

**FIRST PHASE CULTURAL HERITAGE IMPACT
ASSESSMENT OF THE PROPOSED UPGRADE OF
THE CLEAR WATER RISING MAIN AT
THEOGUNJINI WATER TREATMENT WORKS
(WTW). NORTH OF VERULAM, ETHEKWINI
MUNICIPALITY, KWAZULU-NATAL.**



For: Hanslab (Pty) Ltd

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Declaration of Consultants independence

Frans Prins is an independent consultant to Hanslab (PTY) Ltd 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.



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 1836 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 upgrade of the Clear Water Rising Main at the Ogunjini Water Treatment Works (WTW). North of Verulam, Ethekewini Municipality, Kwazulu-Natal identified six grave sites adjacent to the proposed development. Some of these were indicated by local residents who were also interviewed during the survey. It is possible to maintain a buffer of at least 20m around each grave site and there is no need for grave exhumation and translocation. Other heritage sites in the general area, such as 'Shembe Places of Worship' do not occur closer than 50m from the footprint and there is no need for mitigation. The proposed development area is also not part of any known cultural landscape. The Paleontological study reports that no significant fossils are expected and that no further mitigation for Palaeontological Heritage is recommended for this project.

However, attention is drawn to the South African National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and the KwaZulu-Natal Heritage Act (Act No. 4 of 2008) which requires that operations that expose any fossils as well as archaeological and historical remains (including graves) should cease immediately, pending evaluation by the provincial heritage agency.

1 BACKGROUND INFORMATION ON THE PROJECT

The consultant was approached by Hanslab (Pty) Ltd to conduct a heritage impact assessment (HIA) of the Clear Water Rising Main of the Ogunjini Water Treatment Works. According to the National Heritage Resources Act, 1999 (NHRA) (Act No. 25 of 1999), the heritage resources of South Africa include:

- a. places, buildings, structures and equipment of cultural significance;
- b. places to which oral traditions are attached or which are associated with living heritage;
- c. historical settlements and townscapes;
- d. landscapes and natural features of cultural significance;
- e. geological sites of scientific or cultural importance;
- f. archaeological and palaeontological sites;
- g. graves and burial grounds, including-
 - i. ancestral graves;
 - ii. royal graves and graves of traditional leaders;
 - iii. graves of victims of conflict;

- iv. graves of individuals designated by the Minister by notice in the Gazette;
- v. historical graves and cemeteries; and
- vi. other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- h. sites of significance relating to the history of slavery in South Africa;
- i. movable objects, including-
 - i. objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
 - ii. objects to which oral traditions are attached or which are associated with living heritage;
 - iii. ethnographic art and objects;
 - iv. military objects;
 - v. objects of decorative or fine art;
 - vi. objects of scientific or technological interest; and
 - vii. books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

The newly promulgated KwaZulu-Natal Heritage Act (Act No. 4 of 2008) also makes specific mention to rock art and archaeological sites.

It is furthermore stated that:

—(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 Council having been obtained on written application to the KwaZulu-Natal Heritage 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 Council without delay.

(3) The Council may, after consultation with an owner or controlling authority, by way of written notice served on the owner or controlling authority, prohibit any activity considered by the Council to be inappropriate within 50 metres of a rock art site.

(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 Council 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 Council 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, vest in the Provincial Government and the Council is regarded as the custodian on behalf of the Provincial Government.

(b) The Council 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 Council may, subject to such conditions as the Council 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 Council having been obtained on written application to the Council, 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 Council.

(b) An object or material referred to in paragraph (a) must, subject to paragraph (c) and the directives of the Council, 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) vest in the Provincial Government and the Council is regarded as the custodian on behalf of the Provincial Government.

This study aims to identify and assess the significance of any heritage and archaeological resources occurring on the site. Based on the significance, the impact of the development on the heritage resources would be determined. Then appropriate actions to reduce the impact on the heritage resources would be put forward. In terms of the NHRA, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of:

a. its importance in the community, or pattern of South Africa's history;

b. its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;

c. its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;

- d. its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- e. its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- f. its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- g. its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- h. its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- i. sites of significance relating to the history of slavery in South Africa.

Table 1. Background information

Consultants:	Active Heritage cc for Hanslab (Pty) Ltd
Type of development:	<p>The eThekweni Municipality (Applicant) proposes to upgrade the Ogunjini Water Treatment works north of Verulam in Kwazulu-Natal (Figs 1 & 2). The existing WTW has a treatment capacity of 1.3Ml/day and consists of a run-of-river abstraction system, chemical pre-treatment, settling, slow sand filtration, disinfection, clear water storage and a 1,7 kilometre clear water rising main that delivers water to the Ogunjini 1 Reservoir. There is an urgent need to increase the treatment capacity of the works. The proposal will entail a 1Ml/day increase in the treatment capacity resulting in the required 2.3m/day. The details of the upgrade requirements are based on assessments of the capacity and performance of the various components of the existing Water Treatment Works and where new infrastructure is required, it is to be accommodated within the boundary of the existing WTW development line.</p> <p>The replacement of the existing 1,7-kilometer Clear Water Rising Main triggers Activity 19 of GNR 983 (Listing Notice 1) in terms of the National Environmental Management Act (1998) as amended. The existing 160mmØ diameter mPVC pipeline will be replaced with a 200mmØ Class 25 uPVC pipeline to withstand the additional flow resulting from the capacity increase at the WTW.</p>
Rezoning or subdivision:	Rezoning
Terms of reference	To carry out a Heritage Impact Assessment

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 (Act No. 4 of 2008)
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1.1. Details of the area surveyed:

The existing Ogunjini Water Treatment Works is located in the rural part of eThekweni Municipality, north of Verulam under the Iqadi tribal area (Figs 1 & 2). The area can be described as peri-urban in the southern section and rural in the north (Fig 7). Whilst there is ample evidence for small-scale subsistence farming activities it is also evident that a large percentage of the local residents earn an income by working in eThekweni. The project area can be accessed via Road P713.

The GPS co-ordinates for the Ogunjini Water Treatment Works are:
29° 35' 31.69" S 30° 58' 53.99" E (Fig 8).

The GPS co-ordinates for the Clear Water Rising Main are:
Start: 29° 35' 31, 48" S 30° 58' 54, 59" E
End: 29° 36' 21, 52" S 30° 58' 57.63" (Fig 9).

2 BACKGROUND TO ARCHAEOLOGICAL HISTORY OF AREA

The greater Ethekeweni Municipality has been relatively well surveyed for archaeological heritage sites by the KwaZulu-Natal Museum, post-graduate students from the Universities of Cape Town and the Witwatersrand, and subsequently by private heritage consultants in the last few years.

The available evidence, as captured in the Amafa and the KwaZulu-Natal Museum heritage site inventories, indicates that this area contains a wide spectrum of archaeological sites covering different time-periods and cultural traditions. Eighty heritage sites occur within this area. These range from Early Stone Age, Middle Stone Age, and Later Stone Age to Early Iron Age, Middle and Later Iron Age sites as well as historical

sites relating to the rise of the Zulu Kingdom and the subsequent colonial period. One notable Middle Stone Age site, i.e. Segubudu near Stanger have been excavated in the last two decades by the University of the Witwatersrand and yielded impressive archaeological stratigraphies relating to the period associated with the origins of anatomically modern people (Mitchell 2002). The available data base also indicates seven archaeological sites in the near vicinity of the project area. These include a midden with Middle Stone Age and later Stone Age material to the immediate south of the study area. Closer to the coast archaeologists have also identified two Early Iron Age sites, and four middens with Later Iron Age material.

Around 1 700 years ago an initial wave of Early Iron Age People settled along the inland foot of the sand dunes on sandy but humus rich soils which would have ensured good crops for the first year or two after they had been cleared. These early agro-pastoralists produced a characteristic pottery style known as Matola. The Matola people also exploited the wild plant and animal resources of the forest and adjacent sea-shore. The communities seems to been small groups of perhaps a few dozen slash-and burn cultivators, moving into a landscape sparsely inhabited by Later Stone Age San hunter-gatherers.

By 1500 years ago another wave of Iron Age migrants entered the area. Their distinct ceramic pottery is classified to styles known as "Msuluzi" (AD 500-700), Ndongondwane (AD 700-800) and Ntshokane (AD 800-900). Three sites belonging to these periods occur along the banks of the Tugela River near the town of Mandeni. Some of these, such as the Ndongondwane and Mamba sites have been excavated by archaeologists (Maggs 1989:31; Huffman 2007:325-462). Some Early Iron Age potsherds have been located by archaeologists from the then Natal Museum closer to Maphumulo but these sites have not been thoroughly investigated.

The greater Verulam area is also intimately associated with the rise of the Zulu Kingdom of Shaka in the early 1820's. King Shaka had his capital Kwa Dukuza to the immediate south of Mandeni at Stanger. The exact spot of Shaka's death is thought to be where an old mahogany tree now grows in the grounds of the Stanger/Kwa Dukuza municipal offices. The grain pit where Dingane is thought to have secretly buried Shaka is marked by a large rock in the King Shaka Memorial Garden in the town. The Zulu people erected this memorial during the reign of King Solomon (1913-1932). An interpretative centre has since been added. Also in Stanger near King Shaka's memorial, is a small river known as Shaka's spring. From here, unpolluted water was collected for the king's use. Nearby on

the Imbozamo River, was Shaka's Bathing Pool and Shaka's Cave where he would rest after swimming. Not much further off is the famous Execution Cliff where executions were carried out on Shaka's orders (Derwent 2006). The battle of Ndongakusuka, which saw the rise of power of king Cetshwayo in 1856, took place near the mouth of the Tugela River to the north of the study area.

The colonial history of the area starts around 1820 when early English ivory traders established themselves at Port Natal (Durban). Dutch descendants (i.e. Voortrekkers) moved into the area soon after 1834 and established a short lived Boer republic called Natalia. The battle site of Ndongakusuka occur on the northern bank of the Tugela River. Here Zulu warriors under Mpande attacked and decimated a force of settlers from Port Natal and several thousand black levies in April 1838. The force had been raised to assist the beleaguered Voortrekker laagers, then under systematic attack by the Zulu. Some years later Ndongakusuka again became the scene of a great battle between Prince Cetshwayo and his brother, Mbuyazi – the bloodiest battle ever fought on South African soil (Derwent 2006). By 1845 Natal became a British colony. The area to the north of the Tugela River remained independent Zulu territory. However, in 1879 Zulu-land was invaded by British forces and the area annexed soon thereafter. Two well known British forts of this period occur within 30km from the study area, these are the twin forts of Pearson and Tenedos. They were built across from each other on either side of the mouth of the Tugela in 1878 and 1879 respectively. Fort Pearson is named after Colonel Charles Pearson, who led the invasion into Zululand in 1879. It is also the site of the Ultimatum Tree where Cetshwayo was issued the ultimatum intended to spark war. Today, little remains of Fort Pearson apart from the outer trenches. The remains of Fort Tenedos are best viewed from Fort Pearson (ibid). These heritage sites, like the archaeological resources of the province, are also protected by heritage legislation.

3 BACKGROUND INFORMATION OF THE SURVEY

3.1 Methodology

A desktop study was conducted of the SAHRA inventory of heritage sites as reflected on the SAHRIS website. In addition, the archaeological database of the KwaZulu-Natal Museum was consulted. Although the greater Ethekeweni and Verulam areas are rich in

archaeological and heritage sites none are listed for the proposed development area Fig 3.

The study area was visited on 23 August 2017. A ground survey following standard and accepted archaeological procedures was conducted. A transect of 50m on either side of the proposed pipeline was surveyed.

3.2 Restrictions encountered during the survey

3.2.1 Visibility

Visibility during the site visit was good.

3.2.2 Disturbance.

No disturbance of any heritage sites have been observed.

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.

3.4 Interviews with community members and residents.

The consultant also interviewed local residents during the ground survey. The following community members were encountered in the near environs to the proposed pipeline and interviewed. These members are:

- Thandeka Ncobo (Fig 11)
- Martha Zondi (Fig 11)
- Celeni Mkhize
- Tyson Buthelezi (Fig 12)

These residents were asked about the locality of potential heritage resources on or near the footprint. They were also asked their opinions regarding the potential impact of the proposed development on heritage resources in the area. All the community members interviewed though that the proposed pipeline was a good idea as it would ensure water

accessibility to the local community. Thandeka Ncobo indicated that there are 'Shembe Places of Worship' in the general area but none of these occur in the near vicinity of the proposed pipeline development (Fig 10). Subsequent ground surveys by the consultant also could not locate any Shembe Sites closer than 50m to the footprint. All the residents indicated that graves do occur adjacent to the local road that runs broadly parallel to the proposed pipeline. Mr Tyson Buthelezi kindly spend to time to locate the graves in the near vicinity of the Ogunjini Water Treatment Works. Most of the graves was located with his assistance. The consultant also asked about other potential heritage resources in the area such as sites of historical importance, living heritage sites and cultural landscapes. However, the community members interviewed had no knowledge of such.

4 DESCRIPTION OF HERITAGE SITES LOCATED DURING THE SURVEY

The only heritage sites located during the survey were six individual graves. These occurred within 50m from the proposed pipeline development (Figs 4 - 6). The context and description of these is presented in Tables 2 (see below). The consultant could not find any other heritage resources on or near the footprint. The area is also no part of any known cultural landscape (Table 3). The heritage rating of the identified graves is provided in Table 4.

Table 2. Graves Located on the Footprint

No	Heritage Site	Estimated Age and context.	Significance	Requires Mitigation?	Type of Mitigation	GPS Latitude and Longitude
1 (Figs 3 & 13)	Grave 1	Modern Grave younger than 60 years old. It consists of a concrete structure and cross. Approximately 2m x 3m. It occurs approximately 40m from the proposed pipeline trajectory. The grave is clearly associated with a homestead that is situated directly behind the feature.	High significance locally as all graves are protected by provincial heritage legislation. The relatives of the deceased person still live in the area.	Due to the locality of the grave adjacent to the existing road a buffer of 20m is proposed. This buffer zone must be respected by the developer and no alteration of the grave or features within the buffer zone is allowed.	Maintain a buffer zone. No need for grave exhumation and reburial.	29° 35' 44.22" S 30° 59' 4.50" E
2 (Figs 3 & 14)	Grave 2	Modern Grave younger than 60 years old. It consists of a square concrete structure (unmarked). Approximately 4m x 3m. It occurs approximately 30m from the proposed pipeline trajectory. The grave is clearly associated with a homestead that is situated directly behind the feature	High significance locally as all graves are protected by provincial heritage legislation. The relatives of the deceased person still live in the area	Due to the locality of the grave adjacent to the existing road a buffer of 20m is proposed. This buffer zone must be respected by the developer and no alteration of the grave or features within the buffer zone is allowed	Maintain a buffer zone. No need for grave exhumation and reburial	29° 35' 38.28" S 30° 58' 51.30" E
3 (Figs 3 & 15)	Grave 3	Modern Grave younger than 60 years old. It is demarcated by a shallow red brick wall (unmarked). Approximately 1.5m x 2m. It occurs approximately 30m from the proposed pipeline trajectory. The grave is clearly associated with a homestead that is situated directly behind the feature. It is possible that	High significance locally as all graves are protected by provincial heritage legislation. The relatives of the deceased person still live in the area	Due to the locality of the grave adjacent to the existing road a buffer of 20m is proposed. This buffer zone must be respected by the developer and no alteration of the grave or features within the buffer zone is allowed	Maintain a buffer zone. No need for grave exhumation and reburial	29° 35' 38.09" S 30° 58' 50.04" E

		more "invisible graves" occur in this area but none were visible on the surface.				
4 (Figs 3 & 16)	Grave 4	Modern Grave younger than 60 years old. It is well demarcated by a brick wall and two metal gates. Approximately 2 m x 2m. It occurs approximately 50m from the proposed pipeline trajectory. The grave is clearly associated with a homestead that is situated directly behind the feature. .	High significance locally as all graves are protected by provincial heritage legislation. The relatives of the deceased person still live in the area	A buffer of 30m is proposed. This buffer zone must be respected by the developer and no alteration of the grave or features within the buffer zone is allowed	Maintain a buffer zone. No need for grave exhumation and reburial	29° 35' 35.34" S 30° 58' 49.03" E
5 (Figs 3 & 17)	Grave 5	Grave older than 60 years old. It is well demarcated by a square concrete structure and is unmarked. Approximately 2 m x 2.5m. It occurs approximately 30m from the proposed pipeline trajectory. The grave is singular and is not associated with the nearby homestead.	High significance locally as all graves are protected by provincial heritage legislation. The relatives of the deceased person still live in the area	Given the locality of the grave in the near environs of the proposed pipeline trajectory a buffer of at least 20m is proposed. This buffer zone must be respected by the developer and no alteration of the grave or features within the buffer zone is allowed	Maintain a buffer zone. No need for grave exhumation and reburial	29° 36' 12.84" S 30° 58' 57.45" E
6 (Figs 3 & 18)	Grave 6	Modern Grave younger than 60 years old. The grave is marked and indicated by a grave head stone and structure. . Approximately 2 m x 3m. It occurs approximately 50m from the proposed pipeline trajectory. The grave is situated within the grounds of an	High significance locally as all graves are protected by provincial heritage legislation. The relatives of the deceased person still live in the area	Given the locality of the grave in the near environs of the proposed pipeline trajectory a buffer of at least 20m is proposed. This buffer zone must be respected by the developer and no alteration of the	Maintain a buffer zone. No need for grave exhumation and reburial	29° 36' 18.75" S 30° 58' 55.67" E

		occupied homestead.		grave or features within the buffer zone is allowed		
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4.1 Locational data

Province: KwaZulu-Natal

Town: Verulam

Municipality: eThekweni Municipality

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
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.

4.2 Dating the findings

All the graves identified appears to be younger than 60 years old. However, it is important to note that all graves in KwaZulu-Natal is protected by Provincial Heritage Legislation.

5 STATEMENT OF SIGNIFICANCE (HERITAGE VALUE)

5.1 Field Rating

All the graves are rated as locally significant (Table 4) as relatives still visit these graves.

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

- It is important that the developers maintain a buffer zone around all the identified graves in the project area. Due to the proximity of graves 1, 2, 3, & 5 to the proposed pipeline trajectory a buffer zone of at least 20m must be maintained around these heritage features. A buffer zone of at least 30m must be maintained around graves 4 & 6.
- There is no need to initiate a grave exhumation and reburial exercise. However, should it not be possible to maintain the integrity of the proposed buffer zones then a Phase Two Heritage Impact Assessment may be initiated (Appendix 2). However, it must be emphasised that the grave exhumation process is the least favourite option and the process will have to include a lengthy community consultation.
- The paleontologist reports that no significant fossils are expected in the Ordovician to Silurian aged rocks on site. However, if terrace fossils are discovered the HIA specialist and Palaeontologist or local heritage authorities must be informed as such finds will be highly significant (Appendix 3).
- The consultant did not identify any other heritage resources or associated cultural landscapes. The project may thus proceed from a heritage perspective once the above mentioned mitigation aspects have been applied.
- It should, however, be pointed out that the KwaZulu-Natal Heritage Act requires that operations exposing archaeological and historical residues (including graves) as well as fossil material should cease immediately pending an evaluation by the heritage authorities.

7 MAPS AND PHOTOGRAPHS

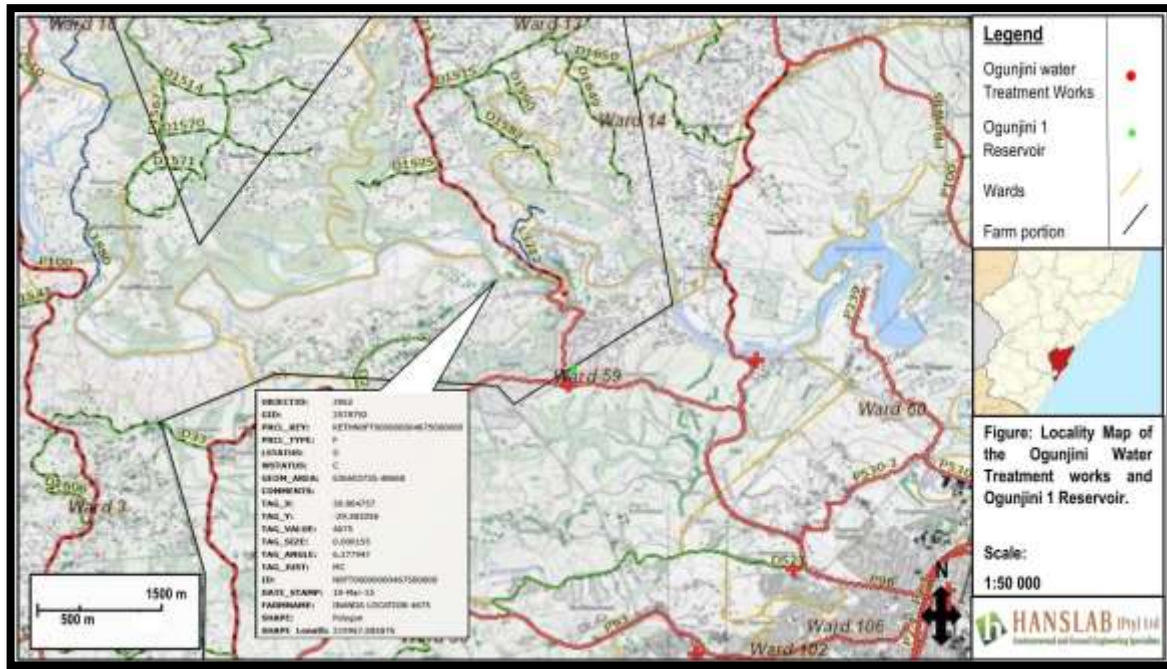


Figure 1. Locality Map of the Project Area (Source: Hanslab).

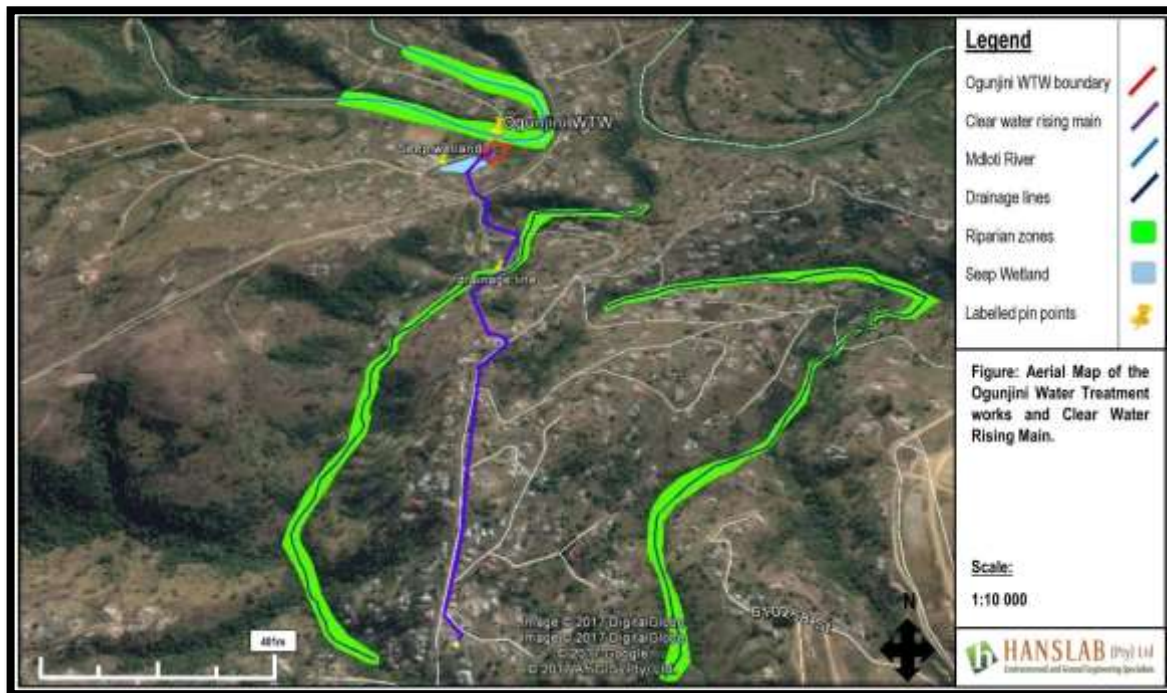


Figure 2. Map of the proposed Ogunjini Clear Water Rising Main (Source: Hanslab).

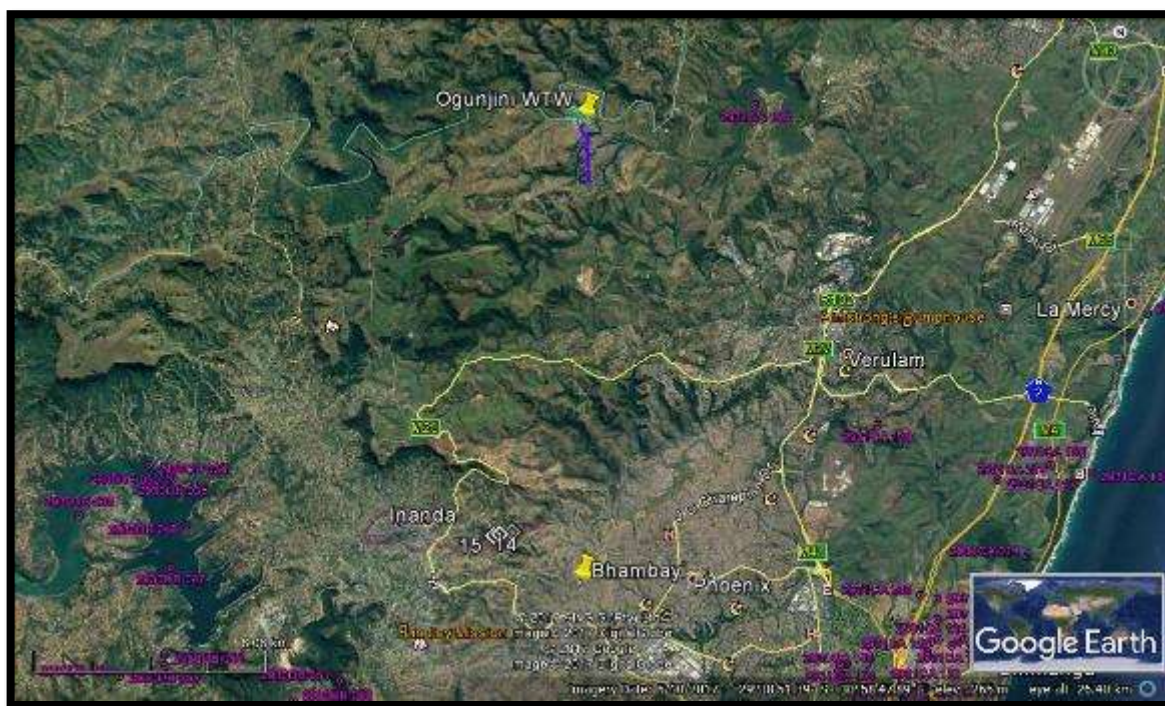


Figure 3. *Distribution of known archaeological sites (purple polygons) and historical sites (yellow polygons) in the greater area.*

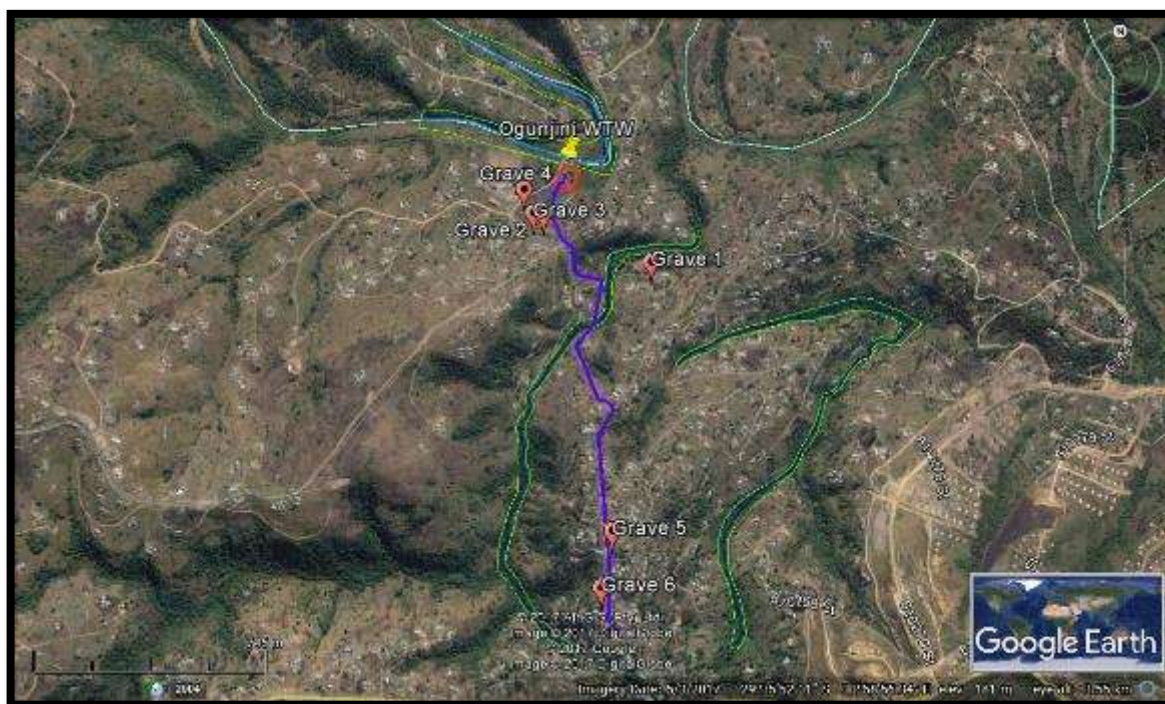


Figure 4. *Google Earth Imagery showing the distribution of graves along the proposed pipeline.*

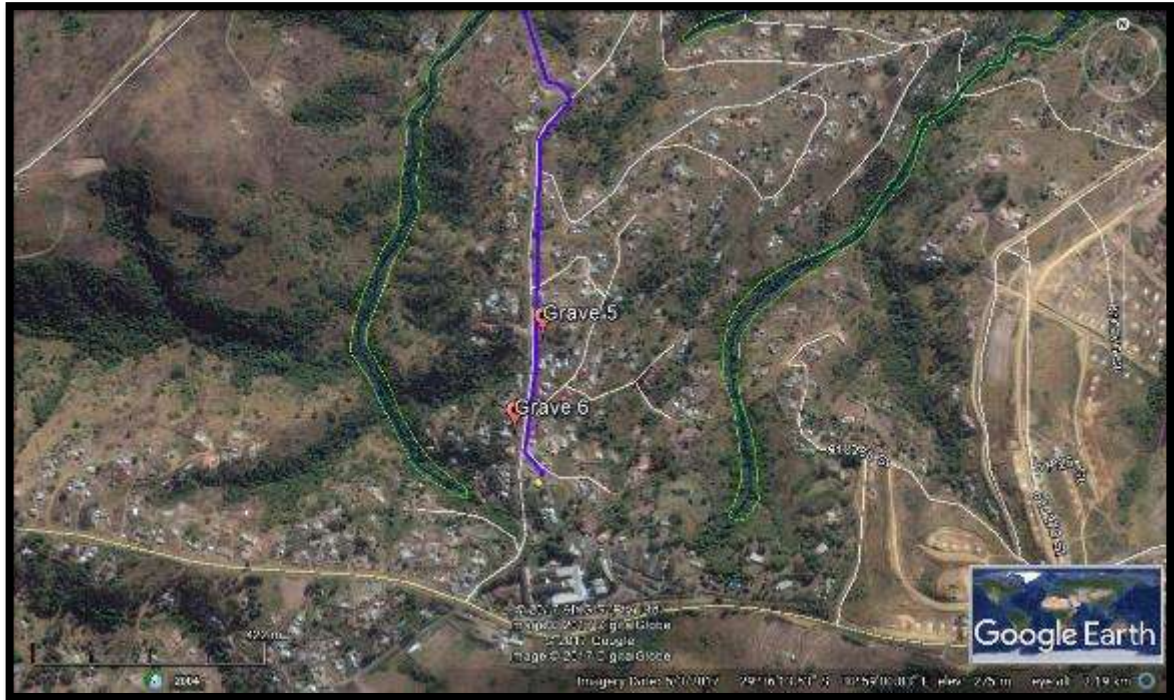


Figure 5. Google Earth Imagery showing the distribution of graves along the southern section of the proposed pipeline.



Figure 6. Google Earth Imagery showing the distribution of graves along the northern section of the proposed pipeline.



Figure 7. View of the proposed pipeline trajectory.



Figure 8. View of the Ogunjini Reservoir in the southern section of the footprint.



Figure 9. *View of the Ogunjini Clear Water Rising in the northern section of the footprint.*

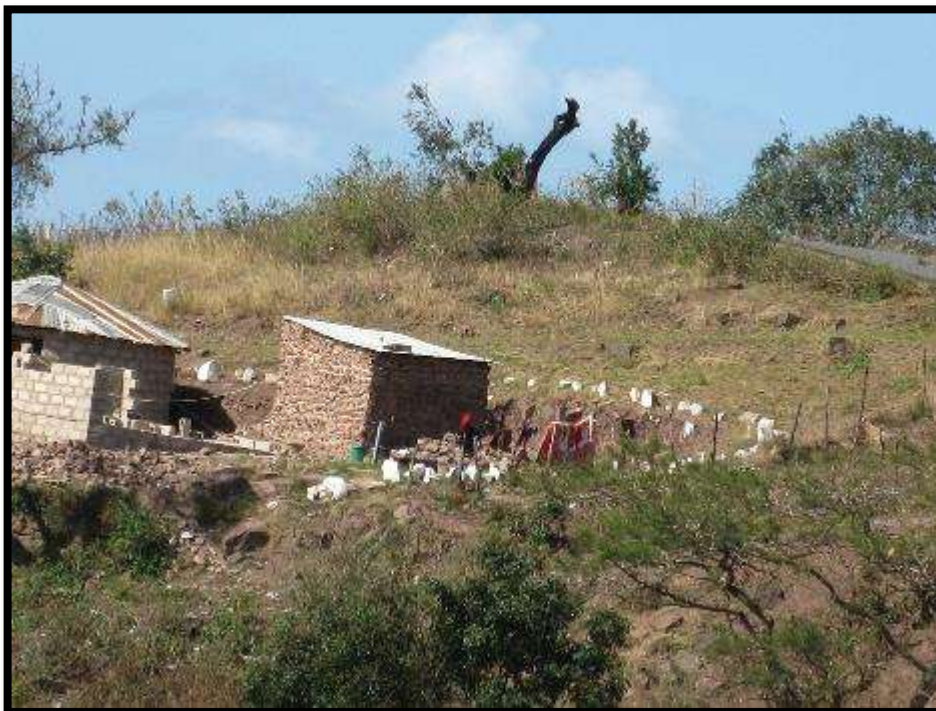


Figure 10. *Although white painted stones initially appear to be ‘Shembe Sites of Worship’ those occurring adjacent to the footprint are merely local plot demarcation signs.*



Figure 11. Local residents of the area that was interviewed by the consultant: Martha Zondi and Thandeka Ncobo.



Figure 12. Local resident Tyson Buthelezi assisted the consultant in finding graves near the Clear Water Rising Main in the northern section of the footprint.



Figure 13. Grave 1



Figure 14. Grave 2



Figure 15. Grave 3



Figure 16. Grave 4



Figure 17. Grave 5



Figure 18. Grave 6

9 REFERENCES

- Bryant, A. T. 1965. *Olden times in Zululand and Natal*. Cape Town: C. Struik.
- Derwent, S. 2006. *KwaZulu-Natal Heritage Sites: a Guide to Some Great Places*. David Phillip: Claremont.
- Lewis, C. 1999. *Ladysmith, the Siege*. Redwood Books. Trowbridge: Wiltshire.
- Huffman, T. N. 2007. *Handbook to the Iron Age: The Archaeology of Pre-colonial Farming Societies in Southern Africa*. University of KwaZulu-Natal Press. Pietermaritzburg
- Lewis-Williams, J. D. 2003. *Images of Mystery: Rock Art of the Drakensberg*. Double Storey Books: Cape Town
- Lewis-Williams, J. D. & Dowson, T. 1992. *Rock Paintings of the Natal Drakensberg. Ukhahlamba Series, Number 5*. University of Natal Press: Pietermaritzburg
- Mazel, A. 1989. People making history, the last ten thousand years of hunter-gatherer communities in the Thukela Basin. *Natal Museum Journal of Humanities*. 1: 1-168
- McCarthy, T. & Rubidge, B. 2005. *The Story of Earth and Life: A Southern African Perspective on a 4.6 billion year journey*. Struik Publishers: Cape Town
- Mitchell, P. 2002. *The Archaeology of Southern Africa*. University Press: Cambridge
- SAHRA, 2005. Minimum Standards for the Archaeological and the Palaeontological Components of Impact Assessment Reports, Draft version 1.4.

APPENDIX 1

RELOCATION OF GRAVES

Burial grounds and graves are dealt with in Article 36 of the NHR Act, no 25 of 1999. 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.

APPENDIX 2

**DESKTOP PALAEOLOGICAL
ASSESSMENT AND FOR THE PROPOSED
UPGRADING OF THE OGUNJINI WTW
AND CLEAR WATER RISING MAIN,
ETHEKWINI METROPOLITAN
MUNICIPALITY, KWAZULU-NATAL
PROVINCE.**

FOR
Active Heritage

DATE: 23 August 2017

By

Gideon Groenewald
Cell: 078 713 6377

10 EXECUTIVE SUMMARY

Gideon Groenewald was appointed to undertake a Desktop Palaeontological Assessment Survey for the proposed upgrading of the Ogunjini Water Treatment Works and Clear Water Rising Main, Ethekwini Metropolitan Municipality, Kwazulu-Natal Province.

The development site applicable to the application for the proposed Upgrading of the Ogunjini Water Treatment Works and Clear Water Rising Main in the Ethekwini Metropolitan Municipality, KwaZulu-Natal Province is underlain by Ordovician to Silurian aged quartzite of the Natal Group.

No significant fossils are expected in the Ordovician to Silurian aged rocks on site. If terrace fossils are discovered the HIA specialist and Palaeontologist must be informed as such finds will be highly significant.

It is recommended that:

- The EAP and ECO must be informed of the fact that a Low Palaeontological sensitivity is allocated to the rocks underlying the development footprint.
- If any fossil are observed during the lifetime of the project, the HIA specialist and Palaeontologist must be informed for appropriate action.
- No further mitigation for Palaeontological Heritage is recommended for this project.

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12 INTRODUCTION

Gideon Groenewald was appointed to undertake a Desktop Palaeontological Assessment Survey for the proposed upgrading of the Ogunjini Water Treatment Works and Clear Water Rising Main, Ethekwini Metropolitan Municipality, Kwazulu-Natal Province (Figure 1).

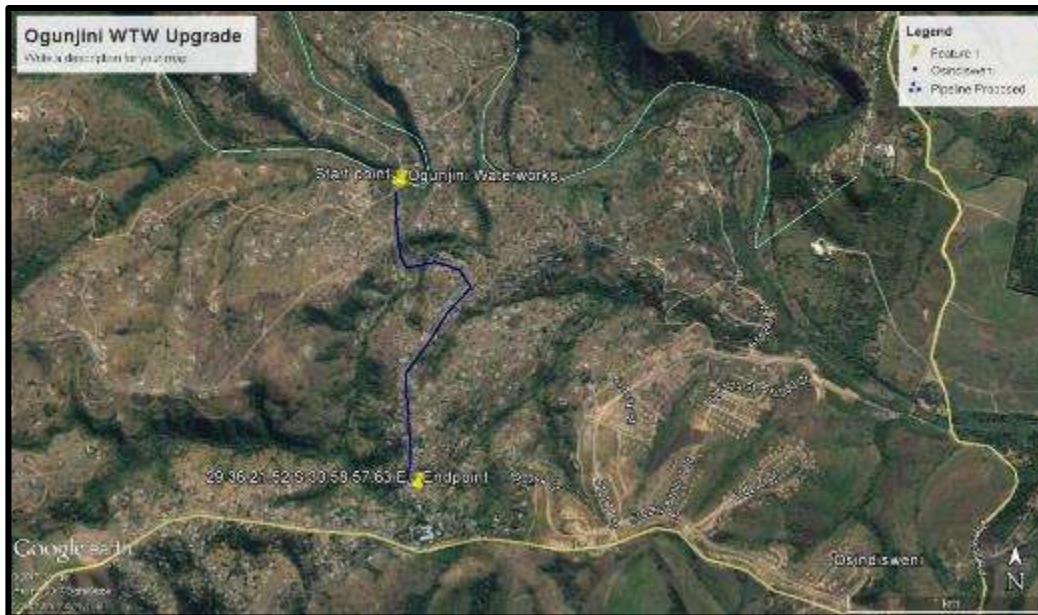


Figure 1 Locality of the Ogunjini Water Treatment Works (WTW) and clear water rising main

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 to Palaeontological Heritage within the development footprint.

Categories of heritage resources recognised as part of the National Estate in Section 3 of the Heritage Resources Act, and which therefore fall under its protection, include:

- geological sites of scientific or cultural importance;
- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens; and
- objects with the potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage.

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 (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

	<p>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.</p>
<p style="text-align: center;">GREY</p>	<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>

When rock units of Moderate to Very 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 terms of the likelihood of Cretaceous age cover and cleared for development by a suitably qualified Palaeontologist.

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 Ogunjini Water Treatment Works and rising main Development is situated at Ogunjini in the Ethekwini Metropolitan north of Durban in KwaZulu-Natal. The development falls in undulating terrain underlain by sandy soils of mainly weathered quartzitic rocks of the Natal Group (Figure 2).



Figure 2 Locality of the Ogunjini WTW and Rising Main

13 GEOLOGY

The site of the development falls on Ordovician to Silurian aged quartzitic sandstone of the Natal Group (Figure 3).



14 NATAL GROUP

The Ordovician to Silurian aged Natal Group consists almost entirely of thickly bedded quartzites with minor shale layers. This group of rocks forms the high lying, more resistant

Figure 3 The study area for the Ogunjini WTW and rising main is underlain by rocks of the Natal Group

parts of the landscape in this area and is interpreted as fluvial deposits of sand that was transported from the north into this part of South Africa.

15 PALAEOLOGY

16 NATAL GROUP

The Ordovician to Silurian aged Natal Group quartzite is mainly a deposit of relatively high energy streams and no significant trace or body fossils have up to date been recorded from these rocks in KwaZulu-Natal. The rocks are age equivalent to the Table Mountain Group in the southern parts of South Africa where very significant fossils were recorded. It will therefore be highly informative if any fossils are recorded during this project.

No significant Quaternary aged sediment is reported on the geological map used for this desktop survey and it is highly unlikely that any fossils will be present in these young sandy layers that might be present locally.

17 PALAEOLOGICAL IMPACT AND MITIGATION

The predicted palaeontological impact of the development is based on the initial mapping assessment and literature reviews as well as information gathered during the desktop investigation. The desktop investigation confirms that the study area is underlain by relatively deep (>2m) sandy soil and rocky outcrops of quartzite, associated with the Natal Group.

The Chances of finding significant fossils in the excavations planned form this project is deemed to be low, with a Low Palaeontological sensitivity allocated to the entire study site (Figure 4).

No further mitigation for Palaeontological Heritage is recommended for this study site. If the ECO do record trace fossils, these will be highly significant and the HIA specialists must be notified of such finds for appropriate action.

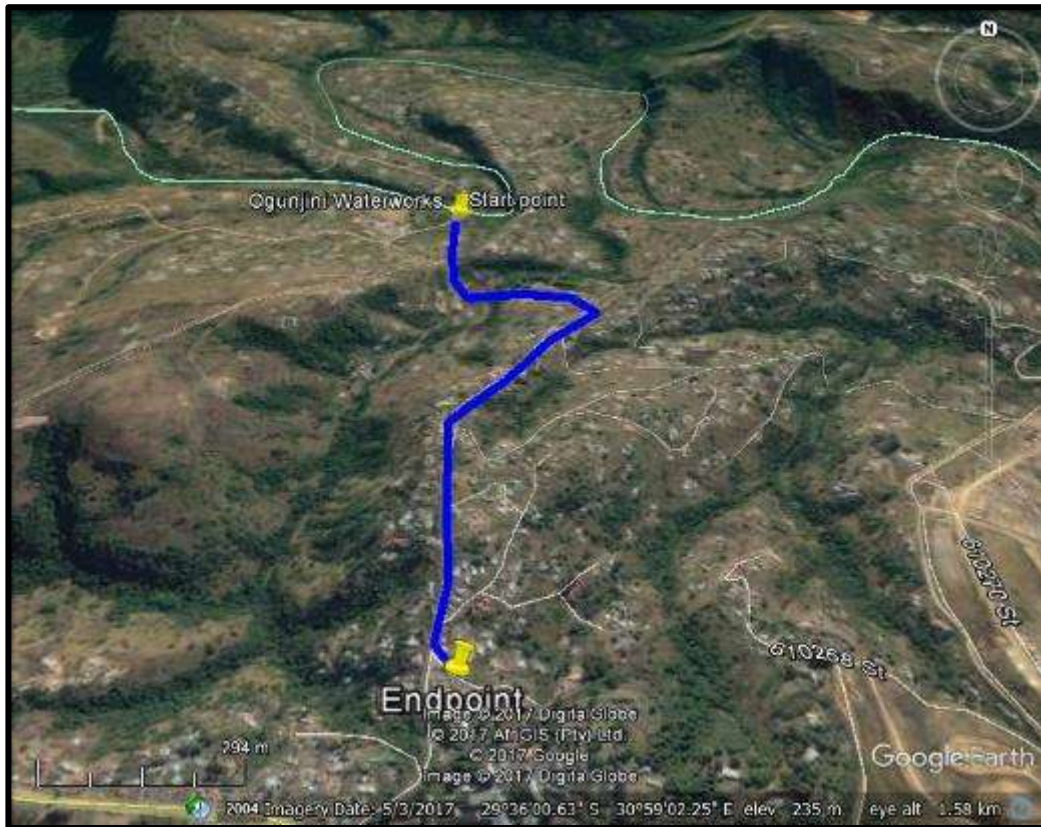


Figure 4 Palaeontological Sensitivity of the study area for the Ogunjini WTW and rising main areas. The route is approximate and the colour code is valid for the entire area, see Table 1.

18 CONCLUSION

The development site applicable to the application for the proposed Upgrading of the Ogunjini Water Treatment Works and Clear Water Rising Main in the Ethekwini Metropolitan Municipality, KwaZulu-Natal Province is underlain by Ordovician to Silurian aged quartzite of the Natal Group.

No significant fossils are expected in the Ordovician to Silurian aged rocks on site. If terrace fossils are discovered the HIA specialist and Palaeontologist must be informed as such finds will be highly significant.

It is recommended that:

- The EAP and ECO must be informed of the fact that a Low Palaeontological sensitivity is allocated to the rocks underlying the development footprint.
- If any fossil are observed during the lifetime of the project, the HIA specialist and Palaeontologist must be informed for appropriate action.

- No further mitigation for Palaeontological Heritage is recommended for this project.

19 REFERENCES

Almond J.E. and Pether J. 2008. *Palaeontological Heritage of the Western Cape.* Internal Report Heritage Western Cape.

Almond J.E., De Klerk B. and Gess R., 2009. *Palaeontological Heritage of the Eastern Cape.* Internal Report, SAHRA.

Groenewald G.H., 2012. *Palaeontological Technical Report for Kwazulu-Natal.* Internal Report, AMAFA.

Groenewald G.H., Groenewald D.P. and Groenewald S.M., 2014. *Palaeontological Heritage of the Free State, Gauteng, Limpopo, Mpumalanga and North West Provinces.* Internal Palaeotechnical Reports, SAHRA.

Johnson MR , Anhaeusser CR and Thomas RJ (Eds). 2009. *The Geology of South Africa.* GSSA, Council for Geoscience, Pretoria.

Linstrom W. 1987 Die Geologie van die gebied Durban.. Explanation Sheet 2930 (1:250 000). Geological Survey of South. Africa.

MacRae C. 1999. *Life Etched in Stone.* Geological Society of South Africa, Linden, South Africa.

McCarthy T and Rubidge BS. 2005. *Earth and Life.* 333pp. Struik Publishers, Cape Town.

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.



Dr Gideon Groenewald
Geologist