HERITAGE SURVEY OF THE PROPOSED CATO RIDGE/INANDA FILLING STATION AND SHOPPING CENTRE

FOR NS ENVIRONMENTAL CONSULTANCY

DATE: 6 FEBRUARY 2017

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EXECUTIVE SUMMARY

A heritage survey was undertaken for the proposed mall and filling station in KwaXimba, Cato Manor, KwaZulu-Natal. The study area is situated above the Msunduze River in an area that has been used for agricultural fields and more recently for housing.

The survey noted two old mango trees that would be remnants from a previous homestead, and thus could be indicative of graves. No grave features were noted due to the disturbed nature of the area. Five pottery sherds were noted and these date to the Early Iron Age.

No further mitigation is required however a protocol for human remains must be established.

A palaeontologist will be required to visit the site once excavations have reached 1.5m in depth.

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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

NS Environmental (Pty) Ltd were appointed by Tshani Consulting, on behalf of Stone Cold Properties 2 (Pty) Ltd to conduct an Environmental Basic Assessment for the proposed construction of a filling station and a Shopping Complex on Portion of the Portion 12 of Farm Inanda Location No: 4675 located within eThekwini Municipality. Umlando was subcontracted to undertake the Heritage Impact Assessment. The proposed project will consist of the following facilities;

- Petrol and Diesel filling station
- Boxer Supermarket
- Cash Build Hardware
- Pep store
- Ackermans
- Restaurants and,
- Other retail facilities

The development footprint for the proposed development is approximately 6 143 m^2.

The proposed site is formally described as Portion of the Portion 12 of Farm Inanda Location No: 4675. The site falls within the jurisdiction of the Ethekwini Metropolitan Municipality and falls in the Outer West Town planning scheme. The site falls approximately 28 km from both Pinetown and Pietermaritzburg. The site is accessible via the N3 then the R103 and then the Mr423 Road.

FIG. 1 GENERAL LOCATION OF THE STUDY AREA

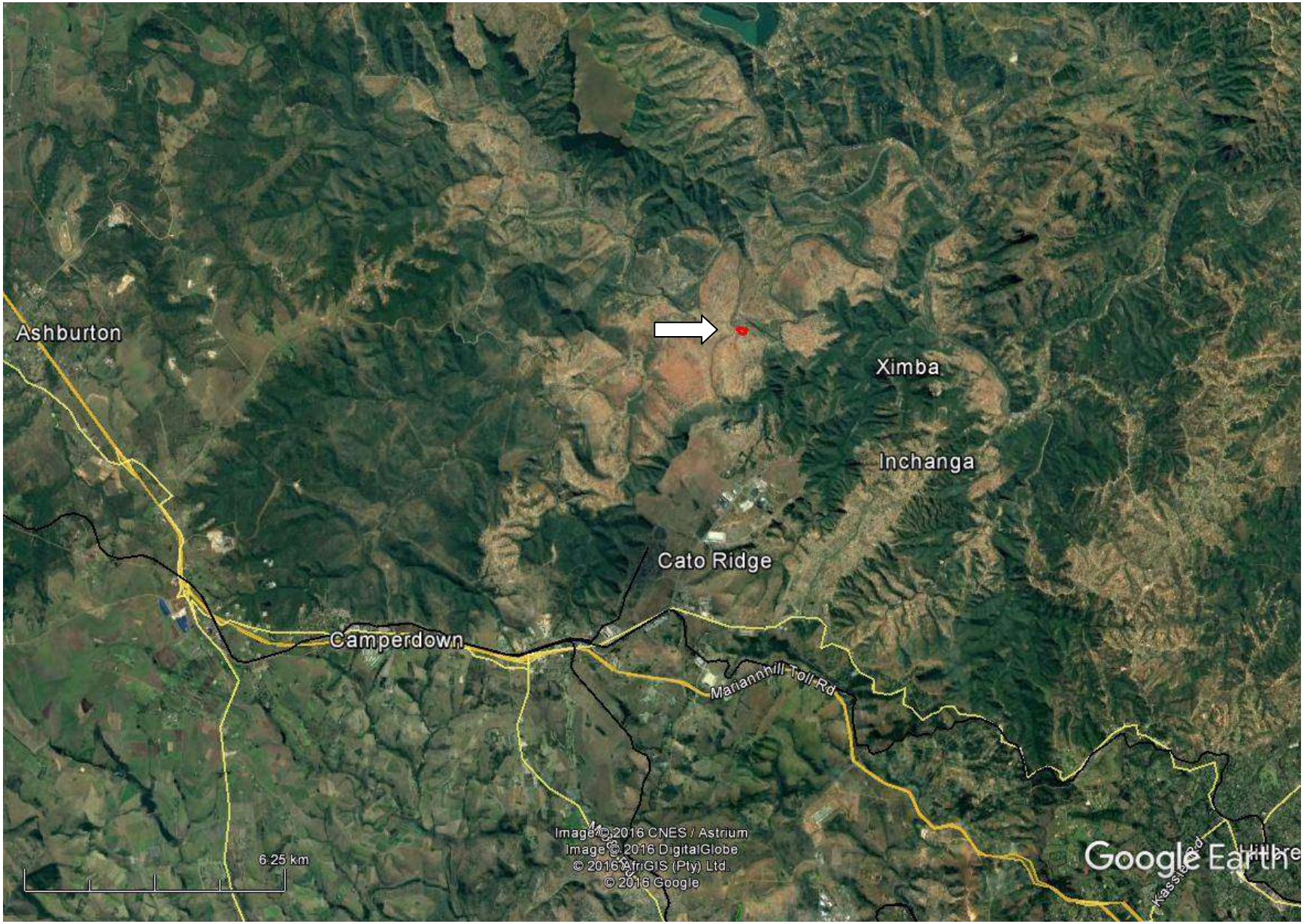


FIG. 2: AERIAL OVERVIEW OF THE STUDY AREA

FIG. 3: TOPOGRAPHICAL OVERVIEW OF THE STUDY AREA

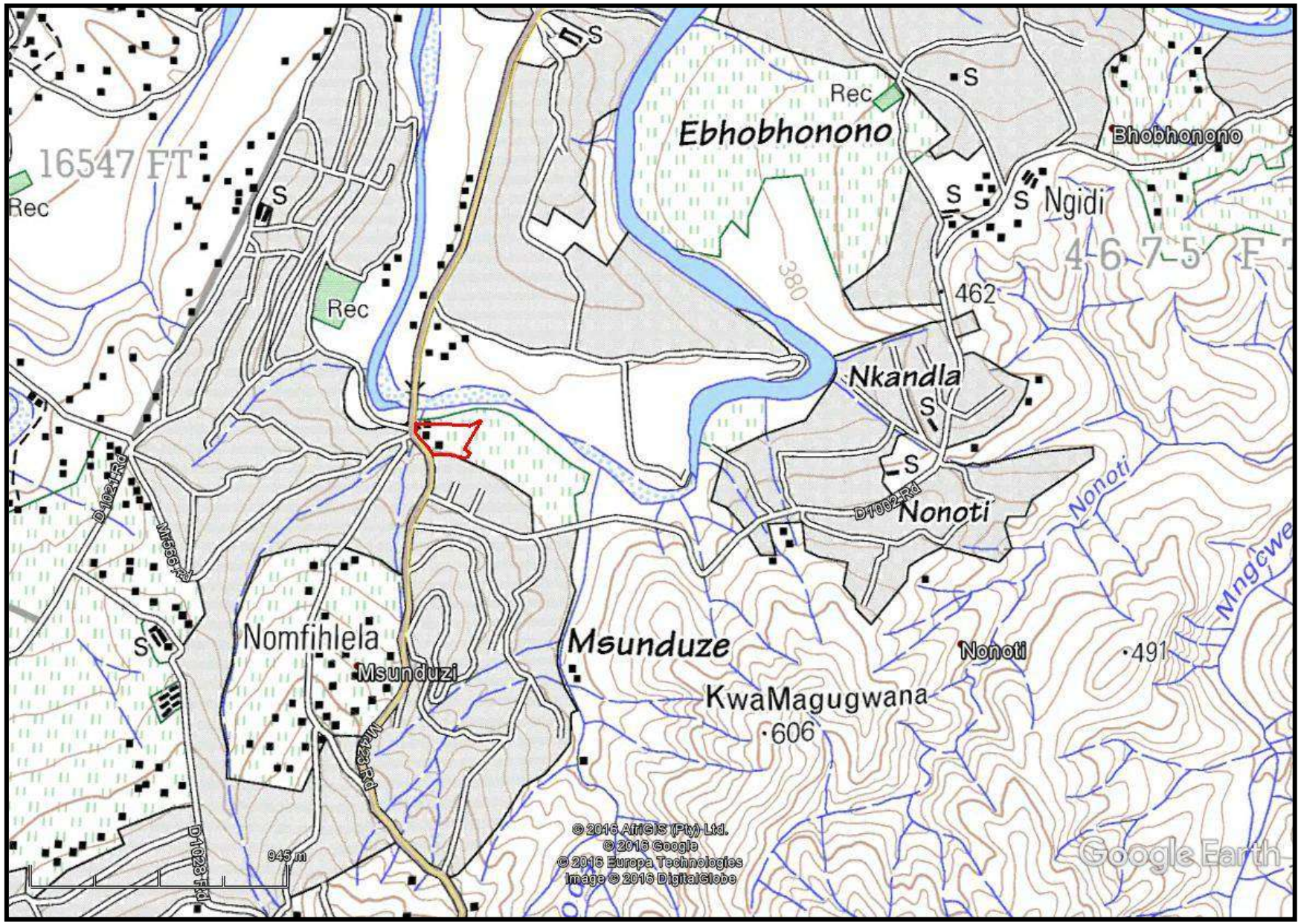


FIG. 4: SCENIC VIEWS OF THE PIPELINE ROUTE

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. 4). These sites are isolated artefacts located on a gravel terrace located on the northern side of the Msunduze River. They include are:

- 2930DA 021 ESA Sangoan and Acheulean tools
- 2930DA 074 ESA general picks
- 2930DA 083 ESA Hand-axe and large flakes
- 2930DA 085 LSA Broken bored stone

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

The 1937 aerial photographs indicate that the area is partially cultivated and that a settlement occurs in the southern part of the footprint (fig. 5).

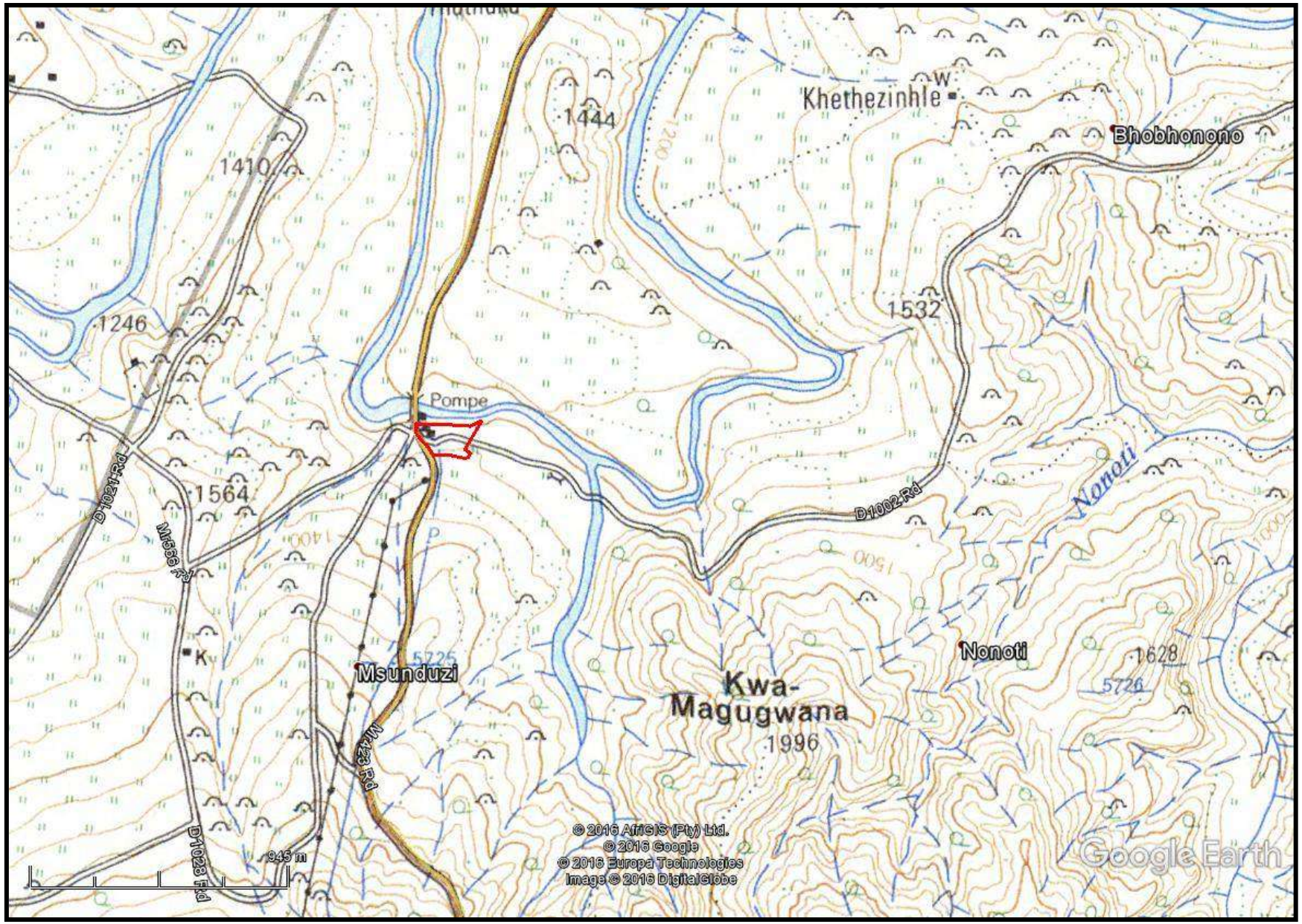
The 1968 topographical map indicates that the area has been changed to cultivated lands. A pump house has been built just outside of the footprint.

By 2002, there are two buildings in the study area (fig. 3) and the land is still used for cultivation.

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

FIG. 6: STUDY AREA IN 1937

FIG. 7: STUDY AREA IN 1968



FIELD SURVEY

A field survey was undertaken in January 2015. The footprint area has been very disturbed by agricultural activity with large terraces. In addition to this there are the foundations and rubble of at least three (recent) buildings.

The foundations are recent and post-date 1968. However, two older mango trees could predate the buildings (fig. 8). This suggests that there could have been a building, or settlement, near the trees. There are was too disturbed to note any previous structures. Human graves might occur near the trees, but they would be subsurface. A protocol for any human remains unearthed during construction should be made whereby Amafa KZN and the SAPS are informed.

FIG. 8: MANGO TREE IN THE FOOTPRINT

A few (five) pottery shards were observed in the southeastern part of the study area. They could belong to the same pot. One of the sherds had horizontal incisions similar to Msuluzi pottery: The decorated shard is probably from the rim;

however it is very small (fig. 9). This would date the pottery between 1 700 to 1 500 years ago.

The shards were located in an area that was very disturbed by agricultural activity. It is highly unlikely that an archaeological deposit occurs, not any *in situ* features. The numbers of shards are too few in number to call the area a site, and probably come from the same pot.

The shards are of low significance

FIG. 9: DECORATED POTTERY SHARD [1]

Fig. 10 shows the location of the finds.

[1] GPS == 11.5cm x 6cm

FIG. 10: LOCATION OF RECORDED FEATURES AND ARTEFACTS[2]

[2] Green tree = Mango tree; yellow pin = location of pottery shards. All buildings in the figure no longer exist

PALAEONTOLOGICAL IMPACT ASSESSMENT

The desktop PIA was undertaken by Dr Gideon Groenewald (Appendix A). The excavations for the construction of the infrastructure for this development will expose some important alluvial soil deposits. Due to the igneous nature of the Natal Structural and Metamorphic Complex fossils are not expected in the bedrock. Judging from the closeness of the river alluvium to the site (fig 10), exposure of Quaternary material is likely. A basic “Chance Find Protocol” must be included in the EMPr for the project to ensure that a suitably qualified palaeontologist visit the site at least for a day during the initial excavations to record any possible Quaternary aged fossils on site.

Recording of fossils will contribute significantly to our understanding of previous eco-systems. A “Chance Find Protocol”, by a suitably qualified palaeontologist, is compulsory. The document and its findings must form part of the EMPr for this project and be presented for approval by AMAFA, before the final ROD for the EIA process can be requested from the competent Authority for the EIA process.

By “Chance Find Protocol” it is meant that a field visit will be required by a qualified palaeontologist. The construction company must allow for this and liaise well in advance with the palaeontologist.

FIG. 10: PALAEOSENSITIVITY 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.

MANAGEMENT PLAN

In terms of the archaeology, no further mitigation or management is required. The artefacts are too few in number for the area to be called a site. The area has been severely disturbed buy buildings and agricultural activity resulting in no archaeological deposit.

The area near the mango trees might have human graves as these trees tend to be planted near homesteads. While the entire area is severely disturbed, the developer should be informed of the possibility of human remains in this area. If any human remains are accidently uncovered during construction, then all construction activity in the area must stop and the SAPA and Amafa KZN must be informed.

A field visit will be required in terms of the palaeontology. This will occur when excavations reach a depth of 1.5m. The palaeontologist will then visit the site to determine if any fossils occur in the sensitive layers.

CONCLUSION

A heritage survey was undertaken for the proposed mall and filling station in KwaXimba, Cato Manor. The study area is situated above the Msunduze River in an area that has been used for agricultural fields and more recently for housing.

The survey noted two old mango trees that would be remnants from a previous homestead, and thus could be indicative of graves. No grave features were noted due to the disturbed nature of the area. Five pottery sherds were noted and these date to the Early Iron Age.

No further mitigation is required however a protocol for human remains must be established. A protocol for “Chance Finds” for the palaeontology is also required.

REFERENCES

117_37B Flight path 29, photo 37125 1937

2930DA Cato Ridge 1:50 000 topographical map 1968

2930DA Cato Ridge 1:50 000 topographical map 2000

Natal Museum Site Record 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 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 DESKTOP REPORT

DESKTOP PALAEONTOLOGICAL ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF A FILLING STATION AND A SHOPPING COMPLEX ON PORTION OF THE PORTION 12 OF FARM INANDA LOCATION NO 4675, LOCATED WITHIN ETHEKWINI METROPOLITAN MUNICIPALITY, KWAZULU-NATAL PROVINCE.

FOR

Umlando

DATE: 06 February 2017

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 the construction of a Filling Station and a Shopping Complex on Portion of The Portion 12 of Farm Inanda Location No 4675, located within Ethekwini Metropolitan Municipality, Kwazulu-Natal Province.

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 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 the construction of a Filling Station and a Shopping Complex on Portion of The Portion 12 of Farm Inanda Location No 4675, located within Ethekwini Metropolitan Municipality, Kwazulu-Natal Province, is underlain by Namibian aged metacrystic hornblend-biotite granite of the Natal Structural and Metamorphic Province and Quaternary aged Alluvium of the uMsunduze River.

No significant fossils are expected before deep excavation (>1.5m) are done but if fossils are 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 a Moderate Palaeontological Sensitivity is allocated to the entire study area. A “Chance Find Protocol” document is essential for this project.

Recommendations contained in the Chance Find Protocol must be approved by AMAFA and SAHRA for inclusion in the EMPr of the project, before the final EIA application can be presented to the Competent Authority responsible to the ROD of this EIA process. If fossils are observed during construction the HIA specialist and Palaeontologist must be informed to take immediate and appropriate action to preserve the fossils.

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

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INTRODUCTION

Gideon Groenewald was appointed by Umlando to undertake a Desktop Survey, assessing the potential Palaeontological Impact related to an application for the construction of a Filling Station and a Shopping Complex on Portion of The Portion 12 of Farm Inanda Location No 4675, located within Ethekwini Metropolitan Municipality, Kwazulu-Natal Province.

This report forms part of the Basic Environmental Impact Assessment and complies with the requirements of the South African National Heritage Resource Act No 25 of 1999. In accordance with Section 38 (Heritage Resources Management), a Heritage Impact Assessment (HIA) is required to assess any potential impacts to palaeontological heritage within the development footprint of the development.

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 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.

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 is often the only opportunity to record the fossil heritage within the development footprint. These records are very important to understand the past and form an important part of South Africa's National Estate.

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.

Prior to a field investigation a preliminary assessment (desktop study) of the topography and geology of the study area is made using appropriate 1:250 000 geological maps (3028 Kokstad) in conjunction with Google Earth. Potential fossiliferous rock units (groups, formations etc) are 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.

When rock units of moderate to high palaeontological sensitivity are present within the development footprint, palaeontological mitigation measures must be incorporated into the Environmental Management Plan. All projects falling on Low to Very Low Palaeontological sensitivity geology must be discussed in a Chance Find Protocol document that must form part of the EMPr of the project.

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

Stone Cold Properties 2 (Pty) Ltd proposes the construction of a filling station and a Shopping Complex on Portion of the Portion 12 of the Farm Inanda Location No 4675, located within the eThekwini Metropolitan Municipality (Figure 1).

The proposal includes:

- Petrol and Diesel filling station
- Boxer Supermarket
- Cash Build Hardware
- Pep store
- Ackermans
- Restaurants and

- Other retail facilities

Cato Ridge is approximately 28km from both Pinetown and Pietermaritzburg and the site coordinates is 29°39'44.60"S and 30°38'13.56"E (Figure 1, 2 and 3). It is assumed that no part of the development will fall within the 100 year flood line of the uMsunduze River but will no doubt fall on alluvial material of the riverbanks (Google Image confirmation of layout plans).

GEOLOGY

The site of the development falls mainly on Namibian aged granite of the Natal Structural and Metamorphic Province which constitutes a structural succession of rock units that forms the basement rock group of the Karoo Basin as well as mainly alluvial material along the uMsunduze River (Figure 4).

Figure 1 Configuration of the study area for the Proposed Cato Ridge Ayanda Shopping Complex in yellow

Figure 2 Locality of the Proposed Cato Ridge Ayanda Shopping Complex in yellow

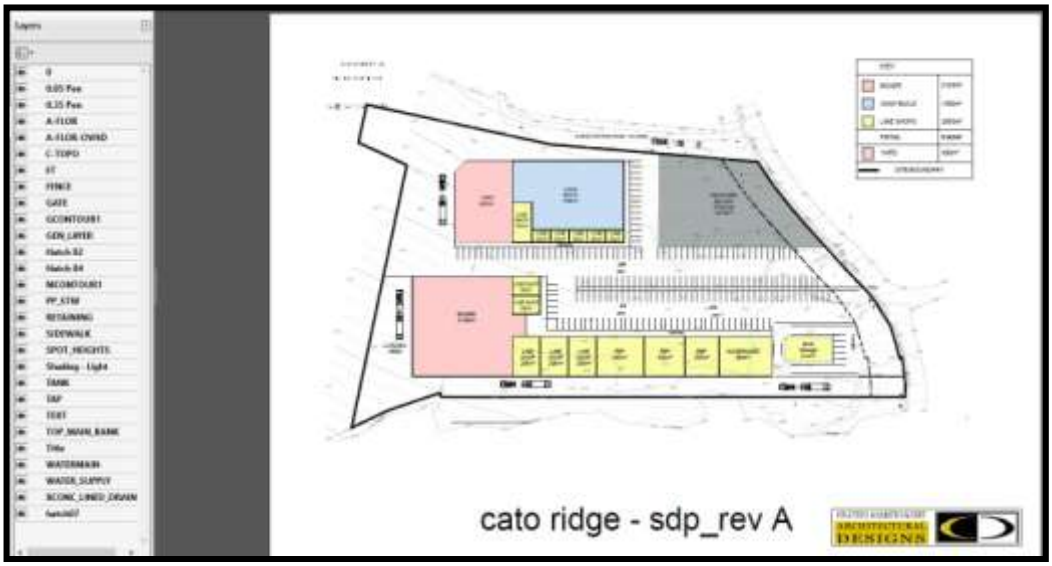

Figure 3 Detailed design of the Proposed Cato Ridge Ayanda Shopping Complex and filling station

Figure 4 Geology of the study area location. The entire study area falls on Quaternary aged Alluvium of the uMsunduze River and the Namibian aged Megacrystic hornblend-biotite granite (Nhg) of the Natal Structural and Metamorphic Province

Natal Structural and Metamorphic Province

The study area is underlain predominantly by Namibian aged megacrystic hornblend-biotite granite (Nhg) of the Natal Structural and Metamorphic Province (Figure 4) (Johnson et al, 2009).

Alluvium

A large part of the study area falls on the alluvium of the uMsunduze River which consists mainly of Quaternary aged sediments, including sandy soils and clays.

PALAEONTOLOGY

Natal Structural and Metamorphic Province

Megacrystic Hornblend-Biotite Granite (Nhg)

Due to the Igneous and Metamorphic nature of these basement rocks they will not contain any fossil heritage. It is however important to note that the site

falls close to the uMzunduzi River and very significant fossils can be associated with the historic flood-lines along the riverbanks. Although a Very Low Palaeontological significance is allocated to the rocks, the layout of the sites falls mostly on Quaternary aged sediments that can contain significant fossils.

Alluvium

The absence of fossil records form Quaternary aged alluvium from this part of KwaZulu-Natal renders the site of higher Palaeontological Heritage importance because of the very high value of any new recording of fossils during excavations for the foundations of infrastructure for this development. Due the fact that no fossils have been recorded in this part of KZN to date, the Moderate Palaeontological sensitivity is retained fore this desktop survey.

It is therefore recommended that a very detailed “Chance Find Protocol” document must be drawn up by a suitably qualified palaeontologist to ensure that the EMPr includes very particular inspection by a palaeontologist during the initial excavations for the development of this Complex and to build a trusting working relationship with the contractors to ensure timeous intervention by the ECO and the Palaeontologist to prevent damage or loss of significant Quaternary aged fossils form this site. Recording of fossils at the site is a unique and once in a life-time opportunity to science in South Africa.

PALAEONTOLOGICAL IMPACT AND MITIGATION

The predicted palaeontological impact of the development 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 alluvium of the uMsunduze River (Figure 5) and maybe some mainly Namibian aged Metacrystic hornblend-biotite granite.

Figure 5 Palaeontological sensitivity for the site is Moderate and it is essential that a Chance Find Protocol for fossils be included in the EMPr of the project

The excavations for the construction of the infrastructure for this development will expose some important alluvial soil deposits. Due to the igneous nature of the Natal Structural and Metamorphic Complex fossils are not expected in the bedrock. Judging from the closeness of the river alluvium to the site (Figure 5), exposure of Quaternary material is likely. A basic "Chance Find Protocol" must be included in the EMPr for the project to ensure that a suitably qualified palaeontologist visit the site at least for a day during the initial excavations to record any possible Quaternary aged fossils on site.

Recording of fossils will contribute significantly to our understanding of previous eco-systems. A "Chance Find Protocol", by a suitably qualified palaeontologist, is compulsory. The document and its findings must form part of the EMPr for this project and be presented for approval by AMAFA, before the final ROD for the EIA process can be requested from the competent Authority for the EIA process.

CONCLUSION

The development site applicable to the application for the construction of a Filling Station and a Shopping Complex on Portion of The Portion 12 of Farm Inanda Location No 4675, located within Ethekwini Metropolitan Municipality,

Kwazulu-Natal Province, is underlain by Namibian aged metacrystic hornblend-biotite granite of the Natal Structural and Metamorphic Province and Quaternary aged Alluvium of the uMsunduze River.

No significant fossils are expected before deep excavation (>1.5m) are done but if fossils are 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 a Moderate Palaeontological Sensitivity is allocated to the entire study area. A "Chance Find Protocol" document is essential for this project.

Recommendations contained in the Chance Find Protocol must be approved by AMAFA and SAHRA for inclusion in the EMPr of the project, before the final EIA application can be presented to the Competent Authority responsible to the ROD of this EIA process. If fossils are observed during construction the HIA specialist and Palaeontologist must be informed to take immediate and appropriate action to preserve the fossils.

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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