PGS
HERITAGE & GRAVE
RELOCATION CONSULTANTS

MATATIELE ROAD REHABILITATION PROJECT

PROPOSED REHABILITATION OF NATIONAL ROUTE R56 SECTION 8, BETWEEN MATATIELE AND THE KWAZULU-NATAL BORDER, WITHIN THE MATATIELE LOCAL MUNICIPALITY, IN THE ALFRED NZO DISTRICT MUNICIPALITY, EASTERN CAPE PROVINCE

Heritage Impact Assessment Report

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Declaration of Independence

The report has been compiled by PGS Heritage (Pty) Ltd, an appointed Heritage Specialist for Gibb (Pty) Ltd. The views stipulated in this report are purely objective and no other interests are displayed during the decision making processes discussed in the Heritage Impact Assessment.

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Report Title	Heritage Impact Assessment for the proposed rehabilitation of National Route R56 Section 8 between Matatiele and the KwaZulu-Natal Border within the Matatiele Local Municipality in the Alfred Nzo District Municipality, Eastern Cape Province		
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Input by Specialists:

- **Dr Maria van der Ryst** was commissioned as Stone Age specialist to provide inputs on the identified Stone Age sites and provide an assessment of these sites and outline whether any mitigation measures would be required. Her assessment and recommendations of these Stone Age sites are included in this report. Please note that due to temporal and budgetary constraints, Dr. Van der Ryst did not assess the sites in the field but based here assessments and recommendations on detailed qualitative descriptions and photographs provided by the author.

- **Dr Gideon Groenewald** was commissioned as Palaeontologist to carry out a Palaeontological Desktop Study of the proposed development. This desktop study is attached under Appendix A and its observations and findings are discussed in the report.

As indicated in the table below, this Heritage Impact Assessment report was compiled in accordance with the NEMA Appendix 6 requirements for specialist reports.

NEMA REGS (2014) - APPENDIX 6	RELEVANT PAGES AND SECTIONS
Details of the specialist who prepared the report.	Pages i, ii, iii, 1 & 2. Also Appendix B
The expertise of that person to compile a specialist report including a curriculum vitae.	Pages i, ii, iii, 1 & 2. Also Appendix B
A declaration that the person is independent in a form as may be specified by the competent authority.	Page ii
An indication of the scope of, and the purpose for which, the report was prepared.	Page 2 (Section 1.1)
The date and season of the site investigation and the relevance of the season to the outcome of the assessment.	Page 12 (Section 3.1)
A description of the methodology adopted in preparing the report or carrying out the specialised process.	Page 12 (Section 3.1)
The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure.	Sections 4 to 7
An identification of any areas to be avoided, including buffers.	Section 8
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers.	Section 7
A description of any assumptions made and any uncertainties or gaps in knowledge.	Page 2 & 3 (Section 1.3)
A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment.	Section 10. Please note that no development alternatives were assessed.
Any mitigation measures for inclusion in the EMPr.	Section 9
Any conditions for inclusion in the environmental authorization.	Sections 9 and 10
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Sections 9 and 10
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and	Executive Summary and Section 10
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	
A description of any consultation process that was undertaken during the course of carrying out the study	Not applicable. A public consultation process was handled as part of the EIA and EMP process.
A summary and copies if any comments that were received during any consultation process	Not applicable. To date no comments regarding heritage resources that require input from a specialist have been raised.
Any other information requested by the competent authority.	Not applicable.

EXECUTIVE SUMMARY

PGS Heritage (PGS) was appointed by Gibb (Pty) Ltd to undertake a Heritage Impact Assessment (HIA), which forms part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for the proposed rehabilitation of National Route R56 Section 8 between Matatiele and the KwaZulu-Natal boundary within the Matatiele Local Municipality, Alfred Nzo District Municipality, Eastern Cape Province.

An archival and historical desktop study was undertaken to provide a historic framework for the project area and also to provide historical information on identified heritage sites. This was followed by fieldwork, which resulted in the identification of ten sites (see table below). The sites include eight Stone Age sites and two historical sites.

During the survey several instances were recorded where previous cuttings made during the construction of the existing road exposed subsurface stone tools. The observed lithics occur in secondary, disturbed contexts. The highest relative densities established for the occurrence of lithic elements are 7 lithics per/m2 in two instances whereas the densities of the others are much lower. Whereas these generally do not reflect significant or representative assemblages, further investigation is required to establish whether these occurrences indeed form part of more extensive Stone Age living floors and/or instances where stone knapping was carried out to produce tools required during subsistence excursions. The majority of the localities have a MSA signature with only one instance where ESA tool types were recorded. The prepared core/Levallois core technique was used to produce the characteristic MSA triangular flake and blade blanks noted during the survey. Such cores were prepared by systematic shaping through flake removals off suitable pieces of raw material to produce pre-determined shaped blanks which were subsequently used in the manufacture of different formal tool types.

The two historic sites comprise an old bridge that was built in 1951 as well as an historic dwelling and church located on the western end of the town of Cedarville.

In the table below a summary will be provided of the identified heritage sites including their site numbers, brief description, recorded GPS coordinates, the heritage significance of each site as well as an outline of the required mitigation measures.

Summarised List of Heritage Sites Identified during the Fieldwork

Site	Description	Significance	Coordinates	Mitigation
Mat 1	MSA Site	Medium / Local (GP. B)	S 30.35246 E 28.84519	Small-scale archaeological excavation work which adheres to standard practice and method.
Mat 2	MSA Site	Low / Local (GP.C)	S 30.37465 E 28.91934	No mitigation is required
Mat 3	Old Bridge	Medium / Local (GP. B)	S 30.37638 E 28.92292	Recording of layout plan and one facade of bridge using measured drawings coupled with photographic recording followed by destruction permit application process.
Mat 4	MSA Site	Medium / Local (GP. B)	S 30.38558 E 28.95260	Small-scale archaeological excavation work which adheres to standard practice and method.
Mat 5	ESA Site	Medium / Local (GP. B)	S 30.44292 E 29.19011	Archaeological monitoring of site during construction phase. Should any significant deposits or artefacts be exposed, small-scale archaeological excavation work will be required which adheres to standard practice and method.
Mat 6	MSA Site	Low / Local (GP. C)	S 30.44201 E 29.18297	No mitigation is required
Mat 7	MSA Site	Low/ Local (GP.C)	S 30.44173 E 29.18128	No mitigation is required
Mat 8	Historic Structures	Medium / Local (GP. B)	S 30.386072 E 29.034557	Developer must be made aware of the presence of these buildings and both must be avoided. However, should any disturbance to any of the two structures be envisaged, further mitigation such as recording and disturbance / destruction permits would be required.
Mat 9	MSA Site	Low / Local (GP. C)	S 30.38759 E 28.96879	No mitigation is required.
Mat 10	MSA Site	Medium / Local (GP. B)	S 30.38100 E 28.93091	Archaeological monitoring of site during construction phase. Should any significant deposits or artefacts be

				exposed, small-scale archaeological excavation work will be required which adheres to standard practice and method.

The impact of the proposed development on the located heritage sites was assessed, and it was established that the proposed development will have a High Impact Risk on Mat 3, a Moderate Impact Risk on Mat 1, Mat 4, Mat 5, Mat 8 and Mat 10 and a Low Impact Risk on Mat 2, Mat 6, Mat 7 and Mat 9. As a result, mitigation measures would be required for sites Mat 1, Mat 3, Mat 4, Mat 5, Mat 8 and Mat 10.

The required mitigation measures are summarised in the table above. Mitigation measures are also outlined in Section 9 of this report.

Apart from the site-specific mitigation measures, the following general mitigation measure would also be required:

- Due to the subterranean nature of many of the lithic sites identified during the fieldwork, it is recommended that an archaeological watching brief be implemented during the course of the construction work on the project. Such a watching brief would assist in the early identification of any Stone Age (or other archaeological) sites which may be located in a subterranean position within the proposed development footprint. Should any such significant lithic or other archaeological material be identified, a site assessment will be made by the archaeologist conducting the watching and brief, and if required mitigation measures will also be outlined. Any such mitigation measures and recommendations will also have to be adhered to.
- The above-mentioned archaeological watching brief should comprise a field visit by a suitably qualified and experienced archaeologist once every two weeks during the duration of the construction.

On the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development to be halted.

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1 INTRODUCTION

PGS Heritage (PGS) was appointed by Gibb (Pty) Ltd to undertake a Heritage Impact Assessment (HIA), which forms part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP), for the proposed rehabilitation of National Route R56 Section 8 between Matatiele and the KwaZulu-Natal Border within the Matatiele Local Municipality in the Alfred Nzo District Municipality, Eastern Cape Province.

1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed development area. The Heritage Impact Assessment aims to inform the EIA in the development of a comprehensive EMPr to assist the developer in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

1.2 Specialist Qualifications

This Heritage Impact Assessment was compiled by PGS Heritage (PGS).

The staff at PGS have a combined experience of nearly 70 years in the heritage consulting industry and have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where the staff have the relevant expertise and experience to undertake that work competently.

Polke Birkholtz, the Project Manager and author, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited with the CRM Section of ASAPA. He has 18 years experience in the heritage assessment and management field and holds a B.A. (cum laude) from the University of Pretoria specialising in Archaeology, Anthropology and History as well as a B.A. (Hons.) in Archaeology (cum laude) from the same institution.

Jennifer Kitto, co-author, has 16 years experience in the heritage sector, a large part of which involved working for a government department responsible for administering the National Heritage Resources Act, No 25 of 1999. She is therefore well-versed in the legislative requirements of heritage management. She holds a BA in Archaeology and Social Anthropology and a BA (Hons) in Social Anthropology.

Dr Maria van der Ryst acted in advisory capacity as specialist for the Stone Age. She has undertaken extensive and in-depth research at several Stone Age and rock art localities. She has also conducted several Phase 2 Archaeological Impact Assessments with a focus on the Iron Age and the Stone Age and specialist studies on the Stone Age.

Dr Gideon Groenewald, the appointed Palaeontologist for this project, holds a PhD in Geology from the Nelson Mandela Metropolitan University (1996) and the National Diploma in Nature Conservation from the University of South Africa (1990). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeoecological aspects. He has extensive experience in the locating of fossil material in the Karoo Supergroup and has more than 20 years of experience in locating, collecting and curating fossils, including exploration field trips in search of new localities in the southern, western, eastern and north-eastern parts of the country. His publication record includes multiple articles in internationally recognized journals. Dr Groenewald is accredited by the Palaeontological Society of Southern Africa (society member for 25 years).

1.3 Assumptions and Limitations

The following assumptions and limitations to this study exist:

- Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

- Such observed or located heritage features and/or objects may not be disturbed or removed in any way, until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

- It should be noted that the fieldwork comprised an intensive vehicle survey of the road which enabled the identification of all visible heritage features (i.e. graves, buildings, bridges, structures) as well as areas with a high potential of containing heritage sites, including road cuttings and rivers. All such areas with the potential of containing heritage sites were assessed on foot and the road cuttings in particular proved to be good places for the identification of Stone Age sites.

- Dr Maria van der Ryst was appointed to provide her inputs on the identified Stone Age sites. Due to temporal and budgetary constraints, she provided her assessments and recommendations from detailed descriptions and photographs of the identified Stone Age sites provided by the authors.

1.4 Legislative Context

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

i. National Environmental Management Act (NEMA) Act 107 of 1998
ii. National Heritage Resources Act (NHRA) Act 25 of 1999
iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
iv. Development Facilitation Act (DFA) Act 67 of 1995

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

GNR 982 (Government Gazette 38282, 14 December 2014) promulgated under the National Environmental Management Act (NEMA) Act 107 of 1998

a. Basic Assessment Report(BAR) – Regulations 19 and 23
b. Environmental Scoping Report (ESR) – Regulation 21
c. Environmental Impacts Assessment (EIA) – Regulation 23
d. Environmental Management Programme (EMPr) – Regulations 19 and 23

ii. National Heritage Resources Act (NHRA) Act 25 of 1999
a. Protection of Heritage Resources – Sections 34 to 36; and
b. Heritage Resources Management – Section 38

iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
a. Section 39(3)

iv. Development Facilitation Act (DFA) Act 67 of 1995
a. The GNR.1 of 7 January 2000: Regulations and rules in terms of the Development Facilitation Act, 1995. Section 31.

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that "*no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority*…". The NEMA (No 107 of 1998) states that an integrated EMP should (23:2 (b)) "…*identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage*". In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and ASAPA have also been incorporated to ensure that a comprehensive and legally compatible HIA report is compiled.

1.5 Terminology and Abbreviations

Archaeological resources

This includes:

i. material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
ii. rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human

agency and which is older than 100 years, including any area within 10m of such representation;

iii. wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;

iv. features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;

ii. carrying out any works on or over or under a place;

iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;

iv. constructing or putting up for display signs or boards;

v. any change to the natural or existing condition or topography of land; and

vi. any removal or destruction of trees, or removal of vegetation or topsoil

Early Stone Age

The archaeology of the Stone Age, dating to between roughly 700 000 and 2 500 000 years ago.

Fossil

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage

That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources

This means any place or object of cultural significance

Holocene

The most recent geological time period, which commenced 10 000 years ago.

Later Stone Age

The archaeology of the last 20 000 years, associated with fully modern people.

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's, associated with ironworking and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age, dating to between 20 000-300 000 years ago, associated with early modern humans.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Table 1: Abbreviations

Abbreviations	*Description*
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Later Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
SAHRA	South African Heritage Resources Agency

Refer to **Appendix B** for further discussion on heritage management and legislative matters.

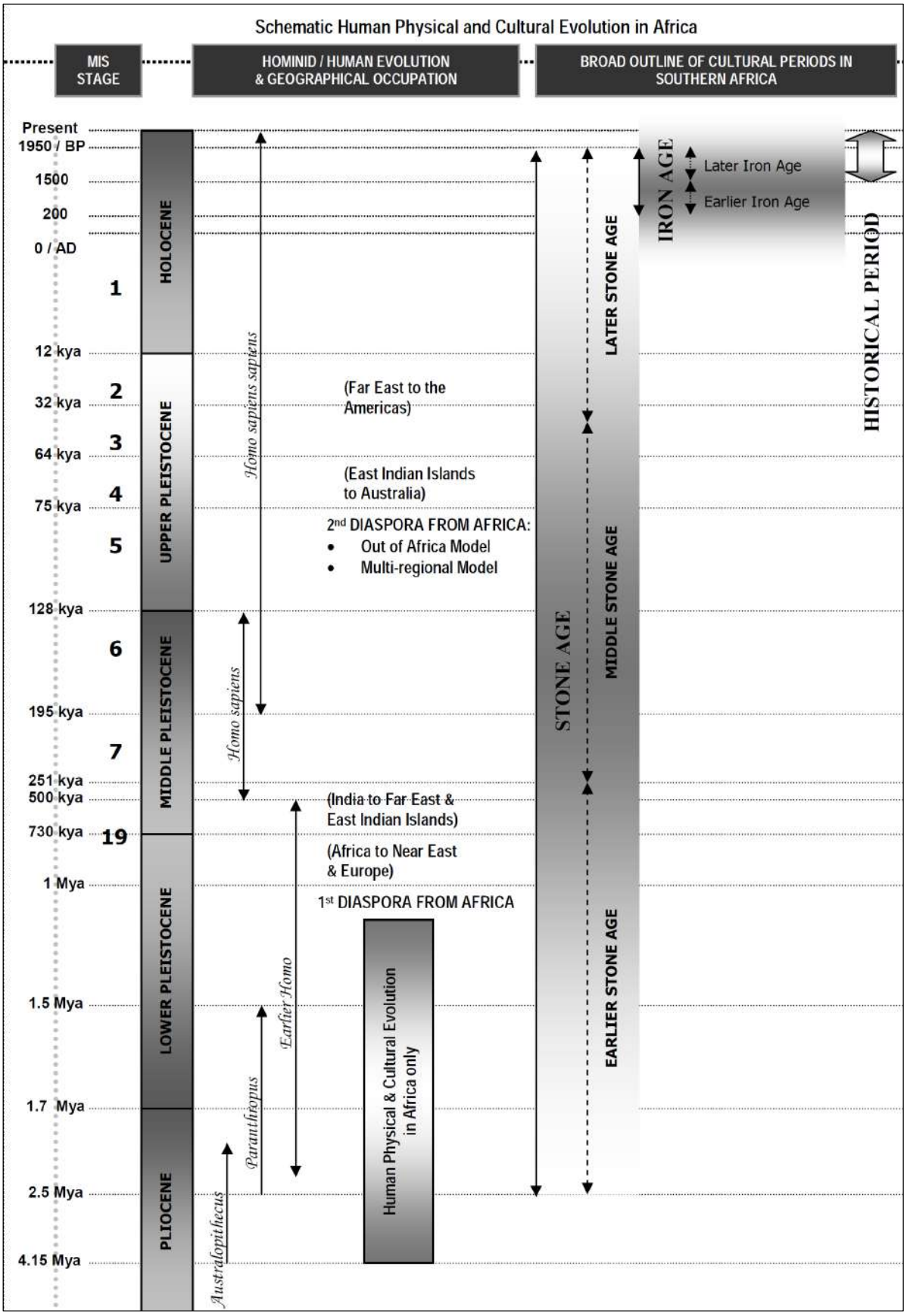

Figure 1–Human and Cultural Time line in Africa (Morris, 2008)

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Site Location and Description

The project is situated along National Route R56 Section 8, which is located between Matatiele at Km 130.15 and the KwaZulu-Natal Border at Km 168.71 within the Alfred Nzo District Municipality and the Matatiele Local Municipality in the Eastern Cape Province. The project starts at Km 130.15, which is located east of Matatiele at the intersection of East Street and the R56.

Table 2: Aspects relating to the Location and Description of the Study Area

Coordinates	West end S 30° 20' 54.73" E 28° 49' 33.28"	East end S 30° 26' 41.59" E 29° 12' 2.25"
Location	The study area is located within the road reserve of Section 8 of National Route R56. The Section 8 of the R56 road is located between Matatiele at Km 130.15 and the KwaZulu-Natal Border at Km 168.71 within the Alfred Nzo District Municipality and the Matatiele Local Municipality, in the Eastern Cape. The project starts at Km 130.15, which is located east of Matatiele at the intersection of East Street and the R56. It is important to note that the proposed rehabilitation project starts immediately east (i.e. outside) of Matatiele and similarly excludes the town of Cedarville.	
Study Area Extent	The study area comprised the road reserve, which is roughly 7 m wide on each side of the existing road. The length of the road to be rehabilitated is approximately 40 km.	
Description	The R56 traverses a scenic landscape characterised by both hills and level valleys. The vegetation of the surroundings of the study area can primarily be described as grassland, with some planted vegetation also present. A number of small streams and rivers intersect the road, the largest of which is the Umzimvubu River across which an extensive concrete bridge was built in 1968. In terms of the road reserve itself, it would appear that significant components of this strip of land on each side of the R56 had been disturbed during the construction of the original tar road. This disturbance includes road cuttings and earthmoving activities.	

Figure 2 – The study area within its regional landscape.

Figure 3 – The study area within its immediate surroundings.

2.2 Technical Project Description

The project comprises the proposed rehabilitation and reseal of National Route R56 Section 8 which is located between Matatiele at Km 130.15 and the KwaZulu-Natal provincial boundary at Km 168.71 within the Matatiele Local Municipality, in the Alfred Nzo District Municipality, province of Eastern Cape. The project starts at Km 130.15, which is located east of Matatiele at the intersection of East Street and the R56.

A number of development alternatives were considered, namely:

1. Adhere to the original PSP scope of works, which suggest that half of the R56 be resealed/overlaid and the other half rehabilitated.
2. Rehabilitate the existing R56 using the in situ material as part of the new pavement by adding 3.0m shoulders with a centreline offset of approximately 6.0-7.0m resulting in a two-way traffic scenario.
3. Rehabilitate the existing R56 using the in situ material as part of the new pavement by adding 1.5m shoulders with a centreline offset of approximately 3.0m resulting in a Stop-Go scenario.
4. Reconstructing the R56 on a new off-set alignment (while traffic continues to use the existing R56).
5. The use of two borrow pits.

The decision was made to proceed with Option 4, which is an upgrade by offsetting the existing centreline by 7m to the right hand side (when driving from Matatiele towards the provincial boundary) and constructing half of the new road while traffic is using the existing road. After this has been completed the traffic will be transferred to the newly constructed half road (7.6m) while the old road is being upgraded to the same width as the other half. This will require widening of existing structures as well as constructing new bridges and demolishing old ones. However, the bridge over the Umzimvubu River at Km 155 will not be affected in any way.

3 ASSESSMENT METHODOLOGY

3.1 Methodology for Assessing Heritage Site Significance

This report was compiled by PGS Heritage for the proposed rehabilitation of National Route R56 Section 8 between Matatiele and the KwaZulu-Natal Border within the Alfred Nzo District Municipality and the Matatiele Local Municipality in the province of Eastern Cape. The applicable maps, tables and figures are included as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review: A basic historical and archaeological background study was undertaken using available literature.

Step II – Physical Survey: A physical survey was conducted by vehicle and on foot along the route of the proposed project area by a qualified heritage specialist/archaeologist and a field assistant. The fieldwork was undertaken from Monday, 11 April 2016 to Wednesday, 13 April 2016 and was aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

Step III – The final step involved the recording and documentation of relevant heritage resources, as well as the assessment of resources in terms of the heritage impact assessment criteria and report writing, as well as mapping and recommendations.

The significance of heritage sites was based on five main criteria:

- site integrity (i.e. primary vs. secondary context),
- amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
    - Low - <10/50m2
    - Medium - 10-50/50m2
    - High - >50/50m2
- uniqueness and
- potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

A - No further action necessary;
B - Mapping of the site and controlled sampling required;
C - No-go or relocate development position
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site

Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report (see **Table 2**).

Table 3: Site significance classification standards as prescribed by SAHRA

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	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	-	High/Medium	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium	Recording before destruction
Generally Protected C (GP.C)	-	Low	Destruction

3.2 Methodology for Impact Assessment

In order to ensure uniformity, a standard impact assessment methodology has been utilised so that a wide range of impacts can be compared. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology was used to describe impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors, along with the equivalent quantitative rating scale for each of the aforementioned criteria, is given in **Table** 4Table **3**.

Table 4: Quantitative rating and equivalent descriptors for the impact assessment criteria

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	*Isolated site/ proposed corridor*	Incidental
2	LOW	*Study area*	Short-term
3	MODERATE	*Local*	Medium-term
4	HIGH	*Regional / Provincial*	Long-term
5	VERY HIGH	*Global / National*	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

Significance Assessment

The Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude, but does not always clearly define these, since their importance in the rating scale is very relative. For example, the magnitude (i.e. the size) of an area affected by atmospheric pollution may be extremely large (1000 km^2) but the significance of this effect is

dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed, the impact would be VERY HIGH if only 100 ha of that grassland type were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in **Table** 5Table **4** below.

Table 5: Description of the significance rating scale

RATING		DESCRIPTION
5	VERY HIGH	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	HIGH	Impact is of substantial order within the bounds of impacts which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	MODERATE	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	LOW	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	VERY LOW	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity is needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	NO IMPACT	There is no impact at all - not even a very low impact on a party or system.

Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table** 6Table **5**.

Table 6: Description of the Spatial significance rating scale

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of possible impacts, and will be felt at a regional scale (District Municipality to Provincial Level). The impact will affect an area up to 50 km from the proposed site.
3	Local	The impact will affect an area up to 5 km from the proposed site.
2	Study Area	The impact will affect an area not exceeding the boundary of the study area.
1	Isolated Sites / proposed site	The impact will affect an area no bigger than the site.

Temporal/Duration Scale

In order to accurately describe the impact, it is necessary to understand the duration and persistence of an impact in the environment. The temporal or duration scale is rated according to criteria set out in **Table** 7Table **6**.

Table 7: Description of the temporal rating scale

RATING		DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium-term	The environmental impact identified will operate for the duration of life of the project.
4	Long-term	The environmental impact identified will operate beyond the life of operation of the project.
5	Permanent	The environmental impact will be permanent.

Degree of Probability

The probability or likelihood of an impact occurring will be described as shown in **Table** 8Table **7** below.

Table 8: Description of the degree of probability of an impact occurring

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very likely
5	It's going to happen / has occurred

Degree of Certainty

As with all studies, it is not possible to be 100% certain of all facts, and for this reason a standard "degree of certainty" scale is used, as discussed in **Table** 9Table **8**. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.

Table 9: Description of the degree of certainty rating scale

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact, or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.

Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner, in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment

criteria. Thus the total value of the impact is described as the function of significance, spatial and temporal scale, as described below:

$$\textbf{\textit{Impact Risk}} = \frac{(\text{SIGNIFICANCE} + \textit{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

An example of how this rating scale is applied is shown below:

Table 10: Example of Rating Scale

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	LOW	Local	Medium Term	Could Happen	**LOW**
Impact on heritage sites	2	3	3	3	1.6

Note: The significance, spatial and temporal scales are added to give a total of 8, which is divided by 3 to give a criterion rating of 2.67. The probability (3) is divided by 5 to give a probability rating of 0.6. The criteria rating of 2.67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to 5 classes as described in the table below.

Table 11: Impact Risk Classes

RATING	IMPACT CLASS	DESCRIPTION
0.1 – 1.0	1	Very Low
1.1 – 2.0	2	Low
2.1 – 3.0	3	Moderate
3.1 – 4.0	4	High
4.1 – 5.0	5	Very High

Therefore, with reference to the example used for air quality above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.

4 CURRENT STATUS QUO

4.1 Site Description

The project is situated along National Route R56 Section 8, which is located between Matatiele at Km 130.15 and the KwaZulu-Natal provincial boundary at Km 168.71 within the Alfred Nzo District Municipality and the Matatiele Local Municipality in the Eastern Cape Province. The project starts at Km 130.15, which is located east of Matatiele at the intersection of East Street and the R56.

The study area is located within the road reserve of Section 8 of National Route R56. As a result, the study area is roughly 7 m wide on each side of the existing road whereas the length of the road to be rehabilitated is approximately 40 km. It is important to note that the proposed rehabilitation project starts immediately east (i.e. outside) of Matatiele and similarly excludes the town of Cedarville.

The R56 traverses a scenic landscape characterised by both hills and level valleys. The vegetation of the surroundings of the study area can primarily be described as grassland, with some planted vegetation also present. A number of small streams and rivers intersect the road, the largest of which is the Umzimvubu River across which an extensive concrete bridge was built in 1968.

In terms of the road reserve itself, it would appear that significant components of this strip of land on each side of the R56 had been disturbed during the construction of the original tar road. This disturbance includes road cuttings and earthmoving activities.

Figure 4 – General view of a section of the study area a short distance east of Matatiele. The view is toward the east.

Figure 5 – General view of a section of the study area between Matatiele and Cedarville. The view is toward the east.

Figure 6 – General view of a section of the bridge over the Umzimvubu River with Cedarville located on the horizon to the right. The view is toward the west.

Figure 7 – General view of a section of the study area between Cedarville and the KwaZulu-Natal boundary. The view is toward the east.

5 DESKTOP STUDY FINDINGS

5.1 Historical Overview of the Study Area and Surroundings

DATE	DESCRIPTION
The Study Area and Surroundings during the Stone Age	
2.5 million to 250 000 years ago	The Early Stone Age (ESA) dates between 2.5 million to 250 000 years BP, and refers to the earliest occurrences of stone tool manufacturing associated with Homo Sapiens' predecessors. Technological industries associated with the ESA are the Oldowan (2.0 - 1.7 mya), characterised by large stone tools with minimal retouch, large flakes and hammer stones, followed by the Acheulean (1.5mya-250 000 mya), characterised by large cutting tools such as hand axes and cleavers (Mitchell, 2002). The Early Stone Age occupation of the Eastern Cape dates to a minimum age of 300,000 B.P. predating the known origins of modern human lineages (Fisher et. al. 2013). Three Early Stone Age sites are recorded in the KwaZulu-Natal Museum heritage database in the greater Matatiele area. Stone tools in the form of hand-axes and cleavers have been recorded at these sites (Prins & Hall, 2012). An Early Stone Age site was also identified during the fieldwork within the present study area (see Mat 5).
250 000 to 20 000 years ago	The Middle Stone Age (MSA) dates to between 250 000 to 20 000 years BP. MSA dates of around 250 000 BP originate from sites such as Leopards Kopje in Zambia, while the late Pleistocene (125 000 BP) yields a number of important dated sites associated with modern humans (Deacon & Deacon, 1999). The MSA is characterised by flake and blade industries, the first use of grindstones, wood and bone artefacts, personal ornaments, use of red ochre, circular hearths and a hunting and gathering lifestyle. Middle Stone Age sites in the Drakensberg region occur in both Lesotho and South Africa. Sites occur as surface scatters as well as deep cave deposits. Prime archaeological deposits, however, occur in the Eastern Cape and Free State sections of the region. Archaeological excavations at Strathalan Cave in the Eastern Cape Province indicate that the Middle Stone Age persisted in the Cape Drakensberg, to the immediate south west of the study area, until around 22 000 years ago (Mitchell 2002). Eleven Middle Stone Age sites, all surface scatters, are known from the greater Matatiele area (Prins & Hall, 2012). Apart from the 11 MSA sites mentioned by Prins & Hall (2012), seven of the eight Stone Age sites identified during the fieldwork of the present study area are also Middle Stone Age sites.
40 000 years ago - to the historic past	The Later Stone Age (LSA) of the study area is significant and characterised by a highly significant density of rock art sites. This phase in the area's history is associated with San hunter gatherers. According to Opperman

	(1999), the earliest indications of the San in the general surroundings of the study area date to around 29 000 BP (Opperman, 1999), with their descendants living in the area up to the 1900's. A large number of LSA sites occur in the greater Matatiele area. Most of these are San rock art sites but four LSA surface scatters have also been recorded in the past (Prins & Hall, 2012). Patricia Vinnicombe recorded a large number of sites around the Matatiele area in the 1960s and 1970s. A high density of rock art was documented in the Tsoelike River valley in the Qacha's Nek district, an area which, according to oral traditions (Jolly 2006: Kruger 2011), was occupied by San people into the twentieth century. These rock art images are composed of very finely drawn polychromatic images with narrow lines, small dots and gradated colouring. The images usually depict eland, rhebok, or humans in various states, activities, or postures. Occasionally, lions, other carnivores, other antelope, baboons, cattle, horses, horseback riders, snakes, and extraordinary creatures with human and animal features (known as therianthropes) are depicted (Kruger, 2011). In spite of this previous research, the Matatiele region was identified as under-researched in a doctoral study. The Matatiele Archaeology and Rock Art (MARA, Rock Art Research Institute, University of the Witwatersrand) project was therefore established to redress the imbalance in the history of research in this region of the former apartheid homeland of the 'Transkei', and aiming to further investigate the phenomenon of raiding cultures in the nineteenth century within the context of the heritage of all the regional cultures. Initial fieldwork led to the discovery of more than fifteen rock art shelters in previously unexplored valleys in the Maloti-Drakensberg around Matatiele. Some of these rock art sites contributed to the hypothesis that, in the nineteenth century, this region was home to raiding bands of mixed cultures (including San) who made paintings of their religious beliefs in the sandstone shelters. The first systematic archaeological survey has yielded over 200 sites, 168 containing rock art. Analysis of finds from excavated shelters is on-going, and has produced material (chiefly lithics, macrobotanicals, and metals) pertaining especially to the period of forager/farmer interaction (Matatiele Archaeology and Rock Art Project, 2014). The site database of Matatiele Archaeology and Rock Art was accessed for the purposes of the present project. With the assistance of Dr. Sam Challis and James Pugin, both of MARA, it was revealed that the closest of the MARA database rock art sites to the present study area, is located on the farm Blakeley some 394m south of the present study area. MARA 118 (also known as Compensation 2 and Blakeley 187-1) comprises a rock shelter with faded rock paintings. The painted motifs from this site include monochrome eland, monochrome human figures with sticks, bovids as well as a white and orange horse (MARA, 2016).
The Study Area and Surroundings during the Iron Age	
AD 1100 - AD 1800s	During colonial times, the surroundings of the study area came to be known as Nomansland, suggesting that no people lived there. However, as indicated by Lewis-Williams (2003:17) the "…*territory was in fact occupied*

	by San, Mpondomise, Bhaca, Mpondo and Sotho…". While the San had already been living in this area during the Later Stone Age, the arrival of Bantu-speaking agro-pastoralists such as the Mpondomise, Bhaca, Mpondo and Sotho in this general area occurred during what is known as the Iron Age. This arrival of the first Iron Age immigrants into the surroundings of the study area initiated a period of contact between the San hunter gatherers and the Nguni and Sotho agro-pastoralists. It is known that San groups in these sections of the north-eastern Cape interacted closely with Bantu-speaking groups in a number of ways, including trade, intermarriage, stock herding and raiding (i.e. raiding partnerships as well as raiding of one another) (Henry 2011). San groups entered into alliances with Bantu-speaking groups and gave them a share of the stock they had raided in return for a certain extent of protection from their chiefs. With increasing pressure on San groups in the north-eastern Cape during the nineteenth century, such alliances often resulted in Bantu-speakers joining San groups for periods of time (Henry 2011). During the more recent past, between 1837 and 1990, detailed historical information has shown that the three major San groups were the Thola, another group united under Mdwebo, and a group under Nqabayo (Mallen, 2009). Almost 2 000 Iron Age sites have been identified in the Maloti Drakensberg region, and most occur at altitudes lower than the 1 800 m contour. Stone walled Iron Age settlements have been recorded in the greater Matatiele area and were most probably built by southern Sotho immigrants who settled here after 1870. However, none are known from the project area (Prins & Hall, 2012). This said, in the wider surroundings, excavations at Strathalan Cave A, close to Maclear, have yielded the remains of sorghum grain and calabash fragments on the living floor, indicating that Nguni farmers were in the area before the 1800's (Opperman, 1996). Early Nguni people arrived in the region between 1100 and 1300 AD (Feely 1986, cited in Fischer et al. 2013; Feely 1987) and as suggested above, by the beginning of the nineteenth century the main Cape Nguni-speaking agro-pastoralist groups inhabiting the Eastern Cape were the Mpondo, Mpondomise and Thembu (Soga 1930, cited in Henry 2011). By the 1820s, the period of unrest and conflict known as the Mfecane, had significantly affected the region, causing disruption amongst these groups (Derricourt 1974, cited in Henry 2011). The effects of the Mfecane were wide-reaching and people were displaced as far as the Zambezi River (Mitchell 2002). No Iron Age sites are known from the study area.
The Study Area and Surroundings during the Historical Period	
23 November 1844 - 1850	Sir Peregrine Maitland, the Governor of the Cape Colony, signed an agreement with King Faku of the AmaPondo in 1844. The terms of the agreement were that the Cape Colony would forego any claims to the territory located between the Mtata and Mzimkulu rivers and undertook to protect the AmaPondo from any 'unjust and unprovoked aggressions'. In

	return, the Pondo king agreed to return any cattle found in this area which had been stolen from within the Cape Colony. However, while King Faku's influence and rule stretched as far as the St. John's (Umzimvubu River), the land to the east of this river and all the way to the Mzimkulu River, was occupied "…*by an assortment of refugees and smaller African tribes who had no allegiance to Faku*" (Du Bois, 2015). According to Dischl (1982) and others, the AmaPondo king ceded his authority over the colder upper sections of the area originally agreed upon in 1844. As a result, these surroundings of the present study area became known as Nomansland.
1850s - 1860s	Nomansland increasingly became a safe haven for the lawless and turbulent, where "…*armed and mounted gangs…traded gunpowder and firearms with other lawless bands*…" (Du Bois, 2015:58). As a result, the Cape Colony offered this land to the Griqua of Adam Kok III, who had recently lost their land to the Boer Republic of the Orange Free State.
Early 1860s	In 1861 and early 1862 a group of 2 000 Griqua under the leadership of Adam Kok III departed on an epic trek from Philippolis, in the present day Free State, to Nomansland. The followers of Kok embarked on this journey of more than 340 km "…*in order to safeguard Griqua autonomy and independence, to minimise internal conflict and to seek access to land which could guarantee his followers a relatively wealthy existence*" (Waldman, 2007:77). The Griqua built a massive laager on the southern slopes of a mountain which they named Mount Currie. They stayed in proximity to this mountain until 1871, when a new town was established on the banks of the Mzintlava River. The Griqua named this town Kokstad, in honour of their leader Adam Kok III (Erasmus, 2004). During the 1860s, the Griqua kingdom was divided into three sections, namely Umzimkulu (east), Kokstad (centre) and Matatiele (west). At Matatiele, Adam Kok III appointed Peter O' Reilly as his magistrate. This appointment laid the foundation for the town of Matatiele (http://catholickokstad.mariannhillmedia.org/matatiele-holy-trinity). The Griqua immigrants found an abundance of natural resources, but also extreme weather conditions. While the trek from Philippolis made some previously effluent people desperately poor in Nomansland, others became successful farmers. All Griqua men older than 18 years were provided with free farms, and a period of relative prosperity ensued. However, this lasted for only a few years until 1874, when the former Nomansland was annexed by the Cape Colonial authorities and renamed Griqualand East. A further setback to the Griqua occurred in 1875, when their beloved leader Adam Kok III died. As a result of these setbacks, a number of Griqua farmers sold their farms and by 1880 only half of the farms in Griqualand East was still in Griqua hands (Waldam, 2007).
1866	After losing his land to the Boer Republic of the Orange Free State, Makwai, the uncle of King Moshoeshoe of the Basotho, was given permission by Adam Kok III to settle near Matatiele. Haber (1975) suggests that the settlement of Makwai was located near the present-day Matatiele Golf

	Course, on the western end of Matatiele.
1874	The area known as Nomansland was annexed by the Cape Colonial authorities in 1874 and was renamed Griqualand East. The annexation of Nomansland had a profound impact on the landscape and its people. For the Griqua, it meant a massive setback, a loss of confidence in the area's future for them as an independent community as well as the start of the process which resulted in many of the Griqua, if not all, becoming landless farm workers. While Matatiele already existed during the 1860s when used by O'Reilly as his magistracy, the events of 1874 pushed the development of Matatiele as a town rapidly forward, and by 1904 municipal status was attained (Raper, 2004). The annexation of Griqualand East by the Cape Colony also stimulated the arrival of white people to the area, including government officials, farmers and soldiers.
30 December 1875	On this day Adam Kok III died after an accident while riding on a cart. His death significantly worsened the position and outlook of the Griqua living in Griqualand East (Besten, 2006).
1875 - 1880	After the annexation of Griqualand East, the Cape Government started removing restrictions on foreigners acquiring farms in Griqualand East. While this measure added to the pressure on the remaining Griqua landowners, the situation worsened after the death of Adam Kok III. Increasing numbers of whites started acquiring farms in Griqualand East (Besten, 2006). In 1876 a three-man survey team arrived in Griqualand East to undertake a general survey of the farms from within this area. The survey team consisted of F. Watermeyer, St. v. Erskine and C.C. Henkel (Besten, 2006). It is worth noting that the original survey diagrams for all the farms relevant to the study area were compiled in 1880. It can be assumed that these diagrams were the result of the survey by Watermeyer, Erskine and Henkel.
1880 - 1881	The Basotho Gun War (1880 – 1881) was a significant conflict within the study area and its surroundings and comprised an armed resistance by a section of the Basotho against British Imperial attempts to disarm them. The events of early October 1880 are especially significant for the present study area. On Saturday, 2 October 1880 a meeting between the Chief Magistrate of Griqualand East, Charles Brownlee, and the Basotho under Makwai and Sekaki took place in Matatiele. Concluding that the Basotho were going to rebel, Brownlee ordered all the white residents and traders of Matatiele and surroundings to depart for Kokstad, using the crossing over the Umzimvubu River at Cedarville Drift as a congregation point. Under the protection of the Basotho of Ramhlagwana, Brownlee and his entourage departed from Matatiele on Monday, 4 October 1880. A strong force of Basotho rebels followed Brownlee all the way to the Umzimvubu River (Macquarrie, 1958).

	Before reaching the river, Brownslee's force was attacked by the Basotho. Shots were exchanged, though without any losses to either side. Brownlee's party managed to reach the river safely and found a number of white farmers and traders with their families at Cedarville Drift. A defensive wagon laager was established which had the hotel on one side, its outbuilding on the other and the wagons in-between. Leaving the position in charge of Mr. Wylde, the Magistrate of Kokstad, Brownlee departed for Kokstad (Brownlee, 1887). The withdrawal of Brownlee from Matatiele to Cedarville Drift and Kokstad would have taken him through at least sections of the present study area. Similarly, the events associated with Cedarville Drift would have taken place in close proximity to sections of the present study area located near Cedarville and the Umzimvubu River.
1880 - 1899	The last decades of the nineteenth century saw the establishment of a permanent white farming and administrative community in Griqualand East on the one hand, and the increasing marginalisation of the Griqua and Bantu-speaking residents of the area on the other. The establishment of the first exclusively white farming associations in Griqualand East during 1882 provides an early indication for the increasing numbers of permanent white farmers in this area. As their position strengthened, farms were developed and expanded (Besten, 2006). The Cedarville area is renowned to this day as one of the best dairy farming areas in South Africa (Erasmus, 2004). These events in Griqualand East did not always go unchallenged, with rebellions breaking out in 1878 and 1897. These rebellions proved unsuccessful (Erasmus, 2004).
1899-1902	At the outbreak of the South African War in 1899, the Cape Colony prepared to stay out of the conflict. However, the need to be prepared for aggression from the Boer forces also required them to plan adequately for the eventuality of war. The uncertainty of the republican intention towards the Transkei Territories, as well as the Eastern Cape regions, pushed the British Army to form a number of white and black units. From December 1899, black volunteer units were developed and consisted predominantly of Bhaca, Thembu and Mfengu. Eventually, over 4 000 men were taken up in the Thembuland Field Force and the East Griqualand Field Force. As the war progressed, the fear of invasion died down and by March 1900 most of these volunteer forces in Griqualand East were disbanded. This said, smaller contingents were revived from time to time as various scares and plots of invasion were uncovered (Nasson, 1999). In 1901, the Matatiele District Defence Force was raised. It appears to have been known as the Matatiele European Reserve as well, and was a special service mounted corps raised at Matatiele, Griqualand East. Their role was the protection of that part of the country against raids by the Boer forces then operating in the northern part of the Cape Colony, especially given the absence of the East Griqualand Mounted Rifles on war service elsewhere. The unit was raised and commanded by Major Charles Tod, other officers

	being Captains W. Harley and D. Johnstone, with Lieutenants A. McDonald and Dan B. Menne. The European strength of the corps was about 100, with headquarters at Matatiele. An African contingent of about 50 men under Captain H. Davis, formed part of the unit. They were known by the nick-name of "The Matatiele Lambs," an appellation not always descriptive of the regiment. The Matatiele District Defence Force operated in East Griqualand, parts of the Barkly East district of the Cape and parts of Basutoland and the corps performed valuable services. It was disbanded in 1902 upon the cessation of hostilities, their services being no longer needed with the regular regiment of Griqualand East having returned. Despite numerous brushes with the enemy during its war, the corps sustained no casualties during its short existence (www.angloboerwar.com). Another unit raised in Griqualand East during the war, was the Griqua Light Horse. Raised in the Mount Currie, Kokstad and Matatiele Districts, the Griqua Light Horse comprised 300 men. All the unit's non-commissioned officers were Griquas, and included the Regimental-Sergeant Major Thomas Kok, a relative of Adam Kok III (www.angloboerwar.com).
1912	Cedarville was formally founded in 1912 when a village management board was established (Raper 2004). It was named after the Cedarberg Mountains, which guards the southern approach to the Umzimvubu river valley (Erasmus 2014). As shown elsewhere, the Cedarville Drift over the Umzimvubu River had long been known as a hotel.
1924	The railway branch line from Franklin via Cedarville and Swartberg was completed in 1924 (Erasmus, 2014).

5.2 Archaeological Background to the Stone Age of the Study Area and Surroundings

This section was written by Dr. Maria van der Ryst.

The South African Stone Age sequence that comprises the Earlier Stone Age (ESA) (>1.5 million years ago to around 250 000 years ago), the Middle Stone Age (MSA) (>20 000 to <300 000 years ago) and the Later Stone Age (LSA) (<40 000 years ago up to the historical period) is based on the concept of techno- or industrial complexes. Each is formed by a group of industries where the assemblages share attributes or common traditions (Lombard et al 2012).

A desktop study on the literature on the Eastern Cape and KwaZulu-Natal, a perusal of several museum collections and the SAHRIS database confirm an enduring prehistoric presence of

humans in this general region. Mitchell (1998, 2002) published a catalogue on early Stone Age collections from South Africa that were made by pioneers. The artefacts are now in the repository of the British Museum (Mitchell 1998, 2002; www.britishmuseum.org). This is a starting point in sourcing the distribution of Stone Age lithics that have often been accrued from small and little known localities.

Eastern Cape

The Stone Age collections at the Albany Museum are particularly important. While the former reflects a strong presence of Stone Age people over most of the Eastern Cape, the archaeology of the Eastern Cape remains under-researched in view of the level of Stone Age occupation in this region (Binneman 2001, 2005; Binneman et al 2010; AGES 2013) In-depth studies on the Stone Age of the study area are lacking. Derricourt (1977) in his review of the Stone Age of the then Transkei and Ciskei, noted that some of the undoubted ESA localities, mostly with handaxes as the diagnostic stone tool, have been recorded at places such as Matatiele, Mount Frere, Mount Ayliff and various others.

At the Strathalan locality, close to Maclear, three adjacent caves have been utilized from the MSA to the LSA as demonstrated by the stratified living floors. Preserved botanical food waste and the remains of wooden implements were uncovered on one of the excavated occupation levels that date to 300 years ago (Opperman 1999). He also excavated shelters where excellent preservation of botanical and faunal remains is associated with terminal MSA assemblages (Opperman & Heydenrych 1990; Opperman 1992, 1996a, 1996b, 1999). Two occupation floors in Strathalan Cave B have been dated to approximately 29 000 and 26 000 years ago respectively. Berry Malan (1949) noted MSA lithics at Glen Grey and Matatiele. MSA lithics were recorded between Molteno and Sterkstroom during more recent heritage surveys (Binneman et al 2010, 2011).

During a recent AIA, a small shelter, containing vandalized paintings and graffiti, was identified near Mount Fletcher southwest of Matatiele (Binneman and Reichert 2015). The Eastern Cape and KZN regions are particularly rich in fine-line polychrome rock art. Most of the rock art of southern Africa dates to the LSA with only a few instances that have been firmly dated to the MSA. Caves and rock shelters were extensively occupied during the LSA and frequently contain paintings along the walls (Booth 2012a). Late rock art expressions are also present.

KwaZulu-Natal

Anderson (2002) refers briefly to a MSA quarry and stone knapping area close to Matatiele in a report on an archaeological survey for the Harry Gwala housing development project but provides no detail.

Rock Art

A vast number of studies on in particular rock art and hunter-gatherer archaeology have been undertaken in this region (e.g. Vinnicombe 1976; Cable et al 1980; Cable 1984; Mazel 1989; Kaplan 1990). Patricia Vinnicombe's (1976) seminal publication on the rock art of the region resulted in a focus on rock art studies. The Rock Art Research Institute (RARI) of the University of the Witwatersrand is also active in recording the rock art of the region (Booth 2012). Vinnicombe recorded several rock art localities in the vicinity of Matatiele – a rock art locality is known within a previous Nature Reserve in a shelter with an archaeological deposit (Anderson 2002). The nearby Tsoelike River valley in Qacha's Nek district of Lesotho contains a high density of rock art. These localities and adjacent areas in KZN were occupied by hunting and gathering groups well into the nineteenth century (Jolly 2003; Kruger 2011). The publications of Orpen (1874), Dornan (1909) and Arbousset and Daumas (1968) contain important contemporary observations on San groups.

5.3 Previous Heritage Impact Assessment Reports from the Study Area and Surroundings

PGS Heritage has completed two previous heritage impact assessments in proximity to the present study area.

Fourie, W. 2014. Proposed Establishment of a New Water Supply Scheme for Ward 15 of the Matatiele Local Municipality, Alfred Nzo District Municipality in the Eastern Cape Province. For Terreco Environmental cc.

This study area was located south-west of the town of Matatiele. During the study, a total of eight heritage sites were identified within, or in close proximity to, the proposed alignment of

the pipeline routes or reservoir sites. Seven of these identified sites were historic/recent homesteads and stone walled enclosures whereas one grave or burial site was also identified.

Fourie, W. 2014. Proposed Establishment of a New Water Supply Scheme For Wards 5 and 7 of the Matatiele Local Municipality, Alfred Nzo District Municipality in the Eastern Cape Province. For Terreco Environmental cc.

During the heritage study a total of 11 heritage sites were identified within, or in close proximity to, the proposed alignment of the pipeline routes or reservoir sites. Ten of these identified sites were cemeteries or grave sites. The other identified heritage site is a historic/recent homestead with a stone walled kraal.

In addition, a search of the SAHRA database -SAHRIS - (http://www.sahra.org.za/sahris) which holds copies of Heritage Impact assessment reports and Archaeological Impact Assessment reports for the whole of South Africa, revealed six other previous reports for this area. The findings of these reports are summarised below.

Anderson G. 2013. Heritage Survey of the Phase 2 of the DR08017 from Mt. Frere to Cedarville, Eastern Cape. For Coastal Environmental Services.

The author was contracted to undertake a heritage survey of the proposed maintenance and upgrades of Phase 2 of the DR08017 from Mount Frere to Cedarville joining the N2, Eastern Cape. The study area is located to the west of Cedarville, towards the N2. The study revealed that the majority of the study area had been heavily ploughed for several decades, and thus any potential stone walling and/or settlements would been destroyed. No heritage sites were observed nor were any modern graves identified within 30 m of the road reserve.

Prins, F. and Hall, S. 2012. Cultural Heritage Impact Assessment of the Proposed Umzimvubu Ward 14 Water Supply Scheme, Alfred Nzo District Municipality.

This report identified four modern grave sites directly adjacent to the proposed pipeline route. The study area was located in Ward 14, south of Matatiele, traveling towards Mount Frere.

Anderson, G. 2002. Archaeological Survey of the Harry Gwala Housing Development, Matatiele. For Udidi and KwaZulu-Natal Heritage.

Several sites were noted in the areas adjacent to, or nearby, the development project. The first of these is a Middle Stone Age quarry and stone knapping area, which was deemed to be of low archaeological significance with no further mitigation required. Furthermore, Patricia Vinnicombe had previously recorded many rock art sites in the immediate vicinity of Matatiele. One of these was located roughly one kilometre from the housing development, in a disused nature reserve. This site is a shelter with an archaeological deposit and several rock art images.

Prins, F.E. and Hall, S.M. 2012. Cultural Heritage Impact Assessment of the Proposed Fobane Water Supply Scheme, Alfred Nzo District Municipality.

This study identified 20 modern grave sites directly adjacent to the proposed pipeline route. Eight San rock art sites were also located in the near vicinity of the proposed pipeline route.

***Kruger, N. 2011. Archaeological Impact Assessment (AIA) of Demarcated Surface Areas at Mafube, Matatiele Municipality, Eastern Cape Province*.**

No archaeological sites were identified during this study.

Schalkwyk, L. and Wahl, B. 2011. Heritage Impact Assessment of Borrow Pits in Alfred Nzo District Municipality, Eastern Cape Province, South Africa.

This study, limited to the impact of quarrying some 30 km west of Matatiele, located a large number of graves including a group of 16 stone-packed graves.

A number of other cases were identified from the SAHRIS database, including a large number of permit applications for excavations of rock shelters as part of the work of MARA (Matatiele Archaeology and Rock Art) (e.g. SAHRIS case numbers 1608, 1618 & 1620). One of these applications, was for a rescue permit requesting permission from SAHRA to remove a human skeleton for preservation, conservation and analysis. The human remains were eroding out of deposit at the Vleidraai 1 rock shelter, (SAHRIS case number 342).

5.4 Archaeological Site Database on SAHRIS

The South African Heritage Resource Information System (SAHRIS) contains a database of archaeological sites which appears to have been derived from the Archaeological Database of the Natal Museum in Pietermaritzburg. While this database does not contain any coordinates, farm names and directions to each site are provided and these allow for the approximate placement of each site on the landscape.

A number of the sites from the relevant 3028BD sheet listed on SAHRIS have access restrictions on them. This means that no information on these sites could be obtained from SAHRIS. However, of the sites which could be accessed, none were found to be located within the present study area. This said, and based on the available descriptions of their localities, the following two sites appear to be located in proximity to the present study area.

Site 3028BD 024

A large shallow scrape at an unknown distance south of the R56 exposed "…*a great many MSA flakes*…" of which the following are kept at the Natal Museum: 10 blades, three side-scrapers, one chisel and two points. The site is located on the farm Blakeley (www.sahra.org.za).

While the exact distance between the R56 and the site is not presently known, the recommended archaeological watching brief would identify any aspects of this site located subterraneously within the study area.

Site 3028BD 025

The site comprises a number of lithics that were exposed by ploughing activities a short distance above (and south of) the R56 road on the farm Edendale. The locality where these lithics were observed is situated 200 yards east of the farmhouse at Edendale. These artefacts were identified as Fauresmith lithics and comprised two hand-axes, several blades and flakes as well as six block-cores with prepared platforms (www.sahra.org.za).

The recommended archaeological watching brief would identify any aspects of this site located subterraneously within the study area.

5.5 MARA Site Database

Dr Sam Challis and James Pugin of Matatiele Archaeology and Rock Art (MARA) were contacted with the aim of requesting site information from their database. The nearest rock art site in the MARA database to the R56 is known as MARA 118 (also known as Compensation 2 and Blakeley 187-1) and comprises a rock shelter with faded rock paintings. The painted motifs include monochrome eland, monochrome human figures with sticks, bovids as well as a white and orange horse (MARA, 2016).

The rock art site is located 394 m south of the R56 road, and as a result will not be impacted on by the proposed development.

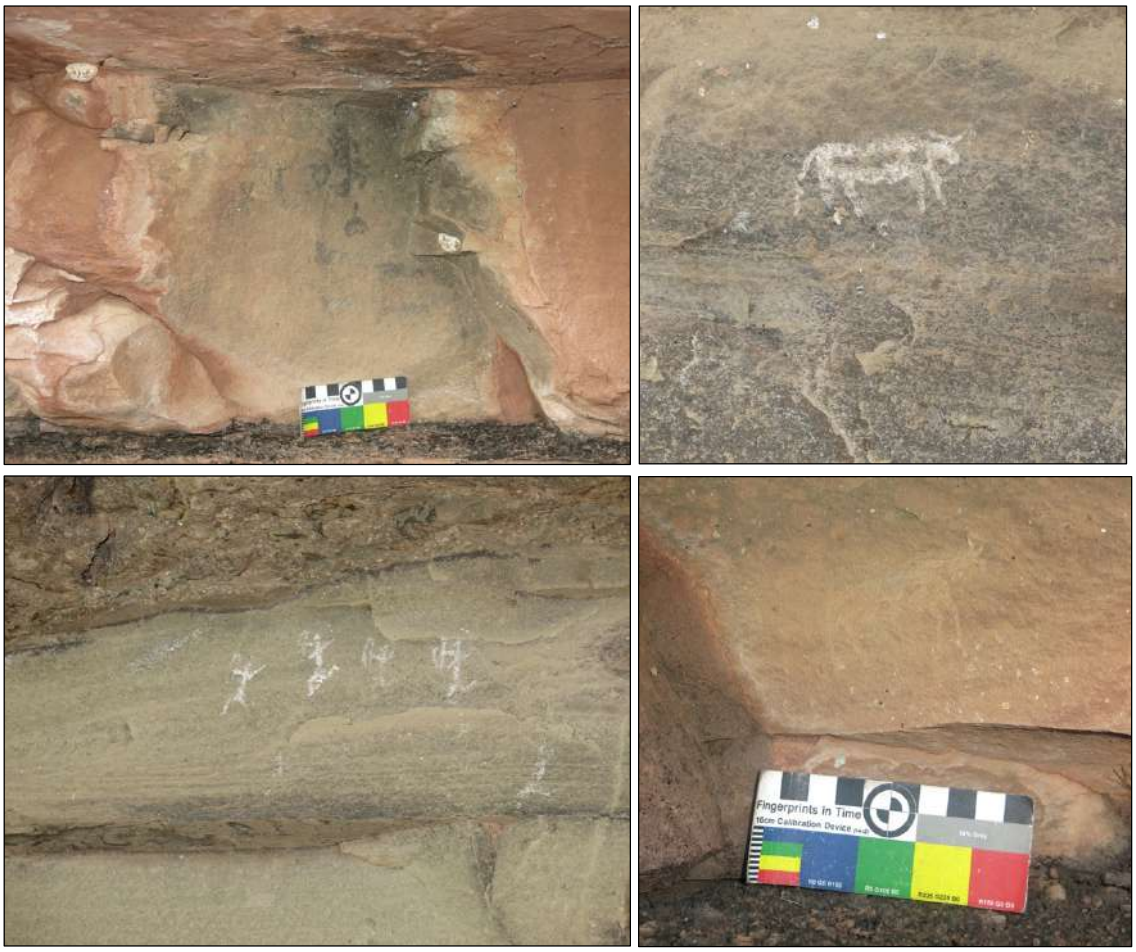

Figure 8 – Photographs depicting the rock art identified at site MARA 118 (Photographs supplied by Matatiele Archaeology and Rock Art).

6 PALAEONTOLOGICAL OVERVIEW AND FINDINGS

6.1 Geology of the Study Area

The study area is underlain by Triassic aged sandstone and red mudstone of the Tarkastad Subgroup (Trt) of the Beaufort Group, Jurassic aged Dolerite of the Karoo Supergroup and Tertiary aged Alluvium.

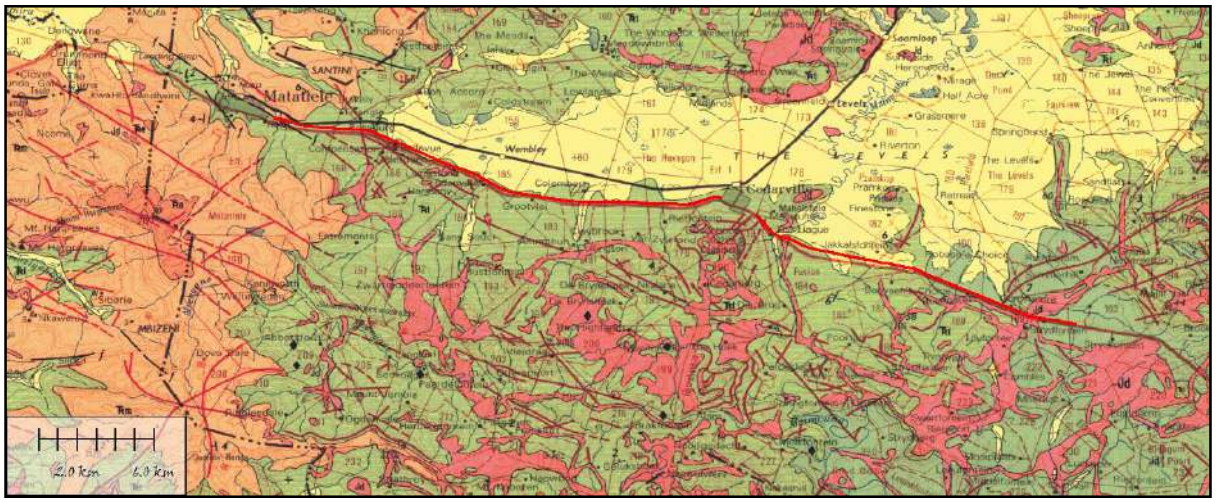

Figure 9 – Geology of the study area as depicted on the relevant geological map sheet. The study area is underlain by the Tarkastad Subgroup, Dolerite and Alluvium.

6.1.1 Karoo Supergroup

Beaufort Group, Tarkastad Subgroup (Trt)

The Tarkastad Subgroup consists largely of a lower, fine-grained sandstone known as the Katberg Formation and upper red coloured mudstone of the Burgersdorp Formation (Groenewald, 1996; Johnson et al, 2009).

Dolerite (Jd)

Dolerite is a mafic intrusive igneous rock and occurs as dykes or sills in the study area. The Jurassic aged dolerite in the study area is associated with the “koppies” or high-lying areas in the region as well as with rocky outcrops along river courses.

6.1.2 Tertiary to Recent Alluvium

The study area is known for the presence of Tertiary aged sediments that represent fluvial deposits along the present river courses and these sediments are terrestrial sediments, including diatomite (diatom deposits), spring deposits, pedocretes, calcareous tufa and other calcrete deposits, peats, soils and gravel that are very important in terms of our understanding of the Early and Late Pliocene period in this region in Southern Africa.

6.2 Palaeontology of the Study Area

6.2.1 Karoo Supergroup

Beaufort Group, Tarkastad Subgroup (Trt)

Katberg Formation

The Beaufort Group is very well known as a treasure house of Palaeontological Heritage in Southern Africa (Smith, 1990; Rubidge (ed) 1995; Groenewald, 1996; Hancox et al, 1997; MacRae, 1999; McCarthy and Rubidge, 2005; Rubidge, 2005; Botha et al, 2006; Van der Walt *et al*, 2010; Smith *et al* 2012, Gastaldo *et al*, 2015). The Tarkastad Subgroup is relatively thin in the study area (Groenewald, 1996) and the Lower Katberg Formation is still very under-studied in the Project Area although previous studies indicate that it is normally underlain by a very fossil rich red musdstone unit, known as the Palingkloof Member that is very well known as the *Lysrosaurus* Assemblage Zone (Ribudge et al 1995). The Katberg Formation is normally sandstone-rich or arenaceous, but in the study area several thin, highly fossiliferous red mudstones are knoe to occur in the hillside next to the R56 (Groenewald, 1996).

Towards the far west and south, new information (Van der Walt *et al*, 2010, Day *et al,* 2013; Viglietti *et al*, 2015, Rutherford *et al*, 2015, David Groenewald, Pers Comm, 2016) confirms very significant vertebrate and plant fossil remains. Plant fossils are mostly associated with *Glossopteris* Assemblages and are well-known from the Lower Beaufort Group (Groenewald, 1996, 2012, Bamford, 1999). Trace fossils, including very significant casts of vertebrate burrows have been described from the Adelaide Subgroup that underlies the Katberg Formation and

outcrops at the end of the proposed upgrade of the R56 (Groenewald, 1996, Modesto et al, 2010; David Groenewald, Pers Comm. 2016).

Burgersdorp Formation

The Burgersdorp Formation overlies the Katberg Formation and it is unlikely that this mudstone will be exposed during the upgrading of the road. It is however very highly likely that mudstone from this formation will form a very important part of the road material quarried for this upgrading from quarries associated with dolerite along the route R56 (Personal observation of the Author, 2013). This formation is very well-known for the presence of fossils of the *Cynognathus* Assemblage Zone and the recording of fossils from this part of the Karoo Basin will be highly significant. Plant fossils include mainly horsetail ferns whilst important trace fossils also include burrows of vertebrates such as Trirachodon (Groenewald, et al, 2001).

"The richness of fossil tetrapods from the Beaufort Group of South Africa has enabled biostratigraphic subdivision of this Permo-Triassic succession, with global applicability. Despite being the thickest of the seven biozones recognised, attempts at further subdivision of the Middle Permian Tapinocephalus Assemblage Zone (Abrahamskraal Formation) have not been successful, largely because the exact stratigraphic ranges of fossil taxa are unknown. This gap in knowledge has limited stratigraphic correlation of the Abrahamskraal Formation and hindered understanding of Middle Permian Karoo basin development. Currently, the lowermost Beaufort Group is split between an eastern and a western stratigraphic scheme and, because of poor outcrop and the relative paucity of fossils in the east, stratigraphic correlation between the two areas has been uncertain. Recent fossil discoveries of the parareptile *Eunotosaurus africanus* in the Eastern Cape and Free State provinces have extended its known geographic range in the east. An additional specimen from the lower Middleton Formation in the Eastern Cape has, for the first time, enabled the biostratigraphic correlation of this unit with the Poortjie Member of the Teekloof Formation in the west. These finds confirm the diachroneity of the boundary between the marine Ecca Group and the terrestrial Beaufort Group." (Day *et al*, 2013) which can be very difficult to follow in the study area due to intrusion of dolerite sills. The use of Palaeontology to confirm relative dating of sedimentary rocks in this part of the basin is therefore highly significant.

The Tarkastad Subgroup is relatively thin (100m) in the study area and fossil assemblages include but is not restricted to petrified wood, tetrapod faunas of the *Lystrosaurus* Assemblage Zone (dicynodonts, cynodonts, therocephalians, procolophonids, archosaurs etc.), including rich lacustrine biotas of amphibians, fish; trace fossils including vertebrate burrows, coprolites. The lower part of the Subgroup is known to overlie examples of diverse terrestrial and freshwater tetrapods of *Dicynodon* (now *Daptocephalus*) Assemblage Zones (amphibians, true reptiles, synapsids – especially therapsids), palaeoniscoid fish, freshwater bivalves, trace fossils (including tetrapod trackways), sparse to rich assemblages of vascular plants (Glossopteris Flora, including spectacular petrified logs) and insects. The sequence contains some of the richest Permo-Triassic tetrapod fauna from Pangaea/Gondwana, including trace fossils and casts of vertebrate burrows as well as plant fossils of the *Glossopteris* Assemblage (MacRae, 1999).

Dolerite (Jd)

Due to the igneous nature of dolerite, no fossils will be found in the rock units.

6.2.2 Tertiary to Recent Alluvium

Although no fossils have to date been recorded from the extensive alluvial and Tertiary to Recent aged valley fill in the study area exposure of these sediments can produce significant fossil remains. Examples include bones and teeth of mammals (e.g. proboscideans, rhinos, bovids, horses, micromammals, early Homo (Florisbad Man (Homo heidelbergensis)); Cornelian and Florisian Mammal Age faunas), reptiles, fish, freshwater molluscs, petrified wood, trace fossils (e.g. termitaria), rhizoliths, diatom floras. Fauna is generally sparse but locally very rich. Scattered records with many areas being poorly studied (e.g. from ancient drainage systems). Key examples include sites at Cornelia, Uitzoek, Erfkroon, Florisbad, Vlakkraal and several sites where Orange River Gravels are preserved, including a site close to the study area known as the Virginia Railway Cutting site, now referred to as the Matjhabeng Site (De Ruiter *et al*, 2010).

Careful observation can reveal similarly important fossils in the Matatiele region.

6.3 Palaeontological Sensitivity of the Study Area

The likely impact of the proposed development on local fossil heritage is determined on the basis of the palaeontological sensitivity of the rock units concerned and the nature and scale of the development itself, most notably the extent of fresh bedrock excavation envisaged. The different sensitivity classes used are shown below.

Table 12: Palaeontological Sensitivity Classes

PALAEONTOLOGICAL SIGNIFICANCE/VULNERABILITY OF ROCK UNITS	
The following colour scheme is proposed for the indication of palaeontological sensitivity classes. This classification of sensitivity is adapted from that of Almond et al (2008, 2009) (Groenewald etal.,2014).	
RED	Very High Palaeontological sensitivity/vulnerability. Development will most likely have a very significant impact on the Palaeontological Heritage of the region. Very high possibility that significant fossil assemblages will be present in all outcrops of the unit. Appointment of professional palaeontologist, desktop survey, phase I Palaeontological Impact Assessment (PIA) (field survey and recording of fossils) and phase II PIA (rescue of fossils during construction) as well as application for collection and destruction permit compulsory.
ORANGE	High Palaeontological sensitivity/vulnerability. High possibility that significant fossil assemblages will be present in most of the outcrop areas of the unit. Fossils most likely to occur in associated sediments or underlying units, for example in the areas underlain by Transvaal Supergroup dolomite where Cenozoic cave deposits are likely to occur. Appointment of professional palaeontologist, desktop survey and phase I Palaeontological Impact Assessment (field survey and collection of fossils) compulsory. Early application for collection permit recommended. Highly likely that a Phase II PIA will be applicable during the construction phase of projects.
GREEN	Moderate Palaeontological sensitivity/vulnerability. High possibility that fossils will be present in the outcrop areas of the unit or in associated sediments that underlie the unit. For example areas underlain by the Gordonia Formation or undifferentiated soils and alluvium. Fossils described in the literature are visible with the naked eye and development can have a significant impact on the Palaeontological Heritage of the area. Recording of fossils will contribute significantly to the present knowledge of the development of life in the geological record of the region. Appointment of a professional palaeontologist, desktop survey and phase I PIA (ground proofing of desktop survey) recommended.

BLUE	Low Palaeontological sensitivity/vulnerability. Low possibility that fossils that are described in the literature will be visible to the naked eye or be recognized as fossils by untrained persons. Fossils of for example small domal Stromatolites as well as micro-bacteria are associated with these rock units. Fossils of micro-bacteria are extremely important for our understanding of the development of Life, but are only visible under large magnification. Recording of the fossils will contribute significantly to the present knowledge and understanding of the development of Life in the region. Where geological units are allocated a blue colour of significance, and the geological unit is surrounded by highly significant geological units (red or orange coloured units), a palaeontologist must be appointed to do a desktop survey and to make professional recommendations on the impact of development on significant palaeontological finds that might occur in the unit that is allocated a blue colour. An example of this scenario will be where the scale of mapping on the 1:250 000 scale maps excludes small outcrops of highly significant sedimentary rock units occurring in larger alluvium deposits. Collection of a representative sample of potential fossiliferous material is recommended.
GREY	Very Low Palaeontological sensitivity/vulnerability. Very low possibility that significant fossils will be present in the bedrock of these geological units. The rock units are associated with intrusive igneous activities and no life would have been possible during implacement of the rocks. It is however essential to note that the geological units mapped out on the geological maps are invariably overlain by Cenozoic aged sediments that might contain significant fossil assemblages and archaeological material. Examples of significant finds occur in areas underlain by granite, just to the west of Hoedspruit in the Limpopo Province, where significant assemblages of fossils and clay-pot fragments are associated with large termite mounds. Where geological units are allocated a grey colour of significance, and the geological unit is surrounded by very high and highly significant geological units (red or orange coloured units), a palaeontologist must be appointed to do a desktop survey and to make professional recommendations on the impact of development on significant palaeontological finds that might occur in the unit that is allocated a grey colour. An example of this scenario will be where the scale of mapping on the 1:250 000 scale maps excludes small outcrops of highly significant sedimentary rock units occurring in dolerite sill outcrops. It is important that the report should also refer to archaeological reports and possible descriptions of palaeontological finds in Cenozoic aged surface deposits.

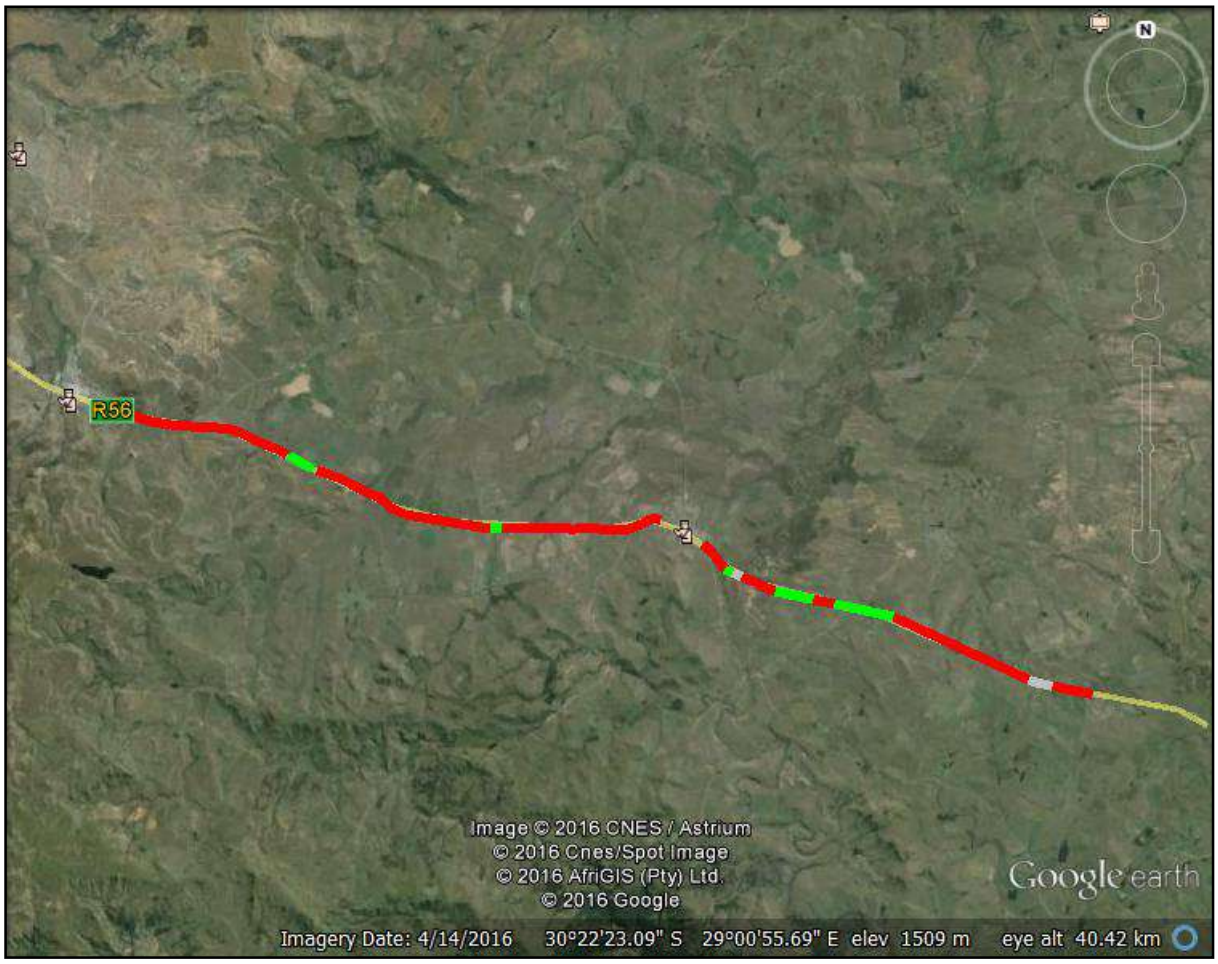

Figure 10 – Palaeo-sensitivity of the proposed road rehabilitation project.

The Triassic aged Tarkastad Subgroup of the Beaufort Group, Karoo Supergroup underlies most of the study site and although large areas are covered in sandy or clayey soils, most of the excavations will be into sandstone or mudstone of the underlying Tertiary aged sediments that might contain significant fossils. Areas underlain by Tarkastad Subgroup and those underlain by Tertiary aged sediments are Very Highly sensitive and Moderately sensitive for Palaeontological Heritage and these areas must be monitored and subjected to Phase 1 PIA assessments preferably simultaneous to the timing of initial excavations for construction of the upgrading of the road.

Areas overlain by dolerite and dolerite scree, is allocated a Very Low Palaeontological sensitivity. Due to the igneous nature of dolerite, no fossils will be found.

6.4 Palaeontological Findings

The potential Palaeontological Impact of the proposed Road Upgrade Development Matatiele to Strydfontein, Matatiele Local Municipality, Alfred Nzo District Municipalty, Eastern Cape Province is Moderate to Very High, with a small section allocated a Very Low Palaeontological sensitivity, based on the fact that most of the route is underlain by Triassic aged rocks of the Tarkastad Subgroup and Jurassic aged dolerite of the Karoo Supergroup as well as Tertiary aged sediments associated with terrestrial deposits associated with wetlands in the study area.

The very high fossiliferous potential of the Tarkastad Subgroup, Beaufort Group of the Karoo Supergroup warrants an allocation of a Very High palaeontological sensitivity to the areas underlain by the rocks of this Subgroup. A Moderate Palaeontological sensitivity is allocated to Tertiary aged sediments in this region. Dolerite areas are allocated Very Low Palaeontological sensitivity. If extensive excavation of topsoil and removal of more than 1.5m of soil cover is planned in this region, all the areas of activity will be allocated a Very High Palaeontological Sensitivity as these rocks can contain very significant remains of plants and animals that will contribute significantly to our understanding of the palaeo-environments in this part of the Karoo Basin.

The following recommendations can be made in terms of the palaeontology:

- The EAP as well as the ECO for this project must be made aware of the fact that the Beaufort Group sediments contains very highly significant fossil remains, albeit mostly exposed during infrastructure development. Several types of fossils have been recorded from this Group in the Karoo Basin of South Africa, with special mention of the Tarkastad Subgroup. Similar fossil richness might be observed in Tertiary aged sediments at Matatiele.
- In areas that are allocated a Very High and Moderate Palaeontological sensitivity and specifically where deep excavation into bedrock is envisaged (following the geotechnical investigation), or where fossils are recorded during the geotechnical investigations, a qualified palaeontologist must be appointed to assess and record fossils at specific footprints of infrastructure developments (Phase 1 PIA) preferably during initial excavations for the development.
- These recommendations must form part of the EMP of the project.

7 FIELDWORK FINDINGS

7.1 Introduction

The fieldwork team from PGS Heritage traversed the study area area by vehicle and conducted a controlled-exclusive surface survey by foot, specifically focussing on road cuttings and river crossings. GPS coordinates were taken of identified heritage sites and such sites were recorded photographically. The track logs recorded during the fieldwork by the team from PGS Heritage are depicted below.

A total of nine heritage sites were identified inside the road reserve, with one site located immediately adjacent to the road reserve. The ten identified sites comprise eight stone age sites (Sites 1, 2, 4, 5, 6, 7, 9 & 10) and two sites consisting of historical structures and buildings (see Sites 3 & 8).

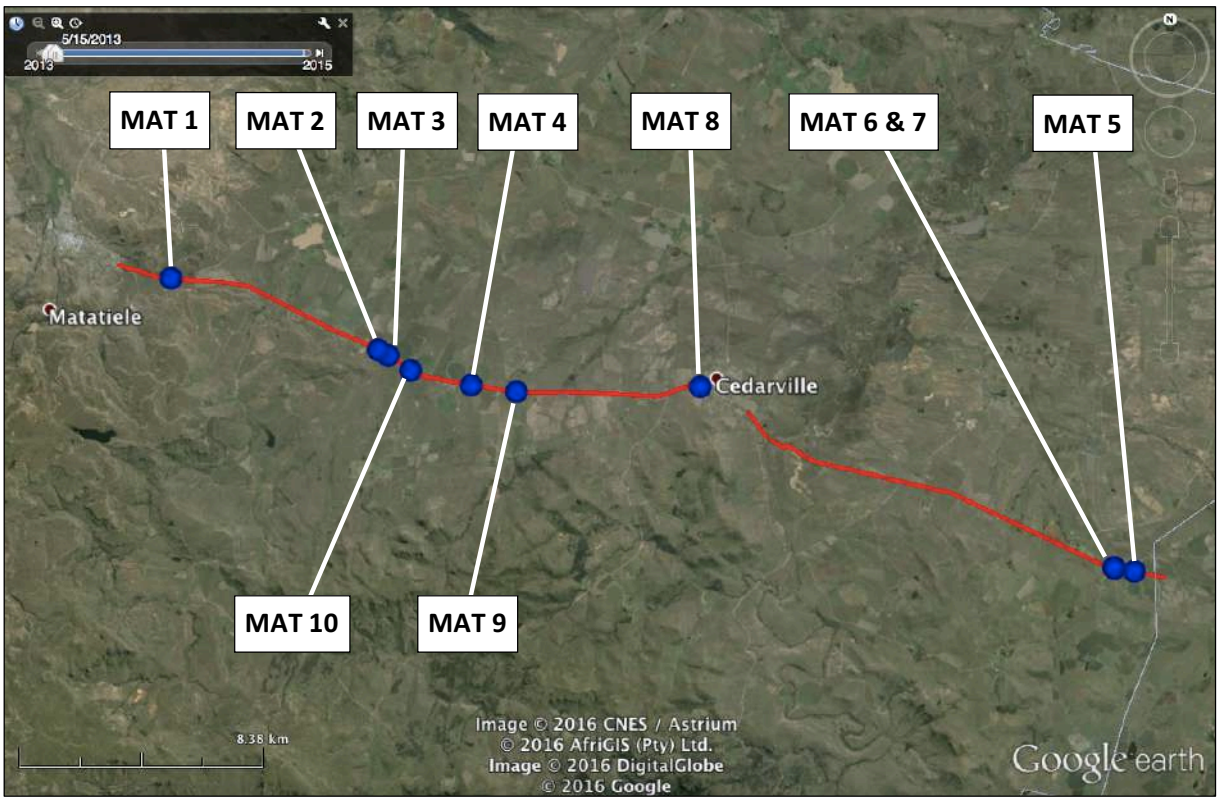

Figure 11 – Google Earth image depicting the distribution of identified heritage sites in blue and the proposed road project in red.

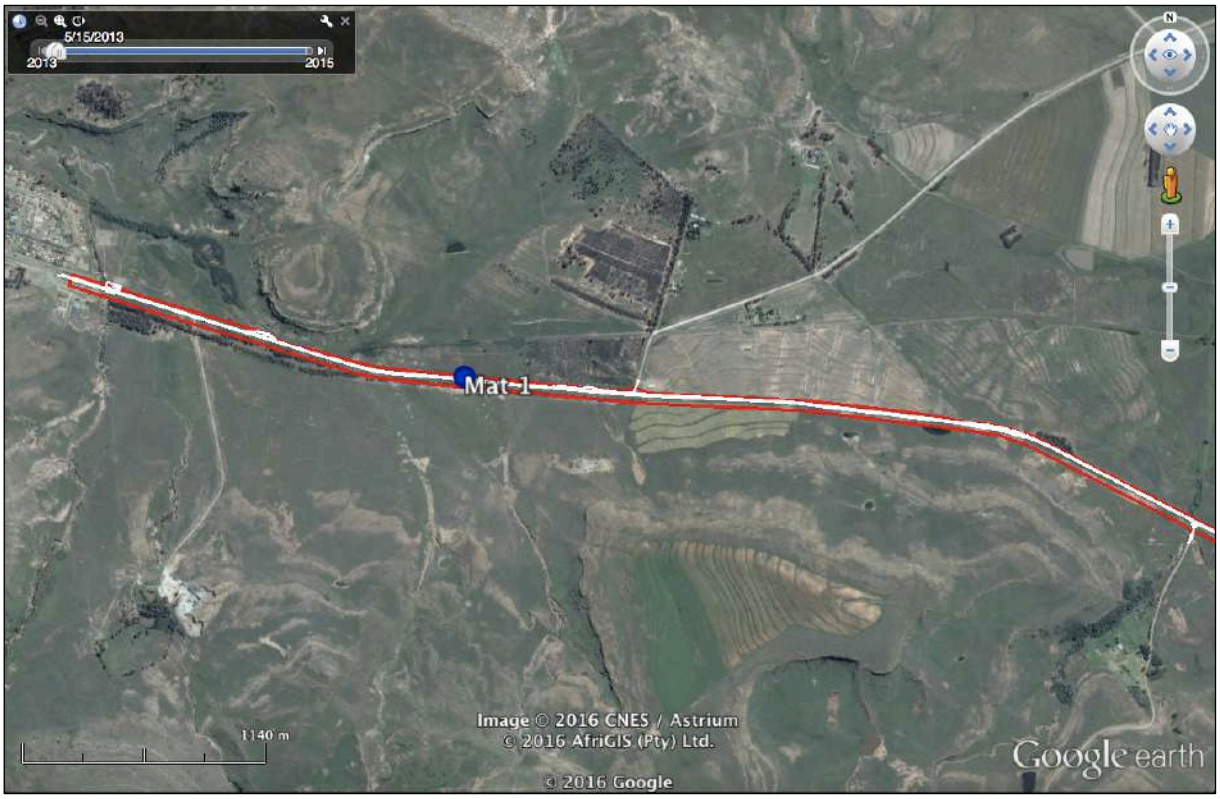

Figure 12 – Google Earth image depicting a closer view of the position of Mat 1. The recorded tracklogs are shown in white.

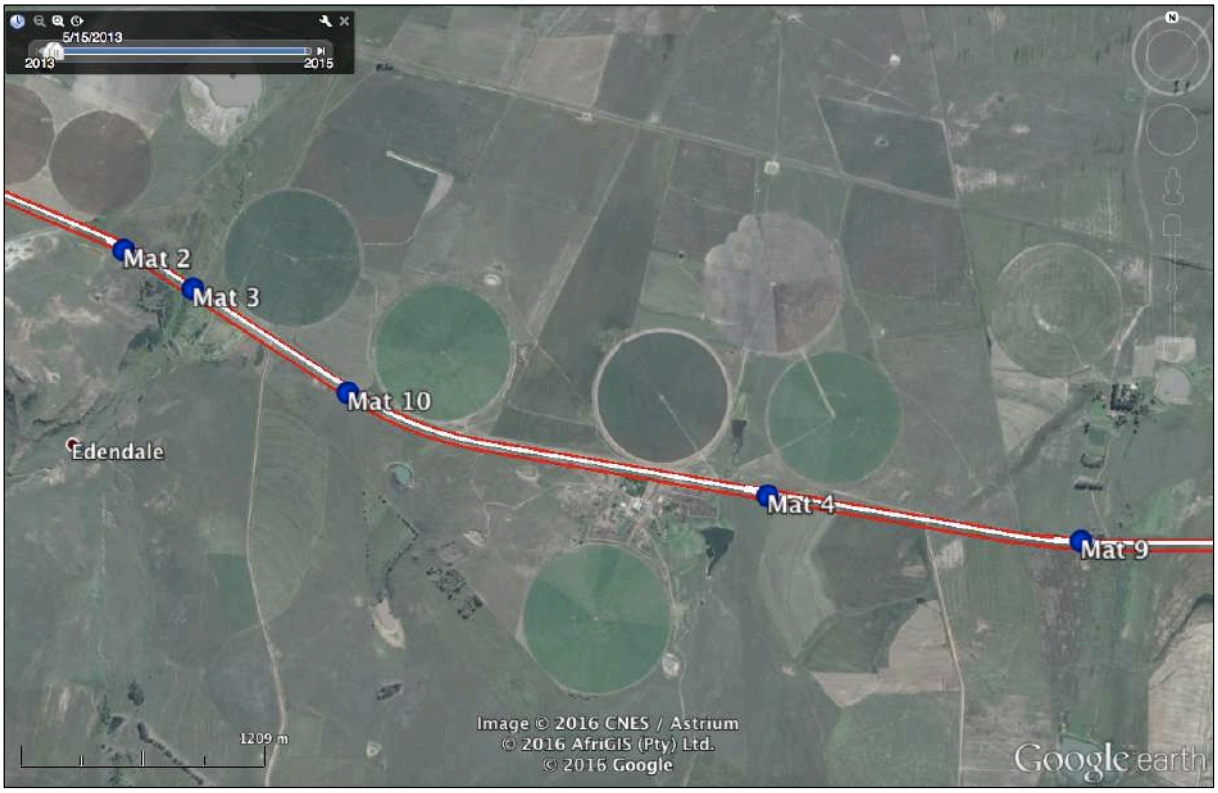

Figure 13 – Google Earth image depicting a closer view of the positions of sites Mat 2, Mat 3, Mat 4, Mat 9 and Mat 10. The recorded tracklogs are shown in white.

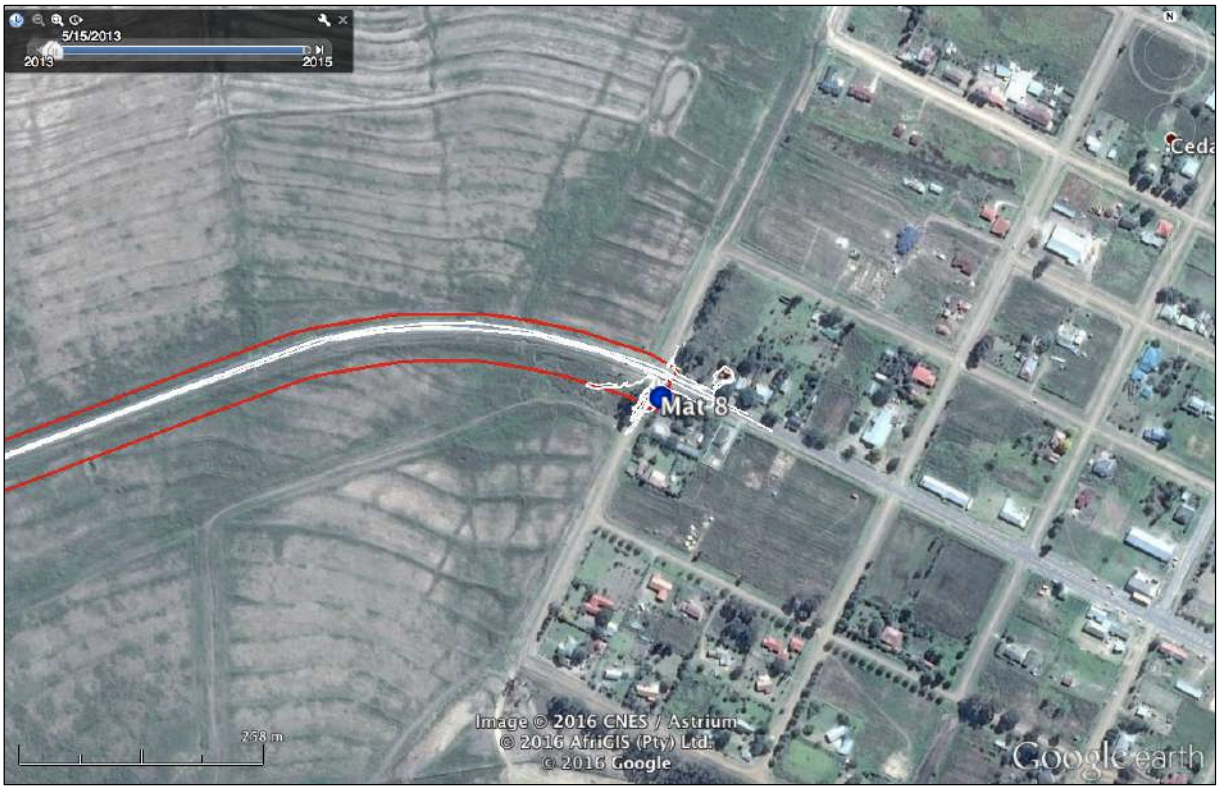

Figure 14 – Google Earth image depicting a closer view of the positions of site Mat 8. The recorded tracklogs are shown in white.

Figure 15 – Google Earth image depicting a closer view of the positions of sites Mat 5, Mat 6 and Mat 7 . The recorded tracklogs are shown in white.

7.2 Fieldwork Findings

7.2.1 MAT 1

GPS Coordinates:

S 30.35246
E 28.84519

Site Description:

This site comprises a concentration of MSA lithics occurring over an area that extends approximately 25m along the northern side of the road. The highest density observed at the site is 7 lithics per/m2.

It is evident from the profile of the road cutting where the lithics were found that they were originally covered by a layer of sand and were exposed during the construction of the road, with erosion continuously revealing more lithics. The lithics include cores, blades, flakes and debitage. However, no hammer stones could be seen.

The lithics originate from eroded contexts and do not indicate a high level of formal retouch. However, the locality is important as there seems to be an underlying deposit that contains significant numbers of stone tools. The presence of cores is also important since this reflects stone knapping at this locality. Hornfels was the main material used in the manufacture of the lithics in the assemblage. Quartzite also featured as a raw material but not to the same extent.

Site Significance:

Due to the underlying deposit and the presence of cores, the site is deemed to be of Medium Significance and is rated as **Generally Protected B (GP.B)**. Some mitigation is therefore required and a permit would be required before it may be destroyed.

Please refer **Section 7** for the required mitigation measures.

Figure 16 – General view of the site. The lithics were observed along the road cutting on the left.

Figure 17 – Sample of lithics observed at the site. Scale is in 1 cm increments.

7.2.2 MAT 2

GPS Coordinates:

S 30.37465
E 28.91934

Site Description:

This site consists of a low density surface scatter of MSA lithics which extends approximately 40m along the side of the road. The highest density of lithics that could be observed at the site was 2 lithics per/m^2, whereas the overall number of lithics observed on the site was low.

The lithics were evidently exposed during the construction of the road, when a road cutting was made into a low hill. Subsequent erosion may have exposed more lithics. However, no evidence for an in situ lithic concentration could be seen.

The lithics observed on the surface of the site comprise flaked blades and triangular flakes produced on prepared cores. Some specimens exhibit utilisation marks. In terms of raw material use, fine-grained quartzite and hornfels appears to have been preferred.

Site Significance:

The lithics from the site has a low density and is of small number. The site is deemed to be of **Low Significance** and rated as **Generally Protected C (GP.C)**. As a result, no mitigation is required for the site, and it may be destroyed during the Construction Phase of the project.

Figure 18 – General view of Mat 2.

Figure 19 –Sample of lithics observed at the site. Scale is in 1 cm increments.

7.2.3 MAT 3

GPS Coordinates:

S 30.37638
E 28.92292

Site Description:

The site comprises a slab type low level reinforced concrete bridge over the Edendale Stream. The structure is a three-span concrete bridge which has a very narrow pedestrian sidewalk on each side and is roughly 20 m by 7 m in extent. The condition of the bridge is not pristine, and a section of the precast concrete handrails on the northern end of the bridge had been severely damaged by presumably a vehicle or truck. The construction date "1951" appears on the north-eastern end of the bridge.

According to information found in the Western Cape Archives (TBK, PAA (A-WS), M/190, MT4/E), the bridge was known as the "Edendale Sluit Bridge" and was designed to have three 20-feet-long spans, a roadway width of 22 feet and 12 inch sidewalks on either side with precast concrete handrails. The earliest record relating to the bridge was found in letter by the District Roads Engineer for Umtata written during December 1948.

In the words of the District Roads Engineer:

"*As the…Main Road is an important one, the width of roadway over the bridge is recommended as 22'… From a consideration of the low pedestrian traffic, however, it is considered necessary to provide for only 12'' of sidewalks and the usual precast handrails*. It would be appreciated if plans for the above bridge could be prepared at the earliest date."

By 20 June 1949 the specifications for the construction of the bridge had been finalised, whereas the bridge was completed in November 1951. The construction of the bridge cost an estimated £2,500 to complete. The completion date obtained from the archival information (November 1951) supports the construction date (1951) which appears on the bridge, and both indicate that the bridge is 65 years old.

According to the archival information obtained from the Western Cape Archives, the bridge was completed at roughly the same time as the so-called "Commonage Bridge". It is not presently known where this bridge is located.

A stone and concrete drift is located a short distance south of the bridge with evidence for a road continuing in a western direction from this drift before joining the modern tar road. It is possible that this concrete drift and road formed part of the construction of the slab type bridge at MAT 3, or alternatively that the drift and road represent tangible remains of the earlier road and crossing point over the stream.

Site Significance:

The bridge is certainly more than 60 years old. The site has a **Generally Protected B (GP.B) Medium Significance.** As a result, mitigation would be required (see Section 7).

Figure 20 – General view of the concrete bridge at Mat 3 as seen from the north.

Figure 21 – Another view of the bridge at Mat 3, this view was taken in a north-western direction across the road width of the bridge.

Figure 22 – The construction date appearing on the north-eastern end of the bridge.

7.2.4 MAT 4

GPS Coordinates:

S 30.38558
E 28.95260

Site Description:

A concentration of MSA lithics was identified here. The lithics extend over a distance of approximately 100m along the southern side of the road. Only one lithic was identified on the northern end of the road. The highest density recorded was 7 lithics per/m^2. Furthermore, a large number of lithics were observed on the surface of the site.

The lithics were revealed when a road cutting was made during the construction of the road. Subsequent erosion activitiy may have further facilitated this process.

Based on the sample that was identified, a high frequency of blades and triangular flakes seems evident. Several cores and a quartzite hammer stone suggest *in situ* stone knapping activities at this particular locality. The range of raw materials used includes hornfels and fine-grained Cryptocrystallline Silicas (CCS).

Site Significance:

Hornfels and CCS materials were extensively used in lithic assemblages from the Kwazulu-Natal region in particular. The raw materials are derived from the Drakensberg volcanics and were sourced by the prehistoric hunting and gathering communities from river systems and outcrops. The evidence for stone tool manufacture at this site is important in the context of the importance of the MSA and the presence of Anatomically Modern Humans with complex cognition and innovative technologies that form the focus of southern African MSA research (Wadley 2013, 2015). Therefore, the site is deemed to be of **Medium significance** and is rated as **Generally Protected B (GP.B).** Mitigation will be required.

Figure 23 – General view of Mat 4.

Figure 24 – Sample of lithics identified at Mat 4. Note the hammer stone (bottom right), and use of different raw material. Scale in 1 cm increments.

7.2.5 MAT 5

GPS Coordinates:

S 30.44292
E 29.19011

Site Description:

Only a small number of lithics were identified along the northern end of the road. As is the case with most of the other Stone Age sites, these lithics were exposed when a road cutting was made during the construction of the road. The highest density of lithics that could be identified here, was 2 lithics per/m^2.

The lithics identified here include typical Large Cutting Tools (LCTs) associated with the ESA, including a cleaver and a handaxe.

Site significance:

Whereas the density of lithics is low, this is the only occurrence of ESA tools that has been recorded during the survey. Therefore, the site is deemed to be of **Medium Significance** and is rated as **Generally Protected B (GP.B)**.

Mitigation will be required.

Figure 25 – General view of Mat 5.

Figure 26 – Lithics identified at Mat 5, including Large Cutting Tools typically associated with the Early Stone Age. Scale in 1 cm increments.

7.2.6 MAT 6

GPS Coordinates:

S 30.44201
E 29.18297

Site Description:

This MSA site extends approximately 40m along the southern side of the road where it was exposed by a road cutting during the construction of the existing road. A very low density of 1 lithic per/m^2 has been established.

The raw materials used for the stone tools include quartzite and hornfels.

Site Significance:

In view of the very low density of the lithics, the site is deemed to be of **Low significance** and is rated as **Generally Protected C (GP.C)**. No mitigation will be required.

Figure 27 – General view of Mat 6.

Figure 28 –Sample of lithics as observed at Mat 6.

7.2.7 MAT 7

GPS Coordinates:

S 30.44174
E 29.18128

Site Description:

This site comprises a low density scatter of MSA lithics that extends approximately 25m along the southern side of the road. The locality was exposed by a cutting during the construction of the existing road. A very low density of 1 lithic per/m^2 was established.

A similar range of raw materials for stone tool manufacture was used as found at the other sites, including the use of hornfels and quartzites. The convergent flakes and blade flakes were mostly produced on prepared cores. Evidence for utilization could be observed on some of the lithic specimens.

Site Significance:

Due to the very low density of the lithics, the site is deemed to be of **Low Significance** and is rated as **Generally Protected C (GP.C)**.

As a result, no mitigation will be required.

Figure 29 – General view of Mat 7.

Figure 30 – Sample of lithics observed at Mat 7. Scale is in 1 cm increments.

7.2.8 MAT 8

GPS Coordinates:

S 30.386072
E 29.034557

Site Description:

According to the road reserve provided by the client, the proposed development footprint on the western side of Cedarville ends directly adjacent to an old house. This house is located on the southern side of the existing road. On the northern side of the road, the road reserve ends against the stand of an old church. Although the church is located on the eastern end of the stand (with no structures or buildings evident on the remainder of the stand), this old corrugated iron church building has significant historical value and is located only 48m from the point where the road reserve ends.

The house on the southern side of the road is certainly older than 60 years, and a number of outbuildings are associated with it, including a rondavel. The old church building is in all likelihood even older, and may very well be older than 100 years. The church appears to be the St. Michael Anglican Church (www.artefacts.co.za), but the exact history or age of this church building is not presently known.

An area of roughly 100m by 100m incorporates both the old house and its stand, as well as the old church and its stand.

Site Significance:

Both buildings are older than 60 years, with the church quite likely older than 100 years as well. As a result, the site is deemed to be of **Medium Significance** and is rated as **Generally Protected B (GP.B).**

Figure 31 – General view of the old dwelling at Mat 8. The road reserve ends immediately adjacent to the façade of the building visible in this photograph.

Figure 32 – General view of the historic church at Mat 8. As indicated in the text, the road reserve ends roughly 48m from this building.

7.2.9 MAT 9

GPS Coordinates:

S 30.38759
E 28.96879

Site Description:

A MSA site was identified here. While widely scattered lithics of very low density were observed over an area that extends approximately 30m along the northern side of the road, the highest density recorded at the site was 5 lithics per/m^2. This latter concentration of lithics was found to be highly localised and seems to have been the result of the excavation of a drainage channel next to the tar road. It is clear therefore that the lithics from the site are all in secondary context.

The sample of lithics observed at the site contains typical MSA tool types such as blades and a convergent flake, again produced on prepared cores. Several of the stone tools exhibit utilization marks.

Site significance:

In view of the secondary context of the lithics as well as the relatively low density of lithics found across the site, it is deemed to be of **Low Significance** and is rated as **Generally Protected C (GP.C)**.

No mitigation will be required.

Figure 33 – General view of Mat 9.

Figure 34 – Sample of lithics observed at Mat 9. Scale is in 1 cm increments.

7.2.10 MAT 10

GPS Coordinates:

S 30.38100
E 28.93091

Site Description:

A MSA site was identified here. These MSA lithics were found over an area that extends approximately 30m along southern side of the road where the stone tools were exposed by a cutting made during the construction of the road. The highest density of lithics observed at the site is 3 lithics per/m^2.

The sample of lithics observed at the site includes typical MSA cores and blade flake forms.

Site Significance:

Even though the site exhibits a relatively low density of lithics, the presence of some cores results in the site being deemed to be of **Medium significance** and rated as **Generally Protected C (GP.C)**.

Since the presence of cores suggests *in situ* stone tool manufacture, some mitigation will be required.

Figure 35 – General view of MAT 10.

Figure 36 – Sample of lithics observed at the site, including cores and flakes. Scale in 1 cm increments.

8 IMPACT OF PROPOSED DEVELOPMENT ON HERITAGE RESOURCES

8.1 Risk Calculation for the Impact of the Proposed Development on Mat 1

Mat 1 falls within the road reserve, and as a result the site is expected to be destroyed during the Construction Phase of the proposed development.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(3 + 3 + 5)}{3} \times \frac{4}{5}$$

Impact Risk = 2.93

Table 13: Risk Calculation for Development Impact on Mat 1

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Moderate	Local	Permanent	Very Likely	**Moderate**
Impact on Mat 1	3	3	5	4	**2.93**

This calculation has revealed that the impact risk of the proposed development on Mat 1 falls within Impact Class 3, which represents a Moderate Impact Risk. Refer Section 7 below for required mitigation measures.

8.2 Risk Calculation for the Impact of the Proposed Development on Mat 2

Mat 2 falls within the road reserve, and as a result the site is expected to be destroyed during the Construction Phase of the proposed development.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(1 + 1 + 5)}{3} \times \frac{4}{5}$$

Impact Risk = 1.87

Table 14: Risk Calculation for Development Impact on Mat 2

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Very Low	Site	Permanent	Very Likely	**Low**
Impact on Mat 2	1	1	5	4	**1.87**

This calculation has revealed that the impact risk of the proposed development on Mat 2 falls within Impact Class 2, i.e. a Low Impact Risk. No mitigation measures would be required.

8.3 Risk Calculation for the Impact of the Proposed Development on Mat 3

Mat 3 is an old bridge that falls within the road reserve. For the construction to be completed, this bridge will have to be demolished and a new bridge built in its place. As a result, the site is expected to be destroyed during the Construction Phase of the proposed development.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(3 + 3 + 5)}{3} \times \frac{5}{5}$$

Impact Risk = 3.67

Table 15: Risk Calculation for Development Impact on Mat 3

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Moderate	Local	Permanent	Will Happen	**High**
Impact on Mat 3	3	3	5	5	**3.67**

This calculation has revealed that the impact risk of the proposed development on Mat 3 falls within Impact Class 4, which represents a High Impact Risk. Refer Section 7 below for required mitigation measures.

8.4 Risk Calculation for the Impact of the Proposed Development on Mat 4

Mat 4 falls within the road reserve, and as a result the site is expected to be destroyed during the Construction Phase of the proposed development.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(3 + 3 + 5)}{3} \times \frac{4}{5}$$

Impact Risk = 2.93

Table 16: Risk Calculation for Development Impact on Mat 4

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Moderate	Local	Permanent	Very Likely	**Moderate**
Impact on Mat 4	3	3	5	4	**2.93**

This calculation has revealed that the impact risk of the proposed development on Mat 4 falls within Impact Class 3, which represents a Moderate Impact Risk. Refer Section 7 below for required mitigation measures.

8.5 Risk Calculation for the Impact of the Proposed Development on Mat 5

Mat 5 falls within the road reserve, and as a result the site is expected to be destroyed during the Construction Phase of the proposed development.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(3 + 3 + 5)}{3} \times \frac{4}{5}$$

Impact Risk = 2.93

Table 17: Risk Calculation for Development Impact on Mat 5

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Moderate	Local	Permanent	Very Likely	**Moderate**
Impact on Mat 5	3	3	5	4	**2.93**

This calculation has revealed that the impact risk of the proposed development on Mat 5 falls within Impact Class 3, which represents a Moderate Impact Risk. Refer Section 7 below for required mitigation measures.

8.6 Risk Calculation for the Impact of the Proposed Development on Mat 6

Mat 6 falls within the road reserve, and as a result the site is expected to be destroyed during the Construction Phase of the proposed development.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(1 + 1 + 5)}{3} \times \frac{4}{5}$$

Impact Risk = 1.87

Table 18: Risk Calculation for Development Impact on Mat 6

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Very Low	Site	Permanent	Very Likely	**Low**
Impact on Mat 6	1	1	5	4	**1.87**

This calculation has revealed that the impact risk of the proposed development on Mat 6 falls within Impact Class 2, i.e. a Low Impact Risk. No mitigation measures would be required.

8.7 Risk Calculation for the Impact of the Proposed Development on Mat 7

Mat 7 falls within the road reserve, and as a result the site is expected to be destroyed during the Construction Phase of the proposed development.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(1 + 1 + 5)}{3} \times \frac{4}{5}$$

Impact Risk = 1.87

Table 19: Risk Calculation for Development Impact on Mat 7

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Very Low	Site	Permanent	Very Likely	**Low**
Impact on Mat 7	1	1	5	4	**1.87**

This calculation has revealed that the impact risk of the proposed development on Mat 7 falls within Impact Class 2, i.e. a Low Impact Risk. No mitigation measures would be required.

8.8 Risk Calculation for the Impact of the Proposed Development on Mat 8

Mat 8 comprises an old house located immediately adjacent to the road reserve, with an old church located 48m from the proposed development. If the unmitigated development's footprint continues across the entire road reserve, some disturbance is envisaged for the old house at least.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(3 + 3 + 5)}{3} \times \frac{4}{5}$$

Impact Risk = 2.93

Table 20: Risk Calculation for Development Impact on Mat 8

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Moderate	Local	Permanent	Very Likely	**Moderate**
Impact on Mat 8	3	3	5	4	**2.93**

This calculation has revealed that the impact risk of the proposed development on Mat 8 falls within Impact Class 3, which represents a Moderate Impact Risk. Refer Section 7 below for required mitigation measures.

8.9 Risk Calculation for the Impact of the Proposed Development on Mat 9

Mat 9 falls within the road reserve, and as a result the site is expected to be destroyed during the Construction Phase of the proposed development.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(1 + 1 + 5)}{3} \times \frac{4}{5}$$

Impact Risk = 1.87

Table 21: Risk Calculation for Development Impact on Mat 9

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Very Low	Site	Permanent	Very Likely	**Low**
Impact on Mat 9	1	1	5	4	**1.87**

This calculation has revealed that the impact risk of the proposed development on Mat 9 falls within Impact Class 2, i.e. a Low Impact Risk. No mitigation measures would be required.

8.10 Risk Calculation for the Impact of the Proposed Development on Mat 10

Mat 10 falls within the road reserve, and as a result the site is expected to be destroyed during the Construction Phase of the proposed development.

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

$$\text{Impact Risk} = \frac{(3 + 3 + 5)}{3} \times \frac{4}{5}$$

Impact Risk = 2.93

Table 22: Risk Calculation for Development Impact on Mat 10

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	Moderate	Local	Permanent	Very Likely	**Moderate**
Impact on Mat 10	3	3	5	4	**2.93**

This calculation has revealed that the impact risk of the proposed development on Mat 10 falls within Impact Class 3, which represents a Moderate Impact Risk. Refer Section 7 below for required mitigation measures.

9 MITIGATION MEASURES

As a result, mitigation measures would be required for sites Mat 1, Mat 3, Mat 4, Mat 5, Mat 8 and Mat 10.

9.1 Required Mitigation Measures for Sites Mat 1 and Mat 4

- Small-scale archaeological excavation work which adheres to standard practice and method.

9.2 Required Mitigation Measures for Site Mat 3

- Recording of one façade and plan of bridge by way of measured drawings.
- Photographic and qualitative recording.
- Permit application to the relevant heritage authority to allow for the destruction of the bridge.

9.3 Required Mitigation Measures for Sites Mat 5 and Mat 10

- Archaeological monitoring of sites during construction phase. Should any significant deposits or artefacts be exposed, small-scale archaeological excavation work will be required which adheres to standard practice and method.

9.4 Required Mitigation Measures for Sites Mat 8

- Developer must be made aware of the presence of the old dwelling (and its outbuildings) as well as the church building and these structures must be avoided during construction. buildings and both must be avoided.
- However, should any disturbance to any of these structures be envisaged, further mitigation such as recording and disturbance / destruction permits would be required.

10 CONCLUSIONS AND RECOMMENDATIONS

PGS Heritage (PGS) was appointed by Gibb (Pty) Ltd to undertake a Heritage Impact Assessment (HIA), which forms part of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for the proposed rehabilitation of National Route R56 Section 8 between Matatiele and the KwaZulu-Natal boundary within the Matatiele Local Municipality, Alfred Nzo District Municipality, Eastern Cape Province.

An archival and historical desktop study was undertaken to provide a historic framework for the project area and also to provide historical information on identified heritage sites. This was followed by fieldwork, which resulted in the identification of ten sites (see table below). The sites include eight Stone Age sites and two historical sites.

During the survey several instances were recorded where previous cuttings made during the construction of the existing road exposed subsurface stone tools. The observed lithics occur in secondary, disturbed contexts. The highest relative densities established for the occurrence of lithic elements are 7 lithics per/m2 in two instances whereas the densities of the others are much lower. Whereas these generally do not reflect significant or representative assemblages, further investigation is required to establish whether these occurrences indeed form part of more extensive Stone Age living floors and/or instances where stone knapping was carried out to produce tools required during subsistence excursions. The majority of the localities have a MSA signature with only one instance where ESA tool types were recorded. The prepared core/Levallois core technique was used to produce the characteristic MSA triangular flake and blade blanks noted during the survey. Such cores were prepared by systematic shaping through flake removals off suitable pieces of raw material to produce pre-determined shaped blanks which were subsequently used in the manufacture of different formal tool types.

The two historic sites comprise an old bridge that was built in 1951 as well as an historic dwelling and church located on the western end of the town of Cedarville.

In the table below a summary will be provided of the identified heritage sites including their site numbers, brief description, recorded GPS coordinates, the heritage significance of each site as well as an outline of the required mitigation measures.

Summarised List of Heritage Sites Identified during the Fieldwork

Site	Description	Significance	Coordinates	Mitigation
Mat 1	MSA Site	Medium / Local (GP. B)	S 30.35246 E 28.84519	Small-scale archaeological excavation work which adheres to standard practice and method.
Mat 2	MSA Site	Low / Local (GP.C)	S 30.37465 E 28.91934	No mitigation is required
Mat 3	Old Bridge	Medium / Local (GP. B)	S 30.37638 E 28.92292	Recording of layout plan and one facade of bridge using measured drawings coupled with photographic recording followed by destruction permit application process.
Mat 4	MSA Site	Medium / Local (GP. B)	S 30.38558 E 28.95260	Small-scale archaeological excavation work which adheres to standard practice and method.
Mat 5	ESA Site	Medium / Local (GP. B)	S 30.44292 E 29.19011	Archaeological monitoring of site during construction phase. Should any significant deposits or artefacts be exposed, small-scale archaeological excavation work will be required which adheres to standard practice and method.
Mat 6	MSA Site	Low / Local (GP. C)	S 30.44201 E 29.18297	No mitigation is required
Mat 7	MSA Site	Low/ Local (GP.C)	S 30.44173 E 29.18128	No mitigation is required
Mat 8	Historic Structures	Medium / Local (GP. B)	S 30.386072 E 29.034557	Developer must be made aware of the presence of these buildings and both must be avoided. However, should any disturbance to any of the two structures be envisaged, further mitigation such as recording and disturbance / destruction permits would be required.
Mat 9	MSA Site	Low / Local (GP. C)	S 30.38759 E 28.96879	No mitigation is required.
Mat 10	MSA Site	Medium / Local (GP. B)	S 30.38100	Archaeological monitoring of site during construction phase. Should any

			E 28.93091	significant deposits or artefacts be exposed, small-scale archaeological excavation work will be required which adheres to standard practice and method.

The impact of the proposed development on the located heritage sites was assessed, and it was established that the proposed development will have a High Impact Risk on Mat 3, a Moderate Impact Risk on Mat 1, Mat 4, Mat 5, Mat 8 and Mat 10 and a Low Impact Risk on Mat 2, Mat 6, Mat 7 and Mat 9. As a result, mitigation measures would be required for sites Mat 1, Mat 3, Mat 4, Mat 5, Mat 8 and Mat 10.

The required mitigation measures are summarised in the table above. Mitigation measures are also outlined in Section 9 of this report.

Apart from the site-specific mitigation measures, the following general mitigation measure would also be required:

- Due to the subterranean nature of many of the lithic sites identified during the fieldwork, it is recommended that an archaeological watching brief be implemented during the course of the construction work on the project. Such a watching brief would assist in the early identification of any Stone Age (or other archaeological) sites which may be located in a subterranean position within the proposed development footprint. Should any such significant lithic or other archaeological material be identified, a site assessment will be made by the archaeologist conducting the watching and brief, and if required mitigation measures will also be outlined. Any such mitigation measures and recommendations will also have to be adhered to.
- The above-mentioned archaeological watching brief should comprise a field visit by a suitably qualified and experienced archaeologist once every three weeks during the duration of the construction.

On the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development to be halted.

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12 REFERENCES

Published sources

Arbousset, T. and Daumas, F. 1968. *Narrative of an exploratory tour to the Cape of Good Hope*. Facsimile reprint. Cape Town: Struik.

Beaumont, P.B., De Villiers, H. and Vogel, J.C. 1978. Modern man in sub-Saharan Africa prior to 49 000 years BP: a review and evaluation with particular reference to Border Cave. *South African Journal of Science* 74: 409-419.

Binneman, J.N.F. 1985. Research along the south-eastern Cape coast. In: S.L. Hall and J.N.F. Binneman (eds) Guide to Archaeological Sites in the Eastern and North-eastern Cape, pp. 117-134. Grahamstown: Southern African Association of Archaeologists.

Binneman, J.N.F. 1994. Notes on a digging stick from Augussie Shelter, eastern Cape. *Southern African Field Archaeology* 3: 112-113.

Binneman, J.N.F. 1997. Results from a test excavation at The Havens Cave, Cambria Valley, south-eastern Cape. *Southern African Field Archaeology* 6: 93-105.

Binneman, J.N.F. 2001. An introduction to a Later Stone Age coastal research project along the south-eastern Cape coast. *Southern African Field Archaeology* 10:75-87.

Binneman, J.N.F. 2005. Archaeological research along the south-eastern Cape coast part 1: open-air shell middens *Southern African Field Archaeology* 13 & 14: 49-77.

Binneman, J.N.F. and Booth, C. 2008. A phase 1 Archaeological Heritage Impact Assessment 19 for the proposed construction and operation of an ethanol production plant on Erven 31, 32, 33 and the remaining extent of Erf 1, Cradock, Inxuba Yethemba local municipality, Eastern Cape Province.

Binneman, J., Booth, C. and Higgitt, N. 2010. A Phase 1 Archaeological Impact Assessment (AIA) for the proposed Coega Ridge Nu-Way housing development, farms Welbedachtsfontein 300, Coega Kop 313, Coegas Kop 316, Coegas Kop 314, Nelson Mandela Metropolitan Municipality, Port Elizabeth, Eastern Cape Province.

Binneman, J., Booth, C. and Higgitt, N. 2011. An archaeological desktop study and Phase 1 Archaeological Impact Assessment (AIA) for the proposed Clidet data cable between Bloemfontein, Orange Free State and Graaff Reinet, Eastern Cape Province; Colesberg, Orange

Free State and Port Elizabeth, Eastern Cape Province; George, Western Cape Province and Port Elizabeth, Eastern Cape Province and; Aliwal North And East London, Eastern Cape Province. Prepared for: SRK Consulting.

Binneman, J.N.F. and Deacon, J. 1984. Experimental determination of use wear on stone adzes from Boomplaas Cave, South Africa. *Journal of Archaeological Sc*ience 13: 219-228.

Binneman, J. and Reichert, K. 2015. A Phase 1 Archaeological Impact Assessment of the proposed development of the Thembeni Residential Township on a portion of the remainder of Erf 318 in Mount Fletcher, Elundini Local Municipality, Eastern Cape Province. On behalf of: Eastern Cape Heritage Consultants.

Booth, C. 2012a. A Phase 1 Archaeological Impact Assessment (AIA) for the proposed Jachtvlakte Precinct sustainable human settlement plan, Nelson Mandela Bay Municipality, Eastern Cape Province.

Booth, C. 2012b. An archaeological desktop study for the proposed Elliot wind energy facility on a site west of Elliot, Sakhisizwe Local Municipality Prepared for: Savannah Environmental (Pty) Ltd.

Brain, J. 1997. Moving from the Margins to the Mainstream: The Roman Catholic Church in Christianity in South Africa – a political, social and cultural history. Elphick R and Davenport R. (Eds) 1997. David Phillips Publishers (Pty) Ltd. Claremont, South Africa.

Cable, J.H.C. 1984. *The Late Stone Age of Southern Natal*. Oxford: British Archaeological Reports.

Cable, J.H.C., Scott, K. & Carter, P.L. 1980. Excavations at Good Hope Shelter, Underberg District, Natal. *Annals of the Natal Museum* 24: 1-34.

Cain, C.H. 2009. Cultural heritage survey of Lesotho for the Maloti-Drakensberg Transfrontier Project, 2005-2006: palaeontology, archaeology, history and heritage management. *South African Archaeological Bulletin* 64(189): 33-44.

Cocks, M. L., Bangay, L., Wiersum, K. F., & Dold, A. P. 2006. Seeing the wood for the trees: the role of woody resources for the construction of gender specific household cultural artefacts in non-traditional communities in the Eastern Cape, South Africa. Environ Dev Sustain (2006) 8:519-533.

Cohen, A. 1999. Mary Elizabeth Barber, the Bowkers and South African prehistory. *South African Archaeological Bulletin* 54: 120-127.

Deacon, H.J. 1993. Planting an idea: an archaeology of Stone Age gatherers in South Africa. *South African Archaeological Bulletin* 48(158): 86-93.

Deacon, H. J. 1972. A review of the Post-Pleistocene in South Africa. *South African Archaeological Society Goodwin Series* 1: 26-45.

Deacon, H. J. 1970. The Acheulian occupation at Amanzi Springs, Uitenhage District, Cape Province. *Annals of the Cape Provincial Museums* (Natural History) 8: 89-189.

Deacon, H.J. 1976. *Where hunters gathered: a study of Holocene Stone Age people in the Eastern Cape*. Claremont: South African Archaeological Society Monograph Series 1: 1-232.

Deacon, H.J. and Brooker, M. 1976. The Holocene and Upper Pleistocene sequence in the southern Cape. *Annals of the South African Museum* 71: 203-214.

Deacon, H.J. and Deacon, J. 1963. Scott's Cave: a Late Stone Age site in the Gamtoos Valley. *Annals of the Cape Provincial Museums* (Natural History) 3: 96-121.

Deacon, H.J. and Deacon, J. *Human beginnings in South Africa*. Cape Town: David Phillips.

Deacon, J. 1972. Wilton: an assessment after 50 years. *South African Archaeological Bulletin* 27: 10-45.

Deacon, J. 1974. Patterning in the radiocarbon dates for the Wilton/Smithfield complex in southern Africa. *South African Archaeological Bulletin* 29: 3-18.

Deacon, J. 1984a. *The Later Stone Age of Southernmost Africa.* Oxford: British Archaeological Reports.

Deacon, J. 1984b. Later Stone Age people and their descendants in southern Africa. In: R. G. Klein (ed.) *Southern African Prehistory and Palaeoenvironments*, pp. 221-328. Rotterdam: A. A. Balkema.

Derricourt, R.M.1975. Some coastal shell middens in southern Moçambique. *Azania* 10(1): 135-139.

Derricourt, R.M. 1977. *Prehistoric man in the Ciskei & Transkei*. Cape Town: Struik.

Doman, S.S. 1909*. Notes on the Bushmen of Basutoland.* South African Journal of Philosophy 18:437-450. Published online: 28 Jun 2010.

Erasmus. (2014). On Route in South Africa. Johnathan Ball Publishers.

eThembeni Cultural Heritage. 2009. Heritage Impact Assessment of upgrading of district road DR 08012 from Maluti to Qachas Nek, Matatiele, Eastern Cape Province, South Africa. For Terratest (Pty) Ltd.

eThembeni Cultural Heritage. 2011. Heritage Impact Assessment of Mt Ayliff-Ntsizwa weirs water supply scheme, Eastern Cape Province, South Africa. Prepared for Arcus GIBB (Pty) Ltd.

Feely, J.M. 1987. The early farmers of Transkei, Southern Africa. BAR International Series 378.

Fisher, E.C., Albert, R., Botha, G., Cawthra, H.C., Esteban, I., Harris, J., Jacobs, Z., Jerardino, A., Marean, C.W., Neumann, F.H., Pargeter, J., Poupart, M. & Venter J. 2013. Archaeological Reconnaissance for Middle Stone Age Sites along the Pondoland Coast, South Africa. PaleoAnthropology 2013: 104−137.

Fourie, W. 2008. Archaeological Impact Assessments within South African Legislation. South African Archaeological Bulletin 63 (187): 77–85, 2008.

Gess, W.H.R. 1969. Excavations of a Pleistocene bone deposit at Aloes near Port Elizabeth. *South African Archaeological Bulletin* 24:31-32.

Hall, S.L. 1990. *Hunter-gatherer-fishers of the Fish River Basin: a contribution to the Holocene prehistory of the Eastern Cape*. DPhil Diss. University of Stellenbosch.

Henderson, Z.L. and Binneman, J.N.F. 1997. Changes in the significance of a site: the Klasies Cave complex in the Middle and Later Stone Ages. In: C. Bonsall and C. Tolan-Smith (eds) *The Human Use of Caves*, pp. 175-184. Oxford: British Archaeological Reports International Series 667.

Jackson, A. O. 1975. The Ethnic Composition of the Ciskei and Transkei. Ethnological Publications no. 53, Government Printers. Pretoria

Jolly, P. 2003. Late Baroa in Lesotho. *The Digging Stick* 20(3): 5-7.

Jolly, P. 2006. The San Rock Painting from "The Upper Cave at Mangolong", Lesotho. The South African Archaeological Bulletin, Vol. 61, No. 183 (Jun., 2006), pp. 68-75.

Kaplan, J. 1990. The Umhlatuzana Rock Shelter sequence: 100 000 years of Stone Age history. *Natal Museum Journal of Humanities* 2: 1-94.

Küsel, U.S., van der Ryst, M. and Küsel, S. 2013. Phase 1 Archaeological Impact Assessment. Proposed upgrading of Road R72: Section Port Alfred to Keiskamma. Royal Haskoning DHV for the South African National Roads Agency Limited (SANRAL).

Lasiak, T. 1991. The susceptibility and/or resilience of rocky littoral molluscs to stock depletion by the indigenous coastal people of Transkei, Southern Africa. *Biological Conservation* 64: 245-264.

Lasiak, T.A. and Field, J.G. 1995. Community-level attributes of exploited and non-exploited rocky infratidal macrofaunal assemblages in Transkei. *Journal of Experimental Marine Biology and Ecology* 185(1): 44-53.

Layard, E.L. 1872. Note on the stone implements of South Africa. *The Journal of the Anthropological Institute of Great Britain and Ireland* 1: xcvii-c.

Legassick, M. C. (2010). The Politics of a South African Frontier: The Griqua, the Sotho-Tswana and the Missionaries, 1780-1840. Basler Afrika Bibliographien.

Lewis, C.A. and Mrara, A.Z. 1986. Rural Settlements, Mission Settlements and Rehabilitation in Transkei. GeoJournal, Vol. 12, No. 4 (June 1986).

Lewis-Williams, JD. 1974. Superpositioning in a Sample of Rock-Paintings from the Barkly East District. The South African Archaeological Bulletin, Vol. 29, No. 115/116 (Dec., 1974), pp. 93-103.

Lewis-Williams, J D. 1983. The Rock Art of Southern Africa (The imprint of man) Cambridge University Press.

Lombard, M., Wadley, L., Deacon, J., Wurz, S., Parsons, I., Mohapi, M. Swart, J. and Mitchell, P. 2012. South African and Lesotho Stone Age sequence updated. *South African Archaeological Bulletin* 67(195): 123-144.

Malan, B.D. 1949. Mangosian and Howieson's Poort. *South African Archaeological Bulletin* 4(13): 34-36.

Mallen, L. (2009). Rock art and identity in the North Eastern Cape Province (Doctoral dissertation). Faculty of Humanities, University of the Witwatersrand, Johannesburg.

Mazel, A.D. 1989. People making history: the last ten thousand years of hunter-gatherer communities in the Thukela Basin. *Natal Museum Journal of Humanities* 1: 1-168.

Mitchell, P.J. 1998. The South African Stone Age in the collections of the British Museum: content, history and significance. *South African Archaeological Bulletin* 53: 26-36.

Mitchell, P. 2002. The archaeology of southern Africa. Cambridge University Press.

Mitchell, P. with contributions by Alison Roberts, Alan Cohen and Karen Perkins. 2002. *Catalogue of Stone Age Artefacts from Southern Africa in the British Museum*. Occasional Paper Number 108. London: The British Museum : Appendices 1-4. Southern African Stone Age Collections in the Department of Ethnography of the British Museum and 5. Gazetteer of the Southern African Stone Age Collections in the British Museum.

Morris, D. 2009. Archaeological Impact Assessment on Portion of Erf 2003, Erf 1, Windsorton, Northern Cape. Department of Archaeology. McGregor Museum.

Nasson, B. 1999. The South African War 1899-1902. New York: Oxford University Press.

Opperman H. 1982. Some Research Results of Excavations in the Colwinton Rock Shelter, North-Eastern Cape. South African Archaeological Bulletin, Vol. 37, No. 136 (Dec., 1982), pp. 51-56.

Opperman, H. 1987. The Later Stone Age of the Drakensberg area and its foothills. Oxford: British Archaeological Reports. International Series 339.

Opperman, H. And Heydenrych, B. 1990. A 22 000 year-old Middle Stone Age camp site with plant food remains from the north-eastern Cape. The South African Archaeological Bulletin, 93-99.

Opperman, H. 1992. A report on the results of a test pit in Strathalan Cave B, Maclear District, north-eastern Cape Province, South Africa: evidence for human behaviour 29,000-26,000 years ago. *Southern African Field Archaeology* 1: 98-102.

Opperman, H 1996a. Strathalan Cave B, north-eastern Cape Province, South Africa: evidence for human behaviour 29,000-26,000 years ago. *Quaternary International* 33:45-54.

Opperman, H 1996b. Excavation of a Later Stone Age deposit in Strathalan Cave A, Maclear District, Northeastern Cape, South Africa. In: Pwiti, G. and Soper, R. (eds) *Aspects of African archaeology,* pp. 335-342. Harare: University of Zimbabwe Press.

Opperman, H 1999. A 300 year-old living floor in Strathalan Cave A, Maclear District, Eastern Cape. *Southern African Field Archaeology* 8:76-80.

Opperman, H & Heydenrych, B 1990. A 22,000 year old Middle Stone Age camp site with plant food remains from the north-eastern Cape. *South African Archaeological Bulletin* 45:93-99.

Orpen, J.M. 1874. A glimpse into the mythology of the Maluti Bushmen. *Cape Monthly Magazine* 9:1-13. Reprinted in *Folklore* (1919) 30: 139-145.

Palmer, A. Spatial assessment of coastal development and land use change in the Eastern Cape, South Africa. *South African Geographical Journal* 92(2): 117-128).

Raper, P.E. 2004. New Dictionary of South African Place Names. Jeppestown: Jonathan Ball

Rudner, J. 1968. Strandloper pottery from South and South West Africa. *Annals of the South African Museum* 49: 441-663.

SAHRA. 1999. *National Heritage Resources Act No. 25 of 1999*. Cape Town: RSA Government Gazette.

SAHRA. 2007. *SG 2.2 SAHRA APM Guidelines: Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports.* Cape Town: South African Heritage Resources Agency.

Sisulu, E. 2002. Walter & Albertina Sisulu. David Phillips Publishers, an imprint of New Africa Books (Pty) Ltd. Claremont, South Africa.

Vinnicombe, P. 1976. *People of the Eland*. Pietermaritzburg: University of Natal Press.

Wadley, L. 2013. Recognizing complex cognition through innovative technology in Stone Age and Palaeolithic Sites. *Cambridge Archaeological Journal* 23: 163–183.

Wadley, L. 2015. Those marvellous millennia: the Middle Stone Age of Southern Africa. *Azania: Archaeological Research in Africa* 50(2):155-226, DOI: 10.1080/0067270X.2015.1039236.

Unpublished Sources

Active Heritage CC. 2013. Cultural Heritage Impact Assessment of 35 ha of indigenous grasslands at Newfields Farm, near Underberg, Kwasani Municipality.

African Heritage Consultants CC. 2013. Phase 1 Archaeological Impact Assessment. Proposed upgrading of road: Port Alfred to Keiskamma. SANRAL and African Heritage Resources.

AGES. 2011. Phase 1 Archaeological Impact Assesment Report. Mafube Greenfield Housing Development, Eastern Cape Province. Prepared for AGES Eastern Cape.

AGES. 2013. Nkantolo access road upgrade project, Mbizana Local Municipality, Alfred Nzo District Municipality, Eastern Cape Province, South Africa. Archaeological Impact Assessment Report. Prepared for: Department of Roads and Public Works.

Anderson, G. 2002. Archaeological Survey of the Hary Gwala housing development, Matatiele. For Udidi and KwaZulu-Natal Heritage

Feely, J.M. 1986. The distribution of Iron Age farming settle¬ment in Transkei, 470 to 1870. Unpublished Master's The¬sis, University of Natal.

Henry, L. 2010. Rock Art And The Contested Landscape Of The North Eastern Cape, South Africa. A dissertation for the Faculty of Humanities, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Master of Arts. Unpublished.

Kruger, N. 2011. Archaeological Impact Assessment (AIA) Of Demarcated Surface Areas at Mafube, Matatiele Municipality, Eastern Cape Province.

Prins, F. and Hall, S. 2012. Cultural Heritage Impact Assessment of the Proposed Umzimvubu Ward 14 Water Supply Scheme, Alfred Nzo District Municipality. An unpublished report by Active Heritage.

Van Ryneveld, K. 2012. Phase 1 Archaeological Impact Assessment. Refurbishment operation and maintenance of The Port Alfred east bank Dune Well water supply scheme Port Alfred Ndlambe Municipality, Eastern Cape South Africa.

Van Schalkwyk, J. 2015. Cultural heritage impact assessment for the proposed special maintenance of sections 6 and 7 of road R56 between Maclear and Indwe, Eastern Cape Province. Prepared for Chameleon Environmental.

Archaeological Databases

The database of MARA (Matatiele Archaeology and Rock Art) was accessed with the assistane of Dr Sam Challis and James Pugin.

Internet

Angloboerwar.com, 2014. http://www.angloboerwar.com/unit-information/south-african-units/1997-matatiele-european-reserve accessed 26.10.14.

CATHOLIC DIOCESE OF KOKSTAD, 2014. http://catholickokstad.mariannhillmedia.org/matatiele-holy-trinity/ accessed 26.10.14.

MATATIELE ARCHAEOLOGY AND ROCK ART PROJECT. 2014. http://marasurvey.wix.com/home#!mission/c21al accessed 26.05.2016

PRESIDENCY, REPUBLIC OF SOUTH AFRICA, 2014. http://www.thepresidency.gov.za/pebble.asp?relid=7579 accessed 26.10.14.

SA VENUES, 2014. http://www.sa-venues.com/attractionskzn/matatiele.php accessed 26.10.14

Appendix A

LEGISLATIVE REQUIREMENTS – TERMINOLOGY AND ASSESSMENT CRITERIA

General principles

In areas where there has not yet been a systematic survey to identify conservation worthy places, a permit is required to alter or demolish any structure older than 60 years. This will apply until a survey has been done and identified heritage resources are formally protected.

Archaeological and palaeontological sites, materials, and meteorites are the source of our understanding of the evolution of the earth, life on earth and the history of people. In terms of the heritage legislation, permits are required to damage, destroy, alter, or disturb them. Furthermore, individuals who already possess heritage material, are required to register it. The management of heritage resources is integrated with environmental resources and this means that, before development takes place, heritage resources are assessed and, if necessary, rescued.

In addition to the formal protection of culturally significant graves, all graves which are older than 60 years and are not located in a cemetery (such as ancestral graves in rural areas), are protected. The legislation also protects the interests of communities that have an interest in the graves: they should be consulted before any disturbance takes place. The graves of victims of conflict and those associated with the liberation struggle are to be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resources authority and, if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the construction company's cost. Thus, the construction company will be able to proceed without uncertainty about whether work will have to be stopped if an archaeological or heritage resource is discovered.

According to the National Heritage Act (Act 25 of 1999 section 32) it is stated that:
An object or collection of objects, or a type of object or a list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including –

- Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects, meteorites and rare geological specimens;
- visual art objects;
- military objects;
- numismatic objects;

- objects of cultural and historical significance;
- objects to which oral traditions are attached and which are associated with living heritage;
- objects of scientific or technological interest;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1 (xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996), or in a provincial law pertaining to records or archives; and
- any other prescribed category.

Under the National Heritage Resources Act (Act No. 25 of 1999), provisions are made that deal with, and offer protection to, all historic and prehistoric cultural remains, including graves and human remains.

Graves and cemeteries

Graves younger than 60 years fall 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 under 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 reinternment 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. In order 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).

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 under the jurisdiction of the South African Heritage Resources Agency (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 the category located inside a formal cemetery administrated by a local authority will also require the same authorisation as set out for graves younger than 60 years, over and above 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.

Appendix B

CURRICULUM VITAE

PROFESSIONAL CURRICULUM
FOR POLKE DOUSSY BIRKHOLTZ

Name: *Polke Doussy Birkholtz*

Date & Place of Birth: *9 February 1975 – Klerksdorp, North West Province, South Africa*

Place of Tertiary Education & Dates Associated:

Institution: University of Pretoria
Qualification: BA (Cum Laude) - Bachelor of Arts Specializing in Archaeology, History & Anthropology
Date: 1996

Institution: University of Pretoria
Qualification: BA Hons (Cum Laude) - Bachelor of Arts with Honours Degree Specializing in Archaeology
Date: 1997

Qualifications:

BA	-	Degree specialising in Archaeology, History and Anthropology
BA Hons	-	Professional Archaeologist

Memberships:

Association of Southern African Professional Archaeologists (ASAPA)
Professional Member of the CRM Section of ASAPA

Overview of Post Graduate Experience:

1997 – 2000 – Member/Archaeologist – Archaeo-Info
2001 – 2003 – Archaeologist/Heritage Specialist – Helio Alliance
2000 – 2008 – Member/Archaeologist/Heritage Specialist – Archaeology Africa
2003 - Present – Director / Archaeologist / Heritage Specialist – PGS Heritage

Languages: English: Speak, Read & Write & Afrikaans: Speak, Read & Write

Total Years' Experience: 17 Years

Experience Related to the Scope of Work:

- Polke has worked as a **HERITAGE SPECIALIST / ARCHAEOLOGIST / HISTORIAN** on more than 275 projects, and acted as **PROJECT MANAGER** on almost all of these projects. His experience include the following:

    - Development of New Sedimentation and Flocculation Tanks at Rand Water's Vereeniging Pumping Station, Vereeniging, Gauteng Province. Heritage Impact Assessment for *Greenline*.

- EThekwini Northern Aqueduct Project, Durban, KwaZulu-Natal. Heritage Impact Assessment for *Strategic Environmental Focus*.
- Johannesburg Union Observatory, Johannesburg, Gauteng Province. Heritage Inventory for *Holm Jordaan*.
- Development at Rand Water's Vereeniging Pumping Station, Vereeniging, Gauteng Province. Heritage Impact Assessment for *Aurecon*.
- Comet Ext. 8 Development, Boksburg, Gauteng Province. Phase 2 Heritage Impact Assessment for *Urban Dynamics*.
- Randjesfontein Homestead, Midrand, Gauteng Province. Baseline Heritage Assessment with Nkosinathi Tomose for Johannesburg City Parks.
- Rand Leases Ext. 13 Development, Roodepoort, Gauteng Province. Heritage Impact Assessment for *Marsh*.
- Proposed Relocation of the Hillendale Heavy Minerals Plant (HHMP) from Hillendale to Fairbreeze, KwaZulu-Natal. Heritage Impact Assessment for *Goslar Environmental*.
- Portion 80 of the farm Eikenhof 323 IQ, Johannesburg, Gauteng Province. Heritage Inventory for *Khare Incorporated*.
- Comet Ext. 14 Development, Boksburg, Gauteng Province. Heritage Impact Assessment for *Marsh*.
- Rand Steam Laundries, Johannesburg, Gauteng Province. Archival and Historical Study for *Impendulo* and *Imperial Properties*.
- Mine Waste Solutions, near Klerksdorp, North West Province. Heritage Inventory for *AngloGold Ashanti*.
- Consolidated EIA and EMP for the Kroondal and Marikana Mining Right Areas, North West Province. Heritage Impact Assessment for *Aquarius Platinum*.
- Wilkoppies Shopping Mall, Klerksdorp, North West Province. Heritage Impact Assessment for *Centre for Environmental Management*.
- Proposed Vosloorus Ext. 24, Vosloorus Ext. 41 and Vosloorus Ext. 43 Developments, Ekurhuleni District Municipality, Gauteng Province. Heritage Impact Assessment for *Enkanyini Projects*.
- Proposed Development of Portions 3, 6, 7 and 9 of the farm Olievenhoutbosch 389 JR, City of Tshwane Metropolitan Municipality, Gauteng Province. Heritage Impact Assessment for *Marsh*.
- Proposed Development of Lotus Gardens Ext. 18 to 27, City of Tshwane Metropolitan Municipality, Gauteng Province. Heritage Impact Assessment for *Pierre Joubert*.
- Proposed Development of the site of the old Vereeniging Hospital, Vereeniging, Gauteng Province. Heritage Scoping Assessment for *Lekwa*.
- Proposed Demolition of an Old Building, Kroonstad, Free State Province. Phase 2 Heritage Impact Assessment for *De Beers Consolidated Mines*.
- Proposed Development at Westdene Dam, Johannesburg, Gauteng Province. Heritage Impact Assessment for *Newtown*.
- West End, Central Johannesburg, Gauteng Province. Phase 1 Heritage Impact Assessment for the *Johannesburg Land Company*.
- Kathu Supplier Park, Kathu, Northern Cape Province. Heritage Impact Assessment for *Synergistics*.
- Matlosana 132 kV Line and Substation, Stilfontein, North West Province. Heritage Impact Assessment for *Anglo Saxon Group* and *Eskom*.

- Marakele National Park, Thabazimbi, Limpopo Province. Cultural Resources Management Plan for *SANParks*.
- Cullinan Diamond Mine, Cullinan, Gauteng Province. Heritage Inventory for *Petra Diamonds*.
- Highveld Mushrooms Project, Pretoria, Gauteng Province. Heritage Impact Assessment for *Mills & Otten*.
- Development at the Reserve Bank Governor's Residence, Pretoria, Gauteng Province. Archaeological Excavations and Mitigation for the *South African Reserve Bank*.
- Proposed Stones & Stones Recycling Plant, Johannesburg, Gauteng Province. Heritage Scoping Report for *KV3*.
- South East Vertical Shaft Section of ERPM, Boksburg, Gauteng Province. Heritage Scoping Report for *East Rand Proprietary Mines*.
- Proposed Development of the Top Star Mine Dump, Johannesburg, Gauteng Province. Detailed Archival and Historical Study for *Matakoma.*
- Soshanguve Bulk Water Replacement Project, Soshanguve, Gauteng Province. Heritage Impact Assessment for *KWP*.
- Biodiversity, Conservation and Participatory Development Project, Swaziland. Archaeological Component for *Africon*.
- Camdeboo National Park, Graaff-Reinet, Eastern Cape Province. Cultural Resources Management Plan for *SANParks*.
- Main Place, Central Johannesburg, Gauteng Province. Phase 1 Heritage Impact Assessment for the *Johannesburg Land Company*.
- Modderfontein Mine, Springs, Gauteng Province. Detailed Archival and Historical Study for *Consolidated Modderfontein Mines.*
- Proposed New Head Office for the Department of Foreign Affairs, Pretoria, Gauteng Province. Heritage Impact Assessment for *Holm Jordaan Group*.
- Proposed Modification of the Lukasrand Tower, Pretoria, Gauteng Province. Heritage Assessment for IEPM.
- Proposed Road between the Noupoort CBD and Kwazamukolo, Northern Cape Province. Heritage Impact Assessment for *Gill & Associates*.
- Proposed Development at the Johannesburg Zoological Gardens, Johannesburg, Gauteng Province. Detailed Archival and Historical Study for *Matakoma.*

- Polke's **KEY QUALIFICATIONS:**

  - Project Management
  - Archaeological and Heritage Management
  - Archaeological and Heritage Impact Assessment
  - Archaeological and Heritage Fieldwork
  - Archival and Historical Research
  - Report Writing

- Polke's **INFORMATION TECHNOLOGY EXPERIENCE:**

  - *MS Office – Word, Excel, & Powerpoint*
  - *Google Earth*

- *Garmin Mapsource*
- *Adobe Photoshop*
- *Corel Draw*

I, Polke Doussy Birkholtz, hereby confirm that the above information contained in my CV is true and correct.

PD Birkholtz

5 January 2016
Date

Appendix C

PALAEONTOLOGICAL DESKTOP STUDY