/Heritage Management Experience (relevant selection)

Halkett, D., Hart, T. & Parkington, J. 1994. Phase 2 archaeological excavations at the Namakwa Sands Project (first phase), Vredendal district, Namaqualand. Unpublished report prepared for Namakwa Sands. Archaeology Contracts Office, UCT.

Halkett, D. & Hart, T. 1997. An archaeological assessment of the coastal strip and a proposed heritage management plan for De Beers Namaqualand Mines, Vol 1&2. Prepared for De Beers Consolidated Mines: Namaqualand Mines. Archaeology Contracts Office, UCT.

Halkett, D. & Lanham, J. 1998. Report on an initial visit to assess the impact of mining on archaeological sites in the Richtersveld. Prepared for Trans Hex Mining Ltd. Archaeology Contracts Office, UCT.

Halkett, D. 1999. A phase one archaeological assessment of heritage resources in the Trans Hex diamond concession Richtersveld. Prepared for Trans Hex Group Ltd. Archaeology Contracts Office, UCT.

Halkett, D. & Hart, T. 2000. Heritage sites in De Beers Namaqualand Mines: A conservation and management handbook. Prepared for De Beers Consolidated Mines: Namaqualand Mines. Archaeology Contracts Office, UCT.

Halkett, D. and Robinson, J. 2017a. Archaeological/heritage scoping report for the expansion of the current granite mine in Core Area One, Lower Swart Modder, Northern Cape Province. Prepared for Klaas Van Zyl on behalf of Sizisa Ukhanyo 830 Trading cc.

Halkett, D. and Robinson, J. 2017b. Archaeological/heritage scoping report for the expansion of the current granite mine in Core Area Two, on portions of the farm Nous West 76 and Lower Zwart Modder 79, Northern Cape Province. Prepared for Klaas Van Zyl on behalf of Sizisa Ukhanyo 830 Trading cc.

Halkett, D. and Robinson, J. 2017c. Archaeological/heritage scoping report for the expansion of the current granite mine in Core Area Three, on portions of the farm Nous West 76, Northern Cape Province. Prepared for Klaas Van Zyl on behalf of Sizisa Ukhanyo 830 Trading cc.

Halkett, D. 2000. An initial assessment of heritage resources within the Trans Hex West Coast Diamond Concessions. Prepared for Trans Hex Mining Ltd. Archaeology Contracts Office, UCT.

Halkett, D. 2001. A report on archaeological excavations on the Orange River floodplain between Jakkalsberg and Sendelingsdrift: Richtersveld. Prepared for Trans Hex Mining Ltd. Archaeology Contracts Office, UCT.

Halkett, D. 2001. An inspection and assessment of specific archaeological sites on De Beers owned properties – Namaqualand. Prepared for De Beers Consolidated Mines: Namaqualand Mines. Archaeology Contracts Office, UCT.

Halkett, D. 2002. Phase 1 archaeological survey: assessment of mining blocks in the BMC and KN areas, Namaqualand. Prepared for De Beers Consolidated Mines: Namaqualand Mines. Archaeology Contracts Office, UCT.

Halkett, D. 2003. A report on the archaeological mitigation program at De Beers Namaqualand Mines, March 2002 to June 2003. Prepared for De Beers Consolidated Mines: Namaqualand Mines. Archaeology Contracts Office, UCT.

Orton, J. & Halkett, D. 2005. A report on the archaeological mitigation program at De Beers Namaqualand Mines, August to September 2004. Prepared for De Beers Consolidated Mines: Namaqualand Mines. Archaeology Contracts Office, UCT.

Orton, J. & Halkett, D. 2005. A report on the archaeological mitigation program at De Beers Namaqualand Mines, August to September 2004. Prepared for De Beers Consolidated Mines: Namaqualand Mines. Archaeology Contracts Office, UCT.

Orton, J. & Halkett, D. 2006. Mitigation of archaeological sites within the Buffels Marine and Koingnaas Complexes, Namaqualand, September 2005 To May 2006. Prepared for De Beers Consolidated Mines: Namaqualand Mines. Archaeology Contracts Office, UCT.



Webley, L. & Halkett, D. 2014. Baseline heritage assessment: proposed aquaculture development at Brand Se Baai, Matzikama Municipality, Western Cape. Prepared for SRK Consulting (South Africa) (Pty) Ltd. ACO Associates cc.


Halkett, D. & Webley T. 2015. Heritage Impact Assessment: Elandsfontein Phosphate mining right on a Portion of Portion 2 And Portion 4 of the farm Elandsfontein 349, Saldanha. Prepared for Billet Trade (Pty) Ltd T/A Braaf Environmental Practitioners on behalf of Elandsfontein Exploration and Mining (Pty) Ltd. ACO Associates cc.

Halkett, D. & Webley, L. 2016. Heritage Impact Assessment of the proposed extension of the Tormin mine, west coast, South Africa. Prepared for SRK Consulting (South Africa) (Pty) Ltd. ACO Associates cc.

### APPENDIX 3: SPECIALIST DECLARATION

I, David Halkett, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- There are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24(F) of the Act.



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Signature of the specialist

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ACO Associates cc

Name of company (if applicable):

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31 January 2019

Date

## APPENDIX 4: GRADING CATEGORIES

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special <b>national</b> significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a <b>province</b> or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by HWC.	Exceptionally High Significance
III		Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register. These resources are currently managed by HWC <i>unless the local authority has been found competent and has been granted delegated authority.</i>	
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an <b>area</b> .	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a <b>townscape</b> , neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance
IIIC	Such a resource is of contributing significance to the environs These are heritage resources which are significant in the context of a <b>streetscape or direct neighbourhood</b> .	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by HWC for structures in this category if they are older than 60 years.	No research potential or other cultural significance



## APPENDIX 5: PALAEOONTOLOGICAL STUDY LETTER

UNIVERSITY OF THE  
WITWATERSRAND,  
JOHANNESBURG



Palaeosciences Centre, East Campus, 1 Jan Smuts Avenue, Braamfontein, Johannesburg  
Private Bag 3, WITS 2050, Johannesburg, SOUTH AFRICA Tel: 011 717 6682

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[Marion.bamford@wits.ac.za](mailto:Marion.bamford@wits.ac.za)

09 September 2017

Dr Ragna Redelstorff  
SAHRA  
111 Harrington Street,  
Cape Town 8001

Dear Dr Redelstorff

**RE: Request for exemption from palaeontological impact assessment for:  
Farm 22 Steinkopf District, Namaqualand Municipality.  
DMR REF NUMBER NC30/5/1/3/2/10223MP  
NC30/5/1/1/2/11461PR (GHAAM) 799PR  
NC30/5/1/1/2/11465PR (OERANOEP) 800PR**

An archaeological impact assessment has already been completed by Melanie Attwell and Associates, for Farm 22 Steinkopf Baseline Scoping Study NHRA S 38(8) for EIM Environmental Solutions (Pty) Ltd and Verde Bitterfontein (Pty) Ltd. November 2015. That report was submitted in terms of Section 39 and Regulation 52 of the Mineral and Petroleum Resources Act (Act 28 of 2002) as a subsidiary specialist heritage study. Section 38(1) and Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) also has application, and contains all the details of the project, location and current and proposed activities. In summary: the sites are pre-worked and therefore mining impact has already occurred, and modification of the landscape has taken place. The exception is at the Dam which is not a pre-worked site. The operation is currently small with minimal infrastructure consisting of water tanks, generators and a prefabricated office.

The application is for the extension of existing mineral rights to undertake the mining of stone within an area of existing stone quarries and the application for additional prospecting rights. An environmental management plan was submitted to the Department of Mineral Resources as part of an earlier successful application for the Groenhoekies Mine, on the same farm.

The sites for extensions of mining operations, like the current sites, all lie in the igneous and metamorphic rocks of the Namaqua-Natal Province, in particular in the Bushmanland Terrane. This group of rocks is made up of three types, namely the ca 2000 million year old (Ma) granitic gneisses, the 1600-1200 Ma amphibolite to

granulite grade supracrustal rocks and the 1200-1000 Ma granitoids. The igneous rocks were metamorphosed during the Namaqua Orogeny and do not contain any fossils.

The SAHRIS palaeosensitivity map indicates that the area is of low (blue) or insignificant (grey) sensitivity. It is therefore requested that no further palaeontological impact assessments be required for this project.



Yours faithfully

Prof Marion Bamford PhD  
Director: ESI

## APPENDIX 6: IMPACT ASSESSMENT METHODOLOGY

### Impact Assessment Methodology for EIAs - Instructions to Specialists

The significance of all potential impacts that would result from the proposed Project is determined in order to assist decision-makers. The significance rating of impacts is considered by decision-makers, as shown below.

- **INSIGNIFICANT:** the potential impact is negligible and will not have an influence on the decision regarding the proposed activity.
- **VERY LOW:** the potential impact is very small and **should not** have any meaningful influence on the decision regarding the proposed activity.
- **LOW:** the potential impact may not have any meaningful influence on the decision regarding the proposed activity.
- **MEDIUM:** the potential impact **should** influence the decision regarding the proposed activity.
- **HIGH:** the potential impact will affect a decision regarding the proposed activity.
- **VERY HIGH:** The proposed activity should only be approved under special circumstances.

The significance of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The significance of each identified impact<sup>1</sup> must be rated according to the methodology set out below:

**Step 1** – Determine the **consequence** rating for the impact by determining the score for each of the three criteria (A-C) listed below and then **adding** them<sup>2</sup>. The rationale for assigning a specific rating, and comments on the degree to which the impact may cause irreplaceable loss of resources and be irreversible, must be included in the narrative accompanying the impact rating:

Rating	Definition of Rating	Score
<b>A. Extent– the area over which the impact will be experienced</b>		
Local	Confined to project or study area or part thereof (the Setback)	1
Regional	The region, which may be defined in various ways, e.g. vegetation type, district, catchment, etc.	2
(Inter) national	Nationally or beyond	3
<b>B. Intensity– the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources</b>		
Low	Site-specific and/or wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and/or wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and/or wider natural and/or social functions or processes are severely altered	3
<b>C. Duration– the timeframe over which the impact will be experienced and its reversibility</b>		
Short-term	Up to 2 years (i.e. reversible impact)	1
Medium-term	2 to 15 years (i.e. reversible impact)	2
Long-term	More than 15 years (state whether impact is irreversible)	3



The combined score of these three criteria corresponds to a Consequence Rating, as follows:

Combined Score (A+B+C)	3 – 4	5	6	7	8 – 9
Consequence Rating	Very low	Low	Medium	High	Very high

Example 1:

Extent	Intensity	Duration	Consequence
Regional 2	Medium 2	Long-term 3	High 7

**Step 2** – Assess the probability of the impact occurring according to the following definitions:

Probability– the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

Example 2:

Extent	Intensity	Duration	Consequence	Probability
Regional 2	Medium 2	Long-term 3	High 7	Probable

**Step 3** – Determine the overall significance of the impact as a combination of the consequence and probability ratings, as set out below:

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	INSIGNIFICANT	INSIGNIFICANT	VERY LOW	VERY LOW
	Low	VERY LOW	VERY LOW	LOW	LOW
	Medium	LOW	LOW	MEDIUM	MEDIUM
	High	MEDIUM	MEDIUM	HIGH	HIGH
	Very High	HIGH	HIGH	VERY HIGH	VERY HIGH

Example 3:

Extent	Intensity	Duration	Consequence	Probability	Significance
Regional 2	Medium 2	Long-term 3	High 7	Probable	HIGH

**Step 4** – Note the status of the impact (i.e. will the effect of the impact be negative or positive?)

Example 4:

Extent	Intensity	Duration	Consequence	Probability	Significance	Status
Regional 2	Medium 2	Long-term 3	High 7	Probable	HIGH	- ve

**Step 5** – State your level of confidence in the assessment of the impact (high, medium or low).

Depending on the data available, you may feel more confident in the assessment of some impact than others. For example, if you are basing your assessment on extrapolated data, you may reduce the confidence level to low, noting that further groundtruthing is required to improve this.

**Example 5:**

<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Regional 2	Medium 2	Long-term 3	High 7	Probable	HIGH	- ve	High

**Step 6** – Identify and describe practical mitigation and optimisation measures that can be implemented effectively to reduce or enhance the significance of the impact. Mitigation and optimisation measures must be described as either:

- **Essential:** best practice measures which must be implemented and are non-negotiable; and
- **Best Practice:** recommended to comply with best practice, with adoption dependent on the proponent’s risk profile and commitment to adhere to best practice, and which must be shown to have been considered and sound reasons provided by the proponent if not implemented.

*Essential* mitigation and optimisation measures must be inserted into the completed impact assessment table. The impact should be re-assessed with mitigation, by following Steps 1-5 again to demonstrate how the extent, intensity, duration and/or probability change after implementation of the proposed mitigation measures.

**Example 6: A completed impact assessment table**

	<i>Extent</i>	<i>Intensity</i>	<i>Duration</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Without mitigation	Regional 2	Medium 2	Long-term 3	High 7	Probable	HIGH	- ve	High
<b>Essential mitigation measures:</b>								
<ul style="list-style-type: none"> <li>• Xxx1</li> <li>• Xxx2</li> <li>• Xxx3</li> </ul>								
With mitigation	Local 1	Low 1	Long-term 3	Low 5	Improbable	VERY LOW	- ve	High

*Best practice* measures (which are assumed not to affect impact significance ratings) must be presented in the text, in bullet format.

**Step 7** – Summarise all impact significance ratings as follows in your executive summary:

<i>Impact</i>	<i>Consequence</i>	<i>Probability</i>	<i>Significance</i>	<i>Status</i>	<i>Confidence</i>
Impact 1: XXXX	Medium	Improbable	LOW	-ve	High
With Mitigation	Low	Improbable	VERY LOW		High
Impact 2: XXXX	Very Low	Definite	VERY LOW	-ve	Medium
With Mitigation:	<i>Not applicable</i>				