

**DESKTOP HIA FOR THE TRIPLE A BEEF
ABATTOIR AND FEED LOT**

**FOR THE INDEPENDENT ENVIRONMENTAL
ADVISOR CC**

DATE: 25 SEPTEMBER 2022

By Gavin Anderson

**Umlando: Archaeological Surveys and Heritage
Management**

PO Box 10153, Meerensee, 3901

Phone: 035-7531785 Cell: 0836585362

umlando@gmail.com



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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

Caine Farming Pty Ltd, trading as Triple A Beef, operates a feedlot and abattoir in the Albert Falls Dam area over 13 adjacent properties. The first property (Ptn 8 Shallow Drift) was bought in 1980 to establish a feedlot. As time passed, additional adjacent properties were purchased to enable the expansion of the feedlot and associated infrastructure such as cattle handling facilities (including loading and offloading facilities), transition paddocks, hospital facilities for sick animals, feed preparation, workshops and offices, abattoir, fodder production, and common services for the feedlot and abattoir.

The impetus for each acquisition came from events such as an outbreak of foot and mouth disease and the closure of the nearby CRAFCOR feedlot and ABACOR abattoir at Cato Ridge, as well as the need to treat and dispose of waste water from the abattoir, and then the need to grow as much of the feedlot ration on site as possible thereby reducing reliance on external farming operations.

The closure of the ABACOR abattoir at Cato Ridge necessitated the establishment of the TAB abattoir on site. It provided the benefit that cattle diseases could be better managed and controlled with appropriate quarantine protocols to ensure animal health and meat safety.

Onsite facilities provided opportunity for vertical integration and to dispose of wastewater beneficially – producing animal feed onsite.

As each property was acquired, worker accommodation was consolidated and amenities provided in consultation with the workers.

All amenities and infrastructure are in place, including:

- Administration
- Feed production sheds

- Abattoir and associated cold and freezer rooms, processing carcasses to primal cuts with deboning facilities, hide preparation, offices, waste water treatment ponds
 - Feedlot pens with feed and water troughs
 - Raw water abstraction points (x4) from the Umngeni River with pipe lines to raw water storage dams (off channel) and reticulation to feedlot pens and other infrastructure
 - Waste water dams runoff from the feedlot pens and wash water from within the cattle drinking facilities (off channel).
 - Housing for workers (separate for feedlot and farm staff, and for abattoir workers)
 - Internal roads and farm tracks
 - Manure storage area

As additional properties were added to the TAB operations, relevant existing infrastructure was either retained (internal farm access, dams) or removed (nursery infrastructure, poultry houses, farm worker accommodation of poor quality).

Umlando was requested to undertake a desktop HIA of the area to determine what could have been affected by the expansion. Figures 1 – 4 show the location of the development.

FIG. 1 GENERAL LOCATION OF THE PROPOSED DEVELOPMENT

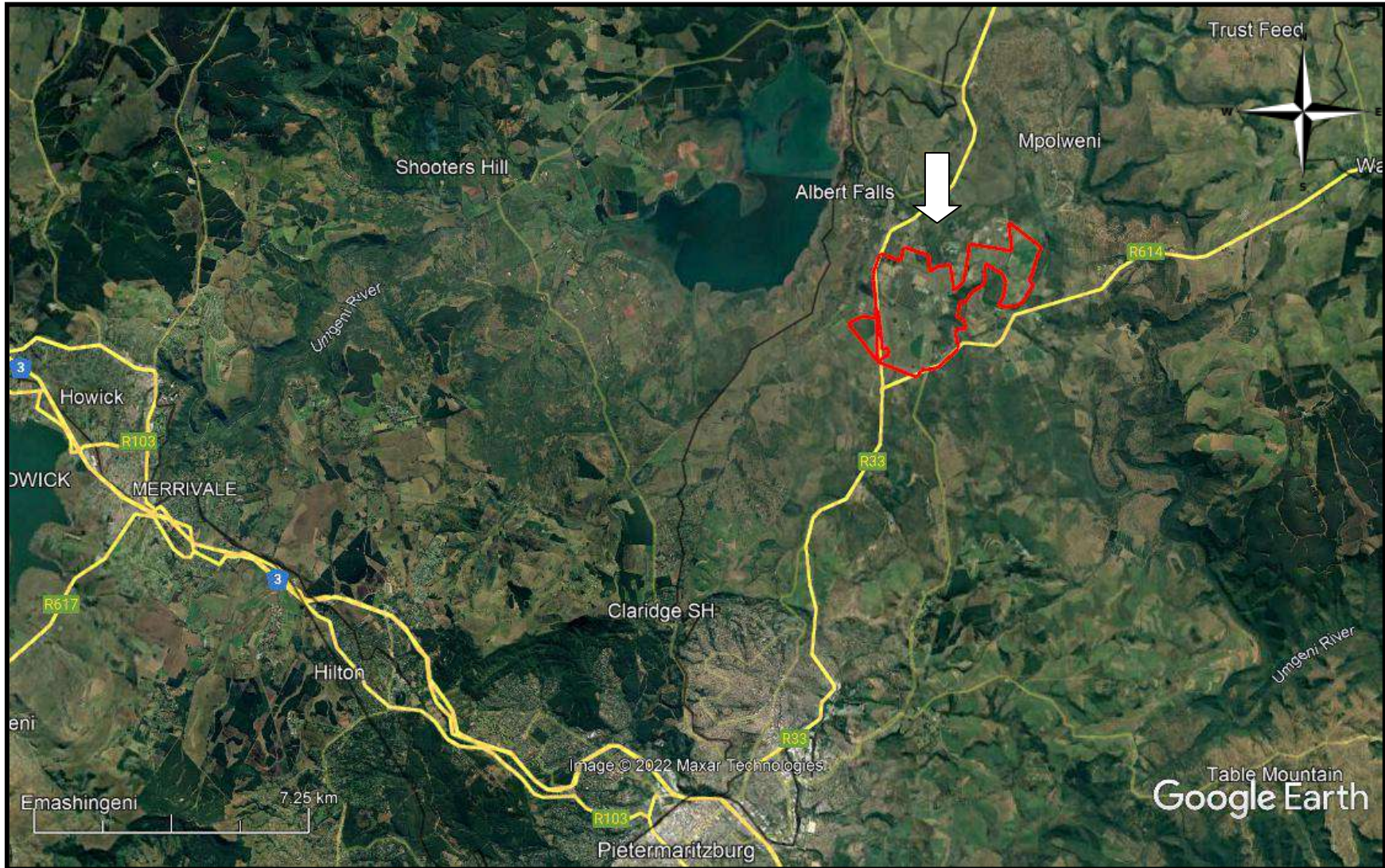


FIG. 2: AERIAL OVERVIEW OF THE PROPOSED DEVELOPMENT

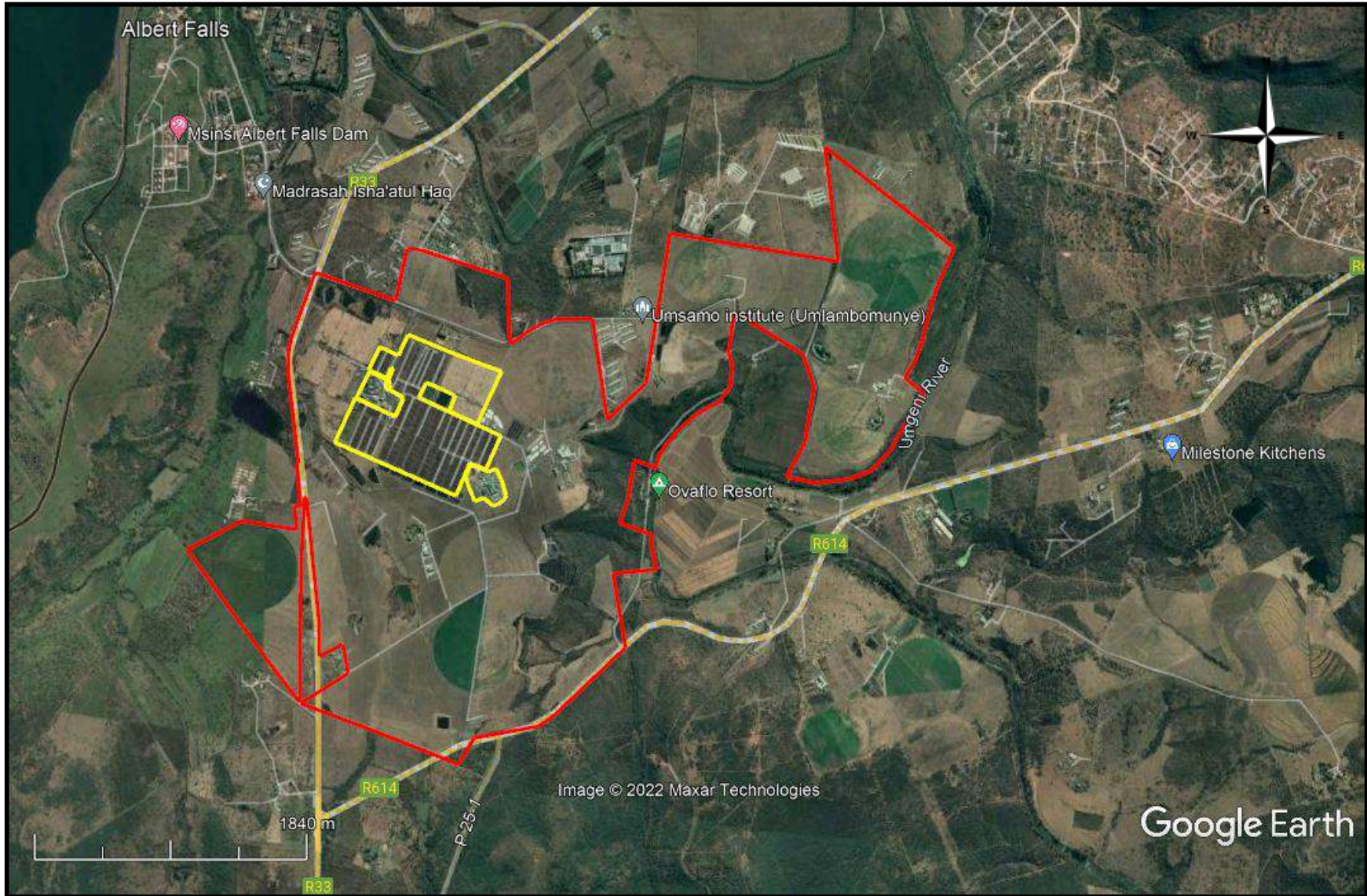


FIG. 3: TOPOGRAPHICAL MAP OF THE PROPOSED DEVELOPMENT (2000)

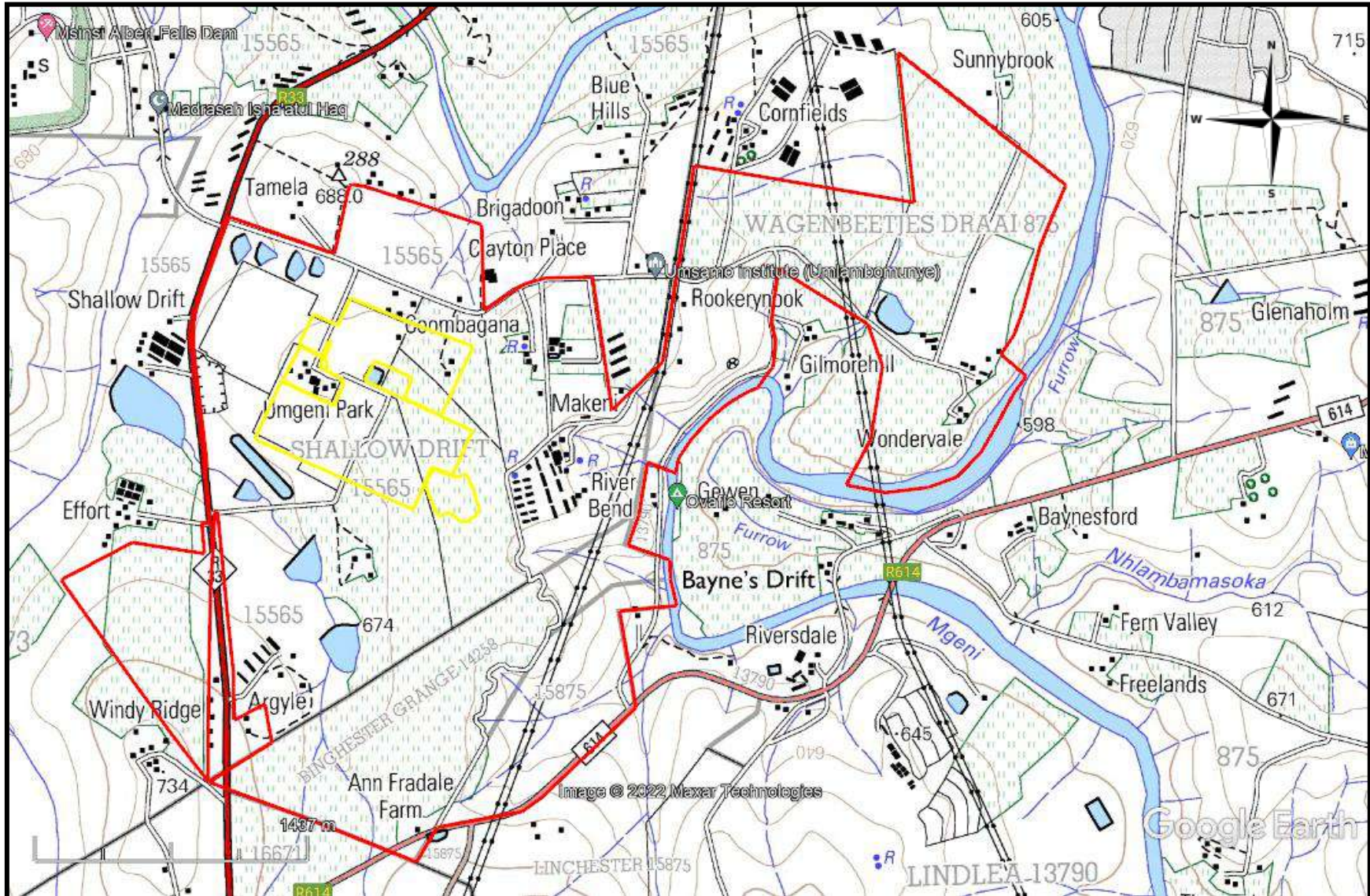


FIG. 4: SCENIC VIEWS OF THE STUDY AREA





Ptn 7 Shallow Drift hay lands, north of D73



Feedlot staff housing along D73, asbestos roofing scheduled for removal October 2022



Pasture and hay production & storage south of D73, note centre pivot



Quarantine herd on Wondervale (Ptn 20 Wagenbeetjes Draai)



Rookerynook hay lands (Ptn 46 Wagenbeetjes Draai)



Yellow billed kites along Umngeni River

KWAZULU NATAL AMAFA AND RESEARCH INSTITUTE, ACT 05, 2018

“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.”

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. This 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. Table 1 lists the grading system.

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

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 general area is known for its stone age material (fig. 5). These sites are open scatters of stone tools in secondary deposits that occur throughout KZN. No surveys have occurred near the study area; however, the general area is known to be archaeologically sensitive. The affected Triple A Beef Are will probably have several stone tools as well; however, these are of low, or no, significance. The KZN Museum database has a site in the middle of the Abattoir; however, it has been incorrectly placed as the site record form mentions it is near Otto's Bluff Station.

The 1937 aerial photograph indicates that there are 10 built structures in the Triple A property. The area by the Admin. Feed has built structures and are probably the original farm house(s) (fig. 6). The rest of the property appears to be grasslands with farm labourers' houses in the north and Argyle to the south. The labourers' houses could have graves associated with them.

The 1968 topographical map indicates additional labourers' buildings to the north and Umgeni Park has expanded (fig. 7). This is repeated on the 1972 aerial photograph (fig. 8) and 1989 aerial photograph.

By 2003, the farmhouse still exists; however, there are several more buildings around it (fig. 8). Most of the farm labourers' houses no longer exist.

The current Google Earth imagery indicates that the original farm buildings still exist. None of the farm labourers' houses occurs, as they are now agricultural fields.

FIG. 5: LOCATION OF KNOWN HERITAGE SITES IN THE GENERAL AREA

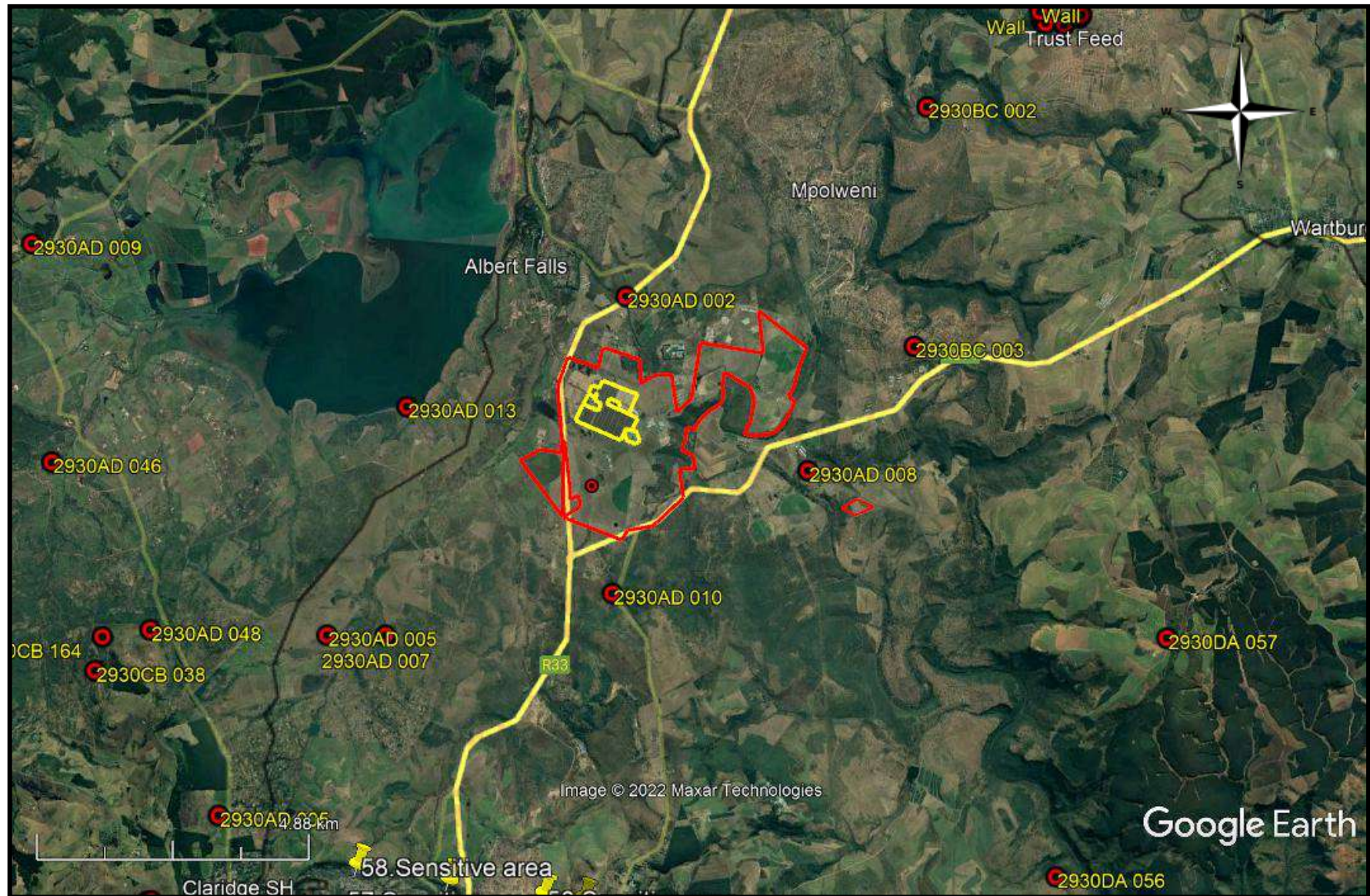


FIG. 6: LOCATION OF THE STUDY AREA IN 1937

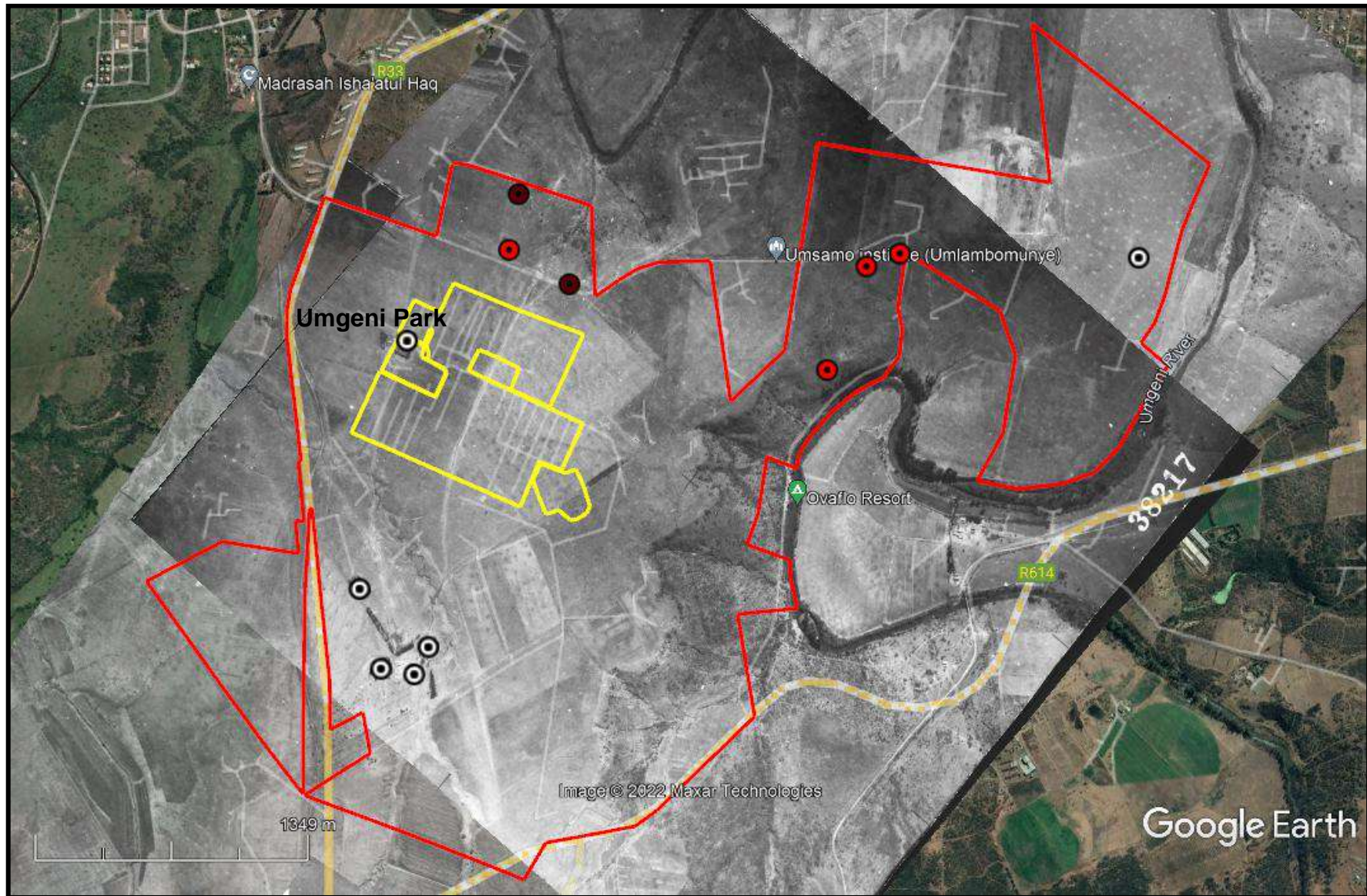


FIG. 7: LOCATION OF THE STUDY AREA IN 1968

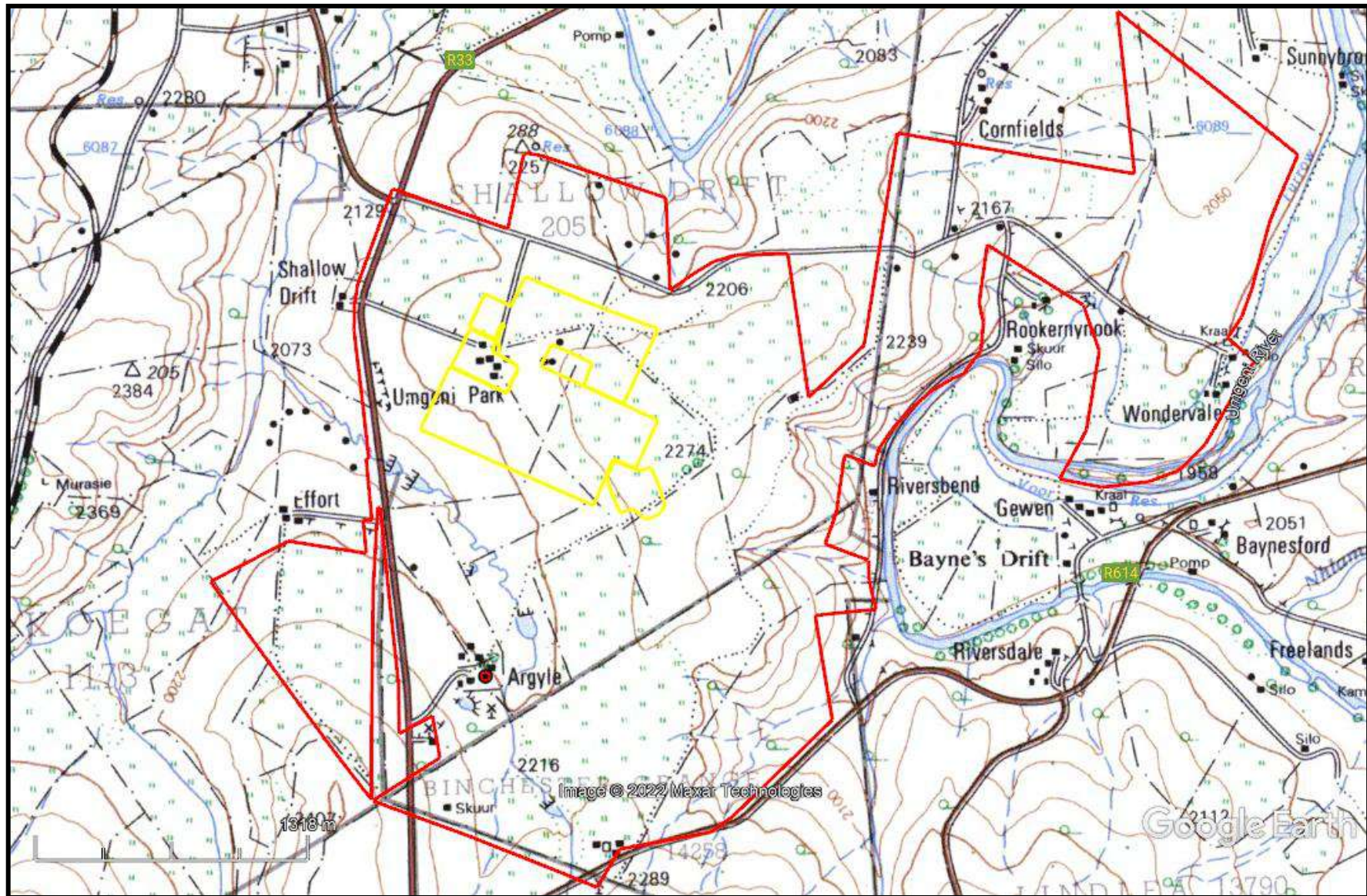


FIG. 8: LOCATION OF THE STUDY AREA IN 1972

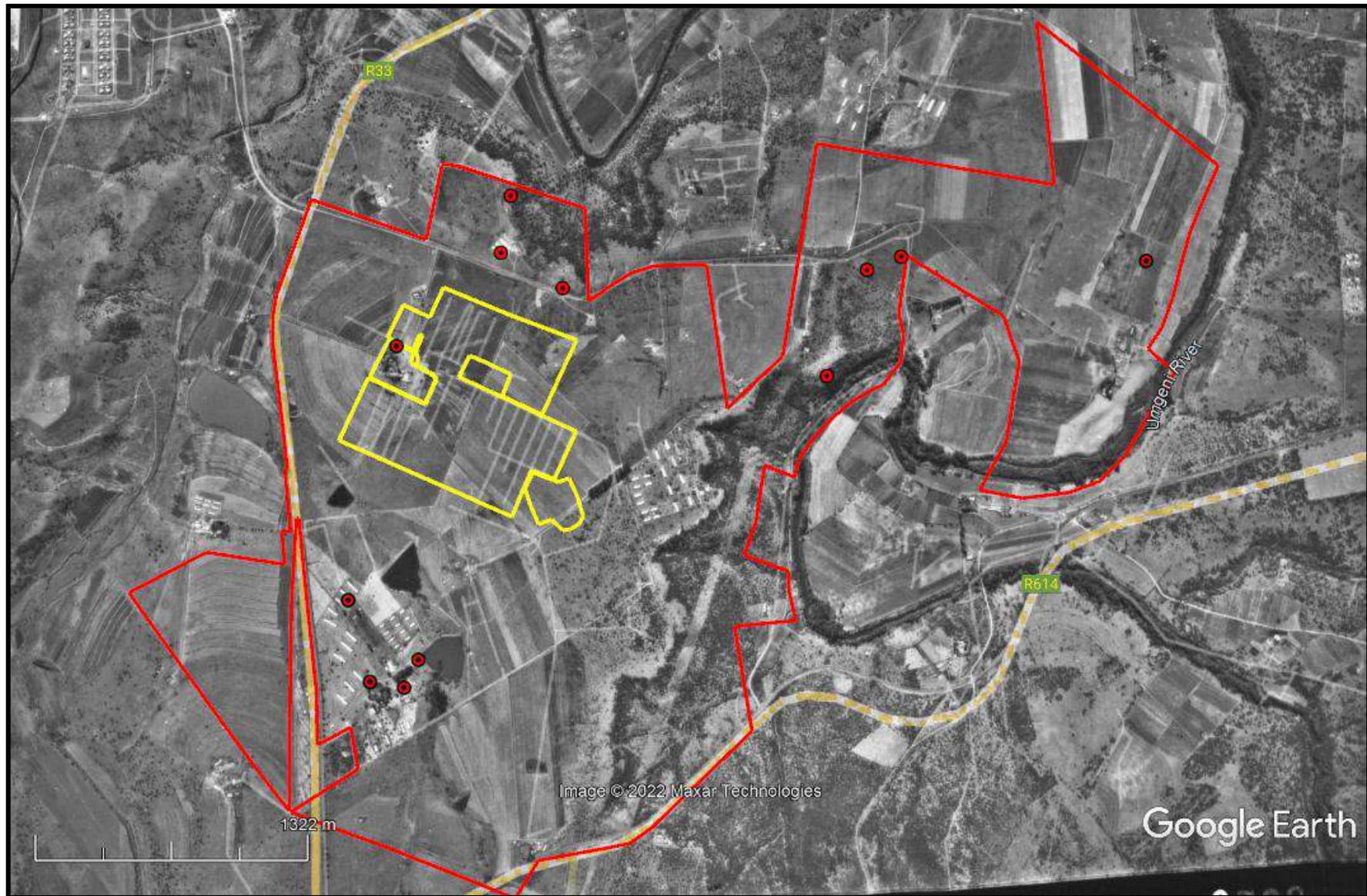
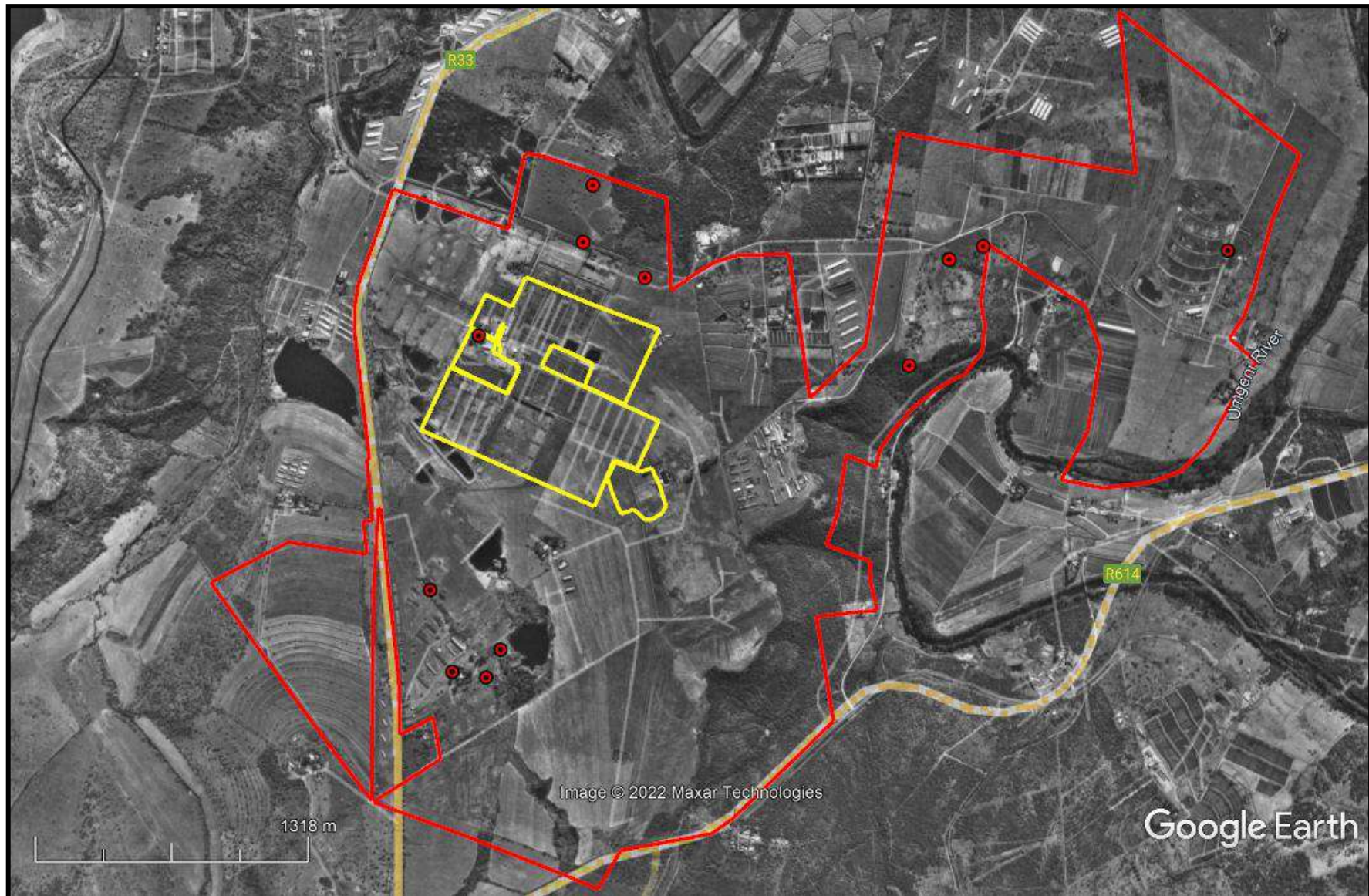


FIG. 9: LOCATION OF THE STUDY AREA IN 1989



FIG. 10: LOCATION OF THE STUDY AREA IN 2003



PALAEONTOLOGICAL SENSITIVITY

The area is in an area of medium palaeontological sensitivity (fig. 11). A desktop PIA was undertaken by Dr Alan Smith Appendix A). Dr Smith states that the area consists of Karoo Dolerite and the Pietermaritzburg Formation. “As the Pietermaritzburg Formation represents an open ocean palaeoenvironment, theoretically, it could contain fossils; however in practise none have been discovered. Occasional trace (*siphonicnus* and *helminthopsis*) and leaf (*glossopteris* and *gangamopteris*), usually fragments, can occur. None of which are paleontologically significant.” The chance of fossils being found on this site is Low, but not Zero. The development is unlikely to have affected palaeontological material.

FIG. 11: PALAEONTOLOGICAL SENSITIVITY MAP



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.

CONCLUSION

A desktop heritage survey was undertaken for the Triple A Beef expansion that occurred without authorisation. The specific areas were the abattoir, admin buildings and the feedlots.

The desktop study noted that the area probably has Stone Age material in a secondary deposit all over the land. These stone tools occur throughout KZN, and do not really constitute a site and are of low significance.

The more recent historical aspect of the total farmland indicates that there were originally ten farm labourers' houses on the northern part of the farm, and two farmsteads in the south. One of these farmsteads became Umgeni Park. By 1989, the farm labourers' houses had been demolished and by 2003, these areas were agricultural fields. This is of some concern, as there may have been graves associated with the 1937 houses; however, this is not related to the current study.

The developments and upgrades appear to have not affected the original farmhouse. Triple A Beef needs to be mindful that these buildings are older than 60 years in age and are protected. Any alterations to these buildings will require a permit. If the buildings have been affected, then they will require further assessment. This does not seem to be the case.

The palaeontology of the area is noted as being of medium sensitivity. However, few fossils have been found in this part of the Pietermartizburg Formation. It is unlikely that the unauthorised development affected palaeontological remains.

No further heritage mitigation is required.

REFERENCES

1:50 000 Topographical Maps

2930AD Albert Falls 1968, 2000

Aerial Photographs

933_007_01903

498_445_016_05521

807_011_08620

117B_015_38216

117B_015_38217

117B_015_38218

Database

KZN Museum

SHARIS

Umlando

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.

A handwritten signature in black ink, appearing to read 'G. Anderson', with a horizontal line underneath.

Gavin Anderson
Archaeologist/Heritage Impact Assessor

APPENDIX A
PIA DESKTOP

**DESKTOP PALEONTOLOGICAL
ASSESSMENT FOR TRIPLE A BEEF
PROJECT, EAST OF ALBERT FALLS DAM,
UMGUNGUNDLOVU DISTRICT
MUNICIPALITY, NEAR
PIETERMARITZBURG, KWA-ZULU NATAL**

FOR

**UMLANDO: Archaeological Surveys & Heritage Management
PO Box 102532, Meerensee, KwaZulu-Natal 3901
phone (035)7531785 f
cell: 0836585362 / 0723481327
Email:umlando@gmail.com**

by

**Dr Alan Smith
Alan Smith Consulting
29 Browns Grove, Sherwood, Durban, 4091, South Africa
Telephone: 031 208 6896
asconsulting@telkomsa.net**

22 September 2022

Declaration of Independence

This report has been compiled by Dr Alan Smith (Pr. Sc. Nat.) of Alan Smith Consulting, Durban. The views expressed in this report are entirely those of the author, if not then the source has been duly acknowledged. No other interest was displayed during the decision making process for the Project.

Specialist: Dr Alan Smith

Signature:



EXECUTIVE SUMMARY

Alan Smith Consulting was appointed by **UMLANDO: Archaeological Surveys & Heritage Management** to conduct a Desk-Top field assessment of the potential impacts to **Palaeontology Resources** that might occur through the activities of the proposed Triple A Beef project development, near Albert Falls Dam, Umgungundlovu District Municipality, KwaZulu-Natal

Section 38 of the National Resources Act No 25 of 1999 (Heritage Resources Management), requires a Palaeontological Impact Assessment (PIA) to assess any potential impacts to palaeontological heritage.

The chances of encountering fossils are **Low**, but **Not Zero**; consequently a “*Chance Find Protocol*” has been included.

ACRONYMS

BA:	Basic Assessment
EDTEA:	(Department of) Economic Development, Tourism and Environmental Affairs
HIA:	Heritage Impact Assessment
PIA;	Palaeontological Impact Assessment
SAHRA:	South African Heritage Resource Agency
SAHRIS:	South African Heritage Resources Information System

1. TERMS OF REFERENCE

Alan Smith Consulting was requested by **UMLANDO: Archaeological Surveys & Heritage Management** to provide a Desk-Top Palaeo Impact Assessment for the proposed Triple A Beef development (Figure 1). This report is to meet the requirements of the National Environmental Management Act (Act 107 of 1998) [as amended] Environmental Impact Assessment (EIA) regulations, Appendix 6.



Figure 1: Location of the Triple A Beef site, east of Albert Falls Dam.

2. SCOPE AND PURPOSE OF REPORT

A Palaeontological Impact Assessment (PIA) is a means of identifying any significant palaeontological material before development begins, so that these can be managed in such a way as to allow the development to proceed (if appropriate) without undue impacts to the fragile heritage of South Africa. This Desk-Top investigation fulfills the requirements of the heritage authorities (SAHRA), such that a comment can be issued by them for consideration by the competent authority (EDTEA), who will review the Basic Assessment (BA) and grant or refuse authorisation. The PIA report will outline any management and/or mitigation requirements that will need to be complied with from a

heritage point of view and that should be included in the conditions of authorisation, should this be granted.

3. METHODOLOGY

Geological maps, a literature review and personal experience (see Section 9) were used in this research.

4. GEOLOGY

The Pietermaritzburg Formation (Pp: brown) underlies the Triple A Beef site (Figure 2).

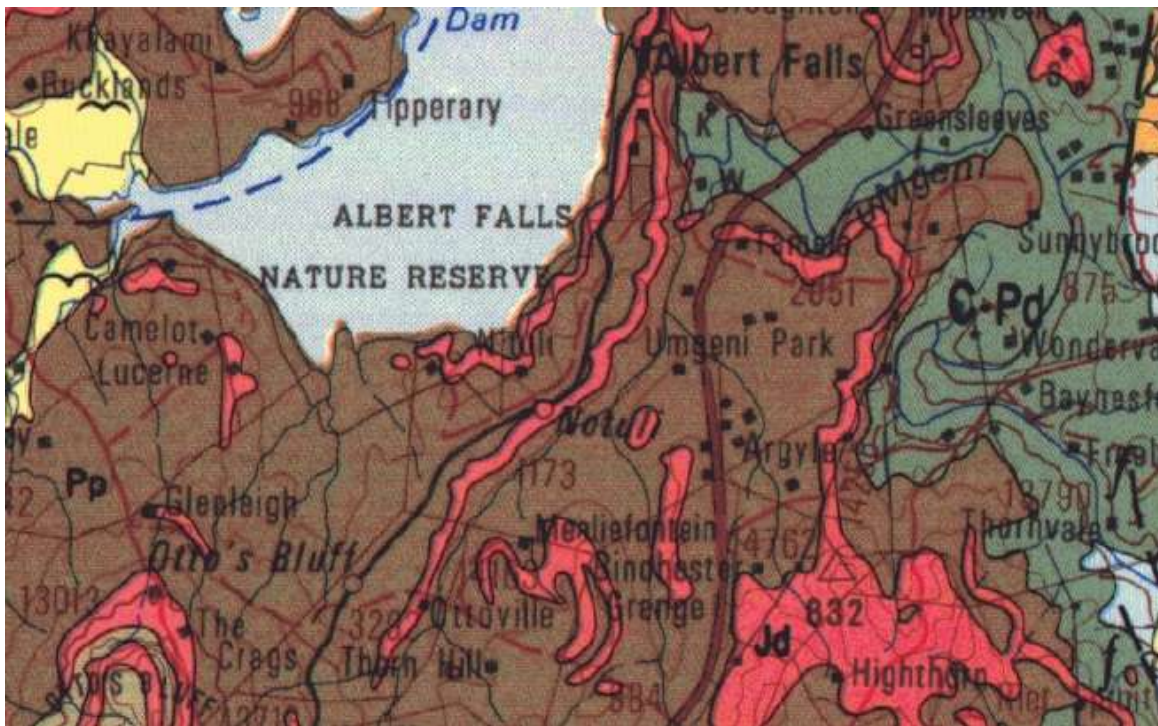


Figure 2: Approximate area of the Triple A Beef project. Extract from the 125 000 Geological Map: Durban 2930. According to this map, the project area will be underlain by the Pietermaritzburg Formation (Pp: brown). Dolerite sills and dykes (Jd: red) may also be intersected

Pietermaritzburg Formation

The Lower Permian Pietermaritzburg Formation is the lowest part of the Ecca Group, a component of the Karoo Supergroup. It is generally dark blue in colour. It thins northward to ultimately disappear (Bordy et al., 2017; Hastie et al., 2019). It is massive to fissile in fresh outcrop, although as it weathers easily fresh outcrop is rare. The Pietermaritzburg Formation grades upward into the succeeding /Vryheid Formation.

The Pietermaritzburg Formation is not well constrained as far as dating is concerned. It succeeds the Dwyka Group which ended about ~290 Ma (Wopfer, 2002; Catuneanu, 2004a; 2004b) or ~284 Ma (Herbert and Compton, 2007). It was deposited just before (or during the early part of) the Vryheid Formation dated ~260Ma (Green and Smith, 2012). The Pietermaritzburg Formation represents deposition during the marine transgression which resulted from melting of the Late Palaeozoic (known locally as “Dwyka”) Glaciation ice cap melting. Deposition took place within the Karoo Sea, which was located within central part of the Gondwana supercontinent and probably linked to the proto Pacific in the southeast (Johnson et al, 2009).

Karoo Dolerite.

The Karoo Dolerite is represented by intrusive dykes (Figure 3) and sills, within this area. It is part of the Karoo-Ferrar Large Igneous Province (LIP). This LIP comprises a succession of lavas up to 4.5 km thick. This comprises mainly basalt which was deposited about 184 Ma. This igneous deposit was extruded as a “Continental Flood Basalt” (CFB), a process that has never been witnessed by mankind. CFB eruptions take place by fissure eruption. The Karoo-Ferrar LIP triggered the break-up of the Gondwana supercontinent (Hastie et al., 2014).

5. PALAEOLOGY

The colour codes used in the Sahrís Palaeosensitivity Map are shown in Table 1 (below).

Table 1: Summary of SAHRIS categories

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

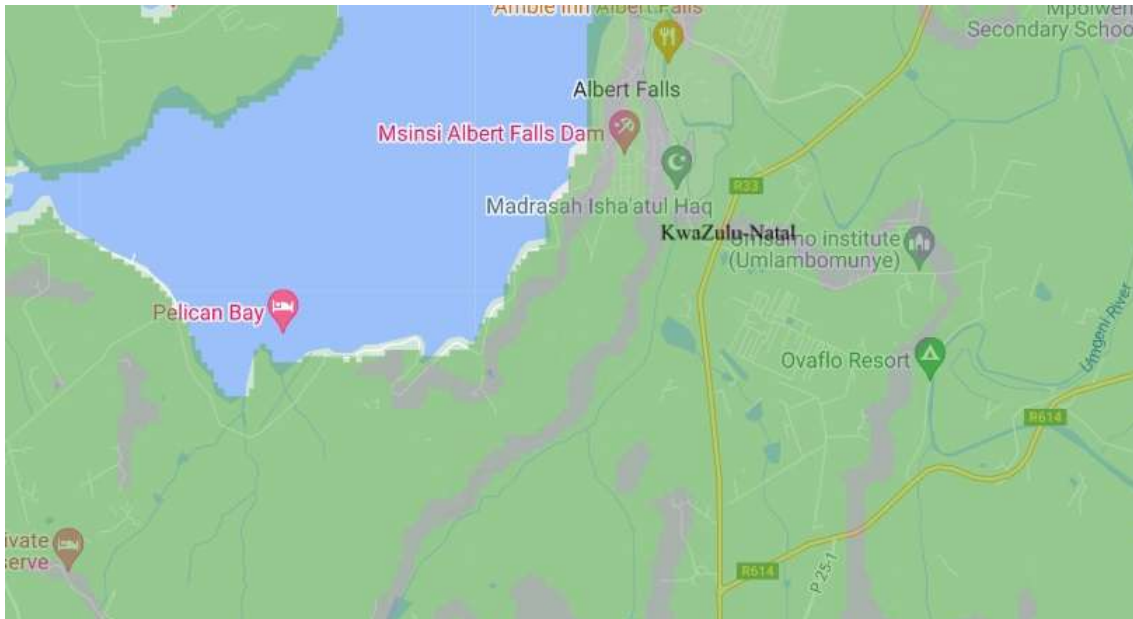


Figure 3: Palaeosensitivity of the Triple A Beef site. Extract from Sahrís Palaeosensitivity Map). It is colour coded green which requires a Desk-Top PIA only.

Pietermaritzburg Formation

As the Pietermaritzburg Formation represents an open ocean palaeoenvironment, theoretically, it could contain fossils, however in practise none have been discovered. Occasional trace (*siphonicnus* and *helminthopsis*) and leaf (*glossopteris* and *gangamopteris*), usually fragments, can occur. None of which are paleontologically significant.

Karoo Dolerite

The Karoo Dolerite which may be encountered here is an igneous intrusive rock and by definition cannot be fossiliferous.

6. SUMMARY

The chance of fossils being found on this site is **Low**, but not **Zero**. A “**Chance Find Protocol**” has been included to cover this eventuality. No further palaeontological work is required, unless triggered by the “**Chance Find Protocol**” in which a suitably qualified palaeontologist must be consulted. The “Chance Find Protocol” must form part of the Environmental Management Programme (EMPr) for the site,

7. REFERENCES

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8. CHANCE FIND PROTOCOL

This Chance Find Protocol must be included in the site EMPr.

If any fossils are found, a Palaeontologist must be notified immediately by the ECO and/or EAP and a site visit must be arranged at the earliest possible time with the Palaeontologist.

In the case of the ECO or the Site Manager becoming aware of suspicious looking palaeo-material:

- The construction must be halted in that specific area and the Palaeontologist must be given enough time to reach the site and remove the material before excavation continues.
- Mitigation will involve the attempt to capture all rare fossils and systematic collection of all fossils discovered. This will take place in conjunction with descriptive, diagrammatic and photographic recording of exposures, also involving sediment samples and samples of both representative and unusual sedimentary or biogenic features. The fossils and contextual samples will be processed (sorted, sub-sampled, labeled, and boxed) and documentation consolidated, to create an archive collection from the excavated sites for future researchers.

Functional responsibilities of the Developer

1. At full cost to the project, and guided by the appointed Palaeontological Specialist, ensure that a representative archive of palaeontological samples and other records is assembled to characterize the palaeontological occurrences affected by the excavation operation.
2. Provide field aid, if necessary, in the supply of materials, labour and machinery to excavate, load and transport sampled material from the excavation areas to the sorting areas, removal of overburden if necessary, and the return of discarded material to the disposal areas.
3. Facilitate systematic recording of the stratigraphic and palaeo-environmental features in exposures in the fossil-bearing excavations, by described and measured geological sections, and by providing aid in the surveying of positions where significant fossils are found.

4. Provide safe storage for fossil material found routinely during excavation operations by construction personnel. In this context, isolated fossil finds in disturbed material qualify as “normal” fossil finds.
5. Provide covered, dry storage for samples and facilities for a work area for sorting, labeling and boxing/bagging samples.
6. Costs of basic curation and storage until collected. Documentary record of palaeontological occurrences must be done.
7. The contractor will, in collaboration with the Palaeontologist, make the excavation plan available to the appointed specialist, in which appropriate information regarding plans for excavations and work schedules must be indicated on the plan of the excavation sites. This must be done in conjunction with the appointed specialist.
8. Initially, all known specific palaeontological information will be indicated on the plan. This will be updated throughout the excavation period.
9. Locations of samples and measured sections are to be pegged, and routinely and accurately surveyed. Sample locations, measured sections, etc., must be recorded three-dimensionally if any “significant fossils” are recorded during the time of excavation.

9. **DETAILS OF SPECIALIST**

Dr Alan Smith

Private Consultant: *Alan Smith Consulting, 29 Brown's Grove, Sherwood, Durban, 4091*

&

Honorary Research Fellow: *Discipline of Geology, School of Agriculture, Earth and Environmental Sciences, University of KwaZulu-Natal, Pietermaritzburg.*

Role: Specialist Palaeontological Report production

Expertise of the specialist:

- PhD in Geology (University of KwaZulu-Natal), Pr. Sc. Nat., I.A.H.S.
- Expert and current researcher in stromatolite growth and fossil varieties (astrobiology)..
- Expert in Vryheid Formation (Ecca Group) in northern KZN, this having been the subject of PhD.
- Scientific Research experience includes: Fluvial geomorphology, palaeoflood hydrology, Cretaceous deposits.
- Experience includes understanding Earth Surface Processes in both fluvial and coastal environments (modern & ancient).
- Alan has published in both national and international, peer-reviewed journals. He has published + 50 journal articles with +580 citations (detailed CV available on request).
- Attended and presented scientific papers and posters at numerous international and local conferences (UK, Canada, South Africa) and is actively involved in research.

Selected recent palaeo-related projects include:

- Desktop PIA: Proposed middle income housing units on Portion 23 of Farm Lot H Weston 13026, Bruntville, Mpofana Local Municipality. Client: UMLANDO.
- Desktop PIA: Proposed ByPass Pipeline for Ulundi bulk water pipeline upgrade. Client: UMLANDO.
- Fieldwork PIA: Bhekuzulu Epangweni KZN water reticulation project, Cathkin Park. Client: Mike Webster, HSG Attorneys.
- Fieldwork PIA: Mpungoze water supply scheme, Empangeni. Client: Enviropro.
- Fieldwork PIA: Helpmekaar Dam. Client: Afzelia environmental consultants.
- Desktop PIA: Zuka valley, Ballito. Client: Mike Webster, HSG Attorneys.
- Mevamhlope proposed quarry palaeontology report. Client: Enviropro.

- Desktop PIA: Proposed Lovu Desalination site. Client: eThembeni Cultural Heritage.
- Desktop PIA: Tinley Manor phase 2 North & South banks: eThembeni Cultural Heritage
- Desktop PIA: Tongaat. Client: eThembeni Cultural Heritage.
- Palaeontological Assessment Reports (3) to Scatec Solar SA (Pty) Ltd on an Appraisal of Inferred Palaeontological Sensitivity for a Potential Photo Voltaic Park at (1) Farm Rooilyf near Groblershoop, N Cape; (2) Farm Riet Fountain No. Portions 1 and 6, 18km SE of De Aar, N Cape; and (3) Dreunberg, near Burgersdorp, Eastern Cape. Client: Sustainable Development Projects.