# HERITAGE SURVEY OF THE EZINKHETHENI DEVELOPMENT

## FOR ISIKHUNGUSETHU ENVIRONMENTAL SERVICES (PTY) LTD

## DATE: 15 February 2018

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# TABLE OF CONTENT

INTRODUCTION ..... 4
**KWAZULU-NATAL HERITAGE ACT NO. 4 OF 2008** ..... 10
METHOD ..... 12
Defining significance ..... 13
RESULTS ..... 16
DESKTOP STUDY ..... 16
PALAEONTOLOGICAL IMPACT ASSESSMENT ..... 21
FIELD SURVEY ..... 22
CONCLUSION ..... 22
REFERENCES ..... 22
**EXPERIENCE OF THE HERITAGE CONSULTANT** ..... 23
**DECLARATION OF INDEPENDENCE** ..... 23
APPENDIX A ..... 24
PIA LETTER OF EXEMPTION ..... 24

**TABLE OF FIGURES**

FIG. 1 GENERAL LOCATION OF THE STUDY AREA ..... 6
FIG. 2: AERIAL OVERVIEW OF THE STUDY AREA ..... 7
FIG. 3: TOPOGRAPHICAL OVERVIEW OF THE STUDY AREA ..... 8
FIG. 4: SCENIC VIEWS OF THE PIPELINE ROUTE ..... 9
TABLE 1: SAHRA GRADINGS FOR HERITAGE SITES ..... 15
FIG. 5: LOCATION OF KNOWN HERITAGE SITES NEAR THE STUDY AREA ..... 17
Fig. 6: Original Surveyor General Map (1863) ..... 18
FIG. 7: STUDY AREA IN 1937 ..... 19
FIG. 8: STUDY AREA IN 1968 ..... 20

## Abbreviations

| | |
|---|---|
| HP | Historical Period |
| IIA | Indeterminate Iron Age |
| LIA | Late Iron Age |
| EIA | Early Iron Age |
| ISA | Indeterminate Stone Age |
| ESA | Early Stone Age |
| MSA | Middle Stone Age |
| LSA | Late Stone Age |
| HIA | Heritage Impact Assessment |
| PIA | Palaeontological Impact Assessment |

# INTRODUCTION

During the mid 2000's, the Provincial Department of Education had been interested in developing the agricultural community around the area which had been lacking in Basic Education facilities and infrastructure. Previously the school was made of make shift material, bricks and mud bricks as a means to accommodate the learners. In 2012, AfriSam decided to buy Purchase Erf 55 Dunveria (14.23097 Ha) at R750 000. The land was then donated and registered in the Councils name, allowing the Department of Education to begin construction of Umsilinga Primary School which was to accommodate and cater for learners around Ezinketheni and Copesville

The Department of Education was given occupational rights to commence construction of the school in terms of the Executive Committee decision of 17/3/2011 and occupation will continue until the property can be subdivided in terms of the Planning and Development Act. Due to interference by some members of the community, graves were discovered on the site where the Sports field was to be placed on the school premises.

The National Environmental Management Act (108 of 1998) listed activities and Amafa aKwazulu-Natali did not permit the construction and development of graves within a 50m to a 100m buffer area. Thus Forcing the Department of Education to look to the Msunduzi Municipality for a solution. During a discussion meeting held by the Department of Education on the 17$^{th}$ May 2016 it was resolved that the Municipality would look to the Option of Purchasing Private land to finish the Sports field.

The Transnet Foundation together with Transnet SOC Ltd has identified Ezinketheni and Copesville as in dire need of social infrastructure particularly in the form of community center, clinic and ABM offices. This followed a request from the community made four years ago while the pipeline was being built.

The above- mentioned areas namely Ezinketheni and Copseville are quite strategic to Transnet, Government and business as the pipeline transporting gas and other petroleum products pass through the areas. There has been a number of theft and vandalism of the pipeline infrastructure over the past years and such it is Transnet`s opinion that investment in social infrastructure will contribute to community development of the residents and also ensure community buy in and protection of Transnet assets.

The study area is located northeast of Pietermaritzburg along the R33 (or Bambatha Road). Figures 1 – 4 show the location of the site.

Umlando was appointed by Isikhungusethu Environmental Services (Pty) Ltd to undertake an HIA of the new land for the proposed buildings.

**FIG. 1 GENERAL LOCATION OF THE STUDY AREA**

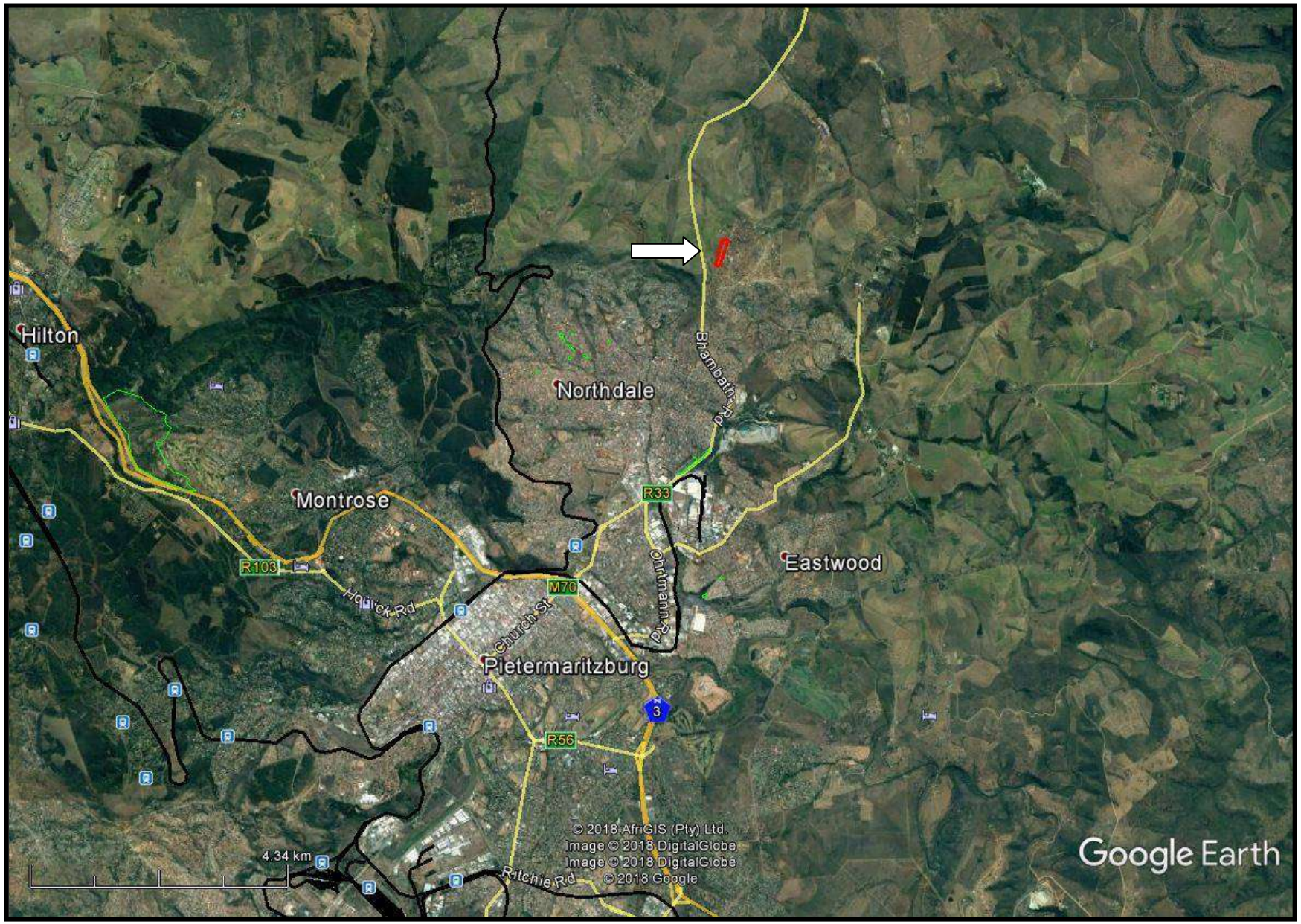


**FIG. 2: AERIAL OVERVIEW OF THE STUDY AREA**

**FIG. 3: TOPOGRAPHICAL OVERVIEW OF THE STUDY AREA**

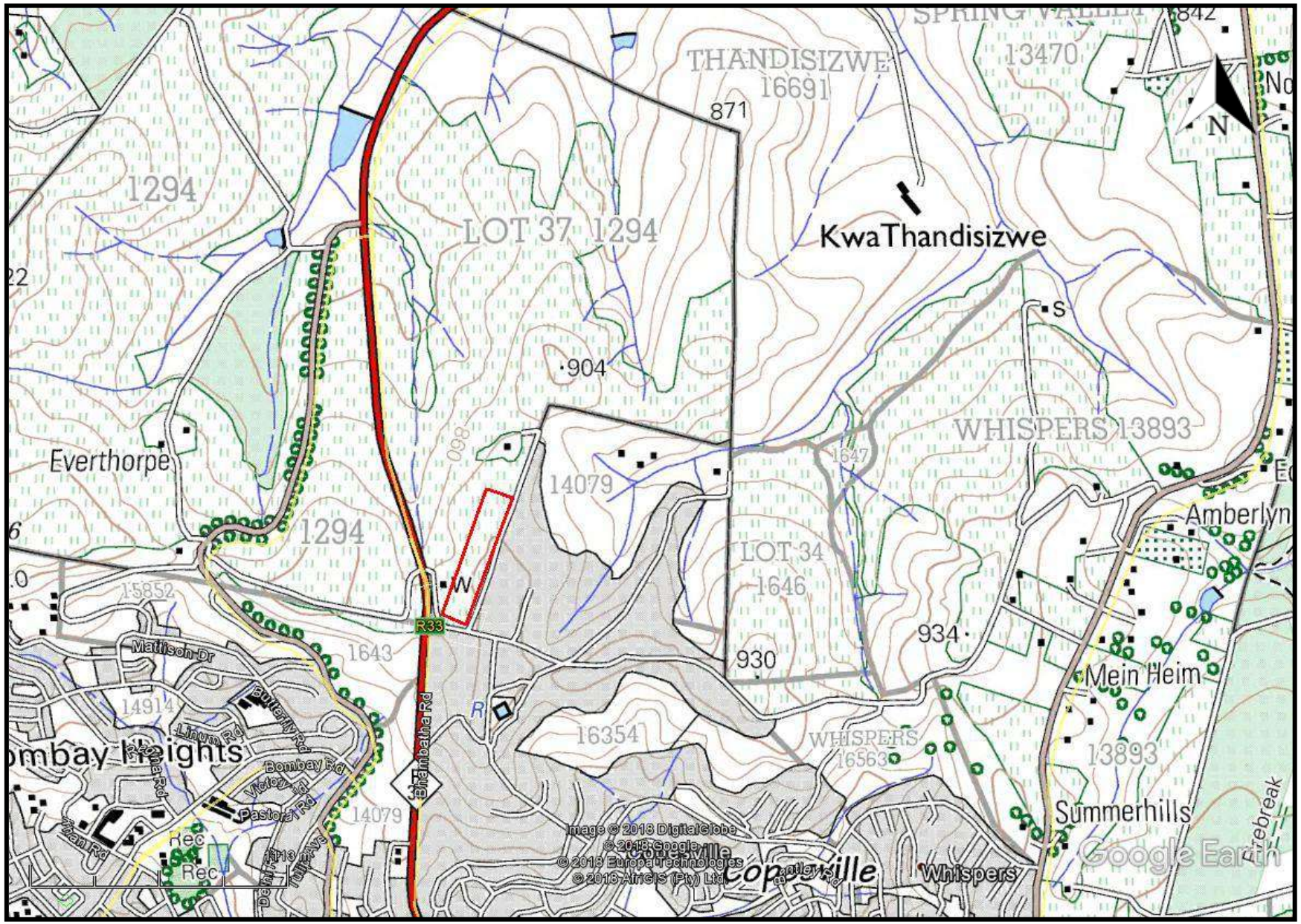


**FIG. 4: SCENIC VIEWS OF THE STUDY AREA**

**KWAZULU-NATAL HERITAGE ACT NO. 4 OF 2008**

"General protection: Structures.—

- No structure which is, or which may reasonably be expected to be older than 60 years, may be demolished, altered or added to without the prior written approval of the Council having been obtained on written application to the Council.
- Where the Council does not grant approval, the Council must consider special protection in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.
- The Council may, by notice in the *Gazette*, exempt—
- A defined geographical area; or
- defined categories of sites within a defined geographical area, from the provisions of subsection where the Council is satisfied that heritage resources falling in the defined geographical area or category have been identified and are adequately protected in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.
- A notice referred to in subsection (2) may, by notice in the *Gazette*, be amended or withdrawn by the Council.

General protection: Graves of victims of conflict.—No person may damage, alter, exhume, or remove from its original position—

- the grave of a victim of conflict;
- a cemetery made up of such graves; or
- any part of a cemetery containing such graves, without the prior written approval of the Council having been obtained on written application to the Council.
- General protection: Traditional burial places.—
- No grave—
- not otherwise protected by this Act; and
- not located in a formal cemetery managed or administered by a local authority, may be damaged, altered, exhumed, removed from its original

position, or otherwise disturbed without the prior written approval of the Council having been obtained on written application to the Council.

The Council may only issue written approval once the Council is satisfied that—

- the applicant has made a concerted effort to consult with communities and individuals who by tradition may have an interest in the grave; and
- the applicant and the relevant communities or individuals have reached agreement regarding the grave.

General protection: Battlefield sites, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites.—

- No person may destroy, damage, excavate, alter, write or draw upon, or otherwise disturb any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.
- Upon discovery of archaeological or palaeontological material or a meteorite by any person, all activity or operations in the general vicinity of such material or meteorite must cease forthwith and a person who made the discovery must submit a written report to the Council without delay.
- The Council may, after consultation with an owner or controlling authority, by way of written notice served on the owner or controlling authority, prohibit any activity considered by the Council to be inappropriate within 50 metres of a rock art site.
- No person may exhume, remove from its original position or otherwise disturb, damage, destroy, own or collect any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.
- No person may bring any equipment which assists in the detection of metals and archaeological and palaeontological objects and material, or

excavation equipment onto any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, or meteorite impact site, or use similar detection or excavation equipment for the recovery of meteorites, without the prior written approval of the Council having been obtained on written application to the Council.

- The ownership of any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site, on discovery, vest in the Provincial Government and the Council is regarded as the custodian on behalf of the Provincial Government." (KZN Heritage Act of 2008)

## METHOD

The method for Heritage assessment consists of several steps.

The first step forms part of the desktop assessment. Here we would consult the database that has been collated by Umlando. These databases contains archaeological site locations and basic information from several provinces (information from Umlando surveys and some colleagues), most of the national and provincial monuments and battlefields in Southern Africa (http://www.vuvuzela.com/googleearth/monuments.html) and cemeteries in southern Africa (information supplied by the Genealogical Society of Southern Africa). We use 1st and 2nd edition 1:50 000 topographical and 1937 aerial photographs where available, to assist in general location and dating of buildings and/or graves. The database is in Google Earth format and thus used as a quick reference when undertaking desktop studies. Where required we would consult with a local data recording centre, however these tend to be fragmented between different institutions and areas and thus difficult to access at times. We also consult with an historical architect, palaeontologist, and an historian where necessary.

The survey results will define the significance of each recorded site, as well as a management plan. All sites are grouped according to low, medium, and high significance for the purpose of this report. Sites of low significance have no diagnostic artefacts or features. Sites of medium significance have diagnostic artefacts or features and these sites tend to be sampled. Sampling includes the collection of artefacts for future analysis. All diagnostic pottery, such as rims, lips, and decorated sherds are sampled, while bone, stone, and shell are mostly noted. Sampling usually occurs on most sites. Sites of high significance are excavated and/or extensively sampled. Those sites that are extensively sampled have high research potential, yet poor preservation of features.

**Defining significance**

Heritage sites vary according to significance and several different criteria relate to each type of site. However, there are several criteria that allow for a general significance rating of archaeological sites.

These criteria are:

**1. State of preservation of:**

1.1. Organic remains:
1.1.1. Faunal
1.1.2. Botanical
1.2. Rock art
1.3. Walling
1.4. Presence of a cultural deposit
1.5. Features:
1.5.1. Ash Features
1.5.2. Graves
1.5.3. Middens
1.5.4. Cattle byres
1.5.5. Bedding and ash complexes

**2. Spatial arrangements:**

2.1. Internal housing arrangements

2.2. Intra-site settlement patterns

2.3. Inter-site settlement patterns

**3. Features of the site:**

3.1. Are there any unusual, unique or rare artefacts or images at the site?

3.2. Is it a type site?

3.3. Does the site have a very good example of a specific time period, feature, or artefact?

**4. Research:**

4.1. Providing information on current research projects

4.2. Salvaging information for potential future research projects

**5. Inter- and intra-site variability**

5.1. Can this particular site yield information regarding intra-site variability, i.e. spatial relationships between various features and artefacts?

5.2. Can this particular site yield information about a community's social relationships within itself, or between other communities?

**6. Archaeological Experience:**

6.1. The personal experience and expertise of the CRM practitioner should not be ignored. Experience can indicate sites that have potentially significant aspects, but need to be tested prior to any conclusions.

**7. Educational:**

7.1. Does the site have the potential to be used as an educational instrument?

7.2. Does the site have the potential to become a tourist attraction?

7.3. The educational value of a site can only be fully determined after initial test-pit excavations and/or full excavations.

**8. Other Heritage Significance:**

8.1. Palaeontological sites

8.2. Historical buildings

8.3. Battlefields and general Anglo-Zulu and Anglo-Boer sites

8.4. Graves and/or community cemeteries

8.5. Living Heritage Sites

8.6. Cultural Landscapes, that includes old trees, hills, mountains, rivers, etc related to cultural or historical experiences.

The more a site can fulfill the above criteria, the more significant it becomes. Test-pit excavations are used to test the full potential of an archaeological deposit. This occurs in Phase 2. These test-pit excavations may require further excavations if the site is of significance (Phase 3). Sites may also be mapped and/or have artefacts sampled as a form of mitigation. Sampling normally occurs when the artefacts may be good examples of their type, but are not in a primary archaeological context. Mapping records the spatial relationship between features and artefacts.

The above significance ratings allow one to grade the site according to SAHRA's grading scale. This is summarised in Table 1.

**TABLE 1: SAHRA GRADINGS FOR HERITAGE SITES**

| SITE SIGNIFICANCE | FIELD RATING | GRADE | RECOMMENDED MITIGATION |
|---|---|---|---|
| **High Significance** | National Significance | Grade 1 | Site conservation / Site development |
| **High Significance** | Provincial Significance | Grade 2 | Site conservation / Site development |
| **High Significance** | Local Significance | Grade 3A / 3B | |
| **High / Medium Significance** | Generally Protected A | | Site conservation or mitigation prior to development / destruction |
| **Medium Significance** | Generally Protected B | | Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction |
| **Low Significance** | Generally Protected C | | On-site sampling monitoring or no archaeological mitigation required prior to or during development / destruction |

# RESULTS

## DESKTOP STUDY

The desktop study consisted of analysing various maps for evidence of prior habitation in the study area, as well as for previous archaeological surveys. The archaeological database indicates that there are archaeological sites in the general area (fig. 5). These sites include all types of Stone Age and Iron Age sites. No sites occur in the study area.

The SAHRIS database indicates that there is a historical crematorium within 100m of the crematorium: The Old Satya Vardhak Sabha Crematorium, Cremorne Cemetery, Pietermaritzburg. However, this has been incorrectly databased.

No national monuments, battlefields, or historical cemeteries are known to occur in the study area.

The property was first surveyed in 1853 (fig. 6). No buildings are shown on the SGD.

The 1937 aerial photographs indicate that the area is already under afforestation (fig. 7) This continued for several decades to at least 1968 (fig. 8). The building indicated on the 1968 topographical map (fig. 8) does not exist anymore.

As noted in the introduction some graves were noted near the school. These are outside the development footprint.

**FIG. 5: LOCATION OF KNOWN HERITAGE SITES NEAR THE STUDY AREA**

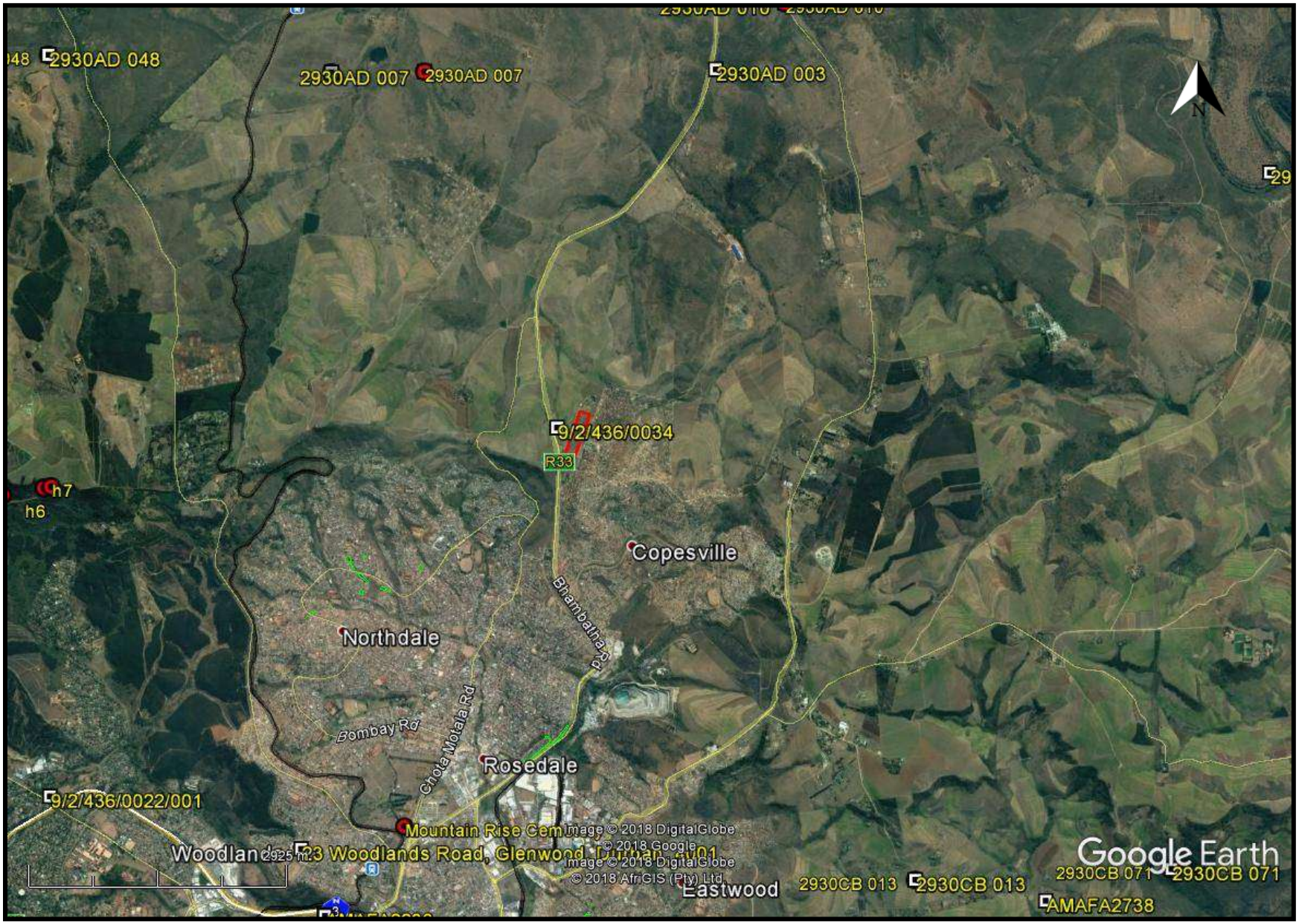


**FIG. 6: ORIGINAL SURVEYOR GENERAL MAP (1853)[1]**

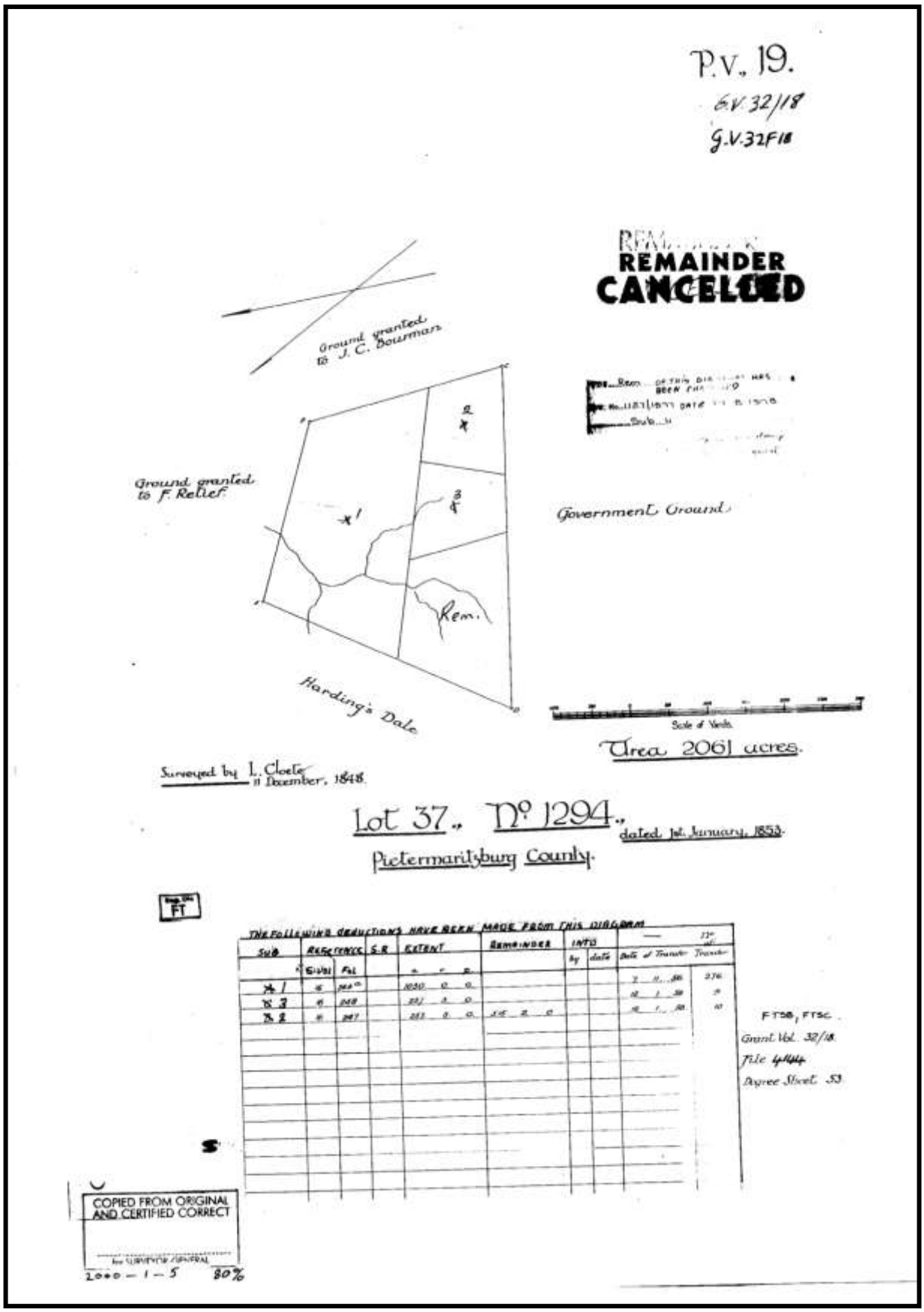
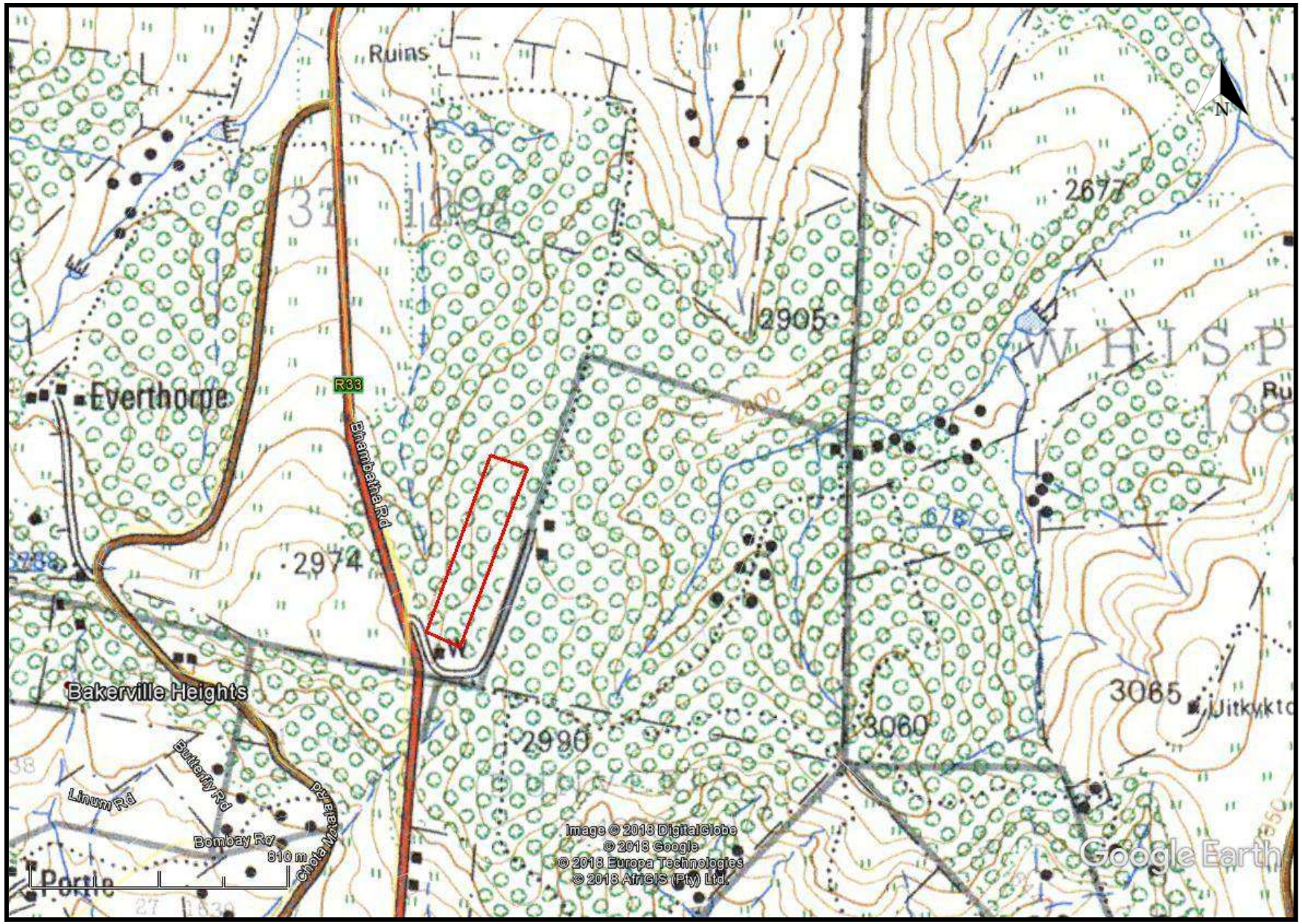


**FIG. 7: STUDY AREA IN 1937**[2]


[2] 117B_049_03462

**FIG. 8: STUDY AREA IN 1968**



## PALAEONTOLOGICAL IMPACT ASSESSMENT

The study area is half in the green and/or grey for palaeosensitivity (fig. 9). Dr Gideon Groenewald has given a letter of exemption for this project (Appendix A) due to the highly disturbed area and minimal impact.

**FIG. 9: PALAEONTOLOGICAL SENSITIVITY OF THE STUDY AREA**

| COLOUR | SENSITIVITY | REQUIRED ACTION |
|---|---|---|
| RED | VERY HIGH | field assessment and protocol for finds is required |
| ORANGE/YELLOW | HIGH | desktop study is required and based on the outcome of the desktop study, a field assessment is likely |
| GREEN | MODERATE | desktop study is required |
| BLUE | LOW | no palaeontological studies are required however a protocol for finds is required |
| GREY | INSIGNIFICANT/ZERO | no palaeontological studies are required |
| WHITE/CLEAR | UNKNOWN | these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map. |

## FIELD SURVEY

The study area has been under afforestation for several decades, and then turned into sugar cane fields. The study area occurs on the eastern side of the main hill. Any archaeological sites that would have existed in the area, would have occurred on the top of the hill, i.e. where the existing buildings occur.

The study area has thus been severely impacted by various forms of agriculture since the 1930s.

The field survey did not record any heritage sites.

No further mitigation or assessment is required.

## CONCLUSION

A heritage survey was undertaken for the proposed development at Ezinkhetheni. No heritage sites were observed along the route and no further mitigation is required.

## REFERENCES

Aerial photograph: 1937. 117B_016_5230
1:50 000 topographical: 2930CB Pietermaritzburg, 1968 2000

Datrabase:
Umlando database
SAHRIS database (when working)
Natal Museum database

## EXPERIENCE OF THE HERITAGE CONSULTANT

Gavin Anderson has a M. Phil (in archaeology and social psychology) degree from the University of Cape Town. Gavin has been working as a professional archaeologist and heritage impact assessor since 1995. He joined the Association of Professional Archaeologists of Southern Africa in 1998 when it was formed. Gavin is rated as a Principle Investigator with expertise status in Rock Art, Stone Age and Iron Age studies. In addition to this, he was worked on both West and East Coast shell middens, Anglo-Boer War sites, and Historical Period sites.

## DECLARATION OF INDEPENDENCE

I, Gavin Anderson, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.

Gavin Anderson
Archaeologist/Heritage Impact Assessor

# APPENDIX A

# PIA LETTER OF EXEMPTION

# APPLICATION FOR EXEMPTION FROM THE PALAEONTOLOGICAL ASSESSMENT PROCESS FOR THE PROPOSED DEVELOPMENT IN THE THANDISIZWE AREA, MSUNDUZI LOCAL MUNICIPALITY, UMGUNGUNGLOVU DISTRICT MUNICIPALITY, KWAZULU-NATAL PROVINCE.

**FOR**

**Umlando**

**DATE: 10 February 2018**

**By**

**Gideon Groenewald**

**Cell: 078 713 6377**

## EXECUTIVE SUMMARY

Gideon Groenewald was appointed by Umlando to undertake a Desktop Survey, assessing the potential Palaeontological Impact related to an Application for Exemption from the PIA Process during the Construction of the proposed development in the Thandisizwe Area, Msunduzi Local Municipality, Umgungunglovu District Municipality, Kwazulu-Natal Province.

This report provide reasons why the developer requests exemption from the PIA process and the man reason is that the entire development node is close to an existing rural housing area, where the chances of finding unbroken fossils is very low indeed. The development include some excavation but rarely deeper than 2m.

**Legal Requirements**

This Palaeontological Assessment forms part of the Heritage Impact Assessment (HIA) and complies with the requirements of the South African National Heritage Resource Act No 25 of 1999 (revised 2014) as well as the KwaZulu-Natal Heritage Act No 4 of 2008. In accordance with Section 38 of the National Resources Act No 25 of 1999 (Heritage Resources Management), a HIA is required to assess any potential impacts to palaeontological heritage within the development footprint.

The development site applicable to the Application for Exemption from the PIA Process during the Construction of the proposed development in the Thandisizwe Area, Msunduzi Local Municipality, Umgungunglovu District Municipality, Kwazulu-Natal Province, is underlain by moderate to low sensitivity rocks of the Karoo Supergroup.

No significant fossils are expected when excavation (>1.5m) are done, and for this reason the author of this Application for Exemption from the PIA process, is confident that very few if any fossils will be disturbed during the construction phase. If fossils are, however recorded during excavations, it will contribute significantly to our knowledge of the Palaeontological Heritage of the KwaZulu-Natal Province.

It is recommended that:

The EAP and ECO must be informed of the fact that most of the area with very flat topography, has a Moderate to Low Palaeontological Sensitivity, but no recording of significant fossils are foreseen.

It is recommended that AMAFA issue the developer with an “Exemption from the PIA Process” with the proviso that if any fossils are observed, that the HIA specialist will be informed immediately for appropriate actions according to the Law.

These recommendations must be included in the EMPr of this project.

## TABLE OF CONTENT

EXECUTIVE SUMMARY ..... 26
Legal Requirements ..... 26
TABLE OF CONTENT ..... 28
INTRODUCTION ..... 29
Legal Requirements ..... 29
Aims and Methodology ..... 29
Scope and Limitations of the Desktop Study ..... 33
Locality and Proposed Development ..... 34
GEOLOGY ..... 35
PALAEONTOLOGY ..... 36
PALAEONTOLOGICAL IMPACT AND MITIGATION ..... 36
CONCLUSION ..... 37
REFERENCES ..... 39
QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR ..... 40
DECLARATION OF INDEPENDENCE ..... 40

## TABLE OF FIGURES

Figure 1 Locality of the proposed pipeline in purple ..... 35
Figure 2 Locality of the Study Area ..... 35
Figure 3 Geology of the study area is mainly Dolerite and Pietermaritzburg Shale ..... 35
Figure 4 The Chance Find of Significant fossils is indeed very low at this specific site ..... 37

## LIST OF TABLES

Table 1 Palaeontological sensitivity analysis outcome classification . 31

## INTRODUCTION

Gideon Groenewald was appointed by Umlando to undertake a Desktop Survey, assessing the potential Palaeontological Impact related to an Application for Exemption from the PIA Process during the Construction of the proposed development in the Thandisizwe Area, Msunduzi Local Municipality, Umgungunglovu District Municipality, Kwazulu-Natal Province.

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Categories of heritage resources recognised as part of the National Estate in Section 3 of the Heritage Resources Act, and which therefore fall under its protection, include:

- geological sites of scientific or cultural importance;
- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; and
- objects with the potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.

### Aims and Methodology

A Desktop investigation by the writer of this report indicated that any excavation into the geological formations on site will most probably not lead to the discovery of fossils, and due to the relatively shallow excavations planned, the chance find of significant fossils is not high enough to warrant expensive Palaeontological Investigations. The aim of this report is to satisfy the

requirements of AMAFA and SAHRA and although it is the only opportunity to record the fossil heritage within the development footprint, the request is for AMAFA to provide a "Letter of Exemption from the PIA Process". The rest of this report contains information that will provide AMAFA with reasons for the request of exemption.

Following the "*SAHRA APM Guidelines: Minimum Standards for the Archaeological & Palaeontological Components of Impact Assessment Reports*" the aims of the palaeontological impact assessment are:

- to identifying exposed and subsurface rock formations that are considered to be palaeontologically significant;
- to assessing the level of palaeontological significance of these formations;
- to comment on the impact of the development on these exposed and/or potential fossil resources and
- to make recommendations as to how the developer should conserve or mitigate damage to these resources.

A preliminary assessment (desktop study) of the topography and geology of the study area was made using appropriate 1:250 000 geological maps (2730 Dundee) in conjunction with Google Earth. Potential fossiliferous rock units (groups, formations etc) have been identified within the study area and the known fossil heritage within each rock unit is inventoried from the published scientific literature, previous palaeontological impact studies in the same region and the author's field experience.

Priority palaeontological areas are identified within the development footprint to focus the field investigator's time and resources. The aim of the desktop survey is to document any exposed fossil material and to assess the palaeontological potential of the region in terms of the type and extent of rock outcrop in the 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 minimal extent of fresh bedrock excavation envisaged. The different sensitivity classes used are explained in Table 1 below.

**Table 1 Palaeontological sensitivity analysis outcome classification**

| 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) and Groenewald et al., (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) compulsory. |
| **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 dolerite sill outcrops. Collection of a representative sample of potential fossiliferous material recommended. At least a Desktop Survey and "Chance Find Protocol" is compulsory. The Chance Find Protocol must be included in the EMPr for the project. |

| | |
|---|---|
| **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. At least a Desktop Survey and "Chance Find Protocol" document is compulsory. The Chance Find Protocol must be included in the EMPr of the project. |

Despite the fact that nearly half of the area outlined in this application falls on geology with a moderate Sensitivity for Palaeontology, the actual trenching development will be limited to existing disturbed areas where houses have been built over many years already.

**Scope and Limitations of the Desktop Study**

The study will include: i) an analysis of the area's stratigraphy, age and depositional setting of fossil-bearing units; ii) a review of all relevant palaeontological and geological literature, including geological maps, and previous palaeontological impact reports; iii) data on the proposed

development provided by the developer (e.g. location of footprint, depth and volume of bedrock excavation envisaged) and iv) where feasible, location and examination of any fossil collections from the study area (e.g. museums).

The key assumption for this scoping study is that the existing geological maps and datasets used to assess site sensitivity are correct and reliable. However, the geological maps used were not intended for fine scale planning work and are largely based on aerial photographs alone, without ground-truthing. There is also an inadequate database for fossil heritage for much of the RSA, due to the small number of professional palaeontologists carrying out fieldwork in RSA and the Kingdom of Lesotho. Most development study areas have never been surveyed by a palaeontologist.

These factors may have a major influence on the assessment of the fossil heritage significance of a given development and without supporting field assessments may lead to either:

- an underestimation of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or
- an overestimation of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by weathering, or are buried beneath a thick mantle of unfossiliferous “drift” (soil, alluvium etc.).

**Locality and Proposed Development**

The study area comprises the built-up areas in Thandisizwe, located within the Thandisizwe Area, Msunduzi Local Municipality, Umgungunglovu District Municipality, KwaZulu-Natal Province, and no significant fossil finds are expected during the development.


**Figure 2 Locality of the Study Area**

## GEOLOGY

The site of the development falls mainly on Permian aged highly weathered shale of the Pietermaritzburg Formation, Ecca Group and Jurassic aged dolerite of the Karoo Supergroup.

The desktop survey concludes that the chance find of any significant fossils is indeed very low.


**Figure 3 Geology of the study area is mainly Dolerite and Pietermaritzburg Shale**

## PALAEONTOLOGY

Almost the entire proposed development area is underlain by Low to Moderately Sensitive Permiian to Jurassic aged rocks of the Karoo Supergroup. The chance find of significant fossil is very low. Any finds of fossils must however still be reported to AMAFA.

The author of this Application for Exemption from the PIA process is convinced that, the areas where the development of infrastructure is planned have been trampled and the chance find of significant Palaeontological Heritage is too small to warrant a full PIA process. It is however important that AMAFA includes a recommendation that, should any fossils be recognised during the development, a suitably qualified Palaeontologist must assess the presence of the fossils and act accordingly. The most likely fossils will only be associated with unweathered upper shales of the Pietermaritzburg Formation and the choice of the site is clearly on the highly fractured contact of the shale with the highly weathered dolerite, a rock that will not contain fossils.

## PALAEONTOLOGICAL IMPACT AND MITIGATION

The predicted palaeontological impact of the development (Figure 3) is based on the initial mapping assessment and literature reviews as well as information gathered during the desktop investigation. The desktop investigation confirms that the study area is underlain by relatively deep (>2m) sandy soil associated with the Permian aged Pietermaritzburg Formation. These upper part of this rock unit is known to be very rich in Palaeontological Heritage objects (trace fossils) and, although highly unlikely, if these are recorded during the development, the HIA specialist as well as the Palaeontologist must be informed for immediate and appropriate action.

Dolerite will not contain fossils and, to date, no significant fossils have been recorded from them KZN.

The excavations for the construction of the infrastructure for this development will most probably not expose any important fossiliferous rock units. Due to the igneous nature of the dolerite, it will not contain fossils.

**Figure 4 The Chance Find of Significant fossils is indeed very low at this specific site**

This application is for an exemption from the PIA process normally required for these areas and although highly unlikely, any recording of fossils will contribute significantly to our understanding of previous eco-systems. Sighting of fossil material must be reported to the HIA specialist.

## CONCLUSION

The development site applicable to the Application for Exemption from the PIA Process during the Construction of the proposed development in the Thandisizwe Area, Msunduzi Local Municipality, Umgungunglovu District Municipality, Kwazulu-Natal Province, is underlain by moderate to low sensitivity rocks of the Karoo Supergroup.

No significant fossils are expected when excavation (>1.5m) are done, and for this reason the author of this Application for Exemption from the PIA process, is confident that very few if any fossils will be disturbed during the construction phase. If fossils are, however recorded during excavations, it will contribute significantly to our knowledge of the Palaeontological Heritage of the KwaZulu-Natal Province.

It is recommended that:

The EAP and ECO must be informed of the fact that most of the area with very flat topography, has a Moderate to Low Palaeontological Sensitivity, but no recording of significant fossils are foreseen.

It is recommended that AMAFA issue the developer with an “Exemption from the PIA Process” with the proviso that if any fossils are observed, that the HIA specialist will be informed immediately for appropriate actions according to the Law.

These recommendations must be included in the EMPr of this project.

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## QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

Dr Gideon Groenewald has a PhD in Geology from the University of Port Elizabeth (Nelson Mandela Metropolitan University) (1996) and the National Diploma in Nature Conservation from Technicon RSA (the University of South Africa) (1989). He specialises in research on South African Permian and Triassic sedimentology and macrofossils with an interest in biostratigraphy, and palaeo-ecological 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).

## DECLARATION OF INDEPENDENCE

I, Gideon Groenewald, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of palaeontological heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.

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