

**PROPOSED CONSTRUCTION OF MTWALUME DAM,
HARRY GWALA DISTRICT MUNICIPALITY, KWAZULU-
NATAL**

Phase 1 Heritage Impact Assessment

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EXECUTIVE SUMMARY

Background:

The Ugu District Municipality (DM) owns and operates the Vulamehlo Water Treatment Plant (WTP) which supplies potable water to areas within the Vulamehlo and Umzumbe Local Municipalities in Ugu DM as well as to areas within the Ubuhlebezwe Local Municipality (LM) in Harry Gwala DM.

A recent assessment revealed that bulk infrastructure within the Vulamehlo/Braemer and Nyavini Water Schemes were under operational strain and not satisfying current water demand let alone future demand. It was discovered that some of the local water supply infrastructure was not fully operational whilst other areas were not been serviced.

The Ugu DM therefore wishes to augment water supply and guarantee security of supply to areas under its jurisdiction through the upgrading and construction of bulk infrastructure including the construction of the Mtwalume Dam.

Legislative environment

Due to the size of the proposed dam, the development triggers Section 38 of the National Heritage Resources Act (NHRA), 1999 (Act No 25 of 1999) that states the following:

“(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

(c) any development or other activity which will change the character of a site-

(i) exceeding 5 000 m² in extent; or

(ii) involving three or more existing erven or subdivisions thereof

must notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

The proposed construction of the Mtwalume Dam may impact on graves, structures, archaeological and palaeontological resources that are protected in terms of sections 33, 34, 35, and 36 of the KwaZulu-Natal Heritage Act (No. 4 of 2008) and in terms of sections 34, 35, and 36 of the NHRA.

Dam site alternatives:

A pre-feasibility assessment of six potential dam sites was undertaken during which each of the sites underwent an environmental scoping exercise as well as a high level geotechnical screening. The purpose of the exercise was to determine if any of the sites contained fatal flaws,

and which of the sites would be the most favourable from both a geotechnical and environmental perspective. Two sites were taken forward for the environmental authorisation process, namely Dam site 3 and Dam site 5. These are the two sites that were assessed in this study.

In February 2016, an additional scope of work was added that included the construction laydown area for both Dam Sites as well as additional inundated area for Dam Site 5.

Results

The project area has never been systematically surveyed for archaeological sites in the past. The Paddock and greater Oribi Gorge areas, situated to the south east of the study area in similar geographical environments are well covered by previous surveys.

Later Stone Age rock art sites occur near the coast. The rock art sites form part of the eastern seaboard coastal rock art zone. Most of these occur in sandstone shelters and depict red monochrome paintings.

Three rock art sites have been recorded as occurring in the greater Highflats area. Rock art sites also occur to the east of the project area closer to the coast. However, all the recorded sites are situated several kilometres from the project area. The closest one is located almost 12 km to the west of the proposed dam sites

No archaeological material or sites were observed during the site inspection that was undertaken. This could be as a result of dense vegetation that made visibility poor especially in terms of sub-surface archaeological sites.

A local resident indicated that there were graves situated at a derelict homestead located close to the site of the wall for Dam Site 3. The construction and subsequent inundation of the dam wall will result in the destruction of the graves. The graves are significant reminders of those who lived at the homestead and therefore it is recommended that the graves be removed prior to the construction of the dam in consultation with the family and affected community as required by Regulation 4 of the KZN Heritage Regulations of 2012 if Dam Site 3 is selected as the site for the Mtwalume Dam.

In terms of Dam Site 5, a number of abandoned homesteads were found in the vicinity of the dam wall. It is possible that there are graves situated near these homesteads although no graves were noted during the site inspection. It is recommended that construction activities keep well clear of the homesteads to avoid any damage to potential graves.

A number of graves were found in the valley area that will be inundated by Dam Site 5. The graves are unmarked. There appear to be at least 5 visible grave sites.

A cattle dip was found in the basin of Dam site 5. It appears to still be in use. The dip will be inundated if Dam Site 5 is selected. The structure is considered to be of medium significance as it appears to be the only one in the surrounding area that local farmers use. The inundation of the cattle dip could impact on farming activity and it is recommended that the Applicant provide a new cattle dip in consultation with the farmers if Dam Site 5 is chosen for the proposed dam.

Recommendations and conclusion

It is recommended that a Phase 2 assessment is undertaken once the dam site is chosen so that a systematic ground survey for both archaeological and grave sites is undertaken to ensure that no graves or significant archaeological sites are inundated/destroyed by the dam.

The identified graves at the derelict homestead close to the site of the proposed dam wall must be removed prior to construction if Dam Site 3 is selected.

Graves situated close to the abandoned homesteads found in the area above the site of the proposed dam wall for Dam Site 5 must be protected from construction activities including the building of access roads, potable water pipelines, etc.

The graves found in the valley that will be inundated by Dam Site 5 will have to be removed in consultation with family members and the community and according to procedures determined by the KwaZulu-Natal 2012 Regulations regarding the relocation of graves.

It was concluded that Dam Site 3 is preferred due to the direct impact on graves and a cattle dip that still appears to be used by local farmers. In addition, Dam Site 3 is located closer to the water treatment plant and there are several existing roads hence limiting impacts whereas Dam Site 5 requires more new access roads, the construction of which could impact on heritage resources.

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List of Abbreviations and Acronyms

| | |
|--------|--|
| ASAPA | Association of Southern African Professional Archaeologists |
| CRM | Cultural Resources Management |
| DM | District Municipality |
| EAP | Environmental Assessment Practitioner |
| FSL | Full Supply Level |
| IAIAsa | International Association of Impact Assessors (South Africa) |
| KZN | KwaZulu-Natal |
| LM | Local Municipality |
| NHRA | National Heritage Resources Act (Act No. 25 of 1999) |
| SAHRA | South African Heritage Resources Authority |
| WSA | Water Service Authority |
| WSP | Water Service Provider |
| WTP | Water Treatment Plant |

AUTHOR DETAILS

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1. INTRODUCTION AND BACKGROUND TO PROJECT

Nemai Consulting has been appointed by Ziyanda Consulting as the independent Environmental Assessment Practitioner (EAP) to undertake the environmental authorisation for the proposed construction of a dam on the Mtwalume River in the Harry Gwala District Municipality in the Umzinto area of KwaZulu-Natal.

The Ugu District Municipality (DM) owns and operates the Vulamehlo Water Treatment Plant (WTP) which supplies potable water to areas within the Vulamehlo and Umzumbe Local Municipalities in Ugu DM as well as to areas within the Ubuhlebezwe Local Municipality (LM) in Harry Gwala DM (formerly known as the Sisonke DM).

A recent assessment revealed that bulk infrastructure within the Vulamehlo/Braemer and Nyavini Water Schemes were under operational strain and not satisfying current water demand let alone future demand. It was discovered that some of the local water supply infrastructure was not fully operational whilst other areas were not been serviced.

The Ugu DM, as the Water Service Authority (WSA) and Water Service Provider (WSP) therefore wishes to augment water supply and guarantee security of supply to Nyavini, Kenterton, Braemer, KwaNkosi, Mayfield and KwaMgayi areas in Ugu DM and to Jolivet and Hlokozi areas in Harry Gwala DM. The Water Scheme intends to provide clean and reliable water supply through the upgrading and construction of bulk infrastructure including the construction of the Mtwalume Dam.

In February 2016, additional scope of work was added to both sites. This additional work included the construction laydown area and an additional area of inundation by Dam Site 5. The construction laydown area for both sites includes:

- Potable water pipeline
- Concrete access road
- Water storage tank
- Mixing and concrete batching plant
- Site camp; and
- Site office

2. LEGISLATIVE REQUIREMENTS

Due to the size of the proposed Mtwalume Dam, the development triggers Section 38 of the National Heritage Resources Act, 1999 (Act No 25 of 1999) that states the following:

“(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

(c) any development or other activity which will change the character of a site-

(i) exceeding 5 000 m² in extent; or

(ii) involving three or more existing erven or subdivisions thereof

must notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

The proposed construction of the Mtwalume Dam could also impact on graves, structures, archaeological and palaeontological resources that are protected in terms of sections 33, 34, 35, and 36 of the KwaZulu-Natal Heritage Act (No. 4 of 2008) as well as sections 34, 35, and 36 of the National Heritage Resources Act (NHRA).

The heritage impact assessment is required to assess the two alternative sites (Dam Site 3 and Dam Site 5) where the dam may be constructed to ascertain whether any heritage resources will be impacted by the proposed development. If any heritage resources are impacted the report will provide mitigation measures to either avoid or limit the impact.

According to Section 3 of the NHRA, heritage resources include the following:

- (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 paleontological 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).

3. TERMS OF REFERENCE (ToR)

- Undertake a Phase 1 Heritage Impact Assessment in order to determine the existence of heritage resources in the project area that could be impacted by the proposed activity.
- Provide mitigation measures and recommendations to avoid or limit the impact of the proposed dam on heritage resources.

4. LOCATION AND DESCRIPTION OF THE STUDY AREA

The proposed Mtwalume Dam will be located on the Mtwalume River. The dam is located approximately 30km west of Umzinto and approximately 38 km west and inland of Pennington on the south coast of KwaZulu-Natal.

The area in which both dam sites are located is rural in nature with clusters of homesteads situated on the plateau above the Mtwalume River valley. Access to the two dam sites takes place via roads that divert off from the R612 that links the coastal areas and the N2 highway with the towns of Umzinto, Ixopo and Highflats.



Figure 1: Google Earth image of location of dam sites

5. METHODOLOGY

A survey of literature was undertaken in order to place the development area in an archaeological and historical context.

A desktop study was conducted of the archaeological databases housed in the KwaZulu-Natal Museum and the South African Heritage Resources Agency (SAHRA) inventory of heritage sites. The SAHRIS website of heritage resources and previous Cultural Resource Management (CRM) surveys was also consulted. Aerial photographs of the area were surveyed. The SARADA data base of Southern African rock art was consulted. In addition, the available archaeological and historical literature covering KwaZulu-Natal was also scrutinised for potential site related information.

A site inspection was undertaken on 11 February 2015 of the two dam sites. A site inspection of the additional scope of work was undertaken on 25 February 2016.

6. ALTERNATIVES DAM SITES

During a pre-feasibility phase, six potential dam sites were identified upstream of the existing Vulamehlo WTP abstraction site. Each of these sites underwent an environmental scoping exercise as well as a high level geotechnical screening. The purpose of the exercise was to

determine if any of the sites contained fatal flaws, and which of the sites would be the most favourable from both a geotechnical and environmental perspective.

Sites that were found to be environmentally sensitive or contained poor founding conditions were discarded. Two sites were taken forward for the environmental authorisation process, namely Dam Site 3 and Dam Site 5. Their locations can be seen in Figures 2 and 3 provided below together with the components of the construction laydown area.

It should be noted that Figure 4 shows the original inundation area (outlined in black) and the proposed inundation area (outlined in yellow) of Dam Site 5. The new inundation area is bigger or larger than the original area of inundation.

7. HERITAGE BACKGROUND TO THE STUDY AREA

7.1 Archaeological

Stone Age sites of all the main periods and cultural traditions occur along the coastal cordon in the immediate vicinity of Port Shepstone closer towards the coast. Later Stone Age sites have been recorded further inland close to Highflats and Umzimkhulu. Most of these occur in open air contexts as exposed by donga and sheet erosion. The occurrence of Early Stone Age tools in the near vicinity of permanent water resources is typical of this tradition.

These tools were most probably made by early hominins such as *Homo erectus* or *Homo ergaster*. Based on typological criteria they most probably date back to between 300 000 and 1.7 million years ago. The presence of the first anatomically modern people (i.e. *Homo sapiens sapiens*) in the area is indicated by the presence of a few Middle Stone Age blades and flakes. These probably date back to between 40 000 and 200 000 years ago.

The later Stone Age flakes and various rock painting sites identified in the area are associated with the San (Bushmen) and their direct ancestors. These most probably dates back to between 200 and 20 000 years ago.

The San were the owners of the land for almost 30 000 years but changes were on the horizon soon after 2000 years ago when the first Bantu-speaking farmers crossed the Limpopo River and arrived in South Africa. By 1500 years ago these early Bantu-speaking farmers also arrived in the project area.



Figure 2: Dam Site 3 and construction laydown area



**PROPOSED MTWALUME
DAM**

DAM SITE 5

Legend

- Site Alternatives:
Dam Site 5
- Dam Basin
 - Dam Wall
 - Bridge to valve chamber
 - Bridge to intake tower
 - Valve Chamber Dam Site 5
 - Intake Tower Dam Site 5
- Construction Laydown Area
- Non construction zone
 - Gravel Road
 - Construction Footprint Dam Site 5
 - Potable Water Pipeline
 - Culvert River Crossing
 - Concrete Access Road
 - Water Storage Tank
 - Mixing & Concrete Batching Plant for Storage of Concrete Materials
 - Site Camp
 - Site Office

Scale 1:15000
0 200 400 m

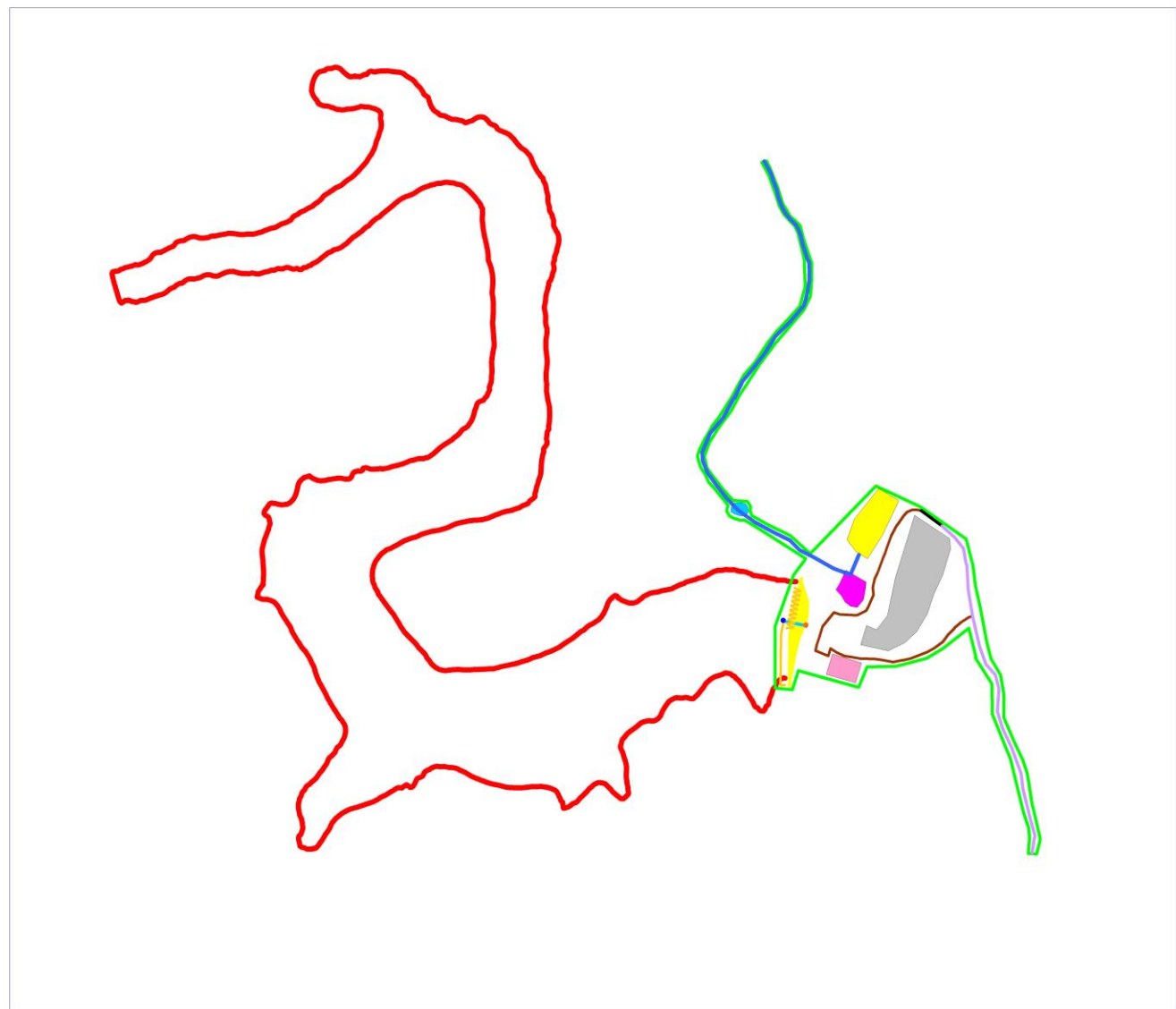


Figure 3: Dam Site 5 and construction laydown area



Figure 4: Google Earth image showing original and expanded inundation area of Dam Site 5

Due to the fact that these first farmers introduced metal technology to Southern Africa, they have been designated as Early Iron Age people in archaeological literature. Their distinct ceramic pottery is classified to styles known as “Msuluzi” (AD 500-700), Ndongondwane (AD 700-800) and Ntshekane (AD 800-900). Most of the Early Iron Age sites in the greater Ugu District Municipality belong to these traditions (Maggs 1989:31; Huffman 2007:325-462). These sites normally occur on alluvial or colluvial soil adjacent to large rivers below the 1000m contour.

Later Iron Age sites also occur in the greater Port Shepstone and Highflats area. These were Bantu-speaking agropastoralists who arrived in Southern Africa after 1000 year ago via East Africa. Later Iron Age communities in KwaZulu-Natal were the direct ancestors of the Zulu-speaking people (Huffman 2007).

It is probable that many African groups moved through the study area during the period of tribal turmoil caused by the expansionistic policies of King Shaka Zulu in the 1820’s and subsequent civil wars in Zululand to the north. It is known from oral history that the greater project area was inhabited by Zulu refugees in the 19th century (Bryant 1965) especially by members of the abakwaCele and Lushaba clans.

These clans arrived in the project area around 1828 soon after the murder of King Shaka when they were being pursued by supporters of King Dingane. According to oral history most of the historical settlement of the area took place on the higher altitude grassland areas.

7.2 Historical

East of and in close proximity to the dam sites, large tracts of sugar cane are found. Not far from the proposed dam is the town of Umzinto, the history of which is closely linked to sugar cane farming in the then Natal Colony.

According to Du Bois (2014: 33), Umzinto sprang into prominence in 1857 as a result of two unrelated developments. One was the decision to open up the area south of the uMkomazi River by inviting applications for grants of Crown land. The other concerned the establishment of the first public company to operate in Natal, namely the Umzinto Sugar Company.

There was a spate of applications for Crown land grants south of the uMkomazi River. By 1859 the number of colonists had grown to 93. As a result, Henry Francis Fynn, Resident Magistrate of the Lower uMkomazi District informed the Colonial Secretary that he would be purchasing land and building a house near Umzinto “as the most central locality in the division” for his magistracy (Du Bois 2014: 34).

According to du Bois (2014: 35), the Umzinto Sugar Company was granted 9 000 acres in the Umzinto area. The sugar factory, as it was called, started operating in March 1860, producing sugar yields which, it was claimed, were unrivalled in the Colony. By 1861 the company had 150 acres under cane, of which 100 acres were ready for crushing.

When indentured labourers arrived in batches in the Natal Colony from India from 1860 to about 1911, they were recruited by sugar cane farmers to work at various sugar farms on the South Coast including farms at Renishaw, Umzinto, Esperanza, Port Shepstone, and Umzimkulu (Govender 2012).

Esperanza is situated on a hilltop about six kilometres to the south of the town of Umzinto, Esperanza was one of the earliest settlements in the area where Indian indentured labourers worked and built a community. The village was established in the 1870s after the pioneer sugar farmers, Reynolds Brothers, closed two mills at Old Esperanza, about 10km away, and at Umzinto to build a new factory on the banks of the nearby Umzinto River (Govender 2012).

According to Govender (2012), the early indentured labourers who worked in the sugar estates at Old Esperanza and Umzinto were moved to the new village. It was the start of a community

that for more than 90 years boasted of being rich in culture, language, education, sport and religion. At the height of its history, the village boasted three temples, a primary school, and sporting, social, women's, and musical clubs. Before the sugar mill was moved in 1952 to Pongola on the North Coast there were more than 500 families, making up about 6 000 people, living at Esperanza.

According to an extract from the reminiscences of Sidney Turner in the Clansthal Conservancy (n.d: 1), a gold rush to the South Coast began after George Parsons and Walter Compton claimed, in August 1868, that they had made rich strikes along the Mtwalume and Mahlongwa rivers; many parties of diggers, including a group of Australians joined in the search.

However, according to Du Bois (2012: 40-41), from February 1887 until 1890 there was ongoing speculation about investment in auriferous prospects in the Umzinto district. A "golden valley" on a farm belonging to the Reynolds brothers triggered a huge interest in gold speculation. Although no substantial gold yields were forthcoming, speculation continued, reaching a peak when it was reported in 1888 that a "well-defined auriferous reef" had been located at Dumisa in the Umzinto district. However, production was disappointing – a mere half ounce per ton of crushed ore. As a result, by September 1891 the mine was closed and its equipment auctioned off.

8. RESULTS AND DISCUSSION

8.1 Archaeological

The project area has never been systematically surveyed for archaeological sites in the past. However, the coastal zone of the greater Port Shepstone area to the east of the study area has been relatively well covered by archaeologists of the then Natal Museum in the 1970's and 1980's. The Paddock and greater Oribi Gorge areas, situated to the south east of the study area in similar geographical environments are also well covered by previous surveys.

These surveys were originally conducted by staff associated with the then Natal Parks board in the 1970's. However, more professional surveys were conducted by archaeologists in the early 1980's (Cable 1984) and later by various archaeologists attached to the Natal Museum (Mazel 1989; Mitchell 2005).

The available evidence indicates that the greater Paddock and Port Shepstone areas contains a wide spectrum of archaeological sites covering different time-periods and cultural traditions. These include Early, Middle and later Stone Age sites, Early Iron Age sites, Later Iron Age sites, and some historical sites.

Particularly noteworthy is the occurrence of Later Stone Age rock art sites near the coast and further inland. The rock art sites form part of the eastern seaboard coastal rock art zone. Most of these occur in sandstone shelters and depict red monochrome paintings.

Three rock art sites are recorded as occurring in the greater Highflats area. Rock art sites also occur to the east of the project area closer to the coast. All these recorded sites are situated many kilometres from the project area. The closest one is located almost 12 km to the west of the proposed dam sites. Given the occurrence of sandstone outcrops overlooking the potential dam sites it is possible that ground surveys may locate rock art sites in the immediate vicinity of the footprint of the dams.

No archaeological material or sites were observed during the site inspection of some areas of the dams. This could be the result of poor visibility incurred as a result of dense vegetation especially in terms of sub-surface archaeological.

Given the abundance of archaeological sites in areas to the east and west of the project area it is possible that the study area may contain archaeological sites. In addition, sandstone cliffs are situated above both proposed dam sites and these may harbour rock shelters with potential Later Stone Age deposits and rock art.

It is therefore recommended that a Phase 2 heritage assessment is conducted in the area of the dam wall as well as the area of inundation of the chosen dam site and where the construction laydown area will be prior to the development of the dam. The Phase 2 Assessment will be a systematic ground survey for grave and archaeological sites.

8.2 Historical

The two dam sites are situated in close proximity to one another and within the steep Mtwalume River valley. There are many settlements situated on the plateau above the river valley with less homesteads situated further down the slopes due to the steep gradients. However, there are some residences found in these areas.



Figure 5: Mtwalume River valley



Figure 6: View up Mtwalume River valley

Dam site 3

A local resident, Mr. Spansani Dlamini showed the specialist a site where a homestead once stood. There are very few remains visible apart from fallow terraced fields and fruit trees. Mr. Dlamini indicated that there were, to his knowledge at least 3 graves underneath a tree close to where the homestead stood. Visibility was poor as the site was heavily overgrown with vegetation.

The graves are situated approximately at 30°19'24.20"S; 30°19'21.79"E and close to the site of the proposed dam wall. The construction and subsequent inundation of the dam wall will most likely result in the destruction of these graves.

The graves are protected by the KZN Heritage Act and are considered to be of high significance. It is therefore recommended that the graves be removed prior to construction if Dam site 3 is selected. Removal must be in accordance with Regulation 4 of the KZN Heritage Regulations of 2012 that were gazetted to regulate heritage matters in the Province.

Regulation 4 refers to an application to the Amafa Council for the damage, alteration, exhumation, or removal from its original position or any other disturbance of a grave in a traditional burial place or not located in a formal cemetery. The regulation requires that there must be extensive consultation with the family, affected community and, if necessary, with the local municipality regarding the intention of exhuming or removing such graves.

No other structures were noted in the area immediately below and north of the dam wall. It should be noted that access to the further reaches of the dam that will be inundated was difficult due to wet conditions and thick vegetation.

There are a number of abandoned dwellings close to and possibly in the area where the construction laydown area is to be located for Dam Site 3. The mud walls of one of the dwellings is still visible. This dwelling is situated at 30°19'33.4"S; 30°19'25.6"E. See Figure 7 below. No visible graves were noted in the area of the dwelling. Although the remains are not regarded as significant, the site could be impacted by the proposed potable water pipeline or by the concrete access road, therefore, the area around the site needs to be checked for possible graves.

The remains of abandoned dwellings were found at 30°19'37.5"S; 30°19'24.4"E. The stone and mud walls of at least two structures remain and the area was thickly overgrown with vegetation. See Figures 8 and 9 below. No visible graves were found. This site could be impacted by the construction laydown area and the area around the remains must be closely investigated for the presence of graves.



Figure 7: Abandoned dwelling above construction laydown area



Figure 8: Abandoned dwelling close to Mtwalume River



Figure 9: Abandoned dwelling in close proximity to Mtwalume River

A Google Earth image below (Figure 10) indicates the location of potential heritage sites within Dam site 3.

Dam site 5

A number of abandoned structures were noted above the area where the dam wall is proposed. No graves could be seen but the vegetation was dense making visibility poor. It appears as if the structures would fall outside the area of inundation of the dam.

However, the graves in the immediate vicinity of the structures could be at risk because of construction activities related to the building of the dam wall. Construction activities, including building of access roads and pipelines, should be kept well away from these abandoned structures. Alternatively a buffer of 10m should be imposed around the structures to avoid damage to potential grave sites.

The valley that Dam Site 5 will inundate contains a fairly large amount of dwellings that appear to be abandoned. Most of these dwellings will be inundated by the new area of inundation of this dam. If Dam Site 5 is chosen for the project, a thorough examination of these dwellings must take place to locate grave sites (if any) and relocate them after consultation with family and/or community.



Figure 10: Heritage sites: Dam site 3



Figure 11: Abandoned homestead



Figure 12: Abandoned homesteads

The valley is used mainly for grazing of cattle and large numbers of cattle were noted during the site inspection. A cattle dip that appears to still be used is located at 30°19'06.5"S; 30°17'14.3"E. The age of the structure could not be determined.

If Dam Site 5 is chosen as the preferred dam site, a complete photographic record of the cattle must take place prior to inundation of the valley. A permit must be obtained from Amafa in

accordance with Regulation 2 of the 2012 Heritage Regulations prior to inundation. The specialist is uncertain of the age of the structure hence it is recommended that application is made to Amafa to ensure that all legislative requirements are met. Regulation 2 relates to the destruction of structures that may be reasonably expected to be older than 60 years.



Figure 13: Cattle dip

As many as 5 grave sites were found at 30°18'33.6"S; 30°17'29.5"E in the valley that will be inundated by the dam. There appears to have been dwellings in the immediate area of the graves but the only evidence of this is a thickly vegetated area and the graves. The graves are indicated as slightly raised mounds of stone and are unmarked. The graves appear to be older than 60 years hence they are protected by section 36 (3) (a) (b) of the NHRA that states that:

No person may, without a permit issued by SAHRA or a provincial heritage resources authority—destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority



Figure 14: Graves

The inundation of the dam will cover these graves therefore if Dam Site 5 is chosen, the relocation of these graves will have to take place in consultation with the affected family or community and once the required permission has been received from Amafa.

A Google Earth image depicting the graves and cattle dip found in the Dam site 5 is provided below.

Immediately above the wall of Dam Site 5 several round indentations (see Figure 15) were found in the ground. It appears that there were a cluster of dwellings in this area but only the indentations remain. No grave sites were visible or identified. These sites are not regarded as significant but it is recommended that during the Phase 2 assessment, the sites are inspected for any graves if Dam Site 5 is chosen.

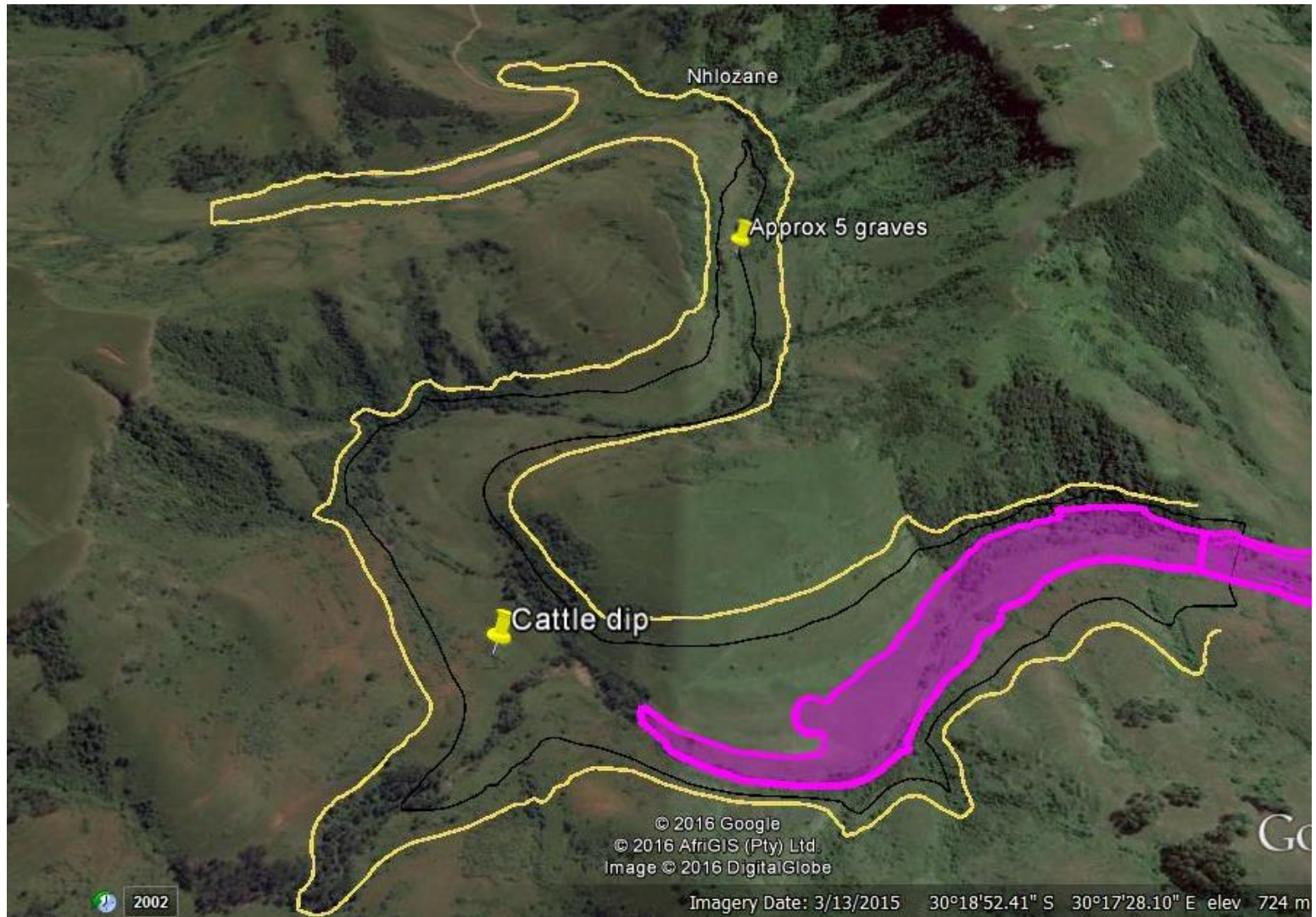


Figure 15: Heritage sites: Dam site 5

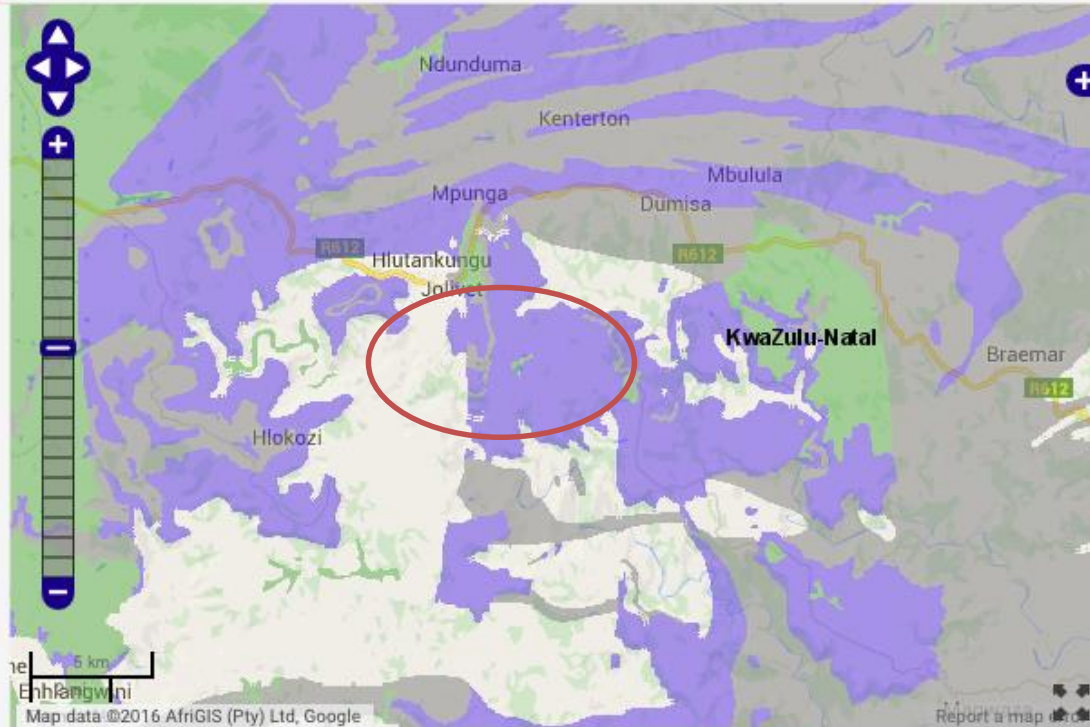


Figure 16: Remains of dwellings

8.3 Palaeontological

The SAHRA's Fossil Sensitivity Map indicates that the project area falls in an area that is of low fossil sensitivity (blue shaded areas on Figure 17 below) with a section of the wider project area falling into an area of unknown fossil sensitivity (white shaded areas). No further studies are recommended as the surrounding area is largely of low or negligible fossil sensitivity and it is not anticipated that significant fossils will be impacted by the proposed dam. A protocol for chance fossil finds during the construction of the dam and construction laydown area is included in section 11 below.

 PalaeoSensitivity Map



1 in 250 000 geological formation layers are courtesy of the [Council for GeoScience](#)

For more information, go to [How to Use the Palaeontological \(fossil\) Sensitivity Map](#)

| Colour | Sensitivity | Required Action |
|---------------|--------------------|---|
| RED | VERY HIGH | field assessment and protocol for finds is required |
| ORANGE/YELLOW | HIGH | desktop study is required and based on the outcome of the desktop study, a field assessment is likely |
| GREEN | MODERATE | desktop study is required |
| BLUE | LOW | no palaeontological studies are required however a protocol for finds is required |
| GREY | INSIGNIFICANT/ZERO | no palaeontological studies are required |
| WHITE/CLEAR | UNKNOWN | these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map. |

Figure 17: Fossil sensitivity overlay with project area indicated within red circle

9. IMPACT ASSESSMENT METHODOLOGY

The significance of impacts identified will be assessed according to the methodology below. The number in brackets is the rating assigned to the different categories of impacts:

Nature (/Status): the project could have a positive, negative or neutral impact on the environment.

Extent of the impact: the extent of the impact will be assessed according to the following parameters:

- (1) Limited to the site and its immediate surroundings.
- (2) Local/ Municipal extending only as far as the local community or urban area.
- (3) Provincial/Regional.
- (4) National i.e. South Africa.
- (5) Across International borders.

Duration of the impact: the lifespan of the impact will be assessed in terms of the duration of the impact, i.e.:

- (1) Immediate (less than 1 year).
- (2) Short term (1-5 years).
- (3) Medium term (6-15 years).
- (4) Long term (the impact will cease after the operational life span of the project).
- (5) Permanent (no mitigation measures or natural process will reduce impact after construction).

Magnitude of the impact: the magnitude or severity of the impacts will be indicated as either:

- (0) None (where the activity will have no impact on the environment).
- (1) Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected).
- (2) Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected).
- (3) Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way).
- (4) High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease)
- (5) Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).

Probability of occurrence: likelihood of impact actually occurring will be indicated as either:

- (0) None (impact will not occur).
- (1) Improbable (the possibility of the impact materializing is very low as a result of design, historic experience or implementation of adequate mitigation measures).
- (2) Low probability (there is a possibility that the impact will occur).
- (3) Medium probability (the impact may occur).
- (4) High probability (it is most likely that the impact will occur).
- (5) Definite / do not know (the impact will occur regardless of the implementation of any prevention or corrective actions or if the specialist does not know what the probability will be based on too little published information).

Significance of the impact: is based on a synthesis of the information contained above, the potential impacts of which will be assigned a significance weighting (S). The weighting is formulated by adding the sum of the numbers assigned to extent (E), duration (D) and magnitude (M) and multiplying this sum by the probability (P) of the impact hence $S=(E+D+M)*P$. The result or score of the assessment of the impacts are tabulated below

Table 1: Significance score and associated description

| Significance score | Significance | Description |
|--------------------|-------------------|--|
| 0 | Negligible | There is no impact |
| 1 - 15 | Low | Impact is of a low order, mitigation measures are easy and simple or not required |
| 16-30 | Low - Medium | Impact is higher but with limited effect, mitigation measures are feasible and easily achieved |
| 31 - 45 | Medium | Impact is real but not substantial and mitigation is both feasible and fairly easily possible |
| 46-60 | Medium - high | Impact is substantial and mitigation measures are difficult, expensive and time consuming |
| >60 | High / fatal flaw | Impact is of the highest order and there are few, if any, mitigation measures to offset impact |

The two dam sites will be assessed individually for anticipated potential and identified heritage impacts including the disturbance and destruction of graves, structures older than 60 years, archaeological sites, etc.

9.1 Dam site 3

9.1.1 Graves

Although only one grave site has been pointed out to the specialist by a local resident, there is a fairly high possibility that more graves could be inundated by the dam hence the recommendation / mitigation measure that a Phase 2 assessment is undertaken. If this site is selected, then the removal of the identified graves will mitigate the impact on them by the construction of the dam.

| Graves | Extent | Duration | Magnitude | Probability | Significance | Nature |
|--------------------------|------------------------|------------------|------------------|---------------------------|---------------------------------|---------------|
| Before mitigation | Local/municipal (2) | Permanent (5) | Low (2) | High probability (4) | Medium $2+5+2 \times 4 = 36$ | Negative |
| After mitigation | Local/municipal (2) | Permanent (5) | Low (2) | Medium probability (3) | Low – medium (27) | Negative |

9.1.2 Protected structures

No structures that are protected in terms of section 33 (1)(a) of the KZN Heritage Act and section 34 (1) of the NHRA, were discovered in the area of inundation of the dam. The ages of the homesteads found just below the dam wall that could be affected by the construction lay down area could not be established but they are in a poor state of repair and their significance is expected to be low. However, the potential presence of graves close to the homestead require that the area is cordoned off so that construction activities do not impact on the homesteads.

| Structures | Extent | Duration | Magnitude | Probability | Significance | Nature |
|--------------------------|------------------------|-------------------|------------------|---------------------------|----------------------|---------------|
| Before mitigation | Local/municipal (2) | Permanent (5) | Low (2) | High probability (4) | Medium 36 | Negative |
| After mitigation | Local/municipal (2) | Short-term (2) | Low (2) | Medium probability (3) | Low – medium (18) | Negative |

9.1.3 Archaeological sites

Although no archaeological sites were found during the site inspection, the area was densely overgrown thereby reducing visibility hence the recommendation that a Phase 2 assessment is undertaken to determine the presence, or not, of archaeological sites (including rock art sites) in the area of inundation of the chosen dam site.

| Archaeological sites | Extent | Duration | Magnitude | Probability | Significance | Nature |
|-----------------------------|-------------------|------------------|------------------|-------------------------|----------------------|---------------|
| Before mitigation | Provincial (3) | Permanent (5) | Low (2) | High probability (4) | Medium 40 | Negative |
| After mitigation | Provincial (3) | Permanent (5) | Low (2) | Medium (3) | Low – medium (30) | Negative |

9.2 Dam site 5

9.2.1 Graves

Several graves were found close to the foundations of a dwelling in the valley that will be inundated by the dam. In addition, there are several residences above the valley that could fall within the inundation area of the dam where additional graves could be found hence the recommendation that a Phase 2 assessment be undertaken. The identified graves are well over 60 years and are protected by both the KZN Heritage Act and the NHRA. If this site is selected, then the removal of the identified graves will mitigate the impact on them by the construction of the dam.

| Graves | Extent | Duration | Magnitude | Probability | Significance | Nature |
|--------------------------|------------------------|------------------|------------------|--------------------|----------------------|---------------|
| Before mitigation | Local/municipal (2) | Permanent (5) | Low (2) | Definite (5) | Medium 45 | Negative |
| After mitigation | Local/municipal (2) | Permanent (5) | Low (2) | Medium (3) | Low – medium (27) | Negative |

9.2.2 Structures

The cattle dip found in the valley could be older than 60 years and appears to be utilised by the local land owners. It is therefore of importance to the surrounding community and if this site is selected, it is recommended that the Applicant provide another cattle dip in consultation with the landowners.

| Structures | Extent | Duration | Magnitude | Probability | Significance | Nature |
|--------------------------|------------------------|------------------|----------------------------------|--------------------|---------------------|---------------|
| Before mitigation | Local/municipal (2) | Permanent (5) | Very high / don't know (5) | Definite (5) | Medium-high 60 | Negative |
| After mitigation | Local/municipal (2) | Permanent (5) | Moderate (3) | Definite (5) | Medium-high (50) | Negative |

9.2.3 Archaeological sites

No archaeological sites were identified during the site inspection. However, it is recommended that a Phase 2 assessment is undertaken to ascertain the presence or not of archaeological sites if Site 5 is selected.

| Archaeological sites | Extent | Duration | Magnitude | Probability | Significance | Nature |
|-----------------------------|-------------------|------------------|------------------|---------------------------|----------------------|---------------|
| Before mitigation | Provincial (3) | Permanent (5) | Low (2) | High (4) | Medium 40 | Negative |
| After mitigation | Provincial (3) | Permanent (5) | Low (2) | Medium probability (3) | Low – medium (30) | Negative |

The assessment of potential impacts on heritage resources within and in close proximity to the two dam sites indicate that significance of impacts are from a low-medium to a medium high significance with dam site 5 having a higher significance impact in terms of impacts on graves and protected structures.

10. RECOMMENDATIONS

The construction of the dam will have a high impact on the area where it is finally proposed. Every measure must be undertaken to avoid, where possible, the inundation of graves, archaeological sites and any inhabited homesteads.

It is therefore recommended that a Phase 2 assessment is undertaken that systematically surveys the footprint of the chosen dam site, the area where the dam wall will be constructed as well as the construction laydown area in order to identify all affected grave sites, archaeological sites and protected homesteads.

This report will be submitted to Amafa for assessment and approval as per the requirements of the legislation.

Dam site 3

The identified graves at the derelict homestead close to the site of the proposed dam wall will be destroyed either by the construction of the dam wall or inundation of the area once the dam wall is built. It is therefore recommended that the graves be removed prior to construction if Dam site 3 is selected.

Removal must be in accordance with Regulation 4 of the KZN Heritage Regulations of 2012. Consultation with the family members (if they can be found) or the affected community and local municipality must take place as well as application to Amafa for permission to remove the graves to a site agreed to by the family or community.

The abandoned dwellings, described above, that may be impacted by the construction laydown area and associated access roads and potable pipeline will need to be assessed to determine if there are any graves near the dwellings. If graves are discovered they should either be barricaded so that construction activity does not impact on them or they should be relocated. It is advised to leave graves *in situ* where possible.

Dam site 5:

There is the possibility of the existence of graves situated close to the abandoned homesteads found in the area above the site of the proposed dam wall. Damage to or destruction of these graves could occur during the construction of the wall through the construction of access roads and other activities taking place in the area. It is therefore recommended that construction activities should be kept well away from these abandoned structures. Alternatively a highly visible buffer of 10m should be placed around the structures to avoid to these sites.

The graves found in the area of inundation of Dam Site 5 will have to be relocated if this dam is chosen. Relocation must follow the requirements as set in the KZN Heritage Regulations.

The cattle dip will also be inundated by the dam. It is regarded to have medium to high significance as it is still in use. It is therefore recommended that if Dam Site 5 is chosen, the Applicant consider providing a cattle dip in an area outside the inundation area of the dam in consultation with affected farmers. If the cattle dip is to be inundated, then a complete photographic record must be taken of the structure. Application for its destruction must be made to Amafa.

11. CONCLUSION

Dam site 3 is the preferred option from a heritage perspective. The site is closer to the water treatment plant therefore there are shorter access roads reducing the potential impact on heritage resources.

It is recommended that a Phase 2 heritage assessment is undertaken once a dam site is chosen to ensure that all graves sites and archaeological sites are recorded and removed prior to the construction of the dam wall, the inundation of the area behind the dam wall and before the construction laydown area is implemented.

12. MITIGATION MEASURES

- A Phase 2 heritage assessment is conducted in the selected dam site to ensure that all graves and archaeological sites (if any) are identified so that they can be removed or recorded before inundation occurs.
- For any chance finds, all work will cease in the area affected and the Contractor will immediately inform the Project Manager and/or the Environmental Control Officer. A registered heritage specialist must be called to site for inspection. The relevant heritage resource agency (Amafa) must be informed about the finding.
- The heritage specialist will assess the significance of the resource and provide guidance on the way forward.
- Permits must be obtained from Amafa if heritage resources are to be removed, destroyed or altered.
- All heritage resources found in close proximity to the construction area to be protected by a 10m buffer in which no construction can take place. The buffer must be cordoned off with highly visible danger tape or barricades.
- Under no circumstances may any heritage material be destroyed or removed from site unless under direction of a heritage specialist.
- Should any remains be found on site that could potentially be human remains, the South African Police Service should be contacted.
- If there are chance finds of fossils during construction, work in the area of the find must be stopped and a palaeontologist must be called to the site in order to assess the fossils and rescue them if necessary (with an Amafa permit). The fossils must then be housed in a suitable, recognized institute.

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