

Phase 1 Archaeological & Cultural Heritage Impact Assessment –

**Proposed Hempel Quarry, Crusher and Stockpile Area,
Farm No 604, near Grahamstown, Makana Local Municipality, Eastern Cape**

- 29 February 2016 -

Report to:

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Specialist Declaration of Interest

I, Karen van Ryneveld (Company – ArchaeoMaps; Qualification – MSc Archaeology), declare that:

- I am suitably qualified and accredited to act as independent specialist in this application;
- I do not have any financial or personal interest in the application, its' proponent or any subsidiaries, aside from fair remuneration for specialist services rendered; and
- That work conducted has been done in an objective manner – and that any circumstances that may have compromised objectivity have been reported on transparently.



Signature –

- 29 February 2016 -

**Proposed Hempel Quarry, Crusher and Stockpile Area,
Farm No 604, near Grahamstown, Makana Local Municipality, Eastern Cape**

Executive Summary

Project Description –

Terreco Environmental have been appointed as independent EAP by the project proponent, WBHO Construction, to apply for EA, including a BAR and EMPr, to the EC DEDEAT for the proposed *Hempel Quarry, Crusher and Stockpile* development, situated on Farm No 604, near Grahamstown in the Makana Local Municipal area, Eastern Cape. The proposed development is located at general development co-ordinate S33°17'13.5"; E26°53'53.4"; with development particulars including an approximate 1.5ha quarry and 1ha crusher and stockpile area, as well as a rough 100m water drainage trench. The site will be accessed directly from the N2 via an approximate 750m access road. Sandstone sourced from the quarry will be utilized for construction of the N2 between Grahamstown and the Fish River.

The Phase 1 Archaeological & Cultural Heritage Impact Assessment –

Project Name & Locality: *Hempel Quarry, Crusher and Stockpile*, Farm No 604, near Grahamstown, Makana Local Municipality, Eastern Cape [1:50,000 Map Ref – 3326BD].

Summary of Findings:

- o No archaeological or cultural heritage developmental ‘fatal flaws’ identified. (Consideration of a ‘No-Go’ option is irrelevant.)
- o All reported on heritage sites comprise known sites: No new significant heritage resources, as defined and protected by the NHRA 1999, were identified during the Phase 1 AIA.
- o The Colonial Period Fraser’s Camp site, situated immediately north-east of the *Hempel Quarry, Crusher and Stockpile* study site will be conserved, with current conservation measures complying with SAHRA / EC PHRA minimum site conservation standards. No additional conservation measures for purposes of development are necessary, not during the construction or operational phases of development.
- o The declared Provincial Heritage Site (PHS) Fraser’s Camp Signal Tower is situated approximately 1.2km west of the *Hempel Quarry, Crusher and Stockpile* study site – the PHS will not be impacted by development.
- o Limited visual impact on the surrounding cultural landscape during the construction and operational phases of development will be virtually nullified upon completion of the development, with specific reference to visual impact from the N2.
- o [In the event of any incidental archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, being encountered during the course of development the process described in Appendix C: ‘Heritage Protocol for Incidental Finds during the Construction Phase’ should be followed.]

Heritage Compliance Summary – Hempel Quarry, Crusher and Stockpile, Farm No 604, near Grahamstown, Makana Local Municipality, EC			
Map Code	Site	Co-ordinates	Recommendations
Hempel Quarry, Crusher and Stockpile (S33°17'13.5"; E26°53'53.4")			
N/A	Colonial Period – Fraser’s Camp	S33°16'57.3"; E26°54'09.5"	N/A Permanent conservation measures complying with SAHRA / EC PHRA minimum site conservation standards are in place. No additional conservation measures for purposes of development are necessary.
N/A	Colonial Period – Fraser’s Camp Signal Tower (declared Provincial Heritage Site [PHS])	S33°17'12.6"; E26°53'07.0"	N/A (based on proximity) Declared PHS situated approximately 1.2km from the <i>Hempel Quarry, Crusher and Stockpile</i> study site.
N/A	Colonial Period – Maranatha Mission	S33°16'54.1"; E26°53'20.5"	N/A (based on proximity) Heritage site situated on nearby property.

Recommendations –

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that development of the proposed *Hempel Quarry, Crusher and Stockpile*, Farm No 604, near Grahamstown, Makana Local Municipality, Eastern Cape, proceed without the developer having to comply with additional heritage compliance requirements.

The EC PHRA (APM Unit) HIA Comment will state legal requirements for development to proceed, or reasons why, from a heritage perspective, development may not be further considered.

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1 – Project Description & Terms of Reference

Terreco Environmental have been appointed as independent Environmental Assessment Practitioner (EAP) by the project proponent, WBHO Construction, to apply for Environmental Authorization (EA), including a Basic Assessment Report (BAR) and Environmental Management Programme report (EMPr), to the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (EC DEDEAT) for the proposed *Hempel Quarry, Crusher and Stockpile* development, situated on Farm No 604, near Grahamstown in the Makana Local Municipal area, Eastern Cape. The proposed development is located at general development co-ordinate S33°17'13.5"; E26°53'53.4"; with development particulars including an approximate 1.5ha quarry and 1ha crusher and stockpile area, as well as a rough 100m water drainage trench. The site will be accessed directly from the N2 via an approximate 750m access road. Sandstone sourced from the quarry will be utilized for construction of the N2 between Grahamstown and the Fish River.

ArchaeoMaps was appointed by Terreco Environmental to compile the Phase 1 Archaeological and Cultural Heritage Impact Assessment (AIA) for the development, as specialist component to the application's Heritage Impact Assessment (HIA), and with findings and recommendations thereof to be included in the BAR and EMPr. Terms of Reference (ToR) for the Phase 1 AIA are summarized as:

- Describe the existing area to be directly affected by the proposal in terms of its current cultural, historical and archaeological characteristics and the general sensitivity of these components to change;
- Describe the likely scope, scale and significance of impacts (positive and negative) on the cultural, historical and archaeological components of the area associated with the 1) construction and 2) operation or use phases of the proposal;
- Make recommendations on the scope of any mitigation measures that may be applied during 1) construction and 2) operation or use phases to avoid / reduce the significance of the identified related impacts. Mitigation measures could also be design recommendations as well as operational controls, monitoring programmes, Phase 2 mitigation, management procedures and the like;
- Broadly describe the implications of a 'No-Go' option;
- Broadly comment on the cumulative cultural, historical and archaeological impacts (positive or negative) associated with the 1) construction and 2) operation and use phases of the proposal;
- Confirm if there are any outright 'fatal flaws' to the establishment of the proposal at its current location from a cultural, historical and archaeological perspective.



Map 1: General locality of the Hempel Quarry, Crusher and Stockpile, Farm 604, near Grahamstown, Makana Local Municipality, Eastern Cape



Map 2: Close-up of the Hempel Quarry, Crusher and Stockpile study site, Farm 604, near Grahamstown

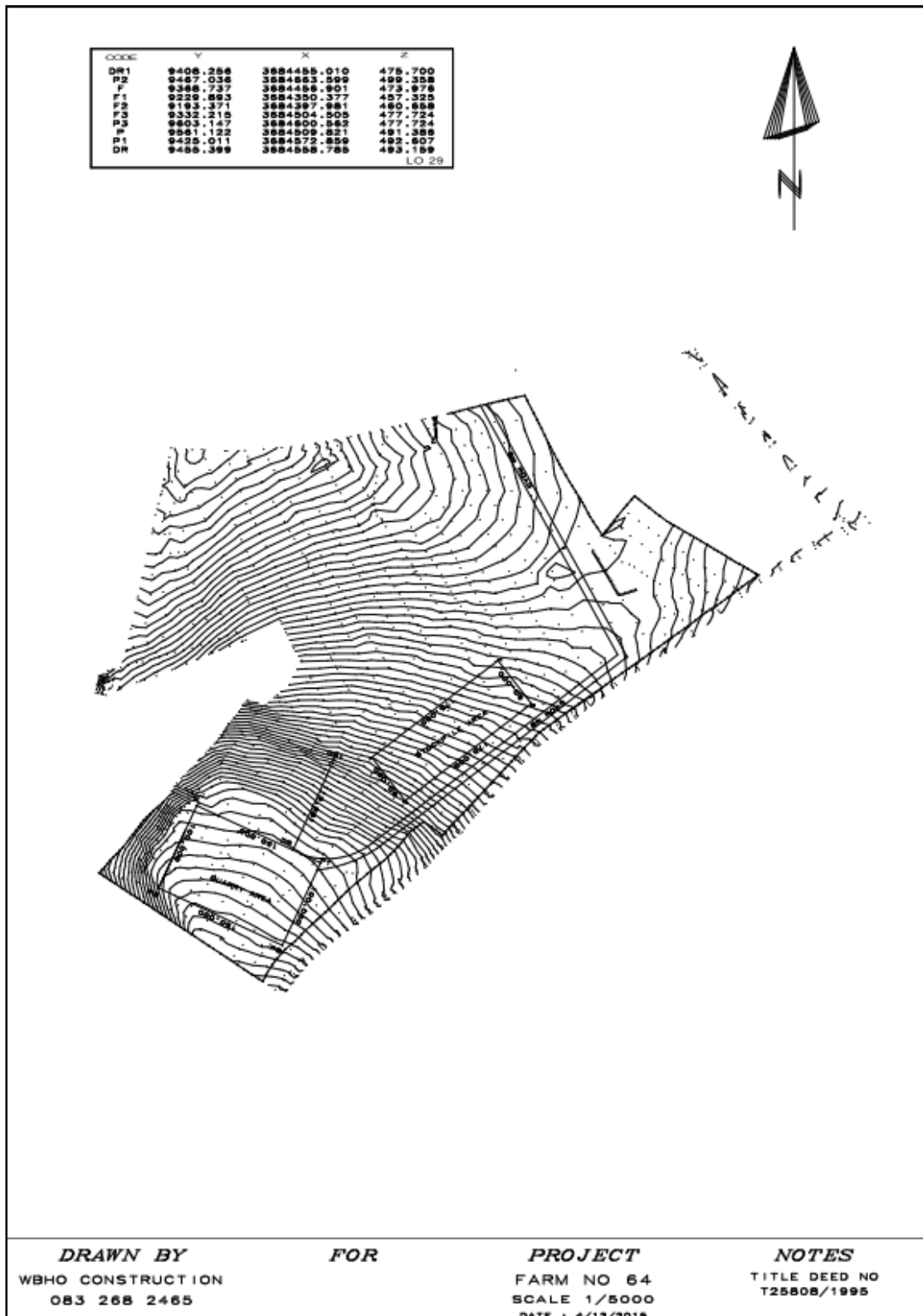
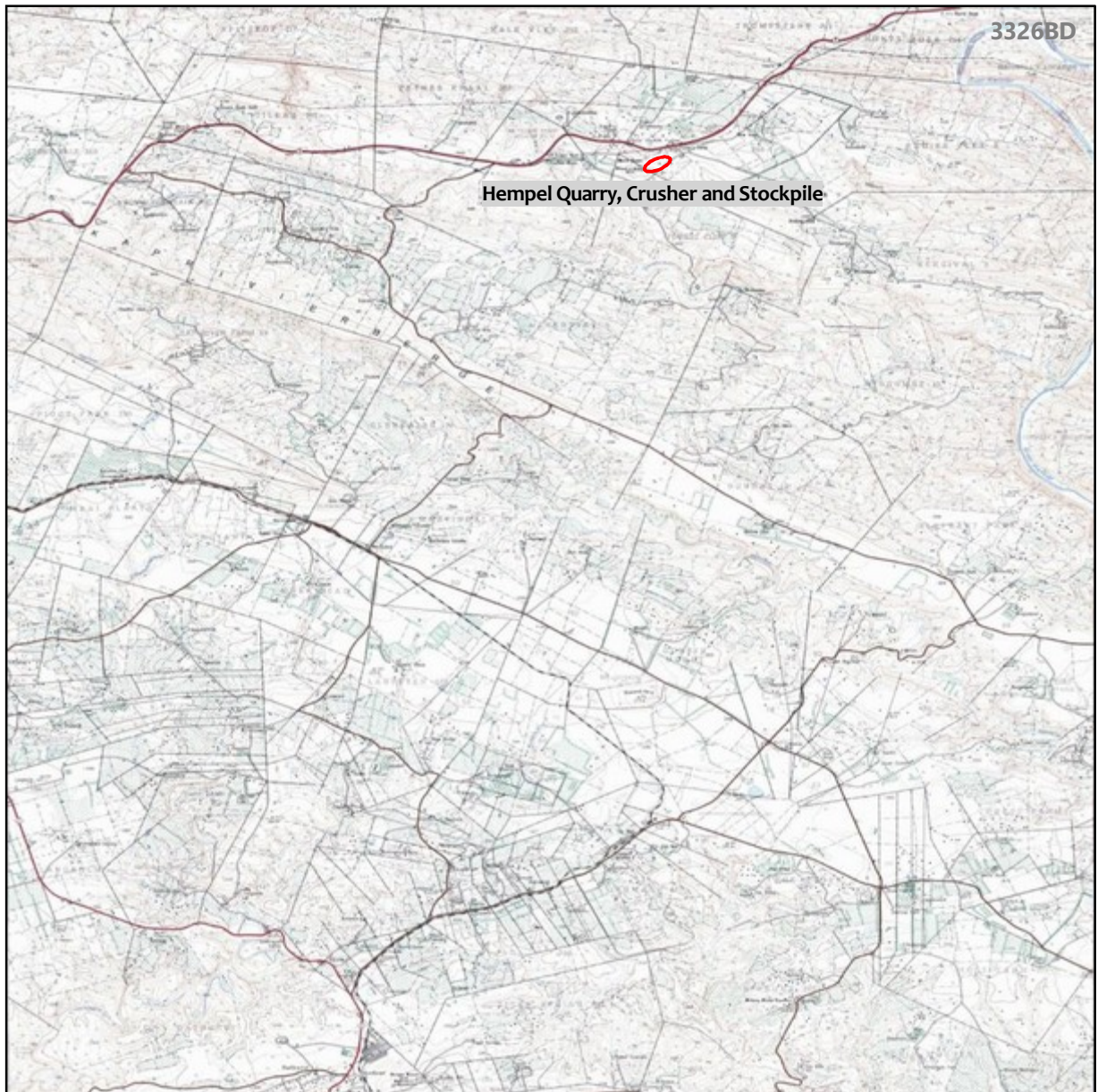


Figure 1: Layout plan – Hempel Quarry, Crusher and Stockpile (courtesy Terresco Environmental and WBHO Construction)



Map 3: Locality of the *Hempel Quarry, Crusher and Stockpile*, Farm No 406, near Grahamstown, Makana Local Municipality, Eastern Cape [1:50,000 Map Ref – 3326BD]

2 – The Phase 1 Archaeological & Cultural Heritage Impact Assessment

2.1.1) Archaeological & Cultural Heritage Legislative Compliance

The Phase 1 Archaeological and Cultural Heritage Impact Assessment (AIA) for the proposed *Hempel Quarry, Crusher and Stockpile*, Farm No 604, near Grahamstown, Makana Local Municipality, Eastern Cape, was requested to meet the Eastern Cape Provincial Heritage Resources Authority's (EC PHRA) requirements with reference to archaeological and basic cultural heritage resources in terms of the National Heritage Resources Act, No 25 of 1999 (NHRA 1999), with specific reference to Section 38(1)(a) and 38(1)(c)(i). This report is submitted in partial fulfillment of the NHRA 1999, Section 38(3) requirements, for purposes of a NHRA 1999, Section 38(4) / Section 38(8) Heritage Impact Assessment (HIA) Comment by the EC PHRA.

NHRA 1999, Section 38	
1)	Subject to the provisions of subsections 7), 8) and 9), any person who intends to undertake a development categorized as –
a)	the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
b)	the construction of a bridge or similar structure exceeding 50 m in length;
c)	any development or other activity which will change the character of a site –
	i. exceeding 5 000 m² in extent; or
	ii. involving three or more existing erven or subdivisions thereof; or
	iii. involving three or more erven or subdivisions thereof which have been consolidated within the past five years; or
	iv. the costs which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
d)	the rezoning of a site exceeding 10 000 m ² in extent; or
e)	any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,
	must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Table 1: Extracts from the NHRA 1999, Section 38

The Phase 1 AIA aimed to locate, identify and assess the significance of archaeological and cultural heritage resources, inclusive of archaeological deposits / sites (Stone Age, Iron Age and Colonial Period), built structures older than 60 years, sites of military history older than 75 years, burial grounds and graves, graves of victims of conflict and basic cultural landscapes or views as defined and protected by the NHRA 1999, that may be affected by the development.

This report comprises a Phase 1 AIA, including a basic pre-feasibility study and field assessment only.

Additional relevant legislation pertaining to the Phase 1 AIA is listed as:

- National Environmental Management Act, No 107 of 1998 (NEMA 1998) and associated Regulations (2014);
- Minerals and Petroleum Resources Development Act, No 28 of 2002 (MPRDA 2002).

2.1.2) Methodology & Gap Analysis

The Phase 1 AIA includes a basic pre-feasibility study and field assessment:

- The pre-feasibility assessment is based on the Appendices A and B introductory archaeological literature as well as general literature available and relevant to the study site. Databases consulted include the SAHRA 2009 Mapping Project Database (MPD), the South African Heritage Resources Information System (SAHRIS) and the SAHRA database on declared Provincial Heritage Sites (PHS) – Albany, Eastern Cape. The study excludes consultation of museum and university databases.
- The field assessment was done over a 1 day period (2016-02-22) with fieldwork conducted by the author. The assessment was done by foot and limited to a Phase 1 surface survey. GPS co-ordinates were taken with a Garmin

Montana 650 (Datum: WGS84). Photographic documentation was done with a Pentax K20D camera. A combination of Garmap and Google Earth software was used in the display of spatial information.

- The field assessment was conducted across the total of the study site and immediate surrounds, without exclusions. Cognizance need to be taken of the nature of archaeological and cultural heritage resources, with their primary context being a sub-surface context. Archaeological and cultural heritage resources may be encountered during the course of development, more specifically during vegetation clearing, trenching and excavation phases of development (See Appendix C: 'Heritage Protocol for Incidental Finds during the Construction Phase').

The Phase 1 AIA was done according to the system and minimum standards prescribed for the 3-tiered Phase 1-3 Heritage Impact Assessment (HIA) process (SAHRA 2007):

- **Phase 1 HIA** – A Phase 1 HIA is compulsory for development types as stipulated in the NHRA 1999, Section 38(1) and Section 38(8), including any other development type or study site as required by the South African Heritage Resources Agency (SAHRA) or relevant Provincial Heritage Resources Authority (PHRA). A Phase 1 HIA comprises at minimum of an archaeological (AIA) and palaeontological (PIA) study, but aims to address all heritage types protected by the NHRA 1999 and to alert developers to additional heritage specialist study requirements, if and where relevant to a development. Phase 1 HIA studies focusses on pre-feasibility or desktop studies, routinely coined with field assessments in order to locate, describe and assign a heritage significance rating to identified resources that may be impacted by development. The aim of a Phase 1 HIA is to make site specific and general development recommendations regarding identified heritage resources for development planning and implementation purposes and may include recommendations for conservation, heritage declaration, monitoring, mitigation (Phase 2 HIA), or destruction.
- **Phase 2 HIA** – Phase 2 HIAs are as a norm required where heritage resources of such significance has been identified during the Phase 1 HIA that mitigation (excavation) thereof is necessary for development purposes. Aside from large scale Phase 2 mitigation (routinely to precede development impact), lower keyed Phase 2 requirements may well include sampling, testing and monitoring during the construction or implementation phase of a development. Phase 2 HIA work is as a norm done under a compulsory heritage permit.
- **Phase 3 HIA** – As an extension to Phase 2 HIA work or cases where recommendations for heritage declaration formed part of a developments heritage compliance requirements, heritage resources of such scientific or heritage tourism significance that their long term conservation and continued research would be necessary within a development framework is proposed as a Phase 3 HIA.

Archaeological and cultural heritage site significance assessment and associated mitigation recommendations were done according to the combined NHRA 1999, Section 7(1) and SAHRA (2007) system.

SAHRA Archaeological and Cultural Heritage Site Significance Assessment			
Site Significance	Field Rating	Grade	Recommended Mitigation
High Significance	National Significance	Grade I	Site conservation / Site development
High Significance	Provincial Significance	Grade II	Site conservation / Site development
High Significance	Local Significance	Grade III-A	Site conservation or extensive mitigation prior to development / destruction
High Significance	Local Significance	Grade III-B	Site conservation or extensive mitigation prior to development / destruction
High / Medium Significance	Generally Protected A	Grade IV-A	Site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B	Grade IV-B	Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally Protected C	Grade IV-C	On-site sampling, monitoring or no archaeological mitigation required prior to or during development / destruction

Table 2: SAHRA archaeological and cultural heritage site significance assessment ratings and associated mitigation recommendations

2.2.1) Pre-feasibility Summary

Based on a basic introductory literature assessment of South African archaeology (See Appendices A and B) and background heritage database research, the probability of archaeological and cultural heritage resources situated on or in direct proximity to the *Hempel Quarry, Crusher and Stockpile* study site can briefly be described as:

Archaeological and Basic Cultural Heritage Probability Assessment – Hempel Quarry, Crusher and Stockpile, Farm No 604, near Grahamstown, Makana Local Municipality, EC			
Primary Type / Period	Sub-Period	Sub-Period Type Site	Probability
EARLY HOMININ / HOMINID	-	-	None-Low
	Graves / Human remains: High scientific significance		
STONE AGE	Earlier Stone Age (ESA)		Low
	Middle Stone Age (MSA)		Medium
	Later Stone Age (LSA)		Medium
		Rock Art	Low
		Shell Middens	None
	Graves / Human remains: ESA & MSA – High scientific significance; LSA – High scientific & social significance		
IRON AGE	Early Iron Age (EIA)		None
	Middle Iron Age (MIA)		None
	Later Iron Age (LIA)		Medium
	Graves & Human remains: EIA – High scientific & medium social significance; MIA & LIA: High scientific & social significance		
COLONIAL PERIOD	Colonial Period		High
		LSA – Colonial Period Contact	None-Low
		LIA – Colonial Period Contact	Medium
		Industrial Revolution	None-Low
		Apartheid & Struggle	None-Low
	Graves / Human Remains: Medium-high scientific & high social significance		

Table 3: Archaeological and basic cultural heritage probability assessment

2.2.2) The SAHRA 2009 MPD & SAHRIS

A single archaeological Cultural Resources Management (CRM) report is recorded in the SAHRA 2009 Mapping Project Database (MPD), situated within an approximate 20km radius from the proposed *Hempel Quarry, Crusher and Stockpile* study site, listed as:

- Van Schalkwyk, L. & Wahl, B. (eThembeni). 2008. *Heritage Impact Assessment of Four Borrow Pits, Ndlambe and Makana Municipalities, Eastern Cape Province, South Africa*.

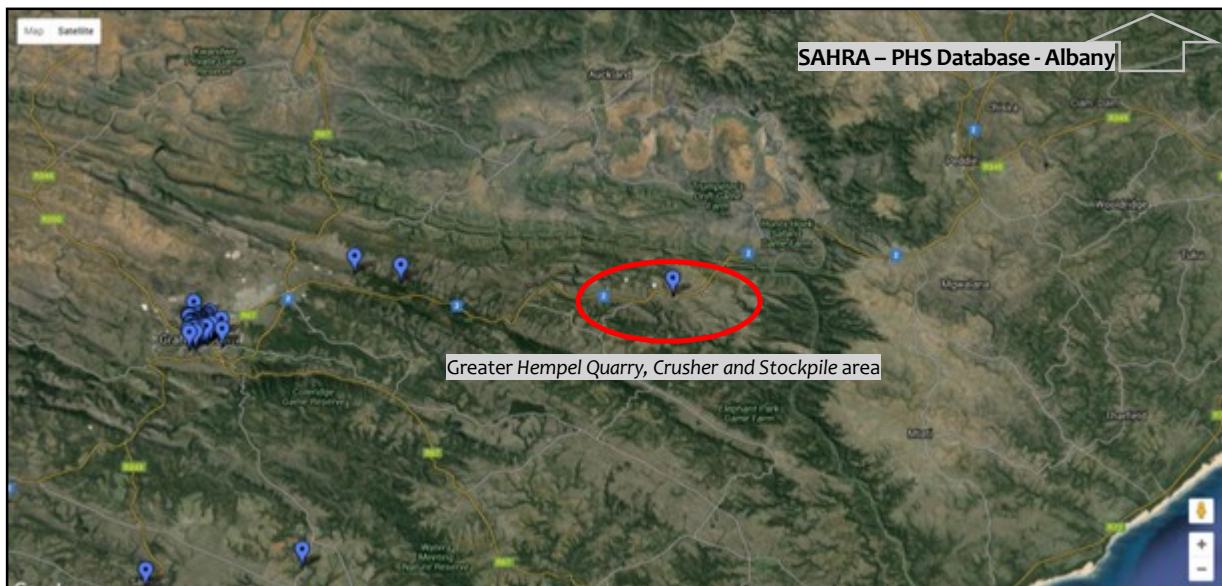
Subsequent to compilation of the SAHRA 2009 MPD, seven SAHRIS cases have been recorded with study sites situated within an approximate 20km radius from the proposed *Hempel Quarry, Crusher and Stockpile*. Relevant archaeological and cultural heritage CRM studies are referenced as:

- Anderson, G. (Umlando). 2015. *Heritage Survey of the Ndlambe Bulk Water Supply Scheme – Sandile Dam to Cannon Rocks, Eastern Cape* [SAHRIS CaseID 7846].
- Ashwell, A. (Makana Heritage Solutions). 2010. *Heritage Impact Assessment – National Route 2 Section 14 between Keiskamma Bridge and Great Fish River* [SAHRIS CaseID 2183].
- Booth, C. (Albany Museum). 2011. *A Phase 1 Archaeological Impact Assessment for the Golf Course Development on Portions 1 and 2 of the Farm Willow Glen and Portion 6 of Belmont Farm, Grahamstown, Makana Municipality, Cacadu District Municipality, Eastern Cape Province* [SAHRIS CaseID 960].

- Booth, C. (Albany Museum). 2015. *Addendum: Archaeological and Cultural Heritage Investigation of Proposed Deviations and Repeater Sites for an Environmental Authorization Amendment for Fibreco Route 4 (George to Port Elizabeth) and 5 (Port Elizabeth to Durban)* [SAHRIS CaseID 7631].
- Nilssen, P. (NARM). 2011. *Scoping Archaeological Impact Assessment – Proposed Development of the Plan 8 Grahamstown Wind Energy Project: Including Farms Gilead 361, Peynes Kraal 362 and Tower Hill 363, Grahamstown, Makana Municipality, Eastern Cape Province* [SAHRIS CaseID 266].
- Van Ryneveld, K. (ArchaeoMaps). 2012a. *Phase 1 Archaeological Impact Assessment: Ripplemead Packshed, Portion of Groot Plaats 4, (near Peddie), Nqusha Municipality, Eastern Cape, South Africa* [SAHRIS CaseID 1109].
- Van Ryneveld, K. (ArchaeoMaps). 2012b. *Phase 1 Archaeological Impact Assessment: Laman Lime Prospecting Application – Farm 101, Farm 102-1, Farm 206-2 and Farm 206-5, Ndlambe Municipality, Eastern Cape, South Africa* [SAHRIS CaseID 295].
- Way-Jones, M.F. (Albany Museum). 2011. *Phase 1: Heritage Impact Assessment for the Proposed Development by the Belmont Development Company on the Heritage Aspects of two Areas: The Grahamstown Golf Course, The Belmont Valley Farms – Portions 1 and 2 of the Farm Willow Glen (known as Willow Glen Annexure) and Portion 6 of Belmont Farm, all of which are Situated Approximately 8km North-East of Grahamstown* [SAHRIS CaseID 960].

2.2.3) SAHRA Provincial Heritage Site Database – Albany, Eastern Cape

Georeferenced declared Provincial Heritage Sites (PHS) recorded in the SAHRA – Albany, Eastern Cape database (http://en.wikipedia.org/wiki/List_of_Heritage_Sites_in_Albany,_South_Africa) indicates these clustered in the Grahamstown area. PHS situated within an approximate 20km radius from the *Hempel Quarry, Crusher and Stockpile* study site comprise of the Fraser’s Camp Signal Tower, spatially displayed and listed in the SAHRA-Albany database as below.



Map 4: Spatial distribution of geo-referenced PHS in the SAHRA – Albany database in relation to the *Hempel Quarry, Crusher and Stockpile* study site, near Grahamstown Eastern Cape

Declared Provincial Heritage Sites – SAHRA, Albany Database					
Map Ref	Identifier	Site Name	Town	NHRA status	Coordinates
N/A	9/2/003/0054	Fraser's Camp Signal Tower, Albany District Fraser's Camp Signal Tower was the next signal tower after Governor's Kop. It stands on the farm Tower Hill to the south of the national road and about 11km west of the Fish River. In 1835, long before the tower was built, Lieutenant Andries Sto... Type of Site: Signal Tower. Previous Use: Signal Tower. Current Use: Vacant. Outstanding historical significance. One of only two surviving towers.	Albany	Provincial Heritage Site	S33°17'00"; E26°53'30"

Table 4: SAHRA, PHS Albany database listing of the PHS – Fraser's Camp Signal Tower

(No. 199.) [17 JANUARY 1938]

THE NATURAL AND HISTORICAL MONUMENTS, RELICS AND ANTIQUES ACT, 1934.—PROTECTION OF MONUMENTS.

Under section eight of the Natural and Historical Monuments, Relics and Antiques Act, 1934 (Act No. 4 of 1934) I, RICHARD STUTTAFORD, Minister of the Interior, do hereby proclaim the objects set out in the Schedule below to monuments in terms of paragraph (a) of that section.

SCHEDULE.

Object.	Situation.
IN THE PROVINCE OF THE TRANSVAAL.	
Verdon Ruins, District Zoutpansberg.	Farm Verdon No. 1020, District Zoutpansberg.
Old English Fort, Pietersburg.	Certain portion 2, called Old English Fort, of Port A of portion of the 4 rent farm Zandrivier 130, situate in the District of Pietersburg, in the Province of the Transvaal measuring 2 morgen square roads. (Deed Transfer No. 2881/ dated 18th April, 1932, in favour of the Government of the Union of South Africa Crown Grant No. 161/ dated 19.9.1934. Ref. 7020/18.)
IN THE ORANGE FREE STATE.	
The Residency, Bloemfontein;	Erven Nos. 1917 and 1 Bloemfontein.
IN THE CAPE PROVINCE.	
Blockhouse, Tulbagh Road.	Diagram lettered ABCD shows 7 square roads square feet and represents piece of land on which blockhouse has been situated in the F.C. 8 No. 5, Division of P, being a portion of Lot II, Koopmans River Out-let—Diagram 9180/1900, Folio 35-00.
The Powder Magazine, East London.	Fort Glamorgan, East London.
Signal Tower Remnants.	Devil's Peak, Capetown. On the farm "Tower Hill" Division of Albany.
Abolish Cottage in the of one piece of land, being marked Nos. 1 and 2, situate at Muisenberg, in the City of Capetown, Cape Division measuring as such two hundred and fifteen (1) square roads ten (10) square feet. Remaining extent of one piece of land situate Muisenberg, in the City of Capetown, Cape Division measuring as such two (20) square roads thirty (30) square feet.

Figure 2: PHS – Fraser's Camp Signal Tower, originally declared and gazetted a National Monument under the Natural and Historical Monuments, Relics and Antiques Act, No 4 of 1934 (NHMRRA 1934), in 1938, Government Gazette No 199

[The locality of Fraser's Camp Signal Tower is erroneously recorded in the SAHRA, PHS Albany database as S33°17'00"; E26°53'30", situated on the property Maranatha Mission 364, whereas the site is in fact situated at S33°17'12.6"; E26°53'07.0", on the property Tower Hill 363, approximately 800m west of the SAHRA, PHS Albany database record.]

2.2.4) General Discussion

Earlier (ESA), Middle (MSA) and Later Stone Age (LSA) sites are well known from the greater Grahamstown area, and recorded as such in significant research resources, including the later MSA Howiesonspoot type site, situated approximately 10km south-west of Grahamstown and the LSA Wilton type site, 20km north-east thereof (Goodwin *et al.* 1929). Whilst no ESA sites have been reported on in archaeological CRM reports consulted, significant numbers of MSA with lesser LSA occurrences have been recorded; most prominent in Anderson's (2015) survey of the Ndlambe Bulk Water Supply Scheme, but also evident in the assessment results of Van Ryneveld (2012b) for the proposed Laman mining and Nilssen (2011) for the Plan 8 Wind Energy Project. Complementing the LSA lithic record of the general Grahamstown area is the presence of LSA shelter sites, many of which yield rock paintings (Goodwin *et al.* 1929). Nilssen (2011) recorded a large painted rock shelter at the Plan 8 Wind Energy Project study site, with images including human, animal and thereanthropic figurines.

The Iron Age record of the greater Grahamstown area is a Later Iron Age (LIA) record, closely tied with the Colonial Period history of the 1820 Settlers, the subsequent Frontier Wars and times thereafter. Anderson (2015) recorded a number of later period LIA homestead sites and ruined remains along the Ndlambe Bulk Water Supply Scheme alignment, with the most prominent type LIA site being informal grave and cemetery sites; a number of which were recorded by Anderson (2015) during the Ndlambe survey. Two further farmworker graves were recorded by Nilssen (2011) situated at the Plan 8 Wind Energy Project study site. Way-Jones (2011) reported on a purported farmworkers cemetery, without the actual site having been located, Van Ryneveld (2012a) recorded a contemporary LIA cemetery from the Ripplemead study site and Ashwell (2010) reported on graves from the N2 Section 14 assessment.

The most prominent heritage resource type recorded in archaeological CRM reports are Colonial Period resources, again closely tied with the history of the 1820 Settlers, the Frontier Wars and the history that unfolded. Shaw Park recorded during the Laman mining survey (Van Ryneveld 2012b) provides a glimpse onto 1820 Settler history, with the site comprising an old church, school, clubhouse and two cemeteries, with the early 1820 Settler Birbury and Lime Stone Hills farmsteads in the immediate vicinity thereof. The Belmont assessments yielded a wealth of Colonial Period resources: The Willow Glen and Fairyvale farmsteads, associated cemeteries, ruined structure foundations, an old stone church and early Settler dwelling, along with remains of the Oak Valley railway line from Grahamstown to Port Alfred, opened on 21 October 1881, as well as the 1901 war memorial of the St Andrew's cadets (Booth 2011; Way-Jones 2011). A Colonial Period packhouse and farmstead remains are situated at the Ripplemead study site (Van Ryneveld 2012a), with a number of protected buildings mentioned by Booth (2015), located in the various towns the Repeater site line route passes by. Anderson (2015) recorded a number of Colonial Period structures and structure remains, the watch tower of Ford Peddie and associated cemeteries and a cavalry barracks along the Ndlambe Bulk Water Scheme alignment route.

Three heritage sites are known from the more immediate vicinity of the *Hempel Quarry, Crusher and Stockpile* study site area, including the declared Provincial Heritage Site (PHS) of Fraser's Camp Signal Tower, constructed in 1843 during the Frontier Wars and the nearby Fraser's Camp, constructed a few years earlier (1835 / 1836), as well as the Maranatha Mission, dating to circa. 1909.

2.3.1) Field Assessment Results

No archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, were identified during the Phase 1 AIA field assessment of the *Hempel Quarry, Crusher and Stockpile* study site:

- Surface site assessment of the quarry area yielded infrequently scattered, presumed Middle Stone Age (MSA) lithic remains. Artefact ratios (artefacts: m²) were too low to be recorded, with only a few lithics observed across the surface of the approximate 1.5ha quarry area and immediate surrounds. Artefacts were produced from fine grained granite and other raw material sources not of the immediate area, with raw material used for artefact production in stark contrast to the sandstone outcrops, thus reasonably inferred to have been brought into the area and not produced on site. Identified artefacts comprised typologically of waste and broken (utilized) flakes, of inferior typology. Flake size indicates a rough MSA association. However, low densities of encountered samples make it impossible to ascertain the technological period of production. Animal burrows at the sandstone outcrops provided subsurface exposed sections of more or less 20-40cm in depth, with inspected subsurface sections indicating general anthropogenic sterile subsurface deposits. The MSA lithic observation at the Hempel quarry site is of such low significance that it does not warrant a site record or site significance assignment. It can reasonably be inferred that further infrequent lithics will be encountered during the course of development. Only in the event of significant clusters of artefacts being encountered, or artefacts identifiable in a clear, approximate 5-10+cm member within a stratigraphic section should the developer cease work and report the find to an accredited archaeologist.
- No Stone Age artefacts were observed at the crusher and stockpile area or along the access road.

Protected heritage resources are present to the north-east and west of the *Hempel Quarry, Crusher and Stockpile* study site. These resources will not be directly impacted by development. They are described to provide a general description of the immediate receiving cultural environment.

The *Hempel Quarry, Crusher and Stockpile* development, specifically the quarry is planned, situated to the south of the sandstone outcrops, from a visual perspective (from the N2) minimizing impact of the development on the greater receiving cultural landscape during the construction and implementation phases of development. Upon completion of development little to no visual impact on the cultural landscape will be discernable from the N2.

2.3.1.1) Colonial Period – Fraser’s Camp: S33°16’57.3”; E26°54’09.5”

Fraser’s Camp, situated on the property Farm No 366 at general site co-ordinate S33°16’57.3”; E26°54’09.5” and immediately to the north-east of the *Hempel Quarry, Crusher and Stockpile* study site comprises a known heritage site. The site is described as: *‘Fraser’s Camp is situated just south of the National Road from Grahamstown to Peddie, 38km from Grahamstown and 10km west of the Great Fish River. The fortified post was one of three established by Lieutenant-Governor Andries Stokenstroom in 1835 and 1836 to prevent the Xhosa from crossing the Great Fish River. It was named after Major George Sackville Fraser who had moved with Colonel John Graham from the 93rd Regiment of Foot to become deputy Landdrost of Grahamstown’* (www.mbendi.com/attraction/fraser-s-fraser-s-camp108276).

The site comprises a number of individual structures formally protected by the NHRA 1999, some of which are individually fenced with access gates complying with SAHRA / EC PHRA minimum standards for heritage site conservation, whilst the total of the complex of structures are also formally fenced with controlled access. Structures at Fraser’s Camp (including the general property on which they are situated) are notably well maintained. The property is in private ownership with structures rented to Razzmatazz Construction for office use.

The known Fraser’s Camp heritage site receives automatic SAHRA / EC PHRA protection as a site of *High Significance* with a *Grade II Provincial Field Rating*. Despite proximity to the *Hempel Quarry, Crusher and Stockpile* study site, Fraser’s Camp will

not be impacted by the proposed development. Current conservation measures suffice for development purposes – No additional conservation measures for purposes of development are necessary.

2.3.1.2) Colonial Period – Fraser’s Camp Signal Tower (PHS): S33°17’12.6”; E26°53’07.0”

Fraser’s Camp Signal Tower, situated at S33°17’12.6”; E26°53’07.0”, approximately 1.2km west of the Hempel Quarry, Crusher and Stockpile study site was declared a National Monument in 1938; today the site receives automatic SAHRA / EC PHRA protection as a declared Provincial Heritage Site under the NHRA 1999. SAHRA (File No 9/2/003/0054) describes the site as: ‘Fraser’s Camp Tower was the next signal tower after Governor’s Kop. It stands on the farm Tower Hill to the south of the National Road and about 11km west of the Fish River. In 1835, long before the signal tower was built, Lieutenant-Governor Andries Stockenstrom built a temporary military post here, named after the first Landdrost of Grahamstown, Captain George S. Fraser.’ Fraser’s Camp Signal Tower was built in 1843. The signal tower formed part of the Fort Beaufort line, linking Fort Selwyn in Grahamstown and Fort Beaufort, and the Peddie line, linking Fort Selwyn and Fort Peddie, set up between 1837 and 1846. These double storied communications towers were approximately 30m in height. During the war of 1846 all towers were destroyed but signaling stations at Fort Selwyn, Fort Beaufort, Governor’s Kop and Fraser’s Camp have been partially restored (www.mbendi.com/attraction/fraser-s-frazer-s-camp108276). [Proximity of Fraser’s Camp Signal Tower from the Hempel Quarry, Crusher and Stockpile study site did not warrant a site inspection for Phase 1 AIA purposes].

2.3.1.3) Colonial Period – Maranatha Mission: S33°16’54.1”; E26°53’20.5”

The Colonial Period Maranatha Mission station was constructed circa. 1909, situated on property Maranatha Mission 364 / 366, but with the exact locality thereof uncertain, assumed to be structures associated with mentioned co-ordinate S33°16’54.1”; E26°53’20.5”, Farm 364. The site, being situated not on the property proposed for development was not inspected for purposes of the Phase 1 AIA; no actual site description or site significance rating can thus be given. The Maranatha Mission station is mentioned in this report for purposes of describing the greater receiving cultural environment of the Hempel Quarry, Crusher and Stockpile study site only.

Brief reference to the Maranatha Mission station is recorded in the General Conference Bulletin 6, May 21, 1909, of the Seventh-day Adventist Church as: ‘The mission is established among the Kaffir natives, near Grahamstown, Cape Colony. It is about four years since work was begun on this mission. A dwelling house has been built, also a meeting and school house, a store and a two-story building, the first floor to be used for a dining room and the second floor for a dormitory. The land has been fenced, cleared and tilled. Meetings have been held, and some forty families in the neighborhood have become interested in the mission, and the truths taught there. For a long time it seemed impossible to awaken an interest among the natives in regard to our school work. They did not care to come to the mission, but finally Elders Armitage and Hyatt went through the Kaffir villages with a wagon and a magic lantern, with views of Bible scenes, and held evening meetings with the natives. They had never seen such things before, and it made a great impression on them. Among other things shown, were views of the beasts mentioned in Daniel 7. The natives thought they were real photographs of the original beasts and said: “Now we know these things are so, because we have really seen the pictures of those beasts”. The result was that many wanted to go to the school and learn. They have a school of about forty pupils now.’ A further inscription reads: ‘When they went with the wagon to gather up the boys, one boy made an appointment with them to meet him at a certain spot. When the wagon was to be there, several weeks from that time, he came a long distance, and waited at the spot five days till the wagon came. This shows how earnest they are to learn. An interest has been awakened in our school all through the Kaffir land, and also among the Fingoes. Wherever the wagon went, our missionaries gave treatments to the sick; the Lord blessed these simple treatments wonderfully, and the sick recovered.’

2.3.2) Conclusion

Despite the known rich cultural heritage of the greater Grahamstown area, with specific reference to Colonial Period resources pertaining to early settlement of the 1820 Settlers and the subsequent Frontier Wars, with heritage resources reflective of this specific cultural period situated in the immediate vicinity of the *Hempel Quarry, Crusher and Sockpile* study site, including Fraser's Camp, the declared Provincial Heritage Site (PHS) of Fraser's Camp Signal Tower and the Maranatha Mission, development will not directly impact on any identified significant cultural resource, implying a development strategically positioned to ensure conservation of these known, non-renewable resources. In addition cognizance has been taken of the cultural landscape; positioning of the Hempel quarry to the south-west of the sandstone outcrops will from a visual point of view, from the N2, result in minimal visual impact of the development on the greater receiving cultural landscape during the construction and implementation phases of development. Upon completion of development little to no visual impact on the cultural landscape will be discernable from the N2.

From an archaeological and cultural heritage perspective the proposed *Hempel Quarry, Crusher and Stockpile* development can be described as a 'safe' development:

- No archaeological or cultural heritage developmental 'fatal flaws' identified. (Consideration of a 'No-Go' option is irrelevant.)
- All reported on heritage sites comprise known sites: No new significant heritage resources, as defined and protected by the NHRA 1999, were identified during the Phase 1 AIA.
- The Colonial Period Fraser's Camp site, situated immediately north-east of the *Hempel Quarry, Crusher and Stockpile* study site will be conserved, with current conservation measures complying with SAHRA / EC PHRA minimum site conservation standards. No additional conservation measures for purposes of development are necessary, not during the construction or operational phases of development.
- The declared Provincial Heritage Site (PHS) Fraser's Camp Signal Tower is situated approximately 1.2km west of the *Hempel Quarry, Crusher and Stockpile* study site – the PHS will not be impacted by development.
- Limited visual impact on the surrounding cultural landscape during the construction and operational phases of development will be virtually nullified upon completion of the development, with specific reference to visual impact from the N2.



Map 5: Map of the proposed Hempel Quarry, Crusher and Stockpile in relation to the localities of the PHS Fraser's Camp Signal Tower, Maranatha Mission and Fraser's Camp



Map 6: Map of the proposed Hempel Quarry, Crusher and Stockpile in relation to Fraser's Camp. Current conservation measures at Fraser's Camp comply with SAHRA / EC PHRA minimum site conservation standards.



Plate 1: General view of the Hempel study site, from the crusher and stockpile area to the sandstone outcrops where the quarry will be situated



Plate 3: Stone Age MSA artefacts from the sandstone outcrops



Plate 2: Close-up of the sandstone outcrops (with a contemporary cement dam)



Plate 4: View from the Hempel quarry site over the crusher and stockpile area, with the Fraser's Camp heritage site in the background



Plate 5: View of the general area along which the Hempel access road will join the N2 in the background



Plate 7: Conserved and utilized structures at the Fraser's Camp heritage site [1]



Plate 6: An individually fenced building at the Fraser's Camp heritage site



Plate 8: Conserved and utilized structures at the Fraser's Camp heritage site [2]

3 – Environmental Impact Assessment Rating

Identified archaeological and cultural heritage resources are ascribed an Environmental Impact Assessment (EIA) rating, based on the outline presented below to provide a significance rating of development impact on resources, both during the 1) construction and 2) operation or use phases of development (in accordance with NEMA 1998, Regulations 2014):

Overall Nature:	1) Negative (negative impact on affected biophysical or human environment), or 2) Positive (benefit to the affected biophysical or human environment).
Type:	1) Direct (caused by the action and occur at the same time and place), 2) Indirect or secondary (caused by the action and are later in time or farther removed in distance but reasonably foreseeable), or 3) Cumulative (impact which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions; can result from individually minor, but collectively significant actions taking place over a period of time).
Spatial Extent:	1) Site (immediate area of activity, incorporating a 50m zone from the edge of the affected area), 2) Local (area up to and/or within 10km from the 'site' as defined above), 3) Regional (entire community, basin or landscape), or 4) National (South Africa).
Duration:	1) Short-term (impact would last for the duration of activities; quickly reversible), 2) Medium-term (impact would affect project activity; reversible over time), 3) Long-term (impact would continue beyond project activity), or 4) Permanent (impact would continue beyond decommissioning).
Severity:	1) Low , 2) Medium or 3) High , being a) Positive or b) Negative (based on separately described categories examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functionality or slightly alters the environment itself)
Reversibility:	1) Completely reversible (completely reversible impact with implementation of correct mitigation measures), 2) Partly reversible (partly reversible impact with implementation of correct mitigation measures), or 3) Irreversible (impact cannot be reversed, regardless of mitigation or rehabilitation measures).
Irreplaceable loss:	1) Resource will not be lost (resource will not be lost provided mitigation measures are implemented), 2) Resource will be partly destroyed (partial loss or destruction of the resource will occur even though management and mitigation measures are implemented), or 3) Resource cannot be replaced (resource is irreplaceable no matter which management or mitigation measures are implemented).
Probability:	1) Unlikely (<40% probability), 2) Possible (40% probability), 3) Probable (>70% probability), or 4) Definite (>90% probability).
Mitigation potential:	1) High or completely mitigatable (relatively easy and cost effective to manage. Specialist expertise and equipment generally not required. Nature of impact easily understood and may be mitigated through implementation of a management plan or 'good housekeeping', including regular monitoring and reporting regimes. Significance of the impact after mitigation is likely to be low or negligible), 2) Moderate or partially mitigatable (management requires higher level of expertise and resources to maintain impacts with acceptable levels. Mitigation can be tied up in the design of the project. Significance of the impacts after mitigation is likely to be low to moderate. It may not be possible to mitigate the impact entirely, with residual impacts resulting), or 3) Low or unmitigatable (will not be possible to mitigate the impact entirely, regardless of expertise and resources. Potential to manage the impacts may be beyond the scope of the project. Management of the impact is not likely to result in a measurable change in the level of significance).
Impact significance:	1) Negligible , 2) Low (largely of HIGH mitigation potential, after consideration of other criteria), 3) Moderate (largely of MODERATE or partial mitigation potential, after consideration of other criteria), or 4) Substantial (largely of LOW mitigation potential, after consideration of other criteria).

Environmental Impact Assessment Rating: Site – Fraser’s Camp													
Potential Impacts	Aspect / Site: Fraser’s Camp	Overall nature	Type	Spatial extent	Duration	Severity	Reversibility	Irreplaceable loss	Probability	MITIGATION POTENTIAL	IMPACT SINIFICANCE		MITIGATION MEASURES
											Without mitigation	With mitigation	
Construction Phase		N (-)	Direct	Site	Short-term	Low (-)	Completely reversible	Resource will not be lost	Unlikely	Completely mitigatable	Moderate	Negligible	Permanent Conservation
Operational phase		N (-)	Direct	Site	Short-term	Low (-)	Completely reversible	Resource will not be lost	Unlikely	Completely mitigatable	Moderate	Negligible	Permanent Conservation

Table 5: Environmental Impact Assessment Rating – Fraser’s Camp

4 – Recommendations

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that development of the proposed *Hempel Quarry, Crusher and Stockpile*, Farm No 604, near Grahamstown, Makana Local Municipality, Eastern Cape, proceed without the developer having to comply with additional heritage compliance requirements.

- No archaeological or cultural heritage developmental ‘fatal flaws’ identified. (Consideration of a ‘No-Go’ option is irrelevant.)
- All reported on heritage sites comprise known sites: No new significant heritage resources, as defined and protected by the NHRA 1999, were identified during the Phase 1 AIA.
- The Colonial Period Fraser’s Camp site, situated immediately north-east of the *Hempel Quarry, Crusher and Stockpile* study site will be conserved, with current conservation measures complying with SAHRA / EC PHRA minimum site conservation standards. No additional conservation measures for purposes of development are necessary, not during the construction or operational phases of development.
- The declared Provincial Heritage Site (PHS) Fraser’s Camp Signal Tower is situated approximately 1.2km west of the *Hempel Quarry, Crusher and Stockpile* study site – the PHS will not be impacted by development.
- Limited visual impact on the surrounding cultural landscape during the construction and operational phases of development will be virtually nullified upon completion of the development, with specific reference to visual impact from the N2.
- [Should any incidental archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, be encountered during the course of development the process described in Appendix C: ‘Heritage Protocol for Incidental Finds during the Construction Phase’ should be followed.]

Heritage Compliance Summary – Hempel Quarry, Crusher and Stockpile, Farm No 604, near Grahamstown, Makana Local Municipality, EC			
Map Code	Site	Co-ordinates	Recommendations
Hempel Quarry, Crusher and Stockpile (S33°17'13.5"; E26°53'53.4")			
N/A	Colonial Period – Fraser’s Camp	S33°16'57.3"; E26°54'09.5"	N/A Permanent conservation measures complying with SAHRA / EC PHRA minimum site conservation standards are in place. No additional conservation measures for purposes of development are necessary.
N/A	Colonial Period – Fraser’s Camp Signal Tower (declared Provincial Heritage Site)	S33°17'12.6"; E26°53'07.0"	N/A (based on proximity) Declared PHS situated approximately 1.2km from the <i>Hempel Quarry, Crusher and Stockpile</i> study site.
N/A	Colonial Period – Maranatha Mission	S33°16'54.1"; E26°53'20.5"	N/A (based on proximity) Heritage site situated on nearby property.

Table 6: Summarized heritage compliance requirements for the proposed *Hempel Quarry, Crusher and Stockpile*, Farm No 604, near Grahamstown, Makana Local Municipality, Eastern Cape

The EC PHRA (APM Unit) HIA Comment will state legal requirements for development to proceed, or reasons why, from a heritage perspective, development may not be further considered.

Notes:

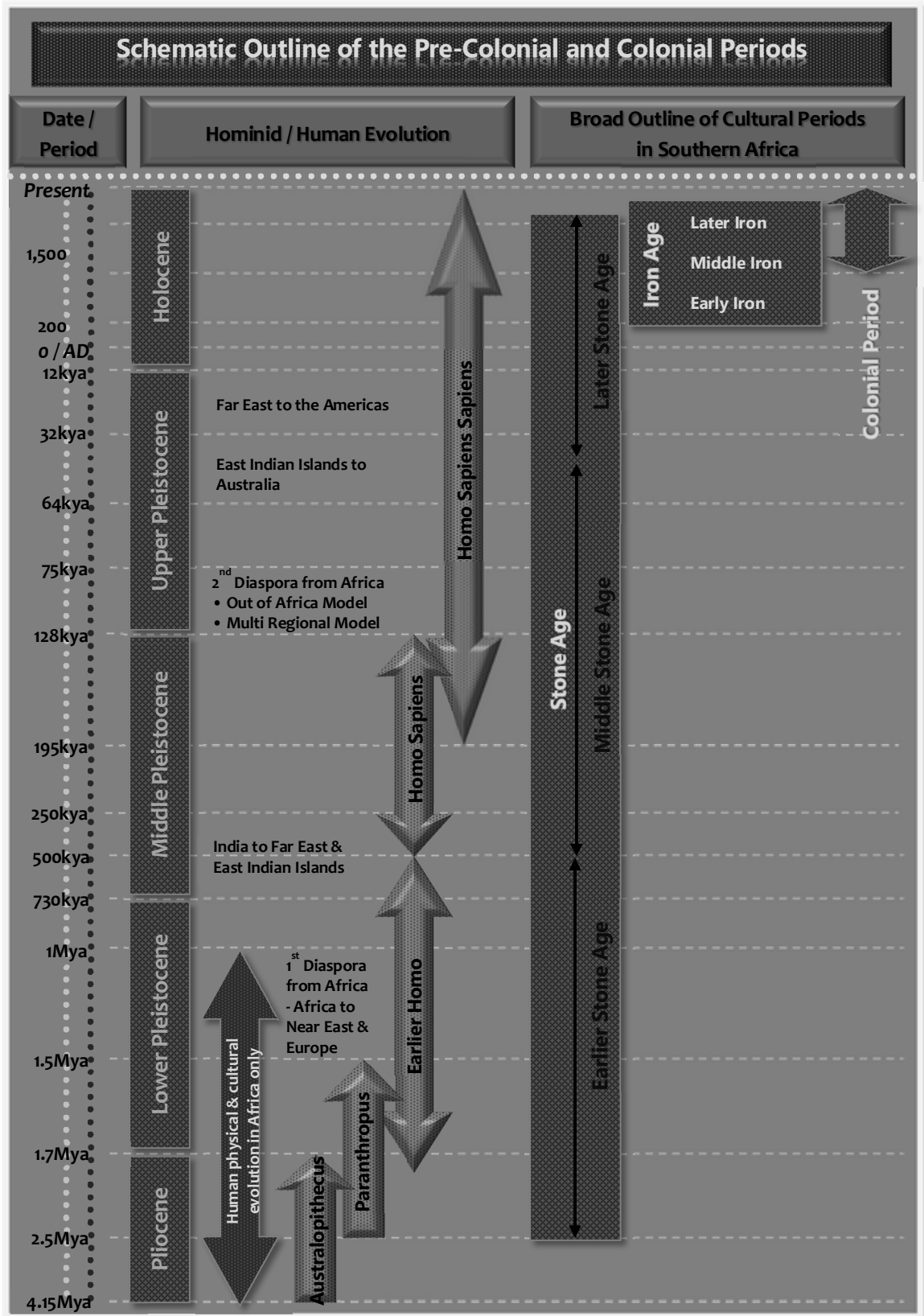
- Should any registered Interested & Affected Party (I&AP) wish to be consulted in terms of Section 38(3)(e) of the NHRA 1999 (Socio-cultural consultation / SAHRA SIA) it is recommended that the developer / EAP ensures that the consultation be prioritized within the timeframe of the environmental assessment process.

Simplified guide to the identification of archaeological sites:

- ❖ **Stone Age** – Knapped stone display flakes that appear unnatural and may result in similar type ‘shaped’ stones often concentrated in clusters or forming a distinct layer in the geological stratigraphy. ESA shapes may represent ‘pear’ or oval shaped stones, often in the region of 10cm in length or larger. Typical MSA types include blade-like or triangular shaped stones often associated with randomly shaped stones that display use or edge-wear around the rim of the artefact. LSA types may well be small, informally shaped stones, often associated with bone, pieces of charcoal and in cases ceramic shards.
 - Rock Art** – Includes both painted and engraves images.
 - Shell Middens** – Include compact shell lenses that may be quite extensive in size or small ephemeral scatters of shell food remains, often associated with LSA artefact remains, but may also be of MSA and Iron Age cultural association.
- ❖ **Iron Age** – Iron Age sites are often characterized by stone features, i.e. the remains of former livestock enclosures or typical household remains, huts are often identified by either mound or depression hollows. Typical artefacts include ceramic remains, farming equipment, beads and trade goods, metal artefacts (including jewelry) etc. Remains of the ‘Struggle’ – events, histories and landmarks associated therewith are often, based on cultural association, classed as part of the Iron Age heritage of South Africa.
- ❖ **Colonial Period** – Built environment remains, either urban or rural, are of a western cultural affiliation with typical artefacts representing early western culture, including typical household remains, trade and manufactured goods, such as old bottles, porcelain and metal artefacts. War memorial remains including the vast array of associated graves and the history of the Industrial Revolution form important parts of South Africa’s Colonial Period heritage.

AD	: Anno Domini (the year o.)
AIA	: Archaeological Impact Assessment
AMAFA	: Amafa aKwaZulu-Natali
ASAPA	: Association of Southern African Professional Archaeologists
BAR	: Basic Assessment Report
BC	: Before the Birth of Christ (the year o.)
BCE	: Before the Common Era (the year o.)
BIA	: Basic Impact Assessment
BID	: Background Information Document
BP	: Before the Present (the year 1950.)
cm	: Centimeter
CRM	: Cultural Resources Management
DAC	: Department of Arts and Culture
DEAT	: Department of Environmental Affairs and Tourism
DEDEAT	: Department of Economic Development, Environmental Affairs and Tourism
DME	: Department of Minerals and Energy
DSACR	: Department of Sport, Arts, Culture and Recreation
ECO	: Environmental Control Officer
EAP	: Environmental Assessment Practitioner
EC PHRA	: Eastern Cape Provincial Heritage Resources Authority
EIA	: Environmental Impact Assessment
EIA ₁	: Early Iron Age
EMPr	: Environmental Management Plan report
ESA	: Earlier Stone Age
ha	: Hectare
HIA	: Heritage Impact Assessment
HWC	: Heritage Western Cape
HCMP	: Heritage Conservation Management Plan
ICOMOS	: International Council on Monuments and Sites
IEM	: Integrated Environmental Management
km	: Kilometer
Kya	: Thousands of years ago
LIA	: Later Iron Age
LSA	: Later Stone Age
m	: Meter
m ²	: Square Meter
MIA	: Middle Iron Age
mm	: Millimeter
MPRDA (2002)	: Mineral and Petroleum Resources Development Act, No 28 of 2002
MSA	: Middle Stone Age
Mya	: Millions of years ago
NEMA (1998)	: National Environmental Management Act, No 107 of 1998
NHRA (1999)	: National Heritage Resources Act, No 25 of 1999
PIA	: Palaeontological Impact Assessment
PHRA	: Provincial Heritage Resources Authority
PSSA	: Palaeontological Society of South Africa
PPP	: Public Participation Process
SAHRA	: South African Heritage Resources Agency
SAHRIS	: South African Heritage Resources Information System
ScIA	: Socio-cultural Impact Assessment
SIA	: Social Impact Assessment

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Introduction to the Archaeology of South Africa

Archaeologically the southern African cultural environment is roughly divided into the Stone Age, the Iron Age and the Colonial Period, including its subsequent Industrial component. This cultural division has a rough temporal association beginning with the Stone Age, followed by the Iron Age and the Colonial Period. The division is based on the identified primary technology used. The hunter-gatherer lifestyle of the Stone Age is identified in the archaeological record through stone being the primary raw material used to produce tools. Iron Age people, known for their skill to work iron and other metal, also practiced agriculture and animal husbandry. Kingdoms and civilizations associated with the Iron Age are indicative of a complex social hierarchy. The Colonial Period is marked by the advent of writing, in southern Africa primarily associated with the first European travelers (Mitchell 2002).

During the latter part of the Later Stone Age (LSA) hunter-gatherers shared their cultural landscape with both pastoralists and Iron Age people, while the advent of the Colonial Period in South Africa is marked by a complex cultural mosaic of people; including LSA hunter-gatherers, pastoralists, Later Iron Age farming communities and Colonial occupation.

1) Early Hominin Evolution

DNA studies indicate that humans and chimpanzees shared a common ancestor between 6-8Mya (Sibley & Ahlquist 1984). By 4Mya, based on fossil evidence from Ethiopia and Kenya, hominins (humans and their immediate fossil ancestors and relatives) had already evolved. The earliest fossils are ascribed to *Ardipithecus ramidus* (4.4Mya), succeeded by *Australopithecus anamensis* (4.2-3.9Mya). These fossils are inferred to lie at the base from which all other hominins evolved (Leakey et al. 1995; White et al. 1994).

In South Africa the later hominins are classed into 3 groups or distinct genera; *Australopithecus* (gracile australopithecines), *Paranthropus* (robust australopithecines) and *Homo*. South Africa has 3 major hominin sites: Taung in the North-West Province, where Raymond Dart identified the first *Australopithecus* fossil in 1924 (Dart 1925); The Cradle of Humankind (Sterkfontein Valley) sites in Gauteng, the most prolific hominin locality in the world for the period dating 3.5-1.5Mya which have yielded numerous *Australopithecus*, *Paranthropus* and limited *Homo* fossils (Keyser et al. 2000; Tobias 2000); and Makapansgat in the Limpopo Province, where several more specimens believed to be older than most of the Cradle specimens were discovered (Klein 1999).

A. africanus, represented at all 3 sites are believed to have been present on the South African landscape from about 3Mya. From approximately 2.8Mya they shared, at least in the Cradle area, the landscape with *P. robustus* and from roughly 2.3Mya with early forms of *Homo* (Clarke 1999). Global climatic cooling around 2.5Mya may have stimulated a burst of species turnover amongst hominins (Vrba 1992); the approximate contemporary appearance of the first stone tools suggests that this was a critical stage in human evolution. But exactly which early hominin population is to be accredited as the ancestor of *Homo* remains elusive.

H. ergaster is present in the African palaeo-anthropological record from around 1.8Mya and shortly thereafter the first exodus from Africa is evidenced by *H. erectus* specimens from China, Indonesia and even Europe (Klein 1999).

2) The Stone Age

2.1) The Earlier Stone Age

In South Africa the only Earlier Stone Age (ESA) Oldowan lithic assemblage comes from Sterkfontein Cave. The predominant quartz assemblage is technologically very simple, highly informal and inferred to comprise exclusively of multi-purpose tools (Kuman et al. 1997). The latter part of the ESA is characterized by the Acheulean Industrial Complex, present in the archaeological record from at least 1.5Mya. Both *H. ergaster* and *P. robustus* may be accredited with the production of these tools. The association between stone tools and increased access to meat and marrow supporting the greater dietary breadth of *Homo* may have been vital to *Homo*'s evolutionary success; and the eventual extinction of the robust australopithecines (Klein 1999).

Probably the longest lasting artefact tradition ever created by hominins, the Acheulean is found from Cape Town to north-western Europe and India, occurring widely in South Africa. Despite the many sites it is still considered a 'prehistoric dark age' by many archaeologists, encompassing one of the most critical periods in human evolution; the transition from *H. ergaster* to archaic forms of *H. Sapiens* (Klein 1999).

The Acheulean industry is characterized by handaxes and cleavers as *folies directeurs* (signatory artefact types), in association with cores and flakes. Handaxes and cleavers were multi-purpose tools used to work both meat and plant matter (Binneman & Beaumont 1992). Later Acheulean flaking techniques involved a degree of core preparation that allowed a single large flake of predetermined shape and size to be produced. This *Victoria West technique* indicates an origin within the Acheulean for the *Levallois technique* of the Middle Stone Age (Noble & Davidson 1966). The lithic artefact component was supplemented by wood and other organic material (Deacon 1970).

2.2) The Middle Stone Age

The Middle Stone Age (MSA), dating from approximately 500kya to 40-27/23kya is interpreted as an intermediate technology between the Acheulean and the Later Stone Age (LSA) (Goodwin & van Riet Lowe 1929). The MSA is typologically characterized by the absence of handaxes and cleavers, the use of prepared core techniques and the production of blades, triangular and convergent flakes, with convergent dorsal scars and faceted striking platforms, often produced by means of the *Levallois technique* (Volman 1984). The widespread occurrence of MSA technology across Africa and its spread into much of Eurasia in Oxygen Isotope Stage (OIS) 7 is viewed as part of a process of population dispersal associated with both the ancestors of the later Neanderthals in Europe and anatomically modern humans in Africa (Foley & Lahr 1997).

After the riches offered by the Cradle sites and Makapansgat, southern Africa's Middle Pleistocene fossil record is comparatively poor. Early Middle Pleistocene fossil evidence suggests an archaic appearance and fossils are often assigned to *H. heidelbergensis* and *H. sapiens rhodesiensis* (Rightmire 1976). Modern looking remains, primarily from Border Cave (KwaZulu-Natal) and Klasies River Mouth (Eastern Cape) raised the possibility that anatomically modern humans had, by 120kya, originated south of the Sahara before spreading to other parts of the world (Brauer 1982; Stringer 1985). Subsequent studies of modern DNA indicated that African populations are genetically more diverse and probably older than those elsewhere (Cann *et al.* 1994). Combined, the fossil and genetic evidence underpins the so-called *Out of Africa 2* model (arguing that gene flow and natural selection led regional hominin populations along distinct evolutionary trajectories after *Homo*'s expansion from Africa in the Lower Pleistocene *Out of Africa 1* model) of modern human origins and the continuing debate as to whether it should be preferred to its *Multiregional* alternative (arguing that modern humans evolved more or less simultaneously right across the Old World) (Mellars & Stringer 1989; Aitken *et al.* 1993; Nitecki & Nitecki 1994).

Persuasive evidence of ritual activity or bodily decoration is evidenced by the widespread presence of red ochre at particularly MSA 2 sites (after Volman's 1984 MSA 1-4 model; Hensilwood & Sealy 1997), while evidence from Lion Cave, Swaziland, indicates that specularite may have been mined as early as 100kya (Beaumont 1973). Evidence for symbolic behavioral activity is largely absent; no evidence for rock art or formal burial practices exists.

2.3) The Later Stone Age

Artefacts characteristic of the Later Stone Age (LSA) appear in the archaeological record from 40/27-23kya and incorporates microlithic as well as macrolithic assemblages. Artefacts were produced by modern *H. sapien* or *H. sapien sapien*, who subsisted on a hunter-gatherer way of life (Deacon 1984; Mitchell 2002).

According to Deacon (1984) the LSA can temporally be divided into 4 broad units directly associated with climatic, technological and subsistence changes:

1. Late Pleistocene microlithic assemblages (40-12kya);
2. Terminal Pleistocene / early Holocene non-microlithic assemblages (12-8kya);
3. Holocene microlithic assemblages (8kya to the Historic Period); and
4. Holocene assemblages with pottery (2kya to the Historic Period) closely associated with the influx of pastoralist communities into South Africa (Mitchell 2002).

Elements of material culture characteristic of the LSA reflect modern behavior. Deacon (1984) summarizes these as:

1. Symbolic and representational art (paintings and engravings);
2. Items of personal adornment such as decorated ostrich eggshell, decorated bone tools and beads, pendants and amulets of ostrich eggshell, marine and freshwater shells;
3. Specialized hunting and fishing equipment in the form of bows and arrows, fish hooks and sinkers;
4. A greater variety of specialized tools including bone needles and awls and bone skin-working tools;
5. Specialized food gathering tools and containers such as bored stone digging stick weights, carrying bags of leather and netting, ostrich eggshell water containers, tortoiseshell bowls and scoops and later pottery and stone bowls;
6. Formal burial of the dead in graves (sometimes covered with painted stones or grindstones and accompanied by grave goods);
7. The miniaturization of selected stone tools linked to the practice of hafting for composite tools production; and
8. A characteristic range of specialized tools designed for making some of the items listed above.

➤ Rock Art

Rock Art is one of the most visible and informative components of South Africa's archaeological record. Research into LSA ethnography (as KhoiSan history) has revolutionized our understanding of both painted and engraved (petroglyph) images, resulting in a paradigm shift in Stone Age archaeology (Deacon & Dowson 2001). Paintings are concentrated in the Drakensberg / Maluti mountains, the eastern Free State, the Cape Fold Mountains, the Waterberg Plateau and the Soutpansberg mountains. Engravings on the other hand are found throughout the Karoo, the western Free State and North-West Province (Mitchell 2002). Both forms of LSA art drew upon a common stock of motifs, derived from widely shared beliefs and include a restricted range of naturalistically depicted animals, geometric imagery, human body postures and non-realistic combinations of human and animal figures (anthropomorphic figurines). LSA Rock Art is closely associated with spiritual or magical significance (Lewis-Williams & Dowson 1999).

Aside from LSA or KhoiSan Rock Art, thus art produced by both hunter-gatherer and pastoralist and agro-pastoralist groups, Rock Art produced by Iron Age populations are known to be present towards the north of the country.

➤ Shell Middens ('Strandloper' Cultures)

South Africa's nearly 3,000km coastline is dotted by thousands of shell middens, situated between the high water mark and approximately 5km inland, bearing witness to long-term exploitation of shellfish mainly over the past 12,000 years. These LSA shell middens are easily distinguishable from natural accumulations of shells and deposits can include bones of animals eaten such as shellfish, turtles and seabirds, crustaceans like crabs and crayfish and marine mammal remains of seals, dolphins and occasionally whales. Artefacts and hearth and cooking remains are often found in shell midden deposits. Evidence exist that fish were speared, collected by hand, reed baskets and by means of stone fish traps in tidal pools (Mitchell 2002).

Shell midden remains were in the past erroneously assigned to 'Strandloper cultures'. Deacon & Deacon (1999) explain that 'no biological or cultural group had exclusive rights to coastal resources.' Some LSA groups visited the coast periodically while others stayed year round and it is misleading to call them all by the same name. Two primary sources of archaeological enquiry serves to shed more light on the lifestyles of people who accumulated shell middens, one being the analysis of food remains in the middens itself and the other being the analysis of LSA human skeletal remains of people buried either in shell middens or within reasonable proximity to the coast.

Shell middens vary in character ranging from large sites tens of meters in extent and with considerable depositional depth to fairly small ephemeral collections, easily exposed and destroyed by shifting dune action. Shell middens are also found inland, along rivers where fresh water mussels occur. These middens are often fairly small and less common; in the Eastern Cape often dated to within the past 3,000 years (Deacon & Deacon 1999).

In addition shell middens are not exclusively assigned to LSA cultures; shellfish were exploited during the Last Interglacial, indicating that the practice was most probably continuous for the past 120,000 years (MSA shell middens). Along the coast of KwaZulu-Natal evidence exist for the exploitation of marine food resources by Iron Age communities. These shell middens are easily distinguished from Stone Age middens by particularly rich, often decorated ceramic artefact content. Colonial Period shell middens are quite rare and extremely ephemeral in character; primarily the result of European shipwreck survivors and reported on along the coast of KwaZulu-Natal and the Transkei, Eastern Cape.

3) The Iron Age

For close to 2 millennia people combining cereal agriculture with stock keeping have occupied most of southern Africa's summer rainfall zone. The rapid spread of farming, distinctive ceramics and metallurgy is understood as the expansion of a Bantu-speaking population, in archaeological terms referred to as the Iron Age.

3.1) The Early Iron Age

Ceramic typology is central to current discussions of the expansion of iron using farming communities. The most widely used approach is that of Huffman (1980), who employs a multidimensional analysis (vessel profile, decoration layout and motif) to reconstruct different ceramic types. Huffman (1998) argues that ceramics can be used to trace the movements of people, though not necessarily of specific social or political groupings. Huffman's Urewe Tradition coincides largely with Phillipson's (1977) Eastern Stream. A combined Urewe Tradition / Eastern Stream model for the Early Iron Age can be summarized as:

1. The Kwale branch (extending along the coast from Kenya to KwaZulu-Natal);
2. The Nkope branch (located inland and reaching from southern Tanzania through Malawi and eastern Zambia into Zimbabwe); and
3. The Kalundu branch (stretching from Angola through western Zambia, Botswana and Zimbabwe into South Africa).

In southern Africa, recent work distinguishes two phases of the Kwale branch: The earlier Silver Leaves facies (250-430AD) occurring as far south as the Northern Province. The later expression or Mzonjani facies (420-580AD) occurs in the Northern Province as well as along the KwaZulu-Natal coastal belt (Huffman 1998). Since the Silver Leaves facies is only slightly younger than the Kwale type site in Kenya, very rapid movement along the coast, perhaps partly by boat, is inferred (Klapwijk 1974). Subsequently (550-650AD) people making Mzonjani derived ceramics settled more widely in the interior of South Africa.

Assemblages attributable to the Nkope branch appear south of the Zambezi but north of South Africa from the 5th Century. Ziwa represents an early facies, with Gokomere deriving jointly from Ziwa and Bambata. A subsequent phase is represented by the Zhizo facies of the Shashe-Limpopo basin, and by Taukome (Huffman 1994). Related sites occur in the Kruger National Park (Meyer 1988). Zhizo (7th – 10th Century) is ancestral to the Toutswe tradition which persisted in eastern Botswana into the 13th Century.

Kalundu origins need further investigation; its subsequent development is however better understood. A post Bambata phase is represented by the 5th – 7th Century sites of Happy Rest, Klein Africa and Maunatlana in the Northern Province and Mpumalanga (Prinsloo 1974, 1989). Later phases are present at the Lydenburg Heads site (Whitelaw & Moon 1996) and by the succession of Mzuluzi, Ndongonwane and Ntshokane in KwaZulu-Natal (7th – 10th Centuries) (Prins & Grainger 1993). Later Kalundu facies include Klingbeil and Eiland in the northern part of the country (Evers 1980) with Kgotpolwe being a lowveld variant in Mpumalanga (10th – 12th Century). Broadhurst and other sites indicate a still later survival in Botswana (Campbell 1991).

Despite the importance accorded to iron agricultural implements in expanding the spread of farming and frequent finds of production debris, metal objects are rare. Metal techniques were simple, with no particular sign of casting, wire drawing or hot working. Jewelry (bangles, beads, pendants etc.) constitute by far the largest number of finds but arrows, adzes, chisels, points and spatulae are known (Miller 1996).

Early Iron Age people were limited to the Miombo and Savannah biomes; excluded from much of the continent's western half by aridity and confined in the south during the 1st millennium to bushveld areas of the old Transvaal. Declining summer rainfall restricted occupation to a diminishing belt close to the East Coast and north of S33° (Maggs 1994); sites such as Canasta Place (800AD), Eastern Cape, mark the southern-most limit of Early Iron Age settlement (Nogwaza 1994).

➤ The Central Cattle Pattern

The Central Cattle Pattern (CCP) was the main cognitive pattern since the Early Iron Age (Huffman 1986). The system can be summarized as opposition between male pastoralism and female agriculture; ancestors and descendants; rulers and subjects; and men and women. Cattle served as the primary means of transaction; they represented symbols exchanged for the fertility of wives, legitimacy of children and appeasement of ancestors. Cattle were also used as tribute to rulers confirming sub-ordination and redistribution as loan cattle by the ruler to gain political support. Cattle represented healing and fertilizing qualities (Huffman 1998; Kuper 1980).

This cognitive and conceptual structure underlies all cultural behavior, including the placement of features in a settlement. The oppositions of male and female, pastoralism and agriculture, ancestors and descendants, rulers and subjects, cool and hot are represented in spatial oppositions, either concentric or diametric (Huffman 1986).

A typical CCP village comprise of a central cattle enclosure (byre) where men are buried. The *Kgotla* (men's meeting place / court) is situated adjacent to the cattle enclosure. Surrounding the enclosure is an arc of houses, occupied according to seniority. Around the outer perimeter of the houses is an arc of granaries where women keep their pots and grinding stones (Huffman 1986). The model varies per ethnic group which helps to distinguish ethnicity throughout the Iron Age, but more studies are required to recognize the patterns.

3.2) The Middle Iron Age

The hiatus of South African Middle Iron Age activity was centered in the Shashe-Limpopo Valley and characterized by the 5-tier hierarchical Mapungubwe State spanning some 30,000km². By the 1st millennium ivory and skins were already exported overseas, with sites like Sofala and Chibueni, Mozambique, interfacing between interior and transoceanic traders. Exotic glass beads, cloth and Middle Eastern ceramics present at southern African sites mark the beginning of the regions incorporation into the expanding economic system that, partly tied together with maritime trading links across the Indian Ocean, increasingly united Africa, Asia and Europe long before Da Gama or Columbus (Eloff & Meyer 1981; Meyer 1998).

Occupation was initially focused at Bambandanyalo and K2. The Bambandanyalo main midden (1030-1220AD) stands out above the surrounding area, reaching more than 6m in places and covering more than 8ha the site may have housed as many as 2,000 people (Meyer 1998). The CCP was not strictly followed; whether this is ideologically significant or merely a reflection of local topography remains unclear. The midden, the size of which may reflect the status of the settlement's ruler, engulfed the byre around 1060-1080AD, necessitating relocation of the cattle previously kept there. The re-organization of space and worldview implied suggests profound social changes even before the sites' abandonment in the early 13th century, when the focus of occupation moved to Mapungubwe Hill, 1 km away (Huffman 1998).

Excavations at Mapungubwe Hill, though only occupied for a few decades (1220-1290AD), yielded a deep succession of gravel floors and house debris (Eloff & Meyer 1981). Huffman (1998) suggests that the suddenness with which Mapungubwe was occupied may imply a deliberate decision to give spatial expression to a new social order in which leaders physically removed themselves from ordinary people by moving onto more inaccessible, higher elevations behind the stone walls demarcating elite residential areas. Social and settlement changes speak of considerable centralization of power and perhaps the elaboration of new ways of linking leaders and subjects.

At Bambandanyalo and Mapungubwe elite burial grave goods include copper, bone, ivory and golden ornaments and beads. Social significance of cattle is reinforced by their importance among the many human and animal ceramic figurines and at least 6 'beast burials' (Meyer 1998).

Today the drought prone Shashe-Limpopo Valley receives less than 350mm of rainfall per annum, making cereal cultivation virtually impossible. The shift to drier conditions in the late 1200's across the Shashe-Limpopo basin and the eastern Kalahari may have been pivotal in the break-up of the Mapungubwe polity, the collapse of Botswana's Toutswe tradition and the emergence of Great Zimbabwe (1220-1550AD), southern Africa's best known and largest (720ha) archaeological site (Meyer 1998).

South of the Limpopo and north of the Soutpansberg, Mapungubwe derived communities survived into the 14th Century, contemporary with the establishment of Sotho-speaking makers of Maloko pottery.

3.3) The Later Iron Age

South African farming communities of the 2nd millennium experienced increased specialization of production and exchange, the development of more nucleated settlement patterns and growing political centralization, albeit not to the same extent as those participating in the Zimbabwe tradition. However, together they form the background to the cataclysmic events of the late 18th / early 19th Century *Mfecane* (Mitchell 2002).

Archaeological evidence of settlement pattern, social organization and ritual practice often differ from those recorded ethnographically. The Moloko ceramic tradition seems to be ancestral to modern Sotho-Tswana speakers (Evers 1980) and from about 1,100AD a second tradition, the Blackburn tradition, appears along South Africa's eastern coastline. Blackburn produced mostly undecorated pottery (Davies 1971), while Mpambanyoni assemblages, reaching as far south as Transkei, includes examples of rim notching, incised lines and burnished ochre slip (Robey 1980). At present, no contemporary farming sites are known further inland in KwaZulu-Natal or the Eastern Cape.

Huffman (1989) argues that similarities between Blackburn and early Maloko wares imply a related origin, presumably in the Chifumbaze of Zambia or the Ivuna of Tanzania, which contains a range of ceramic attributes important in the Blackburn as well as beehive grass huts similar to those made by the Nguni. This is one of the few suggestions of contact between Sotho-Tswana and Nguni speakers on the one hand and farming communities who, if Huffman is correct, were already long established south of the Limpopo. Both ethnographic and archaeological data demonstrate that Sotho-Tswana and Nguni are patrilineal and organize their settlements according to the CCP (Kuper 1980).

From 1,300AD there is increasing evidence for the beginning of agro-pastoralist expansion considerably beyond the area of previous occupation. It is also to this time that the genealogies of several contemporary Bantu speaking groups can be traced (Wilson & Thompson 1969). Associated with this expansion was the regular employment of stone, rather than wood, as building material, an adaptation that has greatly facilitated the discovery and identification of settlements. Maggs (1976) describes 4 basic settlement types all characterized by the use of semi weathered dolomite to produce hard binding *daga* for house floors and a wall building tradition employing larger more regular stones for the inner and outer faces and smaller rubble for the infill. As with the more dispersed homesteads of KwaZulu-Natal and the Eastern Cape, sites tend to be in locally elevated situations, reflecting a deep seated Sotho and Nguni preference for benign higher places rather than supernaturally dangerous riverside localities; another important contrast to both 1st millennium (Maggs 1976) and later Zulu Kingdom settlement patterns (Hall & Maggs 1979).

The lack of evidence for iron production in the interior and eastern part of South Africa emphasize exchange relationships between various groups and associated more centralized polities. By the 19th Century iron production in KwaZulu-Natal was concentrated in particular clans and lineages and associated with a range of social and religious taboos (Maggs 1992). South of Durban comparatively few smelting sites are known (Whitelaw 1991), a trend even more apparent in Transkei (Feely 1987). However, metal remained the most important and archaeologically evident item traded between later farming communities. (Other recorded trade items include glass and ostrich eggshell beads; Indian Ocean seashells; siltstone pipes; *dagga*, and later on tobacco; pigments including ochre, graphite and specularite; hides and salt.)

Rising polity settlements are particularly evident in the north of the country and dated to the 17th Century, including Molokwane, capital of the Bakwena chiefdom (Pistorius 1994) and Kaditshwene, capital of a major section of the Hurutshe, whose population of 20,000 in 1820 almost equals contemporary Cape Town in size (Boeyens 2000). The agglomeration of Tswana settlements in the north of the country was fuelled by both population growth and conflict over access to elephant herds for ivory and long distance trade with the East Coast. During this period ceramic decoration became blander and more standardized than the earlier elaborate decoration that included red ochre and graphite coloring.

The *Mfecane* refers to the wars and population movements of the early 19th Century which culminated in the establishment of the Zulu Kingdom and came to affect much of the interior, even beyond the Zambezi: The late 18th Century was marked by increasing demands for ivory (and slaves) on the part of European traders at Delagoa Bay; as many as 50 tons of ivory were exported annually from 1750-1790. As elephant populations declined, competition increased both for them and for the post 1790 supply of food to European and American whalers calling at Delagoa Bay (Smith 1970). Cattle raiding, conflict over land and changes in climatic and subsistence strategies characterized much of the cultural landscape of the time.

Competition for access to overseas trade encouraged some leaders to replace locally organized circumcision schools and age-sets with more permanently maintained military regiments. These were now used to gain access through warfare to land, cattle and stored food. By 1810 three groups, the Mthethwa, Ndwandwe and Ngwane dominated northern KwaZulu-Natal (Wright 1995). The Mthethwa paramountcy was undermined by the killing of its leader Dingiswayo in circa 1818, which led to a brief period of Ndwandwe dominance. In consequence one of Dingiswayo's former tributaries, Shaka, established often forceful alliances with chiefdoms further south. Shaka's Zulu dominated coalition resisted the Ndwandwe who in return fled to Mozambique. As the Zulu polity expanded it consolidated its control over large areas, incorporating many communities into it. Others sought refuge from political instability by moving south of the Thukela River, precipitating a further *domino effect* as far as the Cape Colony's eastern border (Wright 1995).

4) The Colonial Period

In the 15th Century Admiral Zheng He and his subordinates impressed the power of the Ming Dynasty rulers in a series of voyages as far afield as Java, Sri Lanka, southern Arabia and along the East African coast, collecting exotic animals *en route*. But nothing more came of his expeditions and China never pursued opportunities for trade or colonization (Mote 1991).

Portuguese maritime expansion began around the time of Zheng He's voyages; motivated by a desire to establish a sea route to the riches of the Far East. By 1485 Diogo Cao had reached Cape Cross, 3 years later Bartolomeu Dias rounded the Cape of Good Hope and less than a decade later Vasco da Gama called at several places along South Africa's coast, trading with Khoekhoen (Khoi) at Mossel Bay before reaching Mozambique and crossing the ocean to India. His voyage initiated subsequent Portuguese bases from China to Iraq. In Africa interest was focused on seizing important coastal trading towns such as Sofala and gaining access to the gold of Zimbabwe. Following the 1510 Portuguese-Khoekhoen battle at Table Bay, in which the viceroy of India was killed, Portuguese ships ceased to call along the South African coast (Elphick 1985).

A number of shipwrecks, primarily along the eastern coast attest to Portuguese activity including the Sao Joao, wrecked in 1552 near Port Edward and the Sao Bento, destroyed in 1554 off the Transkei coast. Survivors' accounts provided the 1st detailed information on Africa's inhabitants (Auret & Maggs 1982).

By the late 1500's Portuguese supremacy of the Indian Ocean was threatened. From 1591 numerous Dutch and English ships called at Table Bay and in 1652 the Dutch East India Company (VOC) established a permanent base, with the intent to provide fresh food and water to VOC ships. In an attempt to improve the food supply a few settlers (free burghers) were allowed to establish farms. The establishment of an intensive mixed farming economy failed due to shortages of capital and labor, and free burghers turned to wheat cultivation and livestock farming. While the population grew slowly the area of settlement expanded rapidly with new administrative centers established at Stellenbosch (1676), Swellendam (1743) and Graaf-Reinet (1785). By the 1960's the Colony's frontier was too long to be effectively policed by VOC officials (Elphick 1985).

From the 1700's many settlers expanded inland over the Cape Fold Mountain Belt. The high cost of overland transport constrained the ability to sell their produce while settlement of the interior was increasingly made difficult by resident KhoiSan groups, contributing due to a lack of VOC military support to growing Company opposition in the years before British control of the Cape (1795 / 1806) (Davenport & Saunders 2000).

In 1820 a major British settlement was implanted on the eastern frontier of the Cape Colony, resulting in large numbers of the community moving into the interior, initially to KwaZulu-Natal, and then after Britain annexed Natal (1843), further into the interior to beyond the Vaal River. Disruptions of the *Mfecane* eased their takeover of African lands and the Boers (farmers) established several Republics. A few years later the 2nd South African War saw both the South African and Orange Free State Republics annexed by Britain, a move largely motivated by British desire to control the goldfields of the Witwatersrand. With adjacent regions of the sub-continent also falling, directly or indirectly, under British rule and German colonization of Namibia, European control of the whole of southern Africa was firmly established before the 1st World War (Davenport & Saunders 2000).

➤ Xhosa Iron Age Cultures meets Colonists in the Eastern Cape

From the late 1600's conflict between migrants from the Cape (predominantly Boers) and Xhosa people in the region of the Fish River were strife, ultimately resulting in a series of 9 Frontier Wars (1702-1878) (Milton 1983). Both cultures were heavily based and reliant on agriculture and cattle farming. As more Cape migrants, and later settlers from Britain (1820) and elsewhere arrived, population pressures and competition over land, cattle and good grazing became intense. Cattle raiding became endemic on all sides, with retaliatory raids launched in response. As missionaries arrived with evangelical messages, confrontations with hostile chiefs who saw them as undermining traditional Xhosa ways of life resulted in conflicts which flared into wars.

As pressures between the European settlers and the Xhosa grew, settlers organized themselves into local militia, counteracted by Xhosa warring skills: But both sides were limited by the demands of seasonal farming and the need for labor during harvest. Wars between the Boers and the Xhosa resulted in shifting borders, from the Fish to the Sundays River, but it was only after the British annexed the Cape in 1806 that authorities turned their attention to the Eastern

regions and petitions by the settlers about Xhosa raids. British expeditions, in particular under Colonel John Graham in 1811 and later Harry Smith in 1834, were sent not only to secure the frontier against the Xhosa, but also to impose British authority on the settlers, with the aim to establish a permanent British presence. Military forts were built and permanently manned. Over time the British came to dominate the area both militarily and through occupation with the introduction of British settlers. The imposition of British authority led to confrontations not only with the Xhosa but also with disaffected Boers and other settlers, and other native groups such as the Khoikhoi, the Griqua and the Mpondo. The frontier wars continued over a period of about 150 years; from the 1st arrival of the Cape settlers, and with the intervention of the British military ultimately ending in the subjugation of the Xhosa people. Fighting ended on the Eastern Cape frontier in June 1878 with the annexation of the western areas of the Transkei and administration under the authority of the Cape Colony (Milton 1983).

➤ The Industrial Revolution

The Industrial Revolution refers roughly to the period between the 18th - 19th Centuries, typified by major changes in agriculture, manufacturing, mining, transport, and technology. Changing industry had a profound effect on socio-economic and socio-cultural conditions across the world: The Industrial Revolution marks a major turning point in human history; almost every aspect of daily life was eventually influenced in some way. Average income and population size began to exhibit unprecedented growth; in the two centuries following 1800 the world's population increased over 6-fold, associated with increasing urbanization and demand of resources. Starting in the latter part of the 18th century, the transition from manual labor towards machine-based manufacturing changed the face of economic activity; including the mechanization of the textile industries, the development of iron-making techniques and the increased use of refined coal. Trade expansion was enabled by the introduction of canals, improved roads and railways. The introduction of steam power fuelled primarily by coal and powered machinery was underpinned by dramatic increases in production capacity. The development of all-metal machine tools in the first two decades of the 19th century facilitated the manufacture of more production machines in other industries (More 2000).

Effects of the Industrial Revolution were widespread across the world, with its enormous impact of change on society, a process that continues today as 'industrialization'.

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Heritage Impact Assessment (HIA) – Proposed Hempel Quarry, Crusher and Stockpile Area, Farm No 604, near Grahamstown, Makana Local Municipality, Eastern Cape

Heritage Protocol for Incidental Finds during the Construction Phase

Should any palaeontological, archaeological or cultural heritage resources, including human remains / graves, as defined and protected by the NHRA 1999, be identified during the construction phase of development (including as a norm during vegetation clearing, surface scraping, trenching and excavation phases), it is recommended that the process described below be followed.

➤ **On-site Reporting Process:**

1. The identifier should immediately notify his / her supervisor of the find.
2. The identifier's supervisor should immediately (and within 24 hours after reporting by the identifier) report the incident to the on-site SHE / SHEQ officer.
3. The on-site SHE / SHEQ officer should immediately (and within 24 hours after reporting by the relevant supervisor) report the incident to the appointed ECO / ELO officer. [Should the find relate to human remains the SHE / SHEQ officer should immediately notify the nearest SAPS station informing them of the find].
4. The ECO / ELO officer should ensure that the find is within 72 hours after the SHE / SHEQ officers report reported on SAHRIS and that a relevant heritage specialist is contacted to make arrangements for a heritage site inspection. [Should the find relate to human remains the ECO / ELO officer should ensure that the archaeological site inspection coincides with a SAPS site inspection, to verify if the find is of forensic, authentic (informal / older than 60 years), or archaeological (older than 100 years) origin].
5. The appointed heritage specialist should compile a 'heritage site inspection' report based on the site specific findings. The site inspection report should make recommendations for the destruction, conservation or mitigation of the find and prescribe a recommended way forward for development. The 'heritage site inspection' report should be submitted to the ECO / ELO, who should ensure submission thereof on SAHRIS.
6. SAHRA / the relevant PHRA will state legal requirements for development to proceed in the SAHRA / PHRA Comment on the 'heritage site inspection' report.
7. The developer should proceed with implementation of the SAHRA / PHRA Comment requirements. SAHRA / PHRA Comment requirements may well stipulate permit specifications for development to proceed.
 - Should permit specifications stipulate further Phase 2 archaeological investigation (including grave mitigation) a suitably accredited heritage specialist should be appointed to conduct the work according to the applicable SAHRA / PHRA process. The heritage specialist should apply for the permit. Upon issue of the SAHRA / PHRA permit the Phase 2 heritage mitigation program may commence.
 - Should permit specifications stipulate destruction of the find under a SAHRA / PHRA permit the developer should immediately proceed with the permit application. Upon the issue of the SAHRA / PHRA permit the developer may legally proceed with destruction of the palaeontological, archaeological or cultural heritage resource.
 - Upon completion of the Phase 2 heritage mitigation program the heritage specialist will submit a Phase 2 report to the ECO / ELO, who should in turn ensure submission thereof on SAHRIS. Report recommendations may include that the remainder of a heritage site be destroyed under a SAHRA / PHRA permit.
 - Should the find relate to human remains of forensic origin the matter will be directly addressed by the SAPS: A SAHRA / PHRA permit will not be applicable.

NOTE: Note that SAHRA / PHRA permit and process requirements relating to the mitigation of human remains requires suitable advertising of the find, a consultation, mitigation and re-internment / deposition process.

➤ **Duties of the Supervisor:**

1. The supervisor should immediately upon reporting by the identifier ensure that all work in the vicinity of the find is ceased.
2. The supervisor should ensure that the location of the find is immediately secured (and within 12 hours of reporting by the identifier), by means of a temporary conservation fence (construction netting) allowing for a 5-10m heritage conservation buffer zone around the find. The temporary conserved area should be sign-posted as a 'No Entry – Heritage Site' zone.
3. Where development has impacted on the resource, no attempt should be made to remove artefacts / objects / remains further from their context, and artefacts / objects / remains that have been removed should be collected and placed within the conservation area or kept for safekeeping with the SHE / SHEQ officer. It is imperative that where development has impacted on palaeontological, archaeological and cultural heritage resources the context of the find be preserved as good as possible for interpretive and sample testing purposes.
4. The supervisor should record the name, company and capacity of the identifier and compile a brief report describing the events surrounding the find. The report should be submitted to the SHE / SHEQ officer at the time of the incident report.

➤ **Duties of the SHE / SHEQ Officer:**

1. The SHE / SHEQ officer should ensure that the location of the find is recorded with a GPS. A photographic record of the find (including implementation of temporary conservation measures) should be compiled. Where relevant a scale bar or object that can indicate scale should be inserted in photographs for interpretive purposes.
2. The SHE / SHEQ officer should ensure that the supervisors report, GPS co-ordinate and photographic record of the find be submitted to the ECO / ELO officer. [Should the find relate to human remains the SHE / SHEQ officer should ensure that the mentioned reporting be made available to the SAPS at the time of the incident report].
3. Any retrieved artefacts / objects / remains should, in consultation with the ECO / ELO officer, be deposited in a safe place (preferably on-site) for safekeeping.

➤ **Duties of the ECO / ELO officer:**

1. The ECO / ELO officer should ensure that the incident is reported on SAHRIS. (The ECO / ELO officer should ensure that he / she is registered on the relevant SAHRIS case with SAHRIS authorship to the case at the time of appointment to enable heritage reporting].
2. The ECO / ELO officer should ensure that the incident report is forwarded to the heritage specialist for interpretive purposes at his / her soonest opportunity and prior to the heritage site inspection.
3. The ECO / ELO officer should facilitate appointment of the heritage specialist by the developer / construction consultant for the heritage site inspection.
4. The ECO / ELO officer should facilitate access by the heritage specialist to any retrieved artefacts / objects / remains that have been kept in safekeeping.
5. The ECO / ELO officer should facilitate coordination of the heritage site inspection and the SAPS site inspection in the event of a human remains incident report.
6. The ECO / ELO officer should facilitate heritage reporting and heritage compliance requirements by SAHRA / the relevant PHRA, between the developer / construction consultant, the heritage specialist, the SHE / SHEQ officer (where relevant) and the SAPS (where relevant).

➤ **Duties of the Developer / Construction Consultant:**

The developer / construction consultant should ensure that an adequate heritage contingency budget is accommodated within the project budget to facilitate and streamline the heritage compliance process in the event of identification of incidental palaeontological, archaeological and cultural heritage resources during the course of development, including as a norm during vegetation clearing, surface scraping, trenching and excavation phases, when resources not visible at the time of the surface assessment may well be exposed.

**Resumé:
Karen van Ryneveld
2016**

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Contact Details:	1) Cell: 084 871 1064 2) E-mail: karen@archaeomaps.co.za 3) Website: www.archaeomaps.co.za 4) Postal address: Postnet Suite 239, Private Bag X3, Beacon Bay, 5205
Company:	ArchaeoMaps cc
Occupation:	Archaeologist
Qualification:	MSc Archaeology (WITS University – 2003)
Accreditation:	1) Association of Southern African Professional Archaeologists (ASAPA) accredited Cultural Resources Management (CRM) practitioner [member nr – 163] <ul style="list-style-type: none"> • 2010 – ASAPA CRM Section: Principle Investigator – Stone Age • 2005 – ASAPA CRM Section: Field Director – Stone Age, Iron Age & Colonial Period 2) SAHRA, AMAFA, EC PHRA and HWC listed ASAPA accredited CRM archaeologist

Tertiary Education

2015-Present	University of Fort Hare, East London (<i>MPhil Environmental Studies</i>)
2010	UNISA University, Pretoria (<i>Project Management 501</i>)
2006-2007	Nelson Mandela Metropolitan University, Port Elizabeth (<i>Undergraduate Certificate in Geographical Information Systems</i>)
2001-2003	WITS University, Johannesburg (<i>MSc Archaeology</i>)
1999-2000	University of Pretoria, Pretoria (<i>BA Hons. Archaeology</i>)
1991-1993	University of Pretoria, Pretoria (<i>BA Archaeology & History of Art</i>)

Courses

2016/01	SPA (Safety Passport Alliance) – Petrol Retail [SA Safety Management Services Training (Pty) Ltd – SMST, Sasolburg, Gauteng]
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Employment – Professional Archaeology

2007/04-Present	ArchaeoMaps Archaeological Consultancy [Self-employed] (Archaeologist – CRM)
2006/06-2007/03	National Museum, Bloemfontein (Archaeologist – CRM, Dept. of Archaeology)
2005/04-2006/05	McGregor Museum, Kimberley (Archaeologist – Researcher / CRM, Dept. of Archaeology)
2004/04-2005/01	Amafa aKwaZulu-Natali, Pietermaritzburg (HoD: Archaeology, Paleontology and Meteorites [APM] Unit)
2002/09-2004/03	McGregor Museum, Kimberley (Archaeologist – Researcher / CRM, Dept. of Archaeology)

Employment – Freelance: Ground Penetrating Radar

2015/10-Present	Terra Scan assistant (BCM area, EC) – GPR & underground utilities focussing on the petrol retail (oil & gas) industry [GPR in grave / cemetery sensitive heritage cases – MPhil dissertation research]
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Archaeology – Summary

Karen has been involved in CRM archaeology since 2003 and has been the author (including selected co-authored reports) of approximately 400 Phase 1 AIA studies. Phase 1 AIA work is centred in South Africa, focusing on the Northern and Eastern Cape provinces and the Free State. She has also conducted Phase 1 work in Botswana (2006/2007). In 2007 she started ArchaeoMaps, an independent archaeological consultancy. In 2010 she was awarded ASAPA CRM Principle Investigator (PI) status based on large scale Phase 2 Stone Age mitigation work (De Beers Consolidated Mines – Rooipoort, Northern Cape – 2008/2009) and has also been involved in a number of other Phase 2 projects including Stone Age, Shell Middens, Grave / Cemetery projects and Iron Age sites.

In addition to CRM archaeology she has been involved in research, including the international collaborations at Maloney's Kloof and Grootkloof, Ghaap plateau, Northern Cape (2005/2006). Archaeological compliance experience includes her position as Head of the Archaeology, Palaeontology and Meteorites (APM) Unit at AMAFA aKwa-Zulu Natali (2004).

Company Profile

Company Name	: ArchaeoMaps cc
Registration number	: 2005/180719/23
VAT number	: Not VAT Registered
Accountant	: Azima Financial Services, Bloemfontein
Members / Shareholders	: Karen van Ryneveld (100%)
BBBEE status	: Exempted Micro Enterprise (EME)