

**DESKTOP HERITAGE SURVEY OF THE PROPOSED  
REZONING AND SUBDIVISION OF ERF 1820  
(MTHATHA) TO ACCOMMODATE A  
RESIDENTIAL/BUSINESS DEVELOPMENT IN  
MTHATHA, EASTERN CAPE**

**FOR INDWE ENVIRONMENTAL CONSULTING  
DATE: 18 SEPTEMBER 2020**

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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

“The subject property is situated within the area known as Ncambedlana, which is within the City of Mthatha’s Urban Edge to the east of the N2 National Road. Erf 1820, Mthatha is a vacant erf and is situated in an area which has recently attracted a significant number of new residential developments. The erf is situated on the corner of First Avenue and Hughes Street in Ncambedlana, which is a neighbourhood situated in the northern parts of Mthatha (Refer to Figure 1). The extent of the site is approximately 4 ha and a title deed is in place. Many of the surrounding erven are either vacant or partially developed. The land parcels surrounding the site include a mixture of land uses including Church/Pre School, reservoir, residential and vacant. The area to the west, south and south east is characterised by residential development and community facilities. The prevailing land use to the north, of vacant and large undeveloped properties, is likely to change in the foreseeable future due to the demand for development and relative shortage of developable land in Mthatha.

Govprojdev (Pty) Ltd are proposing to construct a new residential/ business development on Erf 1820 in Mthatha. The proposal includes the following subdivision scope:

- • 70 individual residential erven, with an average size of approximately 317-464m<sup>2</sup>.
- • 1 single residential site with a size of 1771m<sup>2</sup>.
- • 1 church site with a size of 2000m<sup>2</sup>.
- • 1 business site with a size of 2513m<sup>2</sup>.
- • 1 public open space site with a size of 596m<sup>2</sup>.
- • Public Roadway with a size of 5855m<sup>2</sup>” (Indwe Consulting BID 2020).

Umlando was requested to assess the development in terms of an HIA. I decided that a desktop would suffice as a Letter of Exemption.

FIG. 1 GENERAL LOCATION OF THE STUDY AREA



FIG. 2: AERIAL OVERVIEW OF THE STUDY AREA



FIG. 3: TOPOGRAPHICAL MAP OF THE STUDY AREA

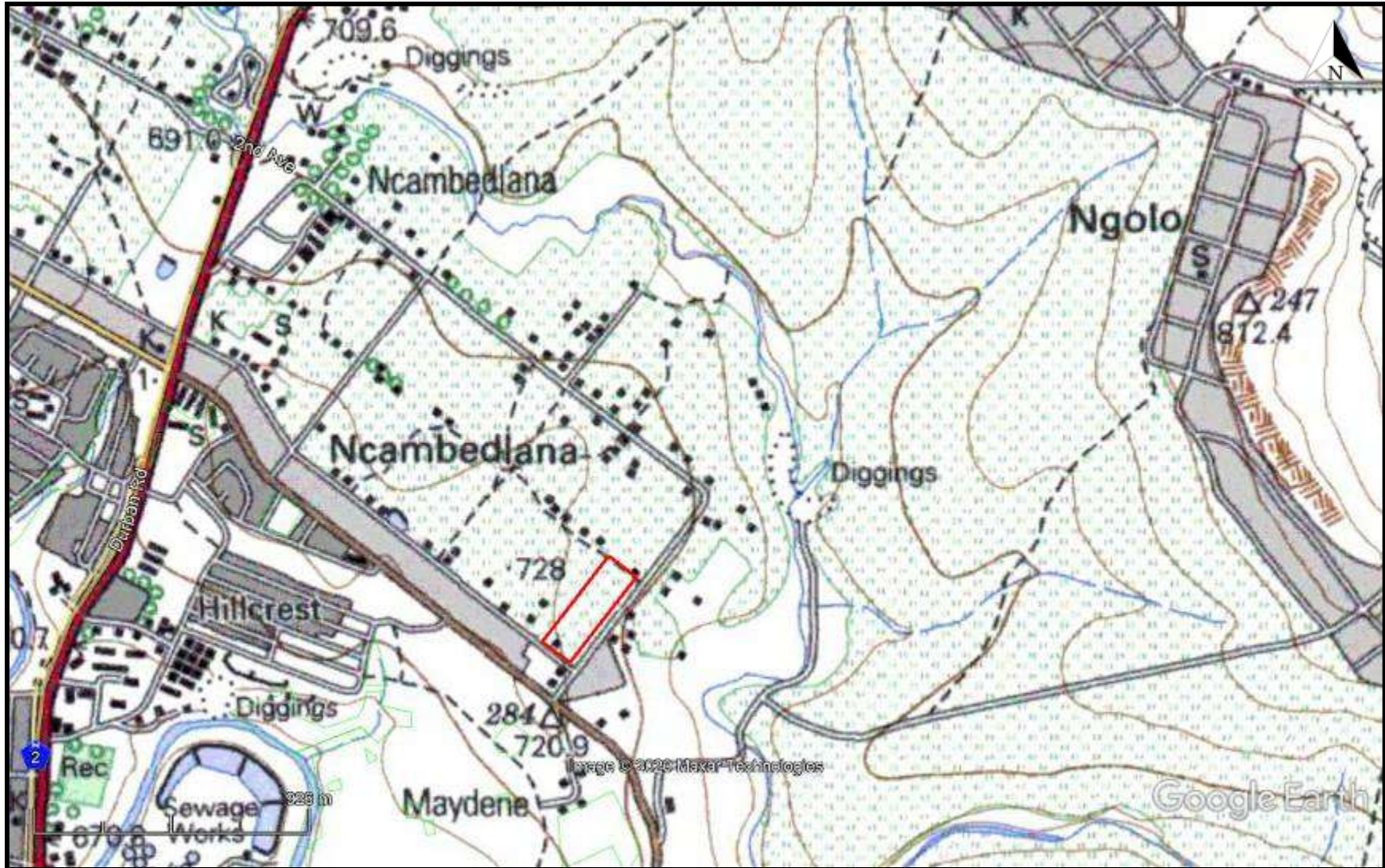


FIG. 4: SCENIC VIEWS OF THE STUDY AREA





## NATIONAL HERITAGE RESOURCES ACT OF 1999

The National Heritage Resources Act of 1999 (pp 12-14) protects a variety of heritage resources. These resources are defined as follows:

1. “For the purposes of this Act, those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate and fall within the sphere of operations of heritage resources authorities.
2. Without limiting the generality of subsection (1), the national estate may include—
  - 2.1. Places, buildings, structures and equipment of cultural significance;
  - 2.2. Places to which oral traditions are attached or which are associated with living heritage;
  - 2.3. Historical settlements and townscapes;
  - 2.4. Landscapes and natural features of cultural significance;
  - 2.5. Geological sites of scientific or cultural importance;
  - 2.6. Archaeological and palaeontological sites;
  - 2.7. Graves and burial grounds, including—
    - 2.7.1. Ancestral graves;
    - 2.7.2. Royal graves and graves of traditional leaders;
    - 2.7.3. Graves of victims of conflict;
    - 2.7.4. Graves of individuals designated by the Minister by notice in the Gazette;
    - 2.7.5. Historical graves and cemeteries; and
    - 2.7.6. Other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
3. Sites of significance relating to the history of slavery in South Africa;
  - 3.1. Movable objects, including—

4. Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
  - 4.1. Objects to which oral traditions are attached or which are associated with living heritage;
  - 4.2. Ethnographic art and objects;
  - 4.3. Military objects;
  - 4.4. objects of decorative or fine art;
  - 4.5. Objects of scientific or technological interest; and
  - 4.6. books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).
5. Without limiting the generality of subsections (1) and (2), a place or object is to be considered part of the national estate if it has cultural significance or other special value because of—
  - 5.1. Its importance in the community, or pattern of South Africa's history;
  - 5.2. Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
  - 5.3. Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
  - 5.4. Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
  - 5.5. Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
  - 5.6. Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
  - 5.7. Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
  - 5.8. Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and

5.9. sites of significance relating to the history of slavery in South Africa”

## 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 database contain 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 1<sup>st</sup> and 2<sup>nd</sup> 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**

<b>SITE SIGNIFICANCE</b>	<b>FIELD RATING</b>	<b>GRADE</b>	<b>RECOMMENDED MITIGATION</b>
<b>High Significance</b>	National Significance	Grade 1	Site conservation / Site development
<b>High Significance</b>	Provincial Significance	Grade 2	Site conservation / Site development
<b>High Significance</b>	Local Significance	Grade 3A / 3B	
<b>High / Medium Significance</b>	Generally Protected A		Site conservation or mitigation prior to development / destruction
<b>Medium Significance</b>	Generally Protected B		Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
<b>Low Significance</b>	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. I also used various sources for historical information.

No national monuments, battlefields, or historical cemeteries are known to occur along the route. No known archaeological sites occur near the study area ((fig. 5).

There have been no previous heritage surveys in the study area. Anderson (2015) undertook a desktop study for a nearby pipeline. I have driven past the study area on several occasions and did not notice any heritage sites such as graves.

The 1953 aerial photograph indicates that the study area was agricultural land with two trees on it (fig. 6). There are no buildings in the study area, but there are buildings on the adjacent land.

The 1983 topographical map indicates that there is a built structure in the study area (fig3), and it still occurs today. The building is not older than 60 years in age.

FIG. 5: KNOWN HERITAGE SITES IN THE AREA

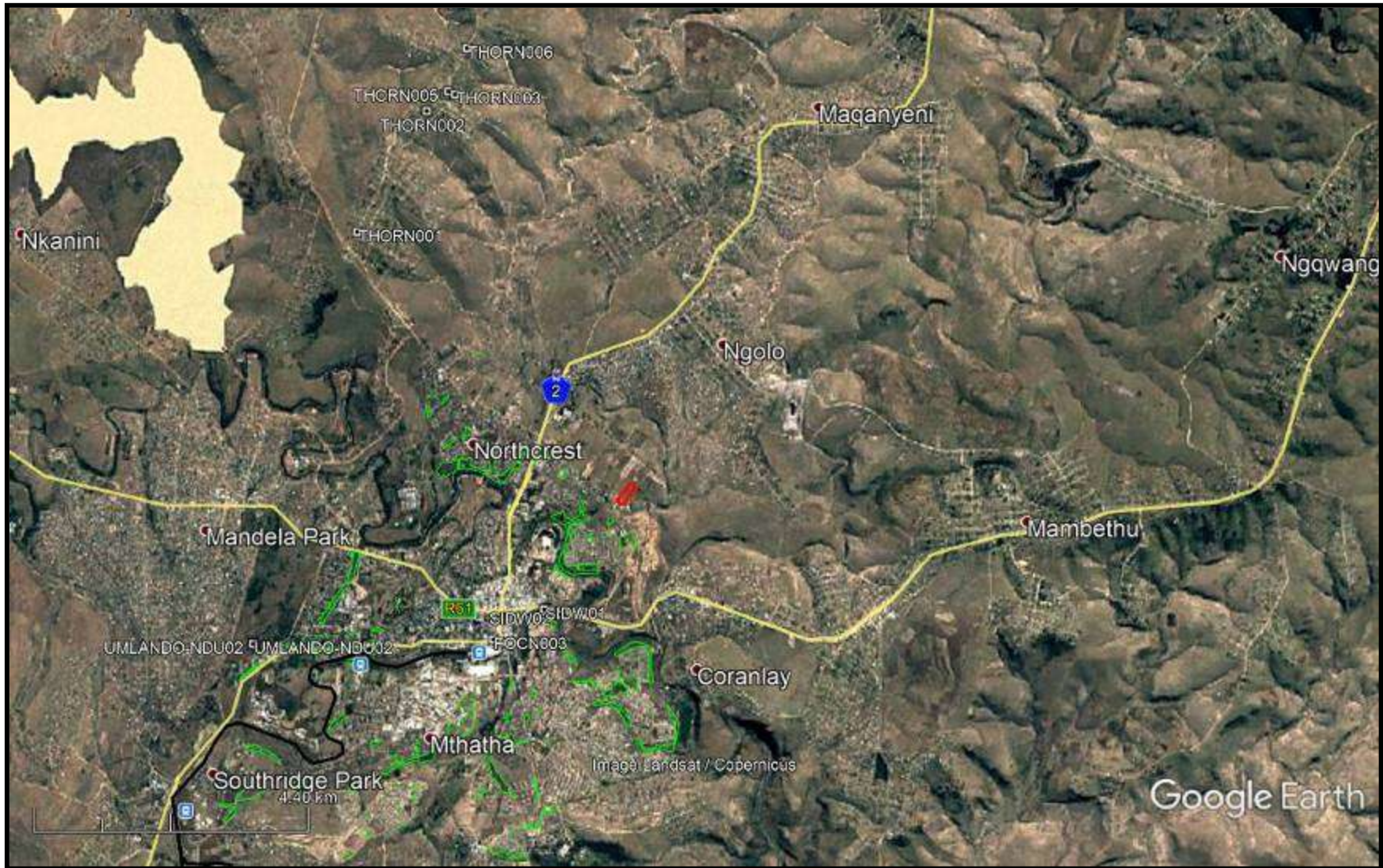




FIG. 6: AERIAL PHOTOGRAPH OF THE STUDY AREA IN 1953



## PALAEONTOLOGICAL SENSITIVITY

The area is rated as having high palaeontological sensitivity (fig. 9). A desktop PIA assessment was undertaken by Dr Allan Smith (Appendix A). He states that “significant Palaeontological Material could be found on site. However there are several mitigating factors:

1. The site is highly disturbed as this is a refurbishment project
2. The site is highly weathered and no fresh rock is exposed.

These two factors mitigate against a field visit. It is possible that Paleontological Material could be exposed during site excavation, consequently a **Chance Find Protocol** has been inserted.”

**FIG. 7: PALAEONTOLOGICAL SENSITIVITY MAP OF THE STUDY AREA**



## CONCLUSION

A desktop heritage survey was undertaken for Erf 1820, Mthatha. The proposed development will include houses, a church and a new road. The desktop study noted that the area was agricultural land for some time. No buildings occur on the property up to the 1980s.

While the area has high palaeontological sensitivity the development will only affect weathered deposits.

The development should be exempt from further HIA assessments.

## REFERENCES

3128DB Mthatha 1983

317\_003\_37250

Anderson, G. 2015. Heritage Survey Of The Proposed Ncambedlana Bulk Sewer Pipeline, Mthatha, Eastern Cape. For Indwe Consultancy

## **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 'Gavin Anderson', with a horizontal line underneath.

Gavin Anderson  
Archaeologist/Heritage Impact Assessor

**PROPOSED REZONING AND SUBDIVISION OF ERF 1820  
(MTHATHA) TO ACCOMMODATE A  
RESIDENTIAL/BUSINESS DEVELOPMENT IN MTHATHA,  
EASTERN CAPE**

**FOR**

**UMLANDO: Archaeological Surveys & Heritage Management**

by

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**September 2020**

## EXECUTIVE SUMMARY

This proposed development is within the Katberg Formation of the Adelaide Subgroup. This unit can contain significant Paleontological Material. However, this site is within a large city (Mthatha) and is already highly disturbed due to urbanisation. Added to this the rock is weathered and poorly exposed. Although this region is red-flagged in the Sahrís Palaeosensitivity Map no purpose will be served by a pre-excavation field trip as fresh rock is not visible. A Chance Find Protocol has been inserted in case fossils are found during excavation. Should this take place then a Palaeontologist must be called to inspect the discovery. If any excavation is more than 2m deep then a field visit from a competent Palaeontologist should be arranged.

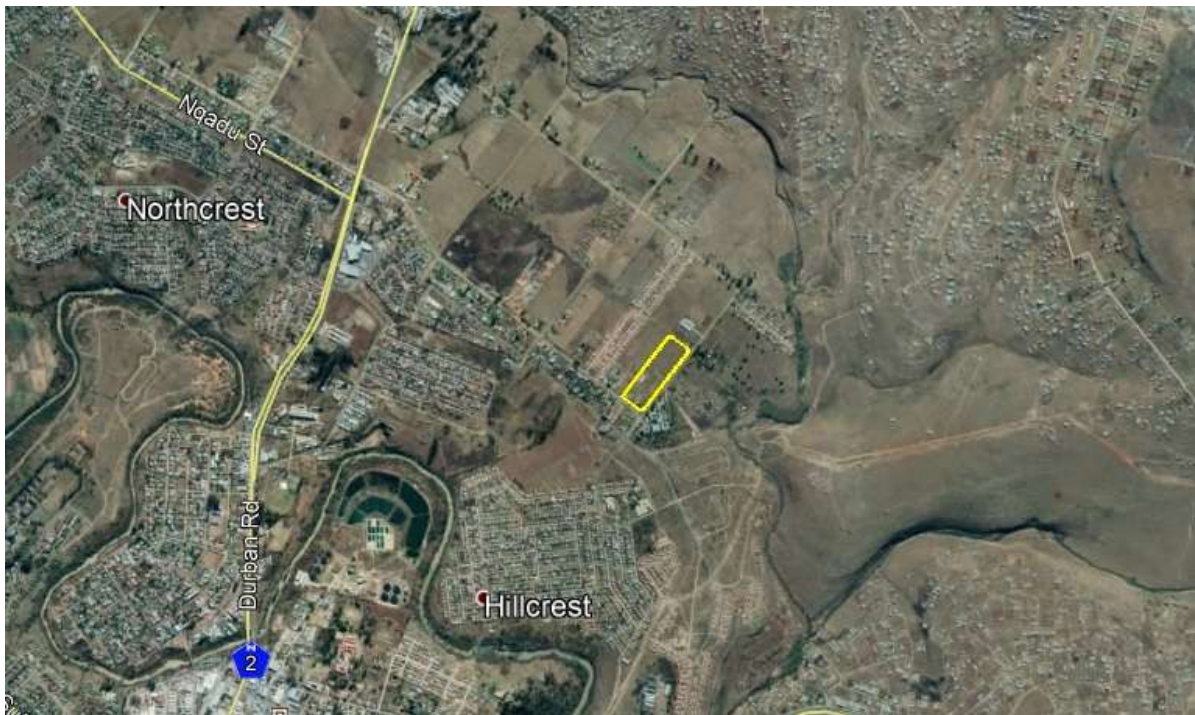
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## 1. BACKGROUND AND PROPOSED PROJECT

Govprojdev (Pty) Ltd are proposing to construct a new residential/ business development on Erf 1820 in Mthatha. The proposal includes the following subdivision scope:

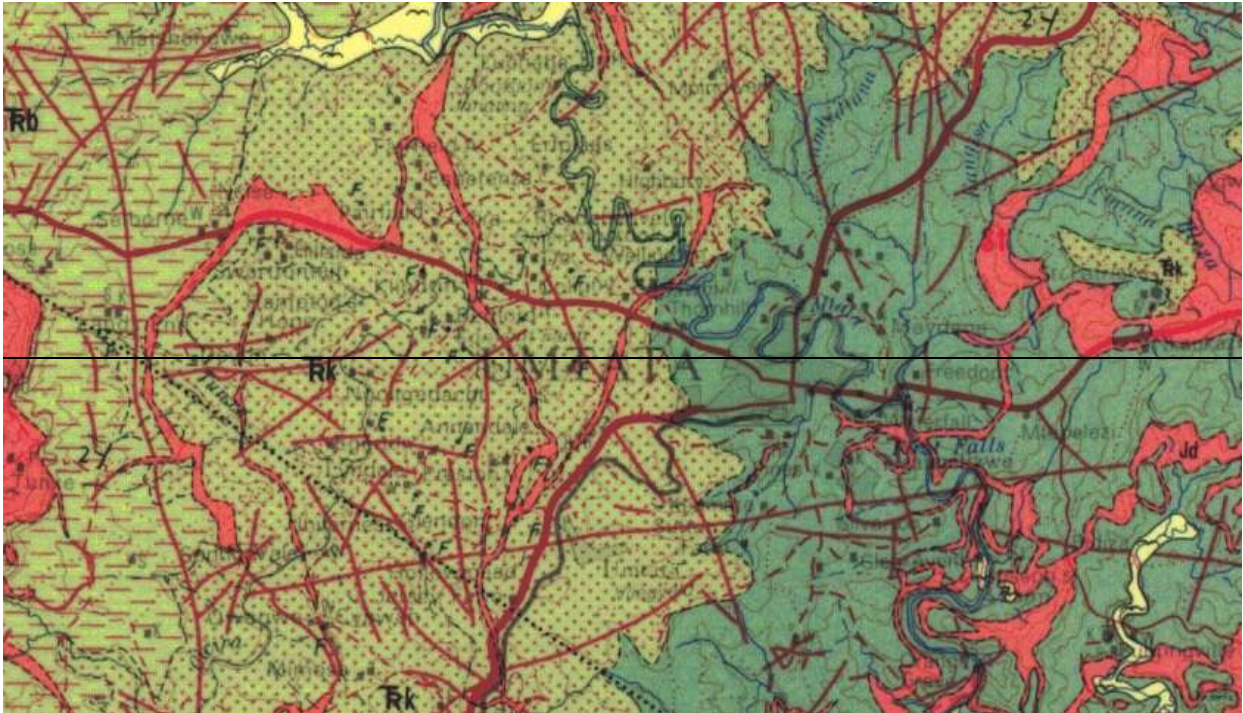
1. 70 individual residential erven, with an average size of approximately 317-464m<sup>2</sup>.
2. 1 single residential site with a size of 1771m<sup>2</sup>.
3. 1 church site with a size of 2000m<sup>2</sup>.
4. 1 business site with a size of 2513m<sup>2</sup>.
5. 1 public open space site with a size of 596m<sup>2</sup>.
6. Public Roadway with a size of 5855m<sup>2</sup>.



*Figure 1: Location of the proposed project. Source map GoogleEarth.*

## 2. GEOLOGY

The proposed project site is located within the Katberg Formation (Trk) of the Adelaide Subgroup of the Beaufort Group (Fig. 2).



*Figure 2: Extract from the Mthatha 3128 1:250 000 Geological Map. Trk is composed of sandstone and red, brown and grey mudstones.*

The Beaufort Group (part of the Karoo Supergroup) is a sequence of fluvio-lacustrine sedimentary rocks that accumulated in a landlocked, intracratonic foreland basin in SW Gondwana during the Middle Permian to Middle Triassic (Neveling et al., 2005).

The Lower Beaufort Group is represented by the Adelaide Subgroup (SACS, 1980). In Mthatha the Adelaide Subgroup is represented by the Katberg Formation. This forms flattish terrain. These rocks formed from sediments originally deposited within a fluvial-floodplain constructed by meandering rivers in a semi-arid climate (Fig. 3), flowing into a large inland sea (Karoo Sea). Lacustrine environments alternate with fluvial environments indicating a series of transgressive-regressive lacustrine episodes (Green, 1998).

### *Dolerite*

Karoo dolerite intrusions may be present. These are 184 million years (Ma) old and represent the onset of the break-up of the Gondwana Supercontinent (Hastie et al., 2014). According to Watkeys (2006), Gondwana rifting commenced between 155 and 135 Ma.





**Fig. 3: Example of the geology that might be uncovered at depth within the Mthatha area. This image shows a river channel (possibly Katberg Formation) cutting down into red shales of the Adelaide Sub-Group near Bergville.**

### **3. PALAEOLOGY**

Beaufort Group rocks are classified red on the Sahr's Map (Fig. 4). Mthatha is located within Triassic Era rocks. These rocks are located above (stratigraphically) the Permo-Triassic Boundary (PTB). The PTB is an extinction event, also known as the Great Dying, when 95% of life on Earth became extinct. The reasons for this are still controversial. There have been five great extinction events in the Phanerozoic Era (541 Mya till Present). Of these the Permo-Triassic Boundary represents the greatest extinction event in the Earth's history.

The PTB is expected to be found within marine sediments where a complete time record may accumulate. In contrast the Adelaide Subgroup comprises terrestrial sediments recorded as sedimentary rocks. Preservation requires a large number of geological processes to come together, but these are less likely to take place during terrestrial deposition. Consequently the placement of the PTB is not accurately known, if it has in fact been preserved, in southern Africa, but it must be considered. Present evidence indicates that the Permo-Triassic Boundary is unlikely to be located in the development area.



**Fig. 4: Palaeosensitivity of rocks in the Mthatha area.**

### Trace fossils

Evidence of bioturbation is ubiquitous within the Adelaide Subgroup siltstones and mudstones, however the various trace fossil (ichnofossil) types are not always identifiable. Trace fossils are very common within the Beaufort Group (Fig. 5 & 6). These have limited **Palaeontological** usage.



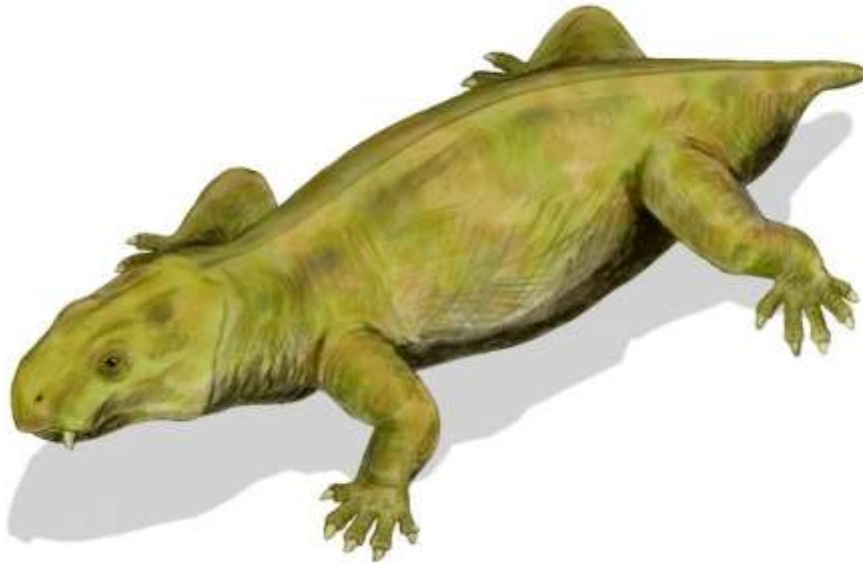
**Fig. 5: Examples of trace fossils found near Bergville. This could be *Arenicolites*.**



**Fig. 6: Trace fossils of unknown species, possibly a shrimp, found near Bergville.**

### **Vertebrate Fossils**

The Beaufort Group is known internationally for its fossils (Cisneros et al., 2008). It contains plant- and animal- fossils. The latter include a wide variety of body fossils, including the mammal-like reptiles such as the Upper Permian- *Dicynodon* (Fig. 7) and the Triassic- aged *Lystrosaurus* (Neveling et al., 2005) and trace fossils (Green, 1997). The Adelaide Subgroup known world-wide for its fossils



**Fig. 7: Dicynadon reproduction (Wikipedia).**

### **Karoo Dolerite**

Karoo Dolerite is also present. This is an igneous intrusive rock and by definition cannot be fossiliferous.

### **Paleontological Material Discussion**

Significant Palaeontological Material could be found on site. However there are several mitigating factors:

3. The site is highly disturbed as this is a refurbishment project
4. The site is highly weathered and no fresh rock is exposed.

These two factors mitigate against a field visit. It is possible that Paleontological Material could be exposed during site excavation, consequently a **Chance Find Protocol** has been inserted.

## **4. CHANCE FIND PROTOCOL**

As this site includes areas flagged red on the SAHRIS PalaeoSensitivity Map (Fig. 4), a “Chance Find Protocol” is **Recommended**.

In the case of any unusual finds, 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, 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.

## 5. CONCLUSIONS & RECOMMENDATIONS

The proposed development is on rock which could be fossiliferous. However, the rock is weathered and the site is highly disturbed. It is unlikely that **Palaeontological Material** will be discovered on a pre-excavation field trip as the rock is highly weathered and fresh rock is not exposed.

A **Chance Find Protocol** has been inserted. Should any **Palaeontological Material** be uncovered a Palaeontologist must be called in to investigate.

Should excavations >2m deep take place and expose fresh rock, a field visit by a competent Palaeontologist should be arranged.

## 6. REFERENCES

Cairncross, B; Beukes, NJ; Coetzee, LL; Rehfeld, U. (2005) The bivalve *Megadesmus* from the Permian Volksrust Shale Formation (Karoo Supergroup), northeastern Karoo Basin, South Africa: implications for late Permian Basin development. South African Journal of Geology, 108: 547-556.

Catuneanu, O., Hancox, P.J., Rubidge, B.S., 1998. Reciprocal flexural behaviour and contrasting stratigraphies: a new basin development model for the Karoo retroarc foreland system, South Africa. *Basin Res.* 10, 417–439.

Cisneros, J. C., Rubidge, B. S., Mason, R. & Dube, C. (2008). "Analysis of millerettid parareptile relationships in the light of new material of *Broomia perplexa* Watson, 1914, from the Permian of South Africa. *Journal of Systematic Palaeontology*, 6, 453-462". *Journal of Systematic Palaeontology*. 6(4): 453–462.

Green, D (1997). Palaeoenvironments of the Estcourt Formation (Beaufort Group), KwaZulu-Natal. MsC (unpubl.), Department of Geology and Applied Geology, University of Natal Durban.

Groenevald, G (2017). Chance find protocol “for the proposed Greater Bulwer DonnyBrook Bulk Water SupplyA Scheme (GBDBWSS): Harry Gwala district Municipality, KwaZuluNatal.

Harrismith 2828 1: 250 000 Geological Map. Council for Geosciences, Pretoria.

Hastie, WW; Watkeys, MK; Aubourg, C (2014). Magma flow in dyke swarms of the Karoo LIP: Implications for the mantle plume hypothesis. *Gondwana Research* 25 (2014) 736–755.

Neveling, P.J. Hancox & B.S. Rubidge (2005) Biostratigraphy of the lower Burgersdorp Formation (Beaufort Group; Karoo Supergroup) of South Africa – implications for the stratigraphic ranges of early Triassic tetrapods. *Palaeont. afr.* ) 41: 81–87.

SACS (South African Committee for Stratigraphy (1980). Council for Geosciences, Pretoria.

Sahris. <https://sahris.sahra.org.za/map/palaeo>

Watkeys, M.K., 2006. Gondwana break-up: a South African perspective. In: M.R. Johnson, C.R. Anhaeusser and R.J. Thomas (Editors), *The Geology of South Africa*, Geological Society of South Africa, Johannesburg/Council for Geoscience, Pretoria, 531-539.

## 7. 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, Durban.*

**Role:** Specialist Palaeontological Report production

### **Expertise of the specialist:**

- PhD in Geology (University of KwaZulu-Natal), Pr. Sc. Nat., I.A.H.S.
- 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 more than 50 journal articles with 360 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 work includes:

- 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.
- 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.