

**HERITAGE DESKTOP FOR THE STONEWALL
QUARRY, KOKSTRAD, KZN**

FOR GCS WATER AND ENVIRONMENT (PTY) LTD

DATE: 13 OCTOBER 2022

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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

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INTRODUCTION

Stonewell Quarry CC (Stonewell) is a dolerite quarry located approximately 5.6km southeast of Kokstad, KwaZulu-Natal on Portion 21 of Farm Waaifontein No 301. The site has been in operation since 2001. Due to a depletion of resources in the current pit, Stonewell wishes to extend the footprint of the current pit by approximately 4.58 ha, and increase the total area of their Mining Right. This activity triggers the need to amend its current approved Environmental Authorisation (EA) to make provision for the increase in mining area, within its existing approved MR area.

Stonewell has proposed the extension of the current pit by 4.58ha. Topsoil stripped during the clearance of the site will be added to the existing topsoil stockpile. No new infrastructure will be required on site. Access to area will be gained through the current pit, and the current storage facilities will be sufficient to handle the material mined from the extension, as resources in the current pit have been depleted.

As with mining from the current pit, material will be mined through an opencast excavation, in benches. The material will be transported by tipper truck to the primary and secondary crusher located to the north of the pit for processing, before being sold.

The Mining Right area consists of approximately 15.5 ha of the total 300.9 ha of Portion 21 of the Farm Waaifontein No. 301. The current mining area is located in the north-western corner of the property.

Umlando was requested to undertake an HIA of the proposed extension. After an initial assessment, we suggested a desktop study would suffice. Figures 1 – 4 show the location of the development.

FIG. 1 GENERAL LOCATION OF THE PROPOSED DEVELOPMENT

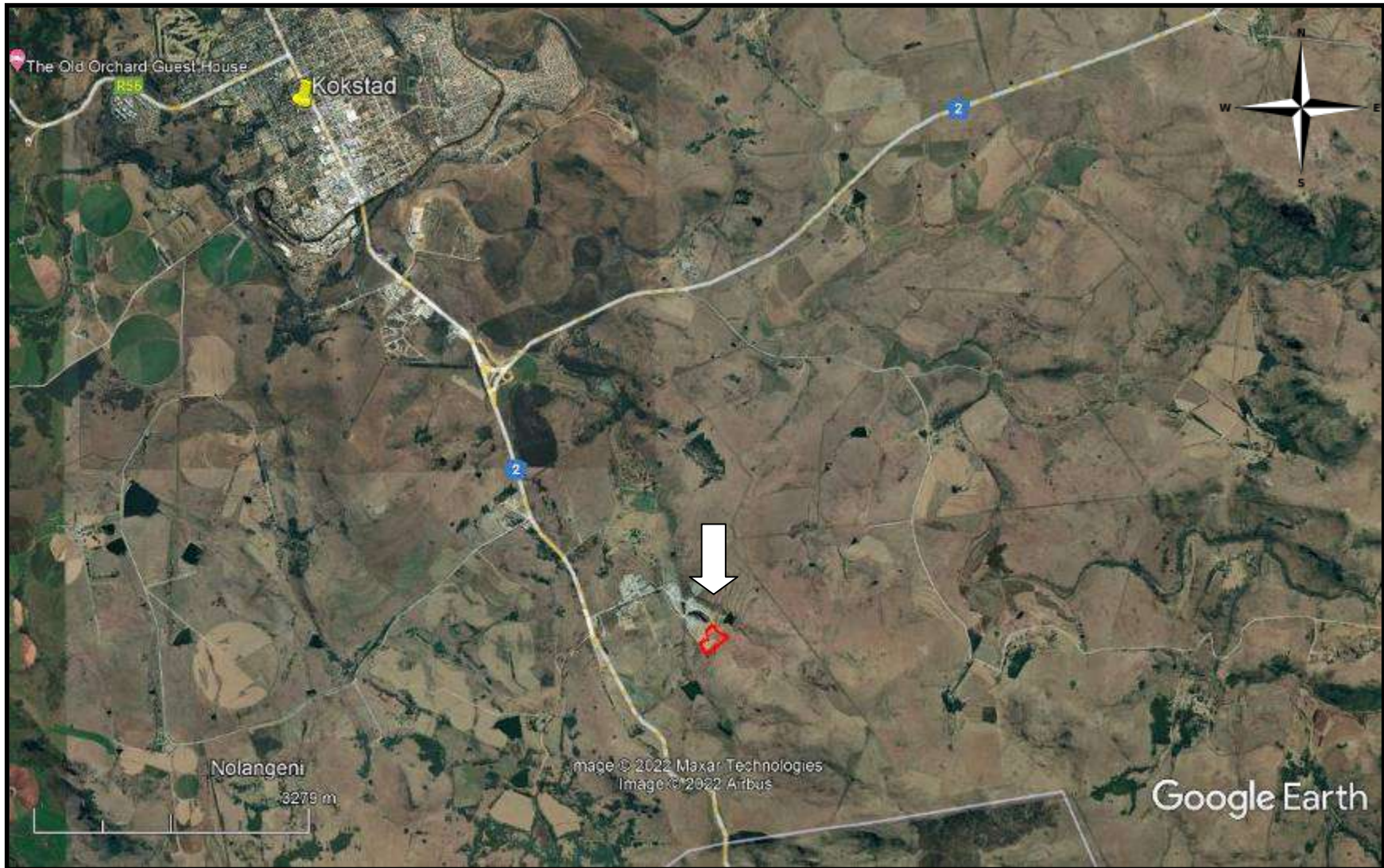


FIG. 2: AERIAL OVERVIEW OF THE PROPOSED DEVELOPMENT



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

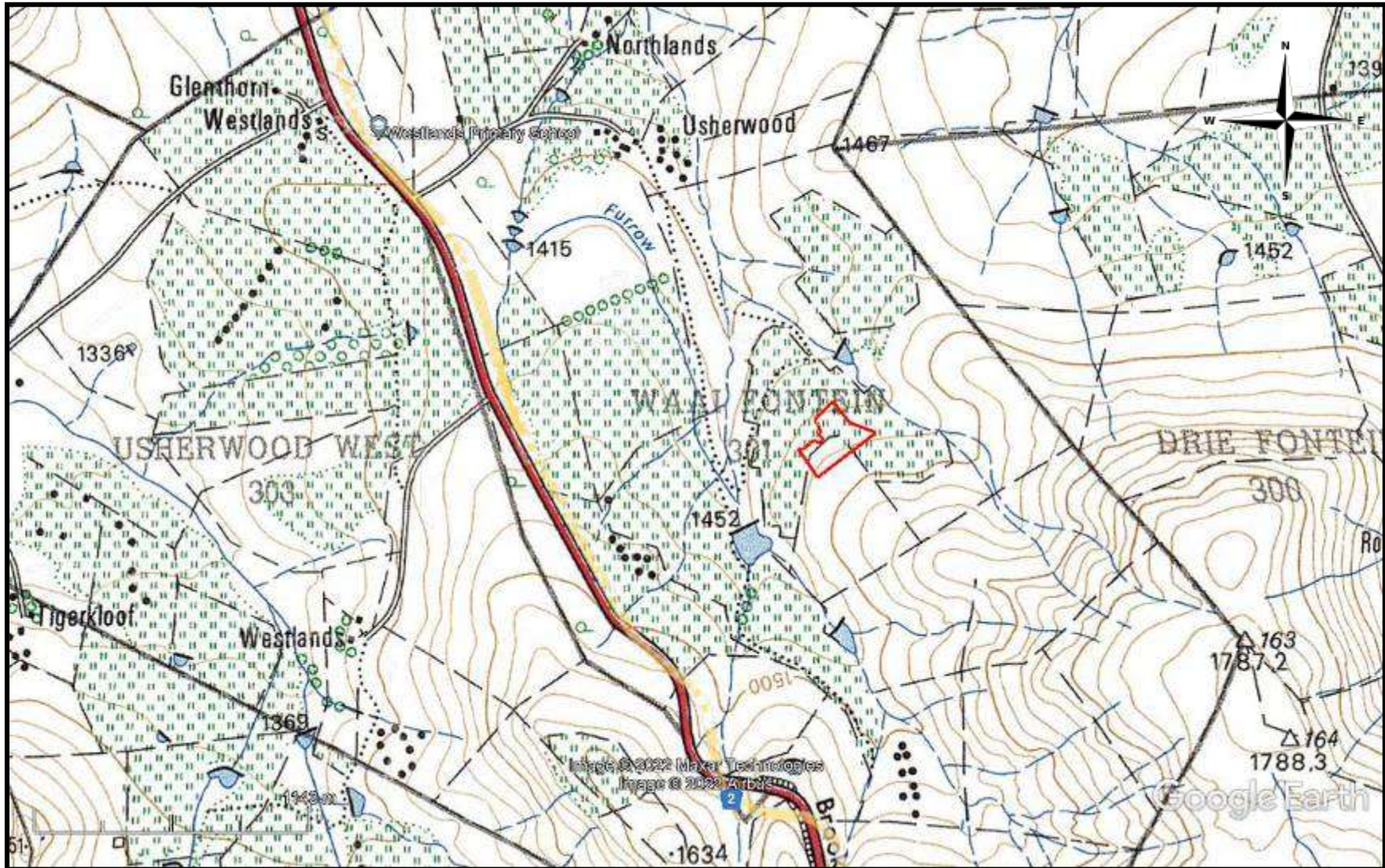


FIG. 4: SCENIC VIEWS OF THE STUDY AREA



KWAZULU NATAL AMAFA AND RESEARCH INSTITUTE, ACT 05, 2018,

The KwaZulu-Natal Amafa And Research Institute, Act 05, 2018, Chapter 8 (pp 29 – 32) defines heritage resources.

“General protection: Structures.

37.(1)(a) 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 Institute having been obtained on written application to the Council.

(b) Where the Institute does not grant approval, the Institute must consider special protection in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.

The Institute may, by notice in the *Gazette*, exempt—

(a) A defined geographical area; or

(b) defined categories of sites within a defined geographical area, from the provisions of subsection where the Institute 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.

(3) 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.

38. No person may damage, alter, exhume, or remove from its original position

(a) the grave of a victim of conflict;

(b) a cemetery made up of such graves; or

(c) any part of a cemetery containing such graves, without the prior written approval of the Institute having been obtained on written application to the Council.

General protection: Informal and private burial grounds

39.(1) or burial ground older than 60 years, or deemed to be of heritage significance by a heritage authority -

- (a) not otherwise protected by this Act; and
- (b) 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 Institute having been obtained on written application to the Council.

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

- (a) the applicant has made a concerted effort to consult with communities and individuals who by tradition may have an interest in the grave; and
- (b) 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.—

40 (1) 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 Institute having been obtained on written application to the Council.

(2) 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 Institute without delay.

(3) The Institute 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 Institute to be inappropriate within 50 metres of a rock art site.

(4) 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 Institute having been obtained on written application to the Council.

(5) 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 Institute having been obtained on written application to the Council.

(6)(a) 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, vests in the Provincial Government and the Institute is regarded as the custodian on behalf of the Provincial Government.

(b) The Institute may establish and maintain a provincial repository or repositories for the safekeeping or display of —

- (i) archaeological objects;
- (ii) palaeontological material;
- (iii) ecofacts;
- (iv) objects related to battlefield sites;
- (v) material cultural artefacts; or
- (vi) meteorites,

(7) The Institute may, subject to such conditions as the Institute may determine, loan any object or material referred to in subsection (6) to a national or provincial museum or institution.

(8) No person may, without the prior written approval of the Institute having been obtained on written application to the Institute, trade in, export or attempt to export from the Province ~

- (a) any category of archaeological object;
- (b) any palaeontological material;
- (c) any ecofact;
- (d) any object which may reasonably be regarded as having been recovered from a battlefield site;
- (e) any material cultural artefact; or
- (f) any meteorite.

(9)(a) A person or institution in possession of an object or material, referred to in paragraphs (a) ~ (f) of subsection (8), must submit full particulars of such object or material, including such information as may be prescribed, to the Institute.

(b) An object or material referred to in paragraph (a) must, subject to paragraph (c) and the directives of the Institute, remain under the control of the person or institution submitting the particulars thereof.

(c) The ownership of any object or material referred to in paragraph (a) vests in the Provincial Government and the Institute 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	Site conservation or mitigation prior to development / destruction
High / Medium Significance	Generally Protected A		Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Medium Significance	Generally Protected B		On-site sampling monitoring or no archaeological mitigation required prior to or during development / destruction
Low Significance	Generally Protected C		

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. No surveys have occurred near the study area; however the general area is known to be archaeologically sensitive (fig. 5). These sites are mostly open scatters of stone tools. A few Rock Art, Late Iron Age and Historical Period sites occur as well.

The Surveyor General's map of the farm Waai Fontein 301 indicates that the farm was surveyed in 1878. The farm was probably rented before 1878, as the map indicates existing houses. These houses still occur there today. This indicates that any built structure on the farm could be more than 150 years old. No structures occur on the quarry footprint.

The 1948 aerial photograph indicates that the footprint is grassland. No built structures occur in the footprint. (fig. 7).

The 1955 and 1969 aerial photographs indicate that the hill has been transformed into agricultural fields (fig.'s 8 - 9). The footprint has been used as agricultural fields since then (fig. 2).

The aerial photographs show that there is no stone walling or other built structures before the land was converted to agricultural fields and ploughed.

No further heritage mitigation should be required for the quarry extension.

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

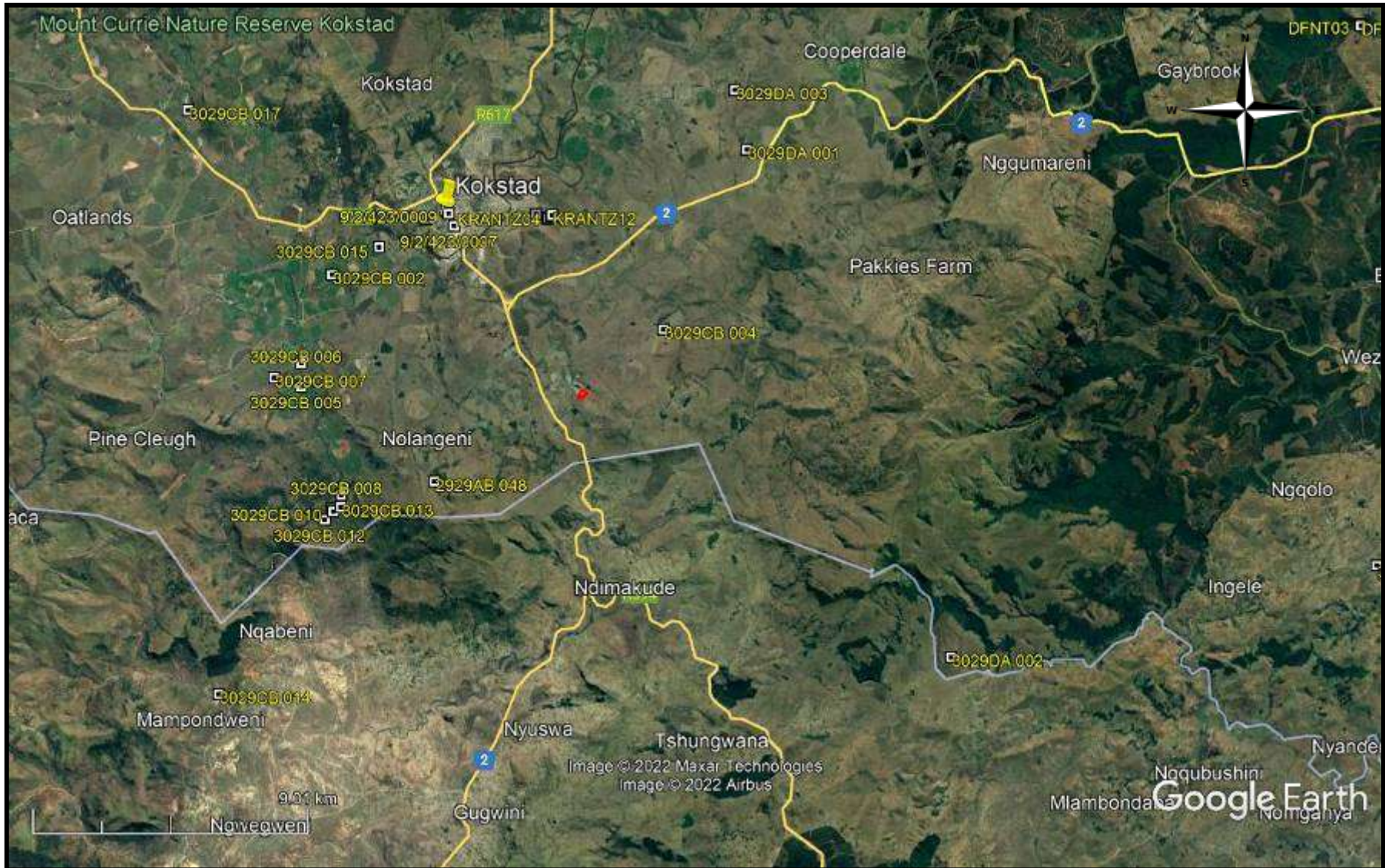
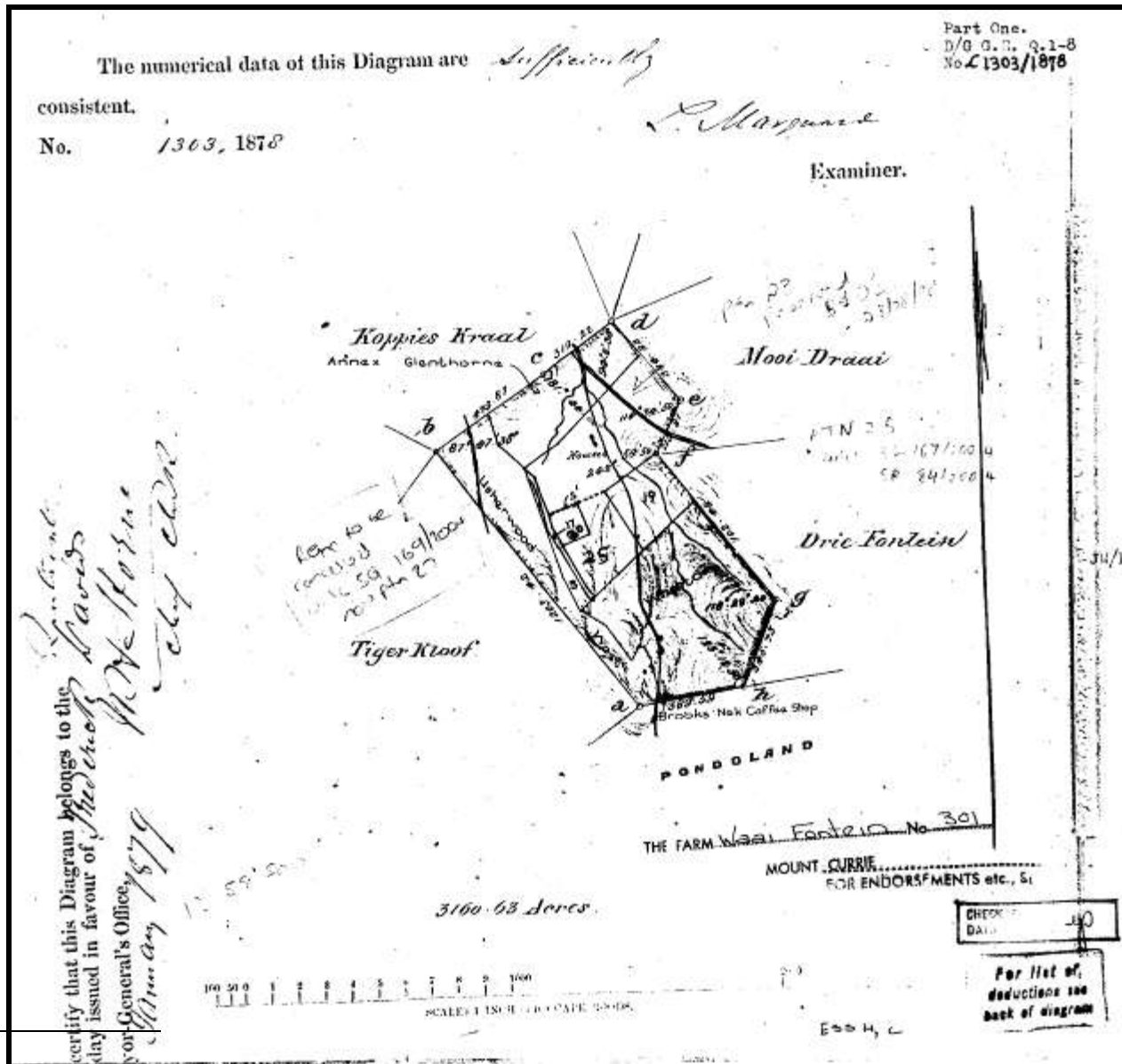


FIG. 6: SURVEYOR GENERAL MAP OF WAAI FONTEIN (1878)¹



¹ N_CC38T1

FIG. 7: LOCATION OF THE STUDY AREA IN 1948²



² 207_005_26716

FIG. 8: LOCATION OF THE STUDY AREA IN 1955³



³ 358_010_05279

FIG. 9: LOCATION OF THE STUDY AREA IN 1969⁴



⁴ 358_010_05279

PALAEONTOLOGICAL SENSITIVITY

While the quarry is only mining dolerite, the geology report mentioned Triassic Sandstone layers. It was decided that a specialist opinion was required regarding these layers.

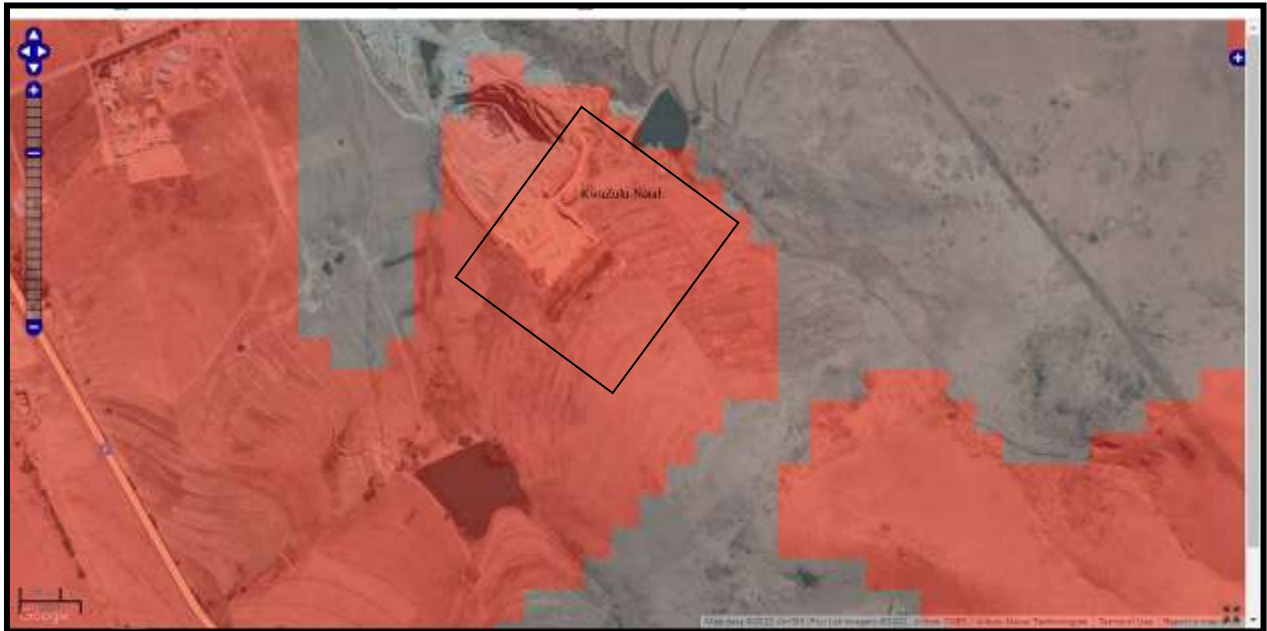
Dr A Smith undertook a desktop survey for the proposed quarry extension since it is noted has having very high significance. He states:

“The proposed extension to the Stonewall Quarry will result in the mining of dolerite and the removal of overburden. The dolerite is by definition not fossiliferous. The overburden comprises the basal unit of the Beaufort Group which is known to be fossiliferous. However the rock unit here is very thin and overlies a thick dolerite sill and is likely to have been heavily thermally metamorphosed due to the hot magma (1200°C) intrusion, to create the dolerite sill (ore body), below it. Consequently any palaeomaterial is likely to have been destroyed.

A “Chance Find” Protocol has been incorporated into this report and MUST be incorporated into the EMP. In mitigation this site is likely to be weathered, reducing the chance of valuable palaeontological material being found.”

Fig. 11 shows the geological profile of the quarry.

FIG. 10: PALAEOLOGICAL 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.

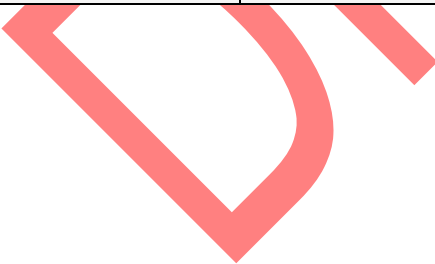


FIG. 11: GEOLOGICAL PROFILE OF THE QUARRY



CONCLUSION

A desktop heritage survey was undertaken for the proposed Stonewall quarry extension. No heritage sites are known to occur in the study area, nor were any noted from the historical maps.

The PIA desktop noted that while the Adelaide Formation existed at the proposed quarry, it is unlikely to be fossiliferous. A Chance Find Protocol was initiated.

The project should be exempt from further heritage mitigation, barring the Chance Find Protocol

REFERENCES

Surveyor General Map

N_CC38T1

1:50 000 Topographical Maps

3029CB 1980 Kokstad

Aerial Photographs

207_005_26716

358_010_05279

616_003_00119

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.



Gavin Anderson
Archaeologist/Heritage Impact Assessor

PIA desktop

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**STONEWALL DOLERITE QUARRY, KOKSTAD:
DESK-TOP PALAEOLOGICAL IMPACT
ASSESSMENT**

FOR

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by

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27 October 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:



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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 Stonewall Quarry Extension, Kokstad, 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 proposed extension to the Stonewall Quarry will result in the mining of dolerite and the removal of overburden. The dolerite is by definition not fossiliferous. The overburden comprises the basal unit of the Beaufort Group which is known to be fossiliferous. However the rock unit here is very thin and overlies a thick dolerite sill and is likely to have been heavily thermally metamorphosed due to the hot magma (1200°C) intrusion, to create the dolerite sill (ore body), below it. Consequently any palaeomaterial is likely to have been destroyed.

A “Chance Find” Protocol has been incorporated into this report and MUST be incorporated into the EMP. In mitigation this site is likely to be weathered, reducing the chance of valuable palaeontological material being found.

1. BACKGROUND AND PROPOSED PROJECT

Stonewall Quarry is a dolerite quarry located approximately 5.6km southeast of Kokstad, KwaZulu-Natal on Portion 21 of Farm Waaifontein No 301 (Figure 1). This quarry has been in operation since 2001. Stonewall wishes to extend the quarry by approximately 4.58 ha.



Figure 1: Location of the Stonewall quarry and extension (green). The image source is Umlando & GoogleEarth).

2. METHODOLOGY

Geological maps, a literature review and personal experience (see Appendix 1) were used in this research.

3. GEOLOGY

The geology of the proposed Stonewall Quarry extension comprises a Karoo dolerite sill, with an Adelaide Subgroup (basal Beaufort Group) hanging wall (Figure 2). The dolerite underlies the Adelaide Subgroup.

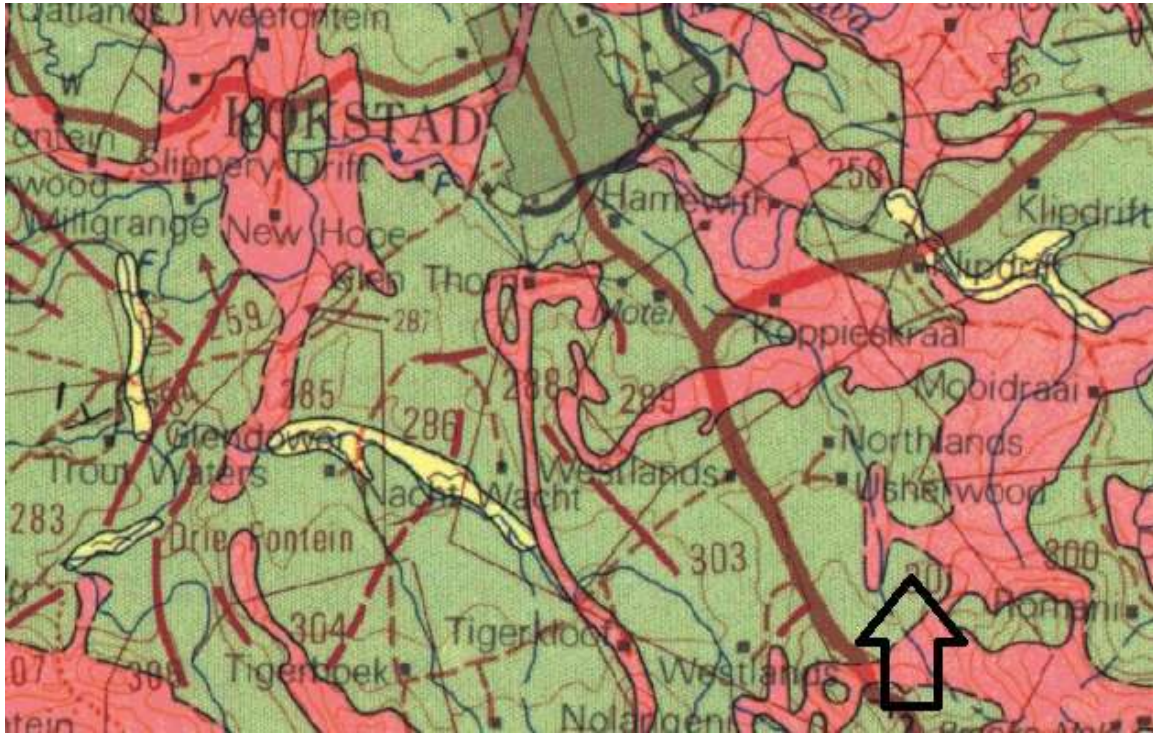


Figure 2 Area of the Stonewall Quarry and extension (arrowed). Extract from the Kokstad 3038 1: 250 000 Geological Map. Grey (Pa) is the Estcourt Formation and red is Karoo Dolerite.

ADELAIDE SUBGROUP

At this locality the Beaufort Group is represented by the Adelaide Subgroup. This may be the Upper Permian Estcourt Formation, but has not been differentiated on the Geological Map (Figure 2). The Estcourt Formation is considered as being the basal unit of the Beaufort-aged Adelaide Subgroup, itself a part of the Karoo Supergroup (Green, 1998). The Adelaide Subgroup is a sequence of fluvio-lacustrine sedimentary rocks that accumulated in a landlocked, intra-cratonic foreland basin within southwest Gondwana during the Middle Permian to Middle Triassic (Neveling et al., 2005). The Estcourt Formation is usually deeply weathered (Figure 3).



Figure 3: An example of the Estcourt Formation as it could occur in the proposed development area. However this lithology is expected to be deeply weathered on this site, but there could be fresh rock at depth (>2m).

KAROO DOLERITE SILL

The dolerite ore body underlies Adelaide Subgroup (Figure 3) rocks. At this location, the Karoo Dolerite is represented by dykes (vertical sheets) and sills, (sub-horizontal sheets). It is part of the Karoo Large Igneous Province (LIP). The Karoo LIP is a sequence of lavas up to 4.5 km thick which was deposited about 184 Ma (million years ago). These igneous rocks are part of the “plumbing” of the LIP, which was extruded as a “Continental Flood Basalt”, a process that has never been witnessed by mankind. This process is believed to have taken place by fissure eruption. This event may have triggered the break-up of the Gondwana supercontinent (Hastie et al., 2014). Karoo dolerite intrusions (these are 184 million years (Ma) old) and represent the onset of the break-up of the Gondwana Supercontinent (Hastie et al (2014). Dolerite outcrop, as it might appear, is illustrated below.



Figure 4: An example of dolerite as it could occur at the proposed site.

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4. PALAEOONTOLOGY

The palaeosensitivity of the proposed Stonewall Quarry extension is shown in Figure 5 below.



Figure 5: Extract from SAHRIS PalaeoSensitivity Map. Red = very high and blue = low (<https://sahris.sahra.org.za/map/palaeo>). The red area corresponds to the Adelaide Subgroup (Estcourt Formation). Grey marks outcrops of Karoo dolerite. Quarry site is boxed.

ADELAIDE SUBGROUP

Evidence of trace fossil bioturbation is ubiquitous within the Estcourt Formation siltstones and mudstones however the various trace fossil (ichnofossil) types are not always identifiable.

The Beaufort Group is known internationally for its palaeontological content (Cisneros et al., 2008). The Estcourt Formation contains plant- and vertebrate fossils. The latter include the mammal-like reptiles such as the Upper Permian- Dicynodon (Neveling et al., 2005) and trace fossils (Green, 1998).

GEOLOGICAL RELATIONSHIPS

The Karoo Dolerite sill was intruded into the Karoo Supergroup at 1200° C, which is marked here by the Adelaide Subgroup (probably the Estcourt Formation). In this process the hanging wall (probably Estcourt Formation) is likely to have been strongly thermally altered destroying any fossils present.

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5. CONCLUSIONS

The Karoo Dolerite sill is unfossiliferous by definition. The Adelaide Subgroup (Estcourt Formation) hanging wall may have been fossiliferous. As this lithology has undergone severe thermal metamorphism any fossils present have probably been destroyed.

The possibility of finding significant fossil in the hanging wall is low, but not zero. A “Chance Find” Protocol has been incorporated into this report and this MUST be incorporated into the EMP. Due to the specialization of this field, this should include regular site inspections by a qualified person.

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6. 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.

6. REFERENCES

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APPENDIX 1: DETAILS OF SPECIALIST

Dr Alan Smith

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

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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 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 590 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.

DRAFT