

Archaeological Impact Assessment

FOR THE PROPOSED REALIGNMENT OF THE N10 TO FACILITATE ACCESS TO THE ILANGA CSP
FACILITY SITE, EAST OF UPINGTON, NORTHERN CAPE PROVINCE

Prepared For
Savannah Environmental (Pty) Ltd

By



HERITAGE

Contracts and Archaeological Consulting

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I, Jaco van der Walt as duly authorised representative of Heritage Contracts and Archaeological Consulting CC, hereby confirm my independence as a specialist and declare that neither I nor the Heritage Contracts and Archaeological Consulting CC have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which the client was appointed as Environmental Assessment practitioner, other than fair remuneration for work performed on this project.



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EXECUTIVE SUMMARY

Site name and location: The proposed realignment of the N10 to facilitate access to the Ilanga CSP Facility site, East of Upington, Northern Cape.

Purpose of the study: Phase 1 Archaeological Impact Assessment of the proposed N10 realignment to determine the presence of cultural heritage sites and the impact of the proposed infrastructure on these non-renewable resources.

1:50 000 Topographic Map: 2821 AD.

EIA Consultant: Savannah Environmental (Pty) Ltd

Developer: South African National Roads Agency Limited

Heritage Consultant: Heritage Contracts and Archaeological Consulting CC (HCAC).

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Date of Report: 13 March 2014.

Findings of the Assessment:

This report focuses on the impact of the proposed straightening of the N10 and the addition of on-ramping and off-ramping lanes to facilitate access to the Ilanga CSP site on heritage resources. Previous work in the immediate vicinity of the study area provides a good basis of understanding the local archaeology (Van Schalkwyk 2011, Gaigher 2012 and van der Walt 2014). These studies recorded 12 sites in the area consisting of cemeteries, Stone Age sites associated with depressions that contain seasonal water and a stream bed margin, historical material (porcelain etc.) and ruins younger than 60 years.

The area where the N10 is proposed to be straightened to eliminate dangerous curves and the addition of on-ramping and off-ramping lanes to facilitate access to the Ilanga CSP site consist of existing road servitude and gravel road entrance to the study area. This area is already disturbed by construction activities of the current alignment of the N10 and no archaeological sites or material was noted in this area. Furthermore no cultural landscape elements were noted and visual impacts to scenic routes and sense of place are also considered to be low as the study area is part of the existing national N10 road. A visual impact assessment was also commissioned for the project, facilitated by the client and no further mitigation is recommended for this aspect from a heritage point of view.

If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP for this project.

The impacts to heritage and archaeological resources by the proposed development are not considered to be highly significant and HCAC is of the opinion that from an archaeological point of view there is no reason why the development should not proceed based on approval from SAHRA.

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- Recommendations delivered to the Client.

CONTENTS

EXECUTIVE SUMMARY	3
GLOSSARY.....	8
1 BACKGROUND INFORMATION	9
1.1 Terms of Reference.....	10
1.2. Archaeological Legislation and Best Practice	10
1.3 Description of Study Area	11
1.3.1 <i>Location Data</i>	11
1.3.2. <i>Location Map</i>	12
2. APPROACH AND METHODOLOGY	13
3 NATURE OF THE DEVELOPMENT	13
4. ARCHAEOLOGICAL AND CULTURAL HISTORIC BACKGROUND	14
4.1. The Stone Age.....	14
4.1.1 The Later Stone Age.....	14
5. HERITAGE SITE SIGNIFICANCE AND MITIGATION MEASURES	15
5.1. Field Rating of Sites	16
6. -DESCRIPTION OF SITES	19
7. Potential Impact.....	21
7.1. Pre-Construction phase:	21
7.2. Construction Phase	21
7.3. Operation Phase:	21
8. CONCLUSIONS AND RECOMMENDATIONS	22
9. PROJECT TEAM.....	23
10. STATEMENT OF COMPETENCY	24
11. REFERENCES.....	25

FIGURES

Figure 1: The locality of the proposed N10 realignment project 12

Figure 2: Site development layout and track logs of areas covered in black 19

Figure 3: Study area viewed from the West. 20

Figure 4: Environment in the northern portion. 20

Figure 5: Eastern section of the study area. 20

Figure 6: North western section of the study area. 20

ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BIA: Basic Impact Assessment
CRM: Cultural Resource Management
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMPR: Environmental Management Programme
ESA: Early Stone Age
GPS: Global Positioning System
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act
MSA: Middle Stone Age
NEMA: National Environmental Management Act
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency
SAHRIS: South African Heritage Resources Information System

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological site (remains of human activity over 100 years old)

Early Stone Age (~ 2.6 million to 250 000 years ago)

Middle Stone Age (~ 250 000 to 40-25 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

The Iron Age (~ AD 400 to 1840)

Historic (~ AD 1840 to 1950)

Historic building (over 60 years old)

1 BACKGROUND INFORMATION

Heritage Contracts and Archaeological Consulting CC has been contracted by Savannah Environmental (Pty) Ltd to conduct A Phase 1 Archaeological Assessment for the proposed infrastructure for the approved Ilanga CSP Facility close to Upington. The report forms part of the EIA and Environmental Management Programme Report (EMPR) for the proposed project.

The aim of the study is to survey the proposed N10 realignment to identify cultural heritage sites, document, and assess their importance within local, provincial and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, review of the HIA for the proposed project; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey no sites of heritage significance were identified within the study area. General site conditions and features on sites were recorded by means of photographs, GPS locations, and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report.

This report must also be submitted to SAHRA for review.

1.1 Terms of Reference

Field study

Conduct a field study to: a) visit the proposed tower positions to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed towers.

Reporting

Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

1.2. Archaeological Legislation and Best Practice

Phase 1, an AIA or a HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of a heritage specialist input is to:

- » Identify any heritage resources, which may be affected;
- » Assess the nature and degree of significance of such resources;
- » Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- » Assess the negative and positive impact of the development on these resources;
- » Make recommendations for the appropriate heritage management of these impacts.

The AIA or HIA, as a specialist sub-section of the EIA, is required under the National Heritage Resources Act NHRA of 1999 (Act 25 of 1999), Section 23(2)(b) of the NEMA and Sections 39(3)(b)(iii) of the MPRDA.

The AIA should be submitted, as part of the EIA, BIA or EMP, to the PHRA if established in the province or to SAHRA. SAHRA will be ultimately responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the EIA, BIA/EMP, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level).

Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is a legal body, based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 AIAs are primarily concerned with the location and identification of sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for from SAHRA by the client before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare.

Authorisation for exhumation and re interment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

1.3 Description of Study Area

1.3.1 Location Data

The proposed site is located on Farm Matjesrivier (Previously known as Farm Annashoek 41, within Ward 14 of the //Khara Hais Local Municipality of the Siyanda District Municipality, Northern Cape Province. The site is located approximately 30 km east of Upington towards Groblershoop. The site is located at 28° 24' 22.8428" S, 21° 28' 50.2309" E.

The study area falls within a Savannah Biome as described by Mucina et al (2006) with the vegetation described as Bushmanland Arid Grassland in the west with Kalahari Karroid Shrubland to the east. The study area is relatively flat with low hills, the area is characterised by red Kalahari windblown sand.

1.3.2. Location Map

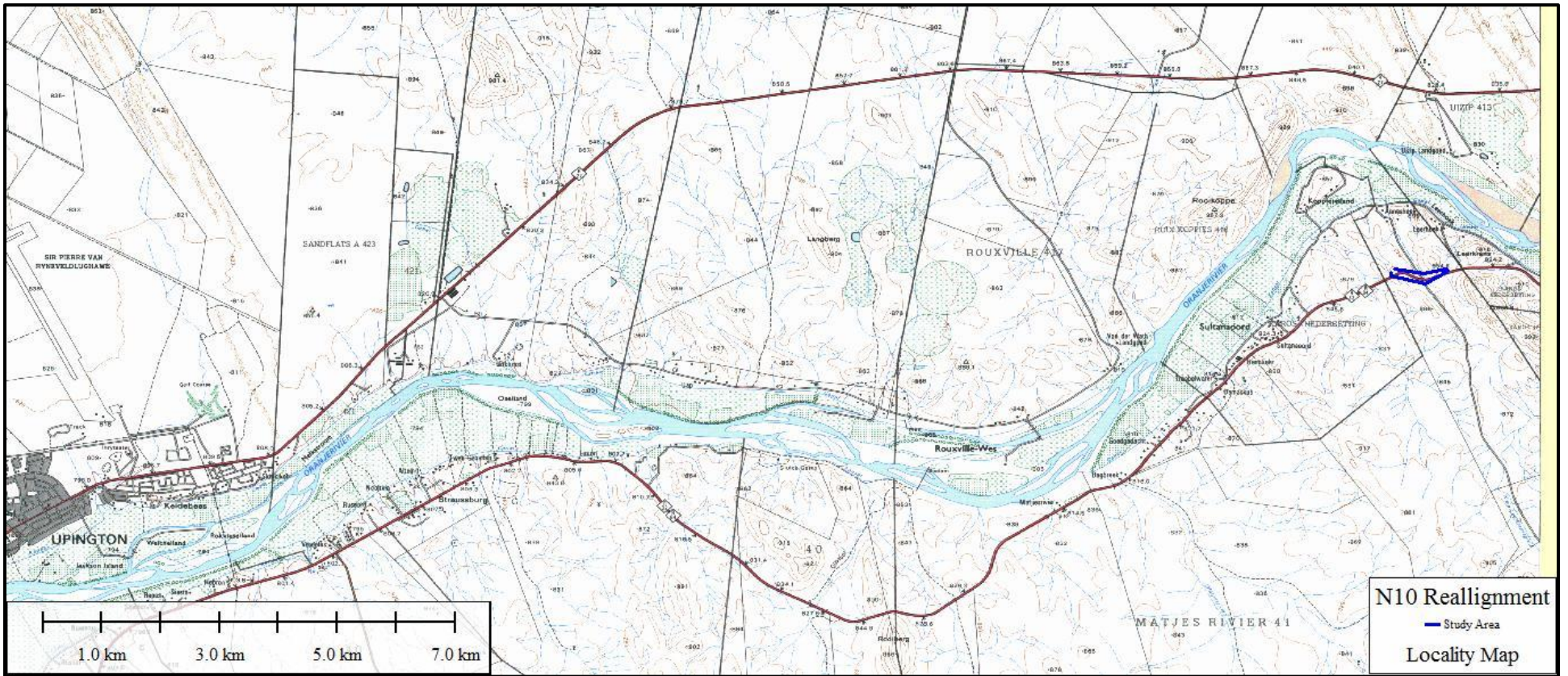


Figure 1: The locality of the proposed N10 reallignment project

2. APPROACH AND METHODOLOGY

The aim of the study is to cover archaeological databases to compile a background of the archaeology that can be expected in the study area followed by field verification; this was accomplished by means of the following phases.

2.1 Phase 1 - Desktop Study

The first phase comprised a scoping study, scanning existing records for archaeological sites, historical sites, graves, architecture (structures older than 60 years) of the area (van der Walt 2013). The following approach was followed for the compilation of the scoping report.

2.1.1 Literature Search

Utilising published reports relevant to the area. The aim of this is to extract data and information on the area in question.

2.1.2 Information Collection

SAHRIS was consulted to collect data from previously conducted CRM projects in the region to provide a comprehensive account of the history of the study area.

2.1.3 Consultation

No public consultation was done by the author as this was done independently as part of the EIA.

2.1.4 Google Earth and Mapping Survey

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located.

2.1.5 Genealogical Society of South Africa

The database of the Genealogical Society was consulted to collect data on any known graves in the area.

2.2 Phase 2 - Physical Surveying

Due to the nature of cultural remains, the majority of which occurs below surface, a field survey of the study area was conducted over a period of 1 day. The study area was surveyed by means of vehicle and extensive surveys on foot on the 5th of March 2015. The survey was aimed at covering the proposed impact area. Track logs of the areas covered were taken (Figure 2). Any changes or deviations of the road will have to be assessed separately.

3 NATURE OF THE DEVELOPMENT

The proposed project entails the straightening of the N10 to eliminate dangerous curves and the addition of on-ramping and off-ramping lanes to facilitate access to the Ilanga CSP site. The overarching objective for the N10 realignment planning process is to provide access to the Ilanga CSP facility and ensure safety for road users during construction and operation of the CSP facility, while minimising social and environmental impacts.

4. ARCHAEOLOGICAL AND CULTURAL HISTORIC BACKGROUND

4.1. The Stone Age

The Stone Age section is an extract from a report completed in the general study area, authored by Dr Marlize Lombard, Department of Anthropology and development studies, University of Johannesburg, commissioned by Heritage Contracts and Archaeological Consulting CC (2011).

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For Cultural Resources Management (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases. Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable. Such finer-grained identifications may help to highlight the importance of some archaeological sites in a specific region. Table 1 provides a brief overview of the Stone Age phases and sub-phases/industrial complexes of South Africa, based on our current knowledge. The information is aimed at assisting the identification of Stone Age occurrences in the field by providing the main associated characteristics, and it provides the broadly associated age estimates. Users of this document should, however, remember that the outlines are broad, and any field interpretations can only be considered preliminary observations until further research is conducted.

4.1.1 The Later Stone Age

4.1.1.1. Hunters-with-livestock/herders

The region is well-known as one that produced the largest sample (n = 56) of prehistoric skeletons in South Africa (Morris 1995). Excavated in 1936, known as the 'Kakamas Skeletons', and currently housed in the National Museum in Bloemfontein, they are considered the 'type' specimens of Khoi morphology (1992). Grave locations can be expected along the Gariiep (perhaps up to 35 km from its shore), and on the Gariiep Islands between Upington and the Augrabies Falls. They are often marked with stone burial cairns, dug into the alluvial soil or into degraded bedrock above the alluvial margin. Graves can be isolated or grouped in small clusters, sometimes containing up to eight graves (Morris 1995).

Burial cairns can be elaborately formed, some with upright stones in their centres, but they are often disturbed. Cairns from near the Gariiep Islands are often characterised by their high conical shapes, and the grave shafts filled with stones. Those closer to Augrabies Falls, however, are low and rounded with ashes in the grave shaft (Dreyer & Meiring 1937; Morris 1984). The placing of specularite or red ochre over the body was common, but other grave goods are rare (Morris 1995).

Where dating was possible, most of the skeletons were dated to the last 200 years-or-so, but association with archaeological material from up to about 1200 years old is possible. The grave sites show parallels to those of recent Khoi populations (Morris 1995).

Apart from the grave locations, archaeological sites of this period in the region have been further divided into Swartkop and Doornfontein sites. Doornfontein sites are mostly confined to permanent water sources. The assemblages contain a consistently large complement of thin-walled, grit-tempered, well-fired ceramics with thickened bases, lugs, bosses, spouts, and decorated necks or rims. Lithics are often produced on quartz, and dominated by coarse irregular flakes with a small or absent retouched component (Beaumont et al. 1995; Lombard & Parsons 2008; Parsons 2008). Late occurrences contain coarser potsherds with some grass temper, a higher number of iron or copper objects, and large ostrich eggshell beads. These assemblages are mostly associated with the Khoi (Beaumont et al. 1995).

Post-Wilton

Swartkop sites can be almost contemporaneous with, or older than, the Doornfontein sites. They are usually characterised by many blades/bladelets and backed blades. Coarse undecorated potsherds, often with grass temper, and iron objects are rare. These sites are remarkably common throughout the region. They usually occur on pan or stream-bed margins, near springs, bedrock depressions containing seasonal water, hollows on dunes, and on the flanks or crests of koppies (Beaumont et al. 1995; Parsons 2008). Some of these sites are also associated with stone features, such as ovals or circles that may represent the bases of huts, windbreaks or hunter's hides (Jacobson 2005; Lombard & Parsons 2008; Parsons

2004). These sites are linked to the historic /Xam communities of the area who usually followed a hunter-gatherer lifeway (Deacon 1986, 1988; Beaumont et al. 1995).

Wilton

These assemblages are distinguished by a significant incidence of cryptocrystalline silicates (mainly chalcedony) and contain many formal tools such as small scrapers, backed blades and bladelets. A regional variation of the Wilton in the area is often referred to as the Springbokoog Industry (Beaumont et al. 1995).

Oakhurst

A few heavily patinated Later Stone Age clusters, that include large scrapers, may represent Oakhurst-type aggregates (Beaumont et al. 1995).

4.1.2. The Middle Stone Age

Previous collections of stone tools in the region include artefacts with advanced prepared cores, blades and convergent flakes or points. Most of the scatters associated with the Middle Stone Age have a 'fresh' or un-abraded appearance. They appear to be mostly associated with the post-Howiesons Poort (MSA 3) or MSA 1 sub-phases (Beaumont et al. 1995).

Substantial Middle Stone Age sites seem uncommon. However, where archaeological sites were excavated, such as Zoovoorbij 458, a Middle Stone Age assemblage was excavated beneath Later Stone Age deposits (Smith 1995). This shows that, although not always visible on the surface, the landscape was inhabited during this phase. The large flake component of the lower units of Zoovoorbij Cave has Levallois-type preparation on the striking platforms, reinforcing their Middle Stone Age context.

4.1.3. The Earlier Stone Age

Stone artefacts associated with this phase, based on their morphology, seem moderately to heavily weathered. Scatters may include long blades, cores (mainly on dolerite), and a low incidence of formal tools such as handaxes and cleavers. Clusters with distinct Acheulean characteristics have been recorded in the area (Beaumont et al. 1995).

5. HERITAGE SITE SIGNIFICANCE AND MITIGATION MEASURES

The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed power line the local extent of its impact necessitates a representative sample and special attention was given to the proposed tower positions. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface.

This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance:

- » The unique nature of a site;
- » The integrity of the archaeological/cultural heritage deposits;
- » The wider historic, archaeological and geographic context of the site;
- » The location of the site in relation to other similar sites or features;
- » The depth of the archaeological deposit (when it can be determined/is known);
- » The preservation condition of the sites;
- » Potential to answer present research questions.

Furthermore, The National Heritage Resources Act (Act No 25 of 1999, Sec 3) distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

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

5.1. Field Rating of Sites

Site significance classification standards prescribed by SAHRA (2006), and approved by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 8 of this report.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP.A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

5.2 Impact Rating of Assessment

The criteria below are used to establish the impact rating of a site. as provided by the client:

- » The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- » The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- » The **duration**, wherein it will be indicated whether:
 - * the lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
 - * the lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
 - * medium-term (5-15 years), assigned a score of 3;
 - * long term (> 15 years), assigned a score of 4; or
 - * permanent, assigned a score of 5;
- » The **magnitude**, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- » The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- » The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- » the **status**, which will be described as either positive, negative or neutral.
- » the degree to which the impact can be reversed.
- » the degree to which the impact may cause irreplaceable loss of resources.

the *degree* to which the impact can be mitigated.

The **significance** is calculated by combining the criteria in the following formula:

$$S=(E+D+M)P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- » < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- » 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » > 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

6. -DESCRIPTION OF SITES

This report deals with the area impacted on by the proposed straightening of the N10 and the addition of on-ramping and off-ramping lanes to facilitate access to the Ilanga CSP site. The general area was covered in previous HIA's by Johnny van Schalkwyk (2011), Stefan Gaigher (2012) and Van der Walt (2014). These studies provides a good understanding of the local archaeology in the area and sites recorded consisted of cemeteries, Stone Age sites associated with depressions that contain seasonal water and a stream bed margin, historical material (porcelain etc.) and ruins younger than 60 years.

The area of that will be impacted on by the proposed project measures approximately 2ha and is mostly located in the road reserve of the existing alignment of the N10. The study area is extensively disturbed by construction activities and box cuts in this area during the construction of the N10 and no heritage sites were recorded during the survey. No raw material suitable for stone tool manufacture occurs in this area or seasonal water sources that would have attracted human occupation. The Orange River is located approximately 2km directly north of the area and would have been more preferable during prehistoric times. No standing structures occur in the study area and no graves were recorded.

6.1. Google Earth Image

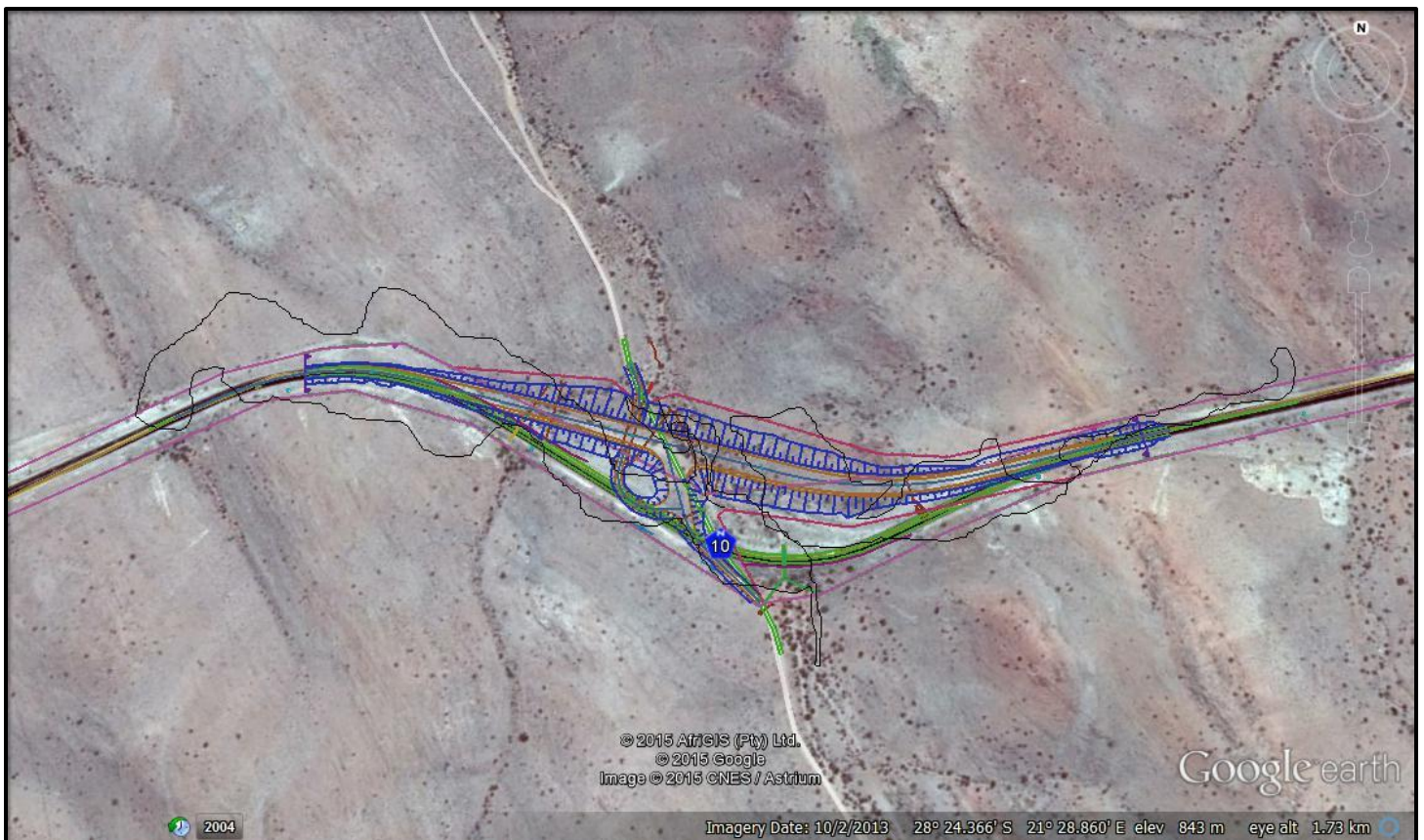


Figure 2: Site development layout and track logs of areas covered in black



Figure 3. Study area viewed from the West.



Figure 4. Environment in the northern portion.



Figure 5. Eastern section of the study area.



Figure 6: North western section of the study area.

7. Potential Impact

7.1. Pre-Construction phase:

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of road infrastructure needed for the construction phase. These activities can have a negative and irreversible impact on all of the recorded heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

7.2. Construction Phase

During this phase the impacts and effects are similar in nature but more extensive than the pre-construction phase. These activities can have a negative and irreversible impact on all of the recorded heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

7.3. Operation Phase:

No impact is envisaged for heritage resources during this phase.

Impact evaluation of the proposed project on heritage resources

<i>Nature: Pre Construction and Construction activities can have a negative impact on heritage resources. Please refer to section 8 for recommendations.</i>		
	Without mitigation	With mitigation
<i>Extent</i>	Local (2)	Local (1)
<i>Duration</i>	Permanent (5)	Permanent (5)
<i>Magnitude</i>	Low (3)	Low (2)
<i>Probability</i>	Not Probable (1)	Not Probable (1)
<i>Significance</i>	Low (10)	Low (9)
<i>Status (positive or negative)</i>	Negative	Negative
<i>Reversibility</i>	Not reversible	Not reversible
<i>Irreplaceable loss of resources?</i>	Yes	Yes
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i> No mitigation required.		
<i>Cumulative impacts:</i> Archaeological and cultural sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.		
<i>Residual Impacts:</i>		
N.A		

8. CONCLUSIONS AND RECOMMENDATIONS

This report deals with the area impacted on by the proposed straightening of the N10 and the addition of on-ramping and off-ramping lanes to facilitate access to the approved Ilanga CSP site. The general area was covered in previous HIA's by van Schalkwyk (2011), Gaigher (2012) and Van der Walt (2014). These studies provides a good understanding of the local archaeology in the area and sites recorded consisted of cemeteries, Stone Age sites associated with depressions that contain seasonal water and a stream bed margin, historical material (porcelain etc.) and ruins younger than 60 years.

The area that will be impacted on by the proposed project measures approximately 2ha and is mostly located in the road reserve of the existing alignment of the N10. The study area is extensively disturbed by construction activities and box cuts in this area, during the construction of the N10 and no heritage sites were recorded during the survey. No raw material suitable for stone tool manufacture occurs in this area or seasonal water sources that would have attracted human occupation. The Orange River is located approximately 2km directly north of the area and would have been more preferable during prehistoric times. No standing buildings or any graves were recorded.

No cultural landscape elements were noted and visual impacts to scenic routes and sense of place are also considered to be low as the study area is located next to the existing National N10 road. A visual impact assessment was also commissioned for the project, facilitated by the client and no further mitigation is recommended for this aspect from a heritage point of view.

Due to the subsurface nature of archaeological material and unmarked graves the possibility of the occurrence of unmarked or informal graves and subsurface finds cannot be excluded. If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find producers is discussed below.

Chance finds procedure

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on mine operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

If the recommendations as made in section 8 of this report are adhered to (subject to approval from SAHRA) there is from an archaeological point of view no reason why the proposed project should not proceed.

9. PROJECT TEAM

Jaco van der Walt, Project Manager and Archaeologist

10. STATEMENT OF COMPETENCY

I (Jaco van der Walt) am a member of ASAPA (no 159), and accredited in the following fields of the CRM Section of the association: Iron Age Archaeology, Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation. This accreditation is also valid for/acknowledged by SAHRA and AMAFA.

I have been involved in research and contract work in South Africa, Botswana, Zimbabwe, Mozambique, DRC and Tanzania; having conducted more than 400 AIAs since 2000.

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