

**FIRST PHASE CULTURAL HERITAGE IMPACT
ASSESSMENT OF THE PROPOSED EXTENSION
AND UPGRADE OF LOCAL ROAD L1859 to MEET
D222, MUDEN.**



ACTIVE HERITAGE cc.

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Declaration of Consultants independence

Frans Prins is an independent consultant to Hanslab (PTY) Lmt and has no business, financial, personal or other interest in the activity, application or appeal in respect of which he was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances whatsoever that compromise the objectivity of this specialist performing such work.

A handwritten signature in black ink, appearing to read 'Frans Prins', is positioned above the printed name.

Frans Prins

LIST OF ABBREVIATIONS AND ACRONYMS

EIA	Early Iron Age
ESA	Early Stone Age
HISTORIC PERIOD	Since the arrival of the white settlers - c. AD 1820 in this part of the country
IRON AGE	Early Iron Age AD 200 - AD 1000 Late Iron Age AD 1000 - AD 1830
LIA	Late Iron Age
LSA	Late Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998 and associated regulations (2006).
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999) and associated regulations (2000)
SAHRA	South African Heritage Resources Agency
STONE AGE	Early Stone Age 2 000 000 - 250 000 BP Middle Stone Age 250 000 - 25 000 BP Late Stone Age 30 000 - until c. AD 200

EXECUTIVE SUMMARY

A cultural heritage survey of the proposed extension and upgrade of the L1859 local road near Muden identified one Shembe Site of Worship and Two Grave Sites within 35m from the road reserve. It is important to maintain a buffer of at least 20m around these heritage sites. Should this not be possible then a phase two heritage impact assessment must be initiated. Mitigation would involve a rescue excavation through a permit application process from the provincial heritage agency Amafa. Various other graves occur in the area but none are situated closer than 50m to the proposed road upgrade and they are therefore not threatened. From a paleontological perspective it must be noted that a high sensitivity is allocated to sections underlain by the Volksrust Formation in the project area. A Phase 1 PIA document and "Chance Find Protocol" is essential during the **first month** of excavation for road foundations deeper than 1.5m. The proposed development may therefore proceed on the remainder of the footprint as planned, however, attention is drawn to the South African Heritage Resources Act, 1999 (Act No. 25 of 1999) and the KwaZulu-Natal Heritage Act (Act no 4 of 2008) which, requires that operations that expose archaeological or historical remains should cease immediately, pending evaluation by the provincial heritage agency.

1 BACKGROUND INFORMATION ON THE PROJECT

Table 1. Background information

Consultants:	Frans Prins of Active Heritage cc conducted the general Heritage Impact Assessment study.
Type of development:	The KZN Department of Transport (Applicant), proposes to upgrade and extend the existing L1859 gravel road to meet District Road D222. The existing porting of the road is approximately 7.8km in length and the Department of Transport (DOT) proposes to extend the road by a further 11km. The proposed upgrade will be approximately 11km in length, 6m wide with a 20m road reserve as per the Department of Transport standard dimensions for a type 7A gravel road. Furthermore, the route encounters two drainage lines. The Department proposes to install a concrete slab structure and one 600mm pipe culvert respectively. The upgrade and extension of the road aims to provide a more convenient access to D222.
Rezoning or subdivision:	Not applicable
Terms of reference	To carry out a Heritage Impact Assessment. The Paleontological Impact Assessment of the footprint is reported in Appendix 2.
Legislative requirements:	The Heritage Impact Assessment was carried out in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and following the requirements of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and the KwaZulu-Natal Heritage Act, 1997 (Act No. 4 of 2008)

1.1. Details of the area surveyed:

The proposed road development is situated near Muden in the Umvoti Local Municipality (Figs 1 & 2). It is situated in a communal area with some Zulu homesteads dotted along the existing mud track and further afield (Figs 5 & 6). However, the greatest part of the proposed road extension trajectory runs through areas with no apparent human habitation

(Fig). These areas are dominated by indigenous woody vegetation with *Acacia species* being dominant. The Department of Transport (Applicant) proposes to upgrade the existing mud track to a Type 7A gravel road. The route encounters two drainage lines. The Department proposes to install a concrete slab structure and one 600mm pipe culvert respectively. The upgrade and extension of the road aims to provide a more convenient access to D222.

The GPS coordinates for the proposed road upgrade are:

Start Point of Proposed Road: S 29° 01'38.86" E 30°22'20.07"

Middle Point of Proposed Road: S 29° 03'57.47" E 30°22'51.96"

End Point of Proposed Road: S 29°06'27.79" E 30°24'11.05"

The GPS coordinates for the proposed structures are:

Pipe culvert: S 29° 01'59.82" E 30°22'28.36"

Concrete Slab Structure: S 29° 01'56.64" E 30°22'25.71"

2 BACKGROUND TO ARCHAEOLOGICAL HISTORY OF AREA

The archaeological history of the Province of KwaZulu-Natal (KZN) dates back to about 2 million years and possibly older, which marks the beginning of the Stone Age. The Stone Age in KZN was extensively researched by Professor Oliver Davies formerly of the Natal Museum. The Stone Age period has been divided in to three periods namely: Early Stone Age (ESA) dating between 2 million years ago to about 200 000 years ago, Middle Stone Age (MSA) dating between 200 000 years ago to about 30 000 years ago, and the Later Stone Age (LSA) which dates from 30 000 to about 2 000 year ago. The Stone Age period ends around approximately 2 000 years ago when Bantu speaking Age farmers from the north arrived in southern Africa. The Iron Age is also divided into three periods, namely: Early Iron Age (EIA) dating between AD 200 and AD 900, Middle Iron Age (MIA) dating between AD 900 and AD 1300, Late Iron Age (LIA) dating between AD 1 300 and 1 820.

2.1 Stone Age

2.1.1 Early Stone Age (ESA)

The ESA is considered as the beginning of the stone tool technology. It dates back to over 2 million years ago until 200 000 years ago. This period is characterised by Oldowan and Acheulean industries. The Oldowan Industry, dating to approximately between over 2 million years and 1.7 million years predates the later Acheulean. The Oldowan Industry consists of very simple, crudely made core tools from which flakes are struck a couple of times. To date, there is no consensus amongst archaeologists as to which hominid species manufactured these artefacts. The Acheulean Industry lasted from about 1.7 million years until 200 thousand years ago. Acheulean tools were more specialized tools than those of the earlier industry. They were shaped intentionally to carry out specific tasks such as hacking and bashing to remove limbs from animals and marrow from bone. These duties

were performed using the large sharp pointed artefacts known as handaxes. Cleavers, with their sharp, flat cutting edges were used to carry out more heavy duty butchering activities (Esterhuysen, 2007). The ESA technology lasted for a very long time, from early to middle Pleistocene and thus seems to have been sufficient to meet the needs of early hominids and their ancestors. ESA tool occurrence has been reported in open air context on seven sites in the greater Weenen area. None of these sites occur on the actual footprint. Apart from stone artefacts, the ESA sites have produced very little as regards other archaeological remains. This has made it difficult to make inferences pointing to economical dynamics of the ESA people in this part of the world. The diet of ESA peoples has therefore had to be reconstructed on the basis of evidence from elsewhere that it comprised primarily of animal and plant foods (Mazel 1989).

2.1.2 Middle Stone Age (MSA)

The MSA dates to between 200 000 and 30 000 years ago, coinciding with the emergence of modern humans. The MSA technology is therefore believed to have been manufactured by fully modern humans known as *Homo sapiens* who emerged around 250 000 years ago. While some of the sites belonging to this time period occur in similar contexts as those of ESA, most of the MSA sites are located in rock shelters. Palaeoenvironmental data suggest that the distribution of MSA sites in the high lying Drakensberg and surrounding areas was influenced by the climate conditions, specifically the amount and duration of snow (Carter, 1976). In general, the MSA stone tools are smaller than those of the ESA. Although some MSA tools are made from prepared cores, the majority of MSA flakes are rather irregular and are probably waste material from knapping exercises. A variety of MSA tools include blades, flakes, scrapers and pointed tools that may have been hafted onto shafts or handles and used as spearheads. Between 70 000 and 60 000 years ago new tool types appear known as segments and trapezoids. These tool types are referred to as backed tools from the method of preparation. Residue analyses on the backed tools from South African MSA sites including those in KZN indicate that these tools were certainly used as spear heads and perhaps even arrow points (Wadley, 2007). A few sites with impressive MSA deposits have been excavated in KZN. Perhaps the best known ones are Sibudu Cave and Umhlatuzana Cave to the south east of the study area, and Border Cave to the north of the study area. All these sites provided impressive evidence for fine resolution data and detailed stratigraphy (Wadley & Jacobs, 2006). Fourteen Middle Stone Age sites have been recorded in the greater Muden area. These, like the Early Stone Age sites, are mostly restricted on open air sites with little archaeological

context remaining. None of the known Middle Stone Age sites occur on the footprint, however, four sites occur within 1km from the start of the proposed road upgrade.

2.1.3 Late Stone Age (LSA)

Compared to the earlier MSA and ESA, more is known about the LSA which dates from around 30 000 to 2 000 (possibly later) years ago. This is because LSA sites are more recent than ESA and MSA sites and therefore achieve better preservation of a greater variety of organic archaeological material. The Later Stone Age is usually associated with the San (Bushmen) or their direct ancestors. The tools during this period were even smaller and more diverse than those of the preceding Middle Stone Age period. LSA tool technology is observed to display rapid stylistic change compared to the slower pace in the MSA. The rapidity is more evident during the last 10 000 years. The LSA tool sequence includes informal small blade tradition from about 22 000 – 12 000 years ago, a scraper and adze-rich industry between 12 000 – 8 000 years ago, a backed tool and small scraper industry between 8 000 – 4 000 years and ending with a variable set of other industries thereafter (Wadley, 2007). Adzes are thought to be wood working tools and may have also been used to make digging sticks and handles for tools. Scrapers are tools that are thought to have been used to prepare hides for clothing and manufacture of other leather items. Backed tools may have been used for cutting as well as tips for arrows. It was also during Later Stone Age times that the bow and arrow was introduced into southern Africa – perhaps around 20 000 years ago. Because of the bow and arrow and the use of traps and snares, Later Stone Age people were far more efficient in exploiting their natural environment than Middle Stone Age people. Up until 2 000 years ago Later Stone Age people dominated the southern African landscape. However, shortly after 2 000 years ago the first Khoi herders and Bantu-speaking agro pastoralists immigrated into southern Africa from the north. This led to major demographic changes in the population distribution of the subcontinent. San hunter-gatherers were either assimilated or moved off to more marginal environments such as the Kalahari Desert or some mountain ranges unsuitable for small-scale subsistence farming and herding. The San in the coastal areas of KZN were the first to have been displaced by incoming African agro pastoralists. However, some independent groups continue to practice their hunter gatherer lifestyle in the foothills of the Drakensberg until the period of white colonialisation around the 1840's (Wright & Mazel, 2007). According to the KwaZulu- Natal Museum archaeological database there are fourteen Later Stone Age sites in the greater Muden area. Although ten of these are

surface scatters the remaining four are cave deposits in archaeological context. Also dating to the LSA period is the impressive Rock Art found on cave walls and rock faces. Rock Art can be in the form of rock paintings or rock engravings. The province of KZN is renowned for the prolific San rock painting sites concentrated in the Drakensberg. Rock art sites do occur outside the Drakensberg including the lower altitude areas towards Muden, however, these sites have not been afforded similar research attention as those sites occurring in the Drakensberg. Four rock art sites occur within 1km from the proposed road upgrade.

2.2 Iron Age

2.2.1 Early Iron Age (EIA)

Unlike the Stone Age people whose life styles were arguably egalitarian, Iron Age people led quite complex life styles. Their way of life of greater dependence on agriculture necessitated more sedentary settlements. They cultivated crops and kept domestic animals such as cattle, sheep, goats and dogs. Pottery production is also an important feature of Iron Age communities. Iron smelting was practised quite significantly by Iron Age society as they had to produce iron implements for agricultural use. However no smelting sites were discovered in the study area as it is the northern KZN that is rich in abandoned iron smelting sites (Maggs, 1989). Although Iron Age people occasionally hunted and gathered wild plants and shellfish, the bulk of their diet consisted of the crops they cultivated as well as the meat of the animals they kept. EIA villages were relatively large settlements strategically located in valleys beside rivers to take advantage of the fertile alluvial soils for growing crops (Maggs, 1989). The EIA sites in KZN date to around AD 500 to AD 900. Extensive research in the province, in the greater Weenen and Muden areas, of this period led to it being divided in the following time lines according to ceramic styles (Maggs, 1989; Huffman 2007):

- _ Msuluzi (AD 500);
- _ Ndondondwane (AD 700 – 800);
- _ Ntshekane (AD 800 – 900).

The archaeological data base of the KwaZulu-Natal Museum indicates that ten Early Iron Age sites occur in the greater Muden area. Here they are situated at altitudes below 1000m adjacent to the Mooi, Mhlopheni and Msuluzi Rivers. The well-known and researched sites of Mhlopheni and Magogo (Maggs & Ward 1984) occurs in the immediate vicinity of the proposed road upgrade.

2.2.2 Late Iron Age (LIA)

The LIA is not only distinguished from the EIA by greater regional diversity of pottery styles but is also marked by extensive stone wall settlements. However, in this part of the world, stone walls were not common as the Nguni people used thatch and wood to build their houses. This explains the failure to obtain sites from the aerial photograph investigation of the study area. Trade played a major role in the economy of LIA societies. Goods were traded locally and over long distances. The main trade goods included metal, salt, grain, cattle and thatch. This led to the establishment of economically driven centres and the growth of trade wealth. Keeping of domestic animals, metal work and the cultivation of crops continued with a change in the organisation of economic activities. Evidence for this stems from the fact that iron smelting evidence was not found in almost every settlement (Maggs, 1989; Huffman 2007). Twelve Later Iron Age sites occur in the greater Muden area. The majority of these were most probably inhabited by early Nguni-speaking agropastoralists before the Shakan era in the beginning of the 19th century. However, despite the occurrence of numerous sites in this area they, in contrast with the Early Iron Age sites, have not been well researched. Two Later Iron Age sites occur within 1km from the proposed road upgrade.

2.3 Historic Period

Oral tradition is the basis of the evidence of historical events that took place before history could be recorded. This kind of evidence becomes even more reliable in cases where archaeology could be utilised to back up the oral records. Sources of evidence for socio political organization during the mid-eighteenth to early nineteenth century in the study area and the larger former Natal Province suggest that the people here existed in numerous small-scale political units of different sizes, population numbers and political structures (Wright & Hamilton, 1989). This period was largely characterised by rage and instability as political skirmishes broke due to the thirst for power and resources between chiefdoms. During the 2nd half of the eighteenth century, stronger chiefdoms and paramuncies emerged. However, these were not fully grown states as there was no proper formal central political body established. This changed in the 1780's when a shift towards a more centralized political state occurred. This shift was mainly characterized by population growth and geographical expansion of states. The most important and largest and strongest states at the time were the Mabhudu, Ndwandwe and Mthethwa. However,

other smaller states, also established themselves in the area. These included in the south the Qwabe, Bhaca, Mbo, Hlubi, Bhele, Ngwane and many others (Wright & Hamilton, 1989). The greater Muden area was inhabited by the Thembu and Mcunu clans. The Zulu kingdom, established by King Shaka however remained the most powerful in the region in the early years of the 19th century. Shaka fought ruthlessly and often defeated his rivals and conquered their cattle, wives and even burnt their villages. Both the Tembu and Mcunu occupied the greater Muden area due to the expansionistic policies of the King Shaka.

These wars are often referred to as Difaqane and this period was characterised by rage and blood shedding. Shaka was assassinated in 1828 at which time he had transformed the nature of the society in the Natal and Zululand regions. He was succeeded by Dingaan (Wright & Hamilton, 1989). Dutch farmers unhappy with the British rule in Cape Town decided to explore into the interior of the country, away from British rule. Some groups remained in the Eastern Cape, others kept going and a few settled in the Orange Free State and the Transvaal. A great number, led by Piet Retief and Gerrit Maritz, crossed the Drakensberg into Natal.

Here they encountered the Zulus who lured them into a trap and brutally massacred many of them. This was only one of the many failures of the white settler expeditions in the frontier areas and when the shocking news reached the Cape, more groups were sent to the interior to revenge. A series of battles were fought but the most notable was the Battle of Blood River in 1838 where the Boers defeated the Zulus. This ended the Zulu threat to the white settlers and a permanent and formal settlement in Natal was established. However the Zulu kingdom remained independent for a couple of decades. The Republic of Natalia was annexed by the British in 1845 and in 1879 the Zulu kingdom was also invaded (Wright & Hamilton, 1989). The Anglo-Zulu War has been well recorded and an important occurrence took place at Keates Drift and Jamesons Drift, near the project area, when a few British soldiers attempted to cross the Tugela River after their defeat at the battle of Isandlwana. Although no relicts or artefacts survive from this encounter the surrounding landscape is still imbued with the meaning of this important period in the colonial history of KwaZulu-Natal. The Bambata Rebellion of 1906 saw various incidents in the close vicinity of the project area. The most significant is perhaps the Bambata Rock Ambush that occurred approximately 20km from the project area.

2.3.1 Short history of Muden

In 1862 the missionary Reverend Heinrich Röttcher sailed to South Africa from Germany on a ship called the Candace. In the same year he trekked through the Midlands where he found and named Müden after his home town in Germany. In 1940 Heinrich's grandson – Vic Röttcher, an orange wine and lucerne farmer, built the Ivala Farmstead. Vic and his wife Nola had 3 children – Lorna, Gene and Denzil who grew up at Ivala. In 1975 Vic passed away and Nola in 1978, after which Denzil ran the farm. In 1982 Denzil passed away and the farm was sold to Mr. Luke Wenzel. During this period the orange wine industry in the Muden Valley suffered financially – largely due to the increasing crime in the area. Other farms in the area suffered the same fate and land issues saw many areas being claimed by the local community. With the collapse of the orange farming industry in the Muden valley some of the former farm-steads became bed and breakfasts and tourist ventures. The Mhlopheni Nature Reserve is another well-known private enterprise in the Muden area that has recently been subject to land claims.

3 BACKGROUND INFORMATION OF THE SURVEY

3.1 Methodology

A desktop study was conducted of the heritage databases housed in the KwaZulu-Natal Museum. In addition, the available archaeological and historical literature covering the greater Muden area was also consulted. The SAHRIS website was consulted to obtain information on previous heritage surveys and site data near the study area.

A ground survey, following standard and accepted archaeological procedures, was conducted by the consultant on 1 November 2017. The consultant also interviewed two local residents whom he encountered on the L1859 during the survey (Fig). These local community members provided information regarding the occurrence of graves and sites of worship adjacent to the L1859.

3.2 Restrictions encountered during the survey

3.2.1 Visibility

Visibility was good.

3.2.2 Disturbance

No disturbance of any heritage sites were noticed.

3.3 Details of equipment used in the survey

GPS: Garmin Etrek

Digital cameras: Canon Powershot A460

All readings were taken using the GPS. Accuracy was to a level of 5 m.

4 DESCRIPTION OF SITES AND MATERIAL OBSERVED

4.1 Locational data

Province: KwaZulu-Natal

Town: Muden

Municipality: Umvoti Local Municipality

4.2 Heritage Sites Located during the Survey

4.2.1 Background

Two Grave Sites and two Shembe Sites of Worship was located adjacent to the L1859 extension. More graves and another Shembe Site of Worship occurs adjacent to the section of the L1859 that precedes the road extension, however, all these sites occur more than 100m from the footprint and there is no need to discuss them here. The local community representatives indicated that there are no 'living heritage sites', apart from the Shembe Sites of Worship, along the L1859 extension. Although some typical Zulu homesteads indicating the traditional 'Central Cattle Pattern' occurs in the area (Figs) the consultant could not find more supporting evidence to rate the area as a cultural landscape. It is also important to note that the L1859 (and extended mud track) already occurred in the landscape prior to the heritage survey. The proposed upgrading will not alter the present 'sense of place'. A description of the four heritage sites that is located adjacent to the L1859 is given in Table 2.

Table 2. Heritage site description and context.

Site no	Site description	GPS Coordinates	Rating	Mitigation per individual site
Shembe Site of Worship 1 (Fig)	A Shembe site of worship consisting of a stone circle with white painted rocks. Some indigenous trees are strategically left in the middle of the circle. The stone circle covers an area of approximately 25m x 20m. It is situated directly adjacent to the L1859 (western aspect) opposite an existing Zulu homestead (<i>umuzi</i>). The stone circle is situated approximately 35m from the edge of the road. It is in use and is classified as a 'living heritage site'.	S 29° 02' 31.17" E 30° 22' 32.79"	Locally significant (Table 3). The site is in use by members of the local community.	Maintain a buffer zone of 20m around this site. Alternatively motivate for a second phase heritage impact assessment by a 'living heritage' specialist. This phase will involve an intensive community liaison process.
Shembe Site of Worship 2 (Fig)	A Shembe site of worship consisting of a stone circle with white painted rocks. Some indigenous trees are strategically left in the middle of the circle. Some white painted stones are placed in the middle of the circle. The stone circle covers an area of approximately 25m x 25m. It is situated approximately 120m from the L1859 (western aspect) near its meeting with the D222. It is in use and is classified as a 'living heritage site'.	S 29° 06' 25.81" E 30° 24' 01.35"	Locally significant (Table 3). The site is in use by members of the local community.	Maintain a buffer zone of 20m around this site. Alternatively motivate for a second phase heritage impact assessment by a 'living heritage' specialist. This phase will involve an intensive community liaison process. However, it is important to mention that this site is situated more than 100m from the proposed road upgrade. Mitigation will therefore not be required under the present circumstances.
Grave Site (Fig 1.	Only one grave is visible on the surface although community members indicated that more "invisible" graves may	S 29° 02' 32.20" E 30° 22' 33.54"	Locally high (Table 3).	This grave is situated at approximately 35m from the edge of the road. It would therefore be realistic to maintain a

	<p>occur adjacent to this visible feature. The grave is informal and is indicated by a heap of stones. The stone heap measures approximately 2m x 1.5m. According to the community members the grave is certainly older than 60 years. It is protected by provincial and national heritage legislation.</p>			<p>buffer zone of 20m around the site. Alternatively motivate for a second phase heritage impact assessment. This will also include applying for a permit from Amafa and a grave exhumation and reburial process (Appendix 1).</p>
<p>Grave Site 2 (Fig)</p>	<p>Two graves are clearly visible in association with an existing Zulu homestead. The two individual graves are situated adjacent to each other next to a hut. They are both informal and not marked as such. Both graves are indicated by stone heaps covering an area of approximately 1.2m x 1.9m for each individual grave. These graves are younger than 60 years old. However, they are protected by provincial heritage legislation</p>	<p>S 29° 02' 25.81" E 30° 22' 36.54"</p>	<p>Locally high (Table 3). These graves are still maintained and frequented by local community members.</p>	<p>This Grave Site is situated at approximately 50m from the edge of the road (east bank). It would therefore be realistic to maintain a buffer zone of 30m around the site. Alternatively motivate for a second phase heritage impact assessment. This will also include applying for a permit from Amafa and a grave exhumation and reburial process (Appendix 1).</p>

Table 3. Evaluation and statement of significance.

Significance criteria in terms of Section 3(3) of the NHRA	
Significance	Rating
1. Historic and political significance - The importance of the cultural heritage in the community or pattern of South Africa's history.	None.
2. Scientific significance – Possession of uncommon, rare or endangered aspects of South Africa's cultural heritage.	None
3. Research/scientific significance – Potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.	None
4. Scientific significance – Importance in demonstrating the principal characteristics of a particular class of South Africa's cultural places/objects.	None
5. Aesthetic significance – Importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.	None
6. Scientific significance – Importance in demonstrating a high degree of creative or technical achievement at a particular period.	None
7. Social significance – Strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.	Yes, the Shembe Sites of Worship are important in terms of indigenous spirituality and religious values. They represent a local expression of a religion that entails a merging of traditional Zulu ancestral veneration with Christianity.
8. Historic significance – Strong or special association with the life and work of a person, group or organization of importance in the history of South Africa.	None.
9. The significance of the site relating to the history of slavery in South Africa.	None.

5 STATEMENT OF SIGNIFICANCE (HERITAGE VALUE)

5.1 Field Rating

- The two Shembe Sites of Worship have been rated as locally significant (Local Grade 111B) (Table 4).
- The two Grave Sites have been rated as locally significant (Local Grade 111B) (Table 4)

Table 4. Field rating and recommended grading of sites (SAHRA 2005)

Level	Details	Action
National (Grade I)	The site is considered to be of National Significance	Nominated to be declared by SAHRA
Provincial (Grade II)	This site is considered to be of Provincial significance	Nominated to be declared by Provincial Heritage Authority
Local Grade IIIA	This site is considered to be of HIGH significance locally	The site should be retained as a heritage site
Local Grade IIIB	This site is considered to be of HIGH significance locally	The site should be mitigated, and part retained as a heritage site
Generally Protected A	High to medium significance	Mitigation necessary before destruction
Generally Protected B	Medium significance	The site needs to be recorded before destruction
Generally Protected C	Low significance	No further recording is required before destruction

6 RECOMMENDATIONS

The proposed development may only proceed, in terms of heritage values, if the following recommendations are adhered to:

- Strictly maintain a buffer zone of 20m around Grave Site 1
- Strictly maintain a buffer zone of 30m around Grave Site 2.
- Strictly maintain a buffer zone of 20m around Shembe Site of Worship 1.
- Strictly maintain a buffer zone of 20m around Shembe Site of Worship 2.
- No construction structures, equipment or vehicles may be stored within these buffer zones.
- No material or structures may be altered or removed from these buffer zone and the relevant heritage site.
- No access roads may be constructed on the site.
- Should it not be possible to maintain the integrity of the Shembe Sites of Worship then a Phase 2 Heritage Impact Assessment may be initiated involving intensive community consultation in order to move the existing site to another abode.
- Should it not be possible to maintain the integrity of the Grave Sites then a Phase Two Heritage Impact Assessment, involving a potential grave exhumation process and a relevant permit application from Amafa, may be initiated. This process, however, is a longwinded exercise involving extensive community consultation (Appendix 1).
- The desktop paleontological impact assessment recommends the following:

No significant fossils are expected before deep excavation (>1.5m) are done. It is however highly likely that significant fossils will be recorded during excavations. The recording of fossils will contribute significantly to our knowledge of the Palaeontological Heritage of the KwaZulu-Natal Province (Appendix 2).

It is recommended that:

- The EAP and ECO must be informed of the fact that a Very High Palaeontological Sensitivity is allocated to the sections of the study area underlain by the Vryheid Formation. A High sensitivity is allocated to sections underlain by the Volksrust Formation. A Phase 1 PIA document and “Chance Find Protocol” is essential during the **first month** of excavation for road foundations deeper than 1.5m.
- When fossils are recorded, a “Chance Find Protocol” must be prepared by a suitably qualified Palaeontologist and recommendations contained in the Phase 1 PIA must be approved by AMAFA and SAHRA for inclusion in the EMPr of the project.
- These recommendations must be included in the EMPr of this project.

It must be noted that the Provincial Heritage Act requires that operations exposing paleontological, archaeological and historical residues as well as graves should cease immediately pending an evaluation by the heritage authorities.

7 MAPS AND FIGURES

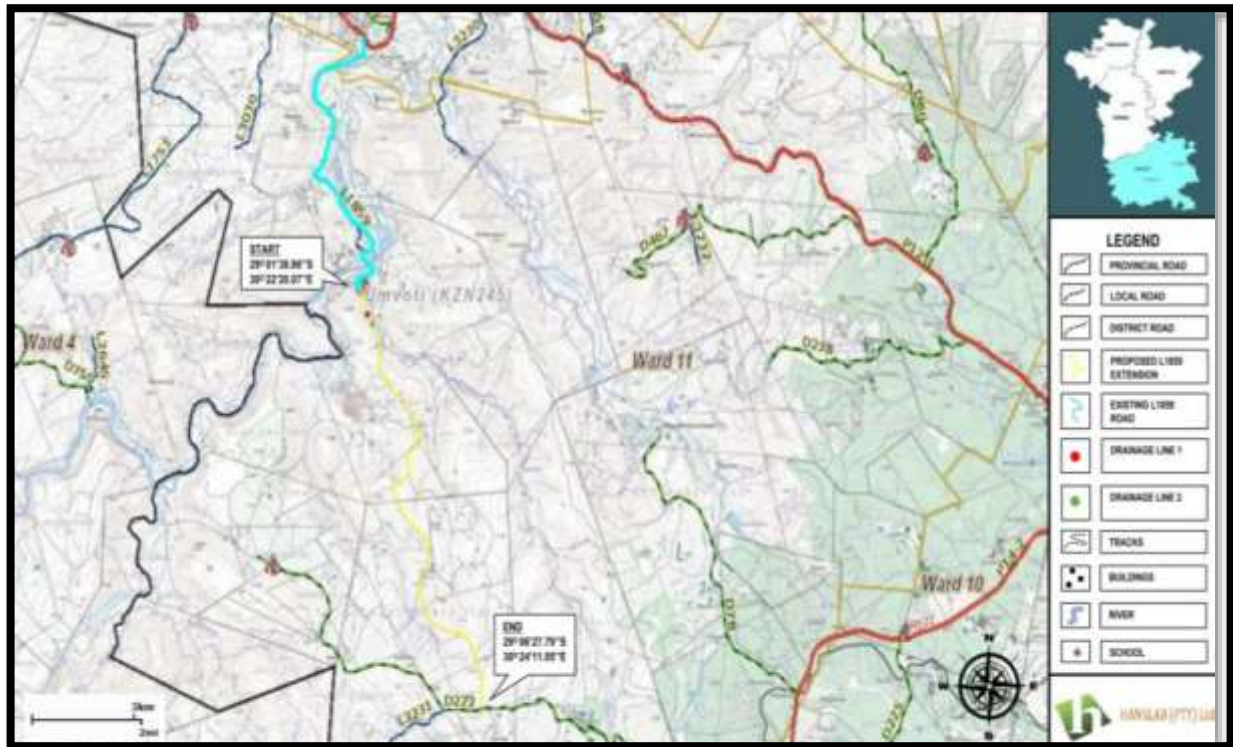


Figure 1. Topographical map showing the location of the proposed L1859 road extension near Muden (highlighted in yellow) (Source: Hanslab).



Figure 2. Aerial photograph showing the proposed L1859 Extension (Source: Hanslab)



Figure 3. Google Earth Imagery showing the distribution of known heritage sites (purple and yellow polygons) in the near environs of the proposed road upgrade. None of these sites occur closer than 1km to the footprint.



Figure 4. Google Earth Imagery showing the location of the Shembe Site of Worship 1 and Grave Site 1 adjacent to the L1859 extension.



Figure 5. Google Earth Imagery showing the location of Grave Site 2 adjacent to the L1859 extension.



Figure 6. Google Earth Imagery showing the location of Shembe Site of Worship 2 adjacent to the D222 and the L1859 extension. The site is situated more than 100m from the footprint.



Figure 7. View of the L1859 extension.



Figure 8. Jacob Mchunu and John Zondo, two local residents, kindly assisted the consultant in identifying graves and other heritage features in the project area.



Figure 9. Flat areas adjacent to major rivers below the 1000m contour often harbours Early Iron Age sites in KZN. However, none were recorded adjacent to this tributary of the Mooi River in the project area.

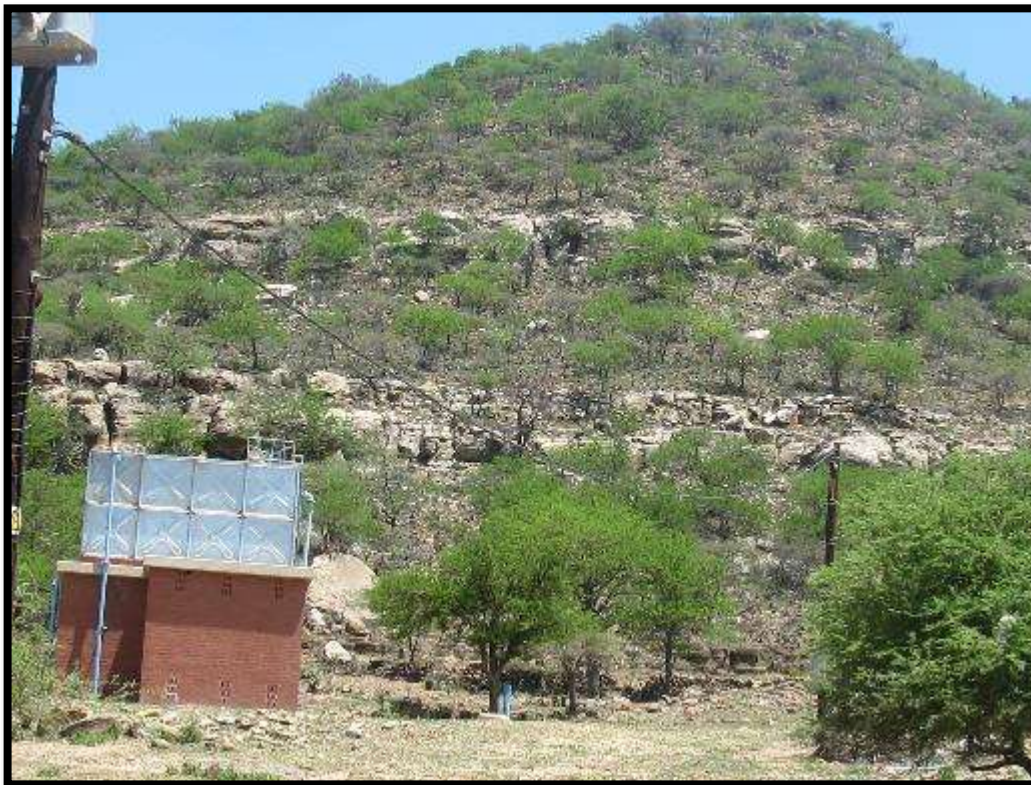


Figure 10. Later Stone Age and rock art do occur in the greater Muden area. However, none were observed along the sandstone outcrops adjacent to the L1589 extension.



Figure 11. Donga and sheet erosion near Watercourse 1 & 2. Stone Age tools and Early Iron Age material often occurs in similar dongas in the area, however, none were observed at this particular locale.



Figure 12. Although Zulu homesteads occur at some locales adjacent to the L1859 the majority of these had no associated graves.



Figure 13. Shembe Site of Worship 1



Figure 14. Altar stones placed in the centre of the stone circle (Shembe Site of Worship 1).



Figure 15. Grave Site 1.



Figure 16. Grave Site 2.



Figure 17. Grave Site 2. Note the grave adjacent to the rondavel hut within the Zulu homestead.

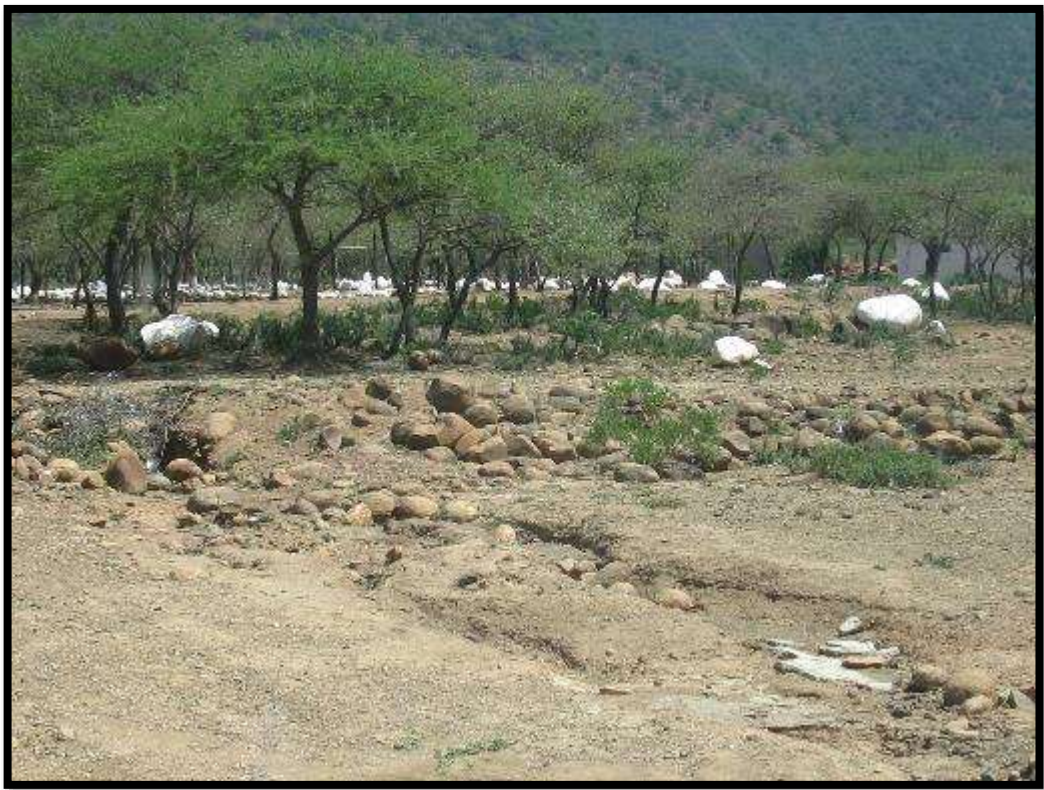


Figure 18. Shembe Site of Worship 2.

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APPENDIX 1

RELOCATION OF GRAVES

Burial grounds and graves older than 60 years are dealt with in Article 36 of the NHR Act, no 25 of 1999. The Human Tissues Act (65 of 1983) protects graves younger than 60 years. These fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and reburial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities.

Below follows a broad summary of how to deal with grave in the event of proposed development.

- If the graves are younger than 60 years, an undertaker can be contracted to deal with the exhumation and reburial. This will include public participation, organising cemeteries, coffins, etc. They need permits and have their own requirements that must be adhered to.
- If the graves are older than 60 years old or of undetermined age, an archaeologist must be in attendance to assist with the exhumation and documentation of the graves. This is a requirement by law.

Once it has been decided to relocate particular graves, the following steps should be taken:

- Notices of the intention to relocate the graves need to be put up at the burial site for a period of 60 days. This should contain information where communities and family members can contact the developer/archaeologist/public-relations officer/undertaker. All information pertaining to the identification of the graves needs to be documented for the application of a SAHRA permit. The notices need to be in at least 3 languages, English, and two other languages. This is a requirement by law.
- Notices of the intention needs to be placed in at least two local newspapers and have the same information as the above point. This is a requirement by law.
- Local radio stations can also be used to try contact family members. This is not required by law, but is helpful in trying to contact family members.
- During this time (60 days) a suitable cemetery need to be identified close to the development area or otherwise one specified by the family of the deceased.
- An open day for family members should be arranged after the period of 60 days so that they can gather to discuss the way forward, and to sort out any problems. The

developer needs to take the families requirements into account. This is a requirement by law.

Once the 60 days has passed and all the information from the family members have been received, a permit can be requested from SAHRA. This is a requirement by law.

Once the permit has been received, the graves may be exhumed and relocated.

All headstones must be relocated with the graves as well as any items found in the grave

APPENDIX 2

**DESKTOP PALAEOLOGICAL
ASSESSMENT FOR THE PROPOSED
UPGRADING AND EXTENSION OF THE
L1859 EXTENSION ROAD, UMVOTI
LOCAL MUNICIPALITY, UMZINYATHI
DISTRICT MUNICIPALITY, KWAZULU-
NATAL PROVINCE.**

FOR
Active Heritage

DATE: 21 October 2017

By

Gideon Groenewald
Cell: 078 713 6377

10 EXECUTIVE SUMMARY

Gideon Groenewald was appointed to undertake a Desktop Palaeontological Assessment Survey and to propose a “Chance Find Protocol”, for the proposed Upgrading and Extension of the L1859 Extension Road, Umvoti Local Municipality, Umzinyathi District Municipality, Kwazulu-Natal Province.

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 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 on palaeontological heritage within the development footprint.

The development site applicable to the application for the Upgrading and Extension of the L1859 Road, Umvoti Local Municipality, Umzinyathi District Municipality, Kwazulu-Natal Province is underlain by shales and sandstone of the Vryheid Formation, shale of the Volksrust Formation and dolerite.

No significant fossils are expected before deep excavation (>1.5m) are done. It is however highly likely that significant fossils will be recorded during excavations. The recording of fossils 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 Very High Palaeontological Sensitivity is allocated to the sections of the study area underlain by the Vryheid Formation. A High sensitivity is allocated to sections underlain by the Volksrust Formation. A Phase 1 PIA document and “Chance Find Protocol” is essential during the **first month** of excavation for road foundations deeper than 1.5m.
- When fossils are recorded, a “Chance Find Protocol” must be prepared by a suitably qualified Palaeontologist and recommendations contained in the Phase 1 PIA must be approved by AMAFA and SAHRA for inclusion in the EMPr of the project.
- These recommendations must be included in the EMPr of this project.

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12 INTRODUCTION

Gideon Groenewald was appointed to undertake a Desktop Palaeontological Assessment Survey and to propose a “Chance Find Protocol”, for the proposed Upgrading and Extension of the L1859 Extension Road, Umvoti Local Municipality, Umzinyathi District Municipality, Kwazulu-Natal Province (Figure 1).

Figure 1 Locality L1859 Extension Road



12.1.1 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 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 on 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.

12.1.2 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 (2830 Dundee and 2930 Durban) 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 2 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	<p>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 emplacement 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.</p>
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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 Phase 1 or 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.).

12.1.3 Locality and Proposed Development

The L1859 Road Development is situated to the north west of Greytown in the rural parts of KwaZulu-Natal. The development falls in undulating terrain underlain by clayey soils of mainly deeply weathered Normandien Formation sandstone and shale, red coloured mudstone and sandstone of the Tarkastad Subgroup and dolerite.



Figure 2 Locality of L1859 Extension Road study

13 GEOLOGY

The site of the development falls mainly on Permian aged shale and sandstone of the Vryheid Formation of the Ecca Group and a substantial section is underlain by Jurassic dolerite of the Karoo Supergroup (Figure 3).



Figure 3 Geology of L1859 Extension. The Vryheid Formation (Pv), Volksrust Formation (Pvo) and dolerite (Jd) underlies the study area

14 KAROO SUPERGROUP

14.1 Ecca Group

14.1.1 Vryheid Formation (Pv)

The Permian aged Vryheid Formation overlies the deep water Pietermaritzburg Formation and is dominantly a coarse-grained sandstone with inter bedded dark coloured shale and coal beds. The Formation is interpreted as a near-shore sandbar and in some cases deltaic deposit into the ancient Ecca sea, that existed in this part of Gondwanaland (Johnson et al, 2009).

14.1.2 Volksrust Formation (Pvo)

The Permian aged Volksrust Formation of the Ecca Group consists primarily of dark coloured shale and represents a relatively deep water marine deposit in this part of the Karoo Basin (Johnson et al, 2009). The upper part of the formation becomes more sandstone rich (Groenewald, 2016) and is interpreted as a time-equivalent of the Waterford Formation of the Ecca Group in the south of the Karoo Basin.

14.2 Dolerite (Jd)

A significant part of the study area falls on Jurassic aged dolerite which was intruded into the Karoo Basin area during the breaking up of Gondwanaland.

15 PALAEONTOLOGY

16 KAROO SUPERGROUP

16.1 Ecca Group

16.1.1 Vryheid Formation (Pv)

The Vryheid Formation is well-known for the occurrence of coal beds that resulted from the accumulation of plant material over long periods of time. Plant fossils described by Bamford (2011) from the Vryheid Formation are; *Azaniodendron fertile*, *Cyclodendron leslii*, *Sphenophyllum hammanskraalensis*, *Annularia sp.*, *Raniganjia sp.*, *Asterotheca spp.*, *Liknopetalon enigmata*, *Glossopteris > 20 species*, *Hirsutum 4 spp.*, *Scutum 4 spp.*, *Ottokaria*

3 spp., *Estcourtia* sp., *Arberia* 4 spp., *Lidgettonia* sp., *Noeggerathiopsis* sp. and *Podocarpidites* sp.

According to Bamford (2011) "Little data have been published on these potentially fossiliferous deposits. Around the coalmines there is most likely to be good material and yet in other areas the exposures may be too poor to be of interest. When they do occur fossil plants are usually abundant and it would not be feasible to preserve and maintain all the sites, however, in the interests of heritage and science such sites should be well recorded, sampled and the fossils kept in a suitable institution.

Although no vertebrate fossils have been recorded from the Vryheid Formation, invertebrate trace fossils have been described in some detail by Mason and Christie (1985). It should be noted, however, that the aquatic reptile, *Mesosaurus*, which is the earliest known reptile from the Karoo Basin, as well as fish (*Palaeoniscus capensis*), have been recorded in equivalent-aged strata in the Whitehill Formation in the southern part of the basin (MacRae, 1999; Modesto, 2006). Indications are that the Whitehill Formation in the main basin might be correlated with the mid-Vryheid Formation. If this assumption proves correct, there is a possibility that *Mesosaurus* could be found in the Vryheid Formation (Catuneanu et al 2005).

The late Carboniferous to early Jurassic Karoo Supergroup of South Africa includes economically important coal deposits within the Vryheid Formation of Natal. The Karoo sediments are almost entirely lacking in body fossils but ichnofossils (trace fossils) are locally abundant. Modern sedimentological and ichnofaunal studies suggest that the north-eastern part of the Karoo basin was marine. In KwaZulu-Natal a shallow basin margin accommodated a prograding fluviodeltaic complex forming a broad sandy platform on which coal-bearing sediments were deposited. Ichnofossils include U-burrows (formerly *Corophioides*) which are assigned to ichnogenus *Diplocraterion* (Mason and Christie, 1985).

16.1.2 Volksrust Formation (Pvo)

The Volksrust Formation is not known to contain abundant fossils but good examples of trace fossils have been described from the upper layers of the Formation.

The bivalve *Megadesmus* is described from the Late Permian Volksrust Shale Formation in the north-eastern Karoo Basin, South Africa (Groenewald 2012). This is the first reported discovery of this genus in Africa. The fossil is large, 9 cm dorsally and 8.4 cm laterally, and both valves are articulated indicating minimum transport after death. The bivalve was encased in interbedded siltstone-shale that constitutes the distal sediments of a prograding delta at the Beaufort –Ecca Group boundary. *Megadesmus* is known from other continents (Australia, India, Siberia, South America and Tasmania) where its presence indicates exclusively marine conditions. The implication for the northeastern Karoo Basin during the Late Permian is that a marine enclave still existed in this geographic area and that terrestrial conditions did not yet prevail as in the southern basin region (Cairncross, 2005).

During recent surveys a very significant, but as yet, unidentified burrow of a soft sediment dweller has been observed in the shale deposits of the upper Volksrust Formation. During a preliminary identification of the trace fossil by international scientists the trace fossil was

assigned to the genus *Curvolithus sp* and further discovery of more examples of these fossils will contribute significantly to our understanding of the palaeo-environments in this part of the Karoo Basin in KwaZulu-Natal. It is important that all new findings be reported according to a “Chance Find Protocol” that must be compiled at the onset of construction for this project.

16.2 Dolerite

Due to its igneous character dolerite will not contain fossils.

17 PALAEOONTOLOGICAL 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) clay soil associated with the Vryheid and Volksrust Formations, as well as dolerite.



The

Figure 4 Palaeontological sensitivity L1859 Extension

excavations for the construction of the infrastructure for this development will most likely expose important fossil rich deposits. Although significant fossils might be present in dongas on the site before excavation, it is proposed that a Phase 1 PIA be done during initial excavation on site. Due to the deep weathering it is highly unlikely that all the potential fossils will be exposed **before** deep (>1.5m) excavations into the Vryheid and Volksrust Formations (Figure 4). It is therefore advisable to postpone the Phase 1 study as well as the compilation of a “Chance Find Protocol” document until the **first week of construction** on this site. No fossils will be present in areas underlain by dolerite.

Recording of fossils will contribute significantly to our understanding of previous eco-systems. A Phase 1 PIA, done by a suitably qualified palaeontologist during the initial stages of construction, is essential. It is Highly likely that fossils will be recorded during the excavation of road foundations into the Vryheid and Volksrust Formations of the Ecca Group. The palaeontologist must visit the site during the first month of excavation for at least five (5) days to compile a “Chance Find Protocol” document. This recommendation 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.

18 CONCLUSION

The development site applicable to the application for the Upgrading and Extension of the L1859 Road, Umvoti Local Municipality, Umzinyathi District Municipality, Kwazulu-Natal Province is underlain by shales and sandstone of the Vryheid Formation, shale of the Volksrust Formation and dolerite.

No significant fossils are expected before deep excavation (>1.5m) are done. It is however highly likely that significant fossils will be recorded during excavations. The recording of fossils 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 Very High Palaeontological Sensitivity is allocated to the sections of the study area underlain by the Vryheid Formation. A High sensitivity is allocated to sections underlain by the Volksrust Formation. A Phase 1 PIA document and “Chance Find Protocol” is essential during the **first month** of excavation for road foundations deeper than 1.5m.
- When fossils are recorded, a “Chance Find Protocol” must be prepared by a suitably qualified Palaeontologist and recommendations contained in the Phase 1 PIA must be approved by AMAFA and SAHRA for inclusion in the EMPr of the project.
- These recommendations must be included in the EMPr of this project.

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20 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).

21 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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