

**POST HIA DESKTOP FOR THE KWAJALI WATER  
RETICULTAION, UGU MUNICIPALTY, KZN**

**FOR WALLACE & GREEN (PTY) LTD**

**DATE: 9 APRIL 2022**

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## Abbreviations

HP	Historical Period
IIA	Indeterminate Iron Age
LIA	Late Iron Age
EIA	Early Iron Age
ISA	Indeterminate Stone Age
ESA	Early Stone Age
MSA	Middle Stone Age
LSA	Late Stone Age
HIA	Heritage Impact Assessment
PIA	Palaeontological Impact Assessment

## INTRODUCTION

The project area is located approximately 11 km south west of Harding in the KwaZulu Natal. The project area encompasses peri-urban areas and rural areas; all situated in the Umziwabantu Local Municipality with jurisdiction of UDM. Access to the community is via gravel road, which branches off the N2 south west of Harding Town.

Ugu District Municipality, in its effort to continually reduce the Non-Revenue Water occurrence in the entire District. The project has been triggered by an excessive number of illegal connections along the rising main posing a hydraulic and operational challenge to deliver water to the KwaJali intermediate reservoir.

The project is a direct pipeline replacement of the existing rising main pipe with a pipe of a similar diameter. The existing rising main pipeline with illegal connections will then be converted into a gravity main to supply areas around the KwaJali community. The existing rising main pipeline turned gravity pipeline will also supply a few localised stand pipes. The existing supply sources comprise of the Weza Water Treatment Works. The water from Weza WTW is distributed by pumping means to the KwaJali intermediate reservoir where it gravitates to the water reticulation system by means of the converted rising main pipe to gravity pipe. The water source is adequate to meet the supply.

The proposal is to pump the water from Weza WTW to KwaJali reservoir via a new rising main pipeline. KwaJali reservoir will then supply the reticulation area by gravity means via the new gravity main pipeline. This proposal will effectively change the inlet chamber pipe configuration to include the new rising main and the gravity mains.

The rising mains had already been replaced before the HIA was initiated. We were then asked to undertake a desktop to note what could have been affected. KZNARI Form I will be submitted with the HIA report.

Figures 1 – 4 show the location of the development.

FIG. 1 GENERAL LOCATION OF THE PROPOSED DEVELOPMENT

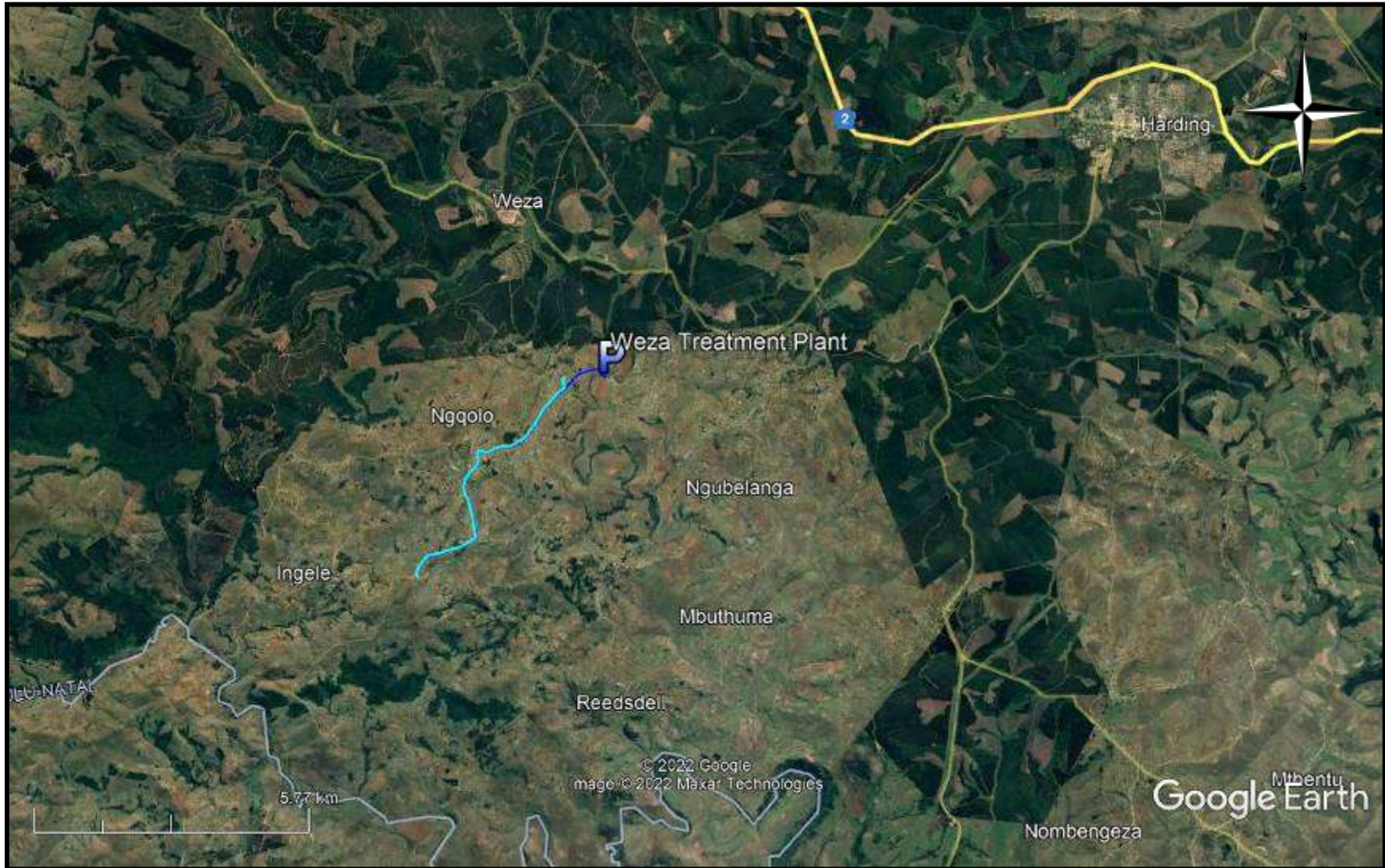


FIG. 2: AERIAL OVERVIEW OF THE PROPOSED DEVELOPMENT

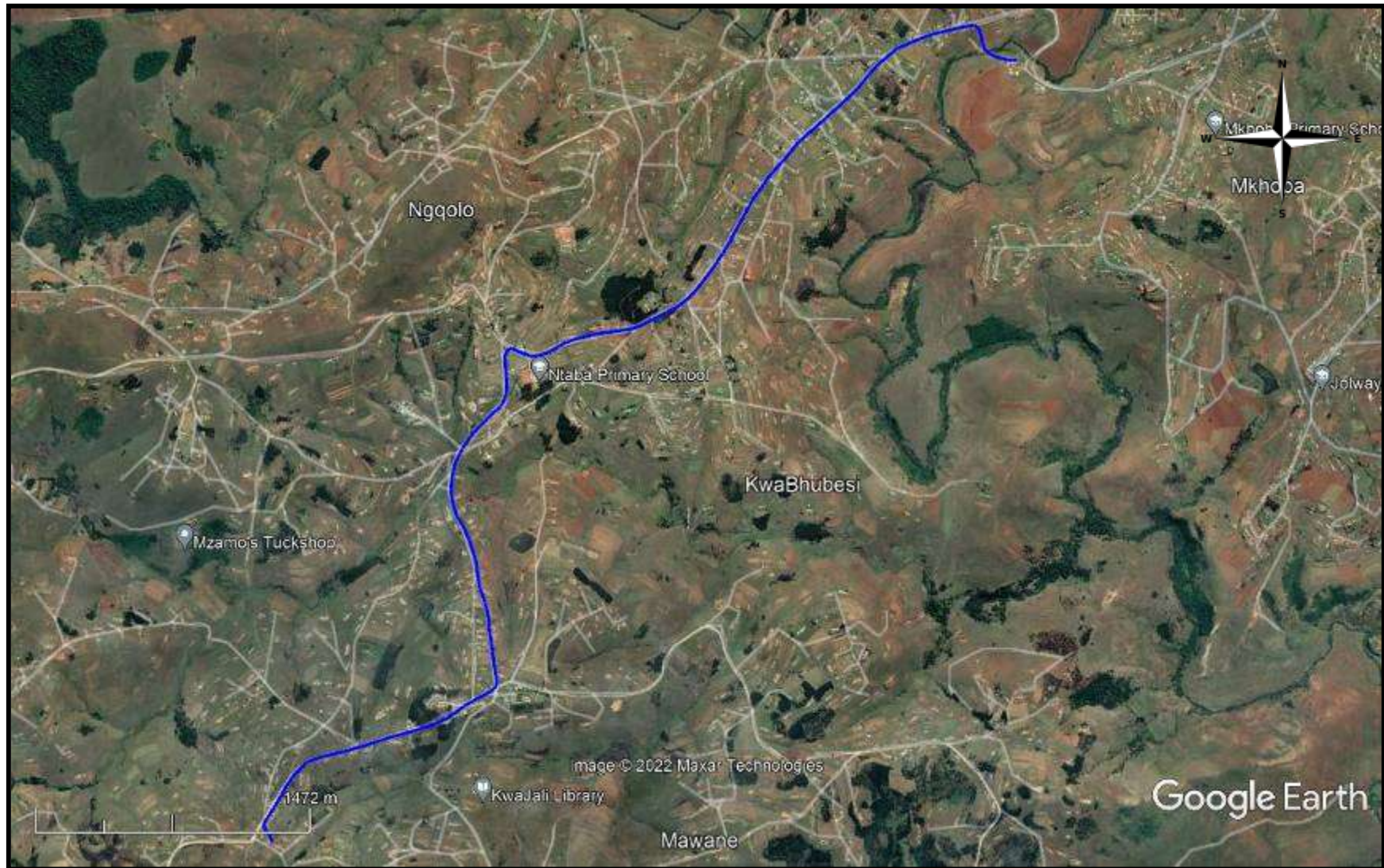






FIG. 4: SCENIC VIEWS OF THE STUDY AREA



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

“General protection: Structures.—

- No structure which is, or which may reasonably be expected to be older than 60 years, may be demolished, altered or added to without the prior written approval of the Council having been obtained on written application to the Council.
- Where the Council does not grant approval, the Council must consider special protection in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.
- The Council may, by notice in the *Gazette*, exempt—
- A defined geographical area; or
- defined categories of sites within a defined geographical area, from the provisions of subsection where the Council is satisfied that heritage resources falling in the defined geographical area or category have been identified and are adequately protected in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.
- A notice referred to in subsection (2) may, by notice in the *Gazette*, be amended or withdrawn by the Council.

General protection: Graves of victims of conflict.—No person may damage, alter, exhume, or remove from its original position—

- the grave of a victim of conflict;
- a cemetery made up of such graves; or
- any part of a cemetery containing such graves, without the prior written approval of the Council having been obtained on written application to the Council.
- General protection: Traditional burial places.—
- No grave—
- not otherwise protected by this Act; and
- not located in a formal cemetery managed or administered by a local authority, may be damaged, altered, exhumed, removed from its original

position, or otherwise disturbed without the prior written approval of the Council having been obtained on written application to the Council.

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

- the applicant has made a concerted effort to consult with communities and individuals who by tradition may have an interest in the grave; and
- the applicant and the relevant communities or individuals have reached agreement regarding the grave.

General protection: Battlefield sites, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites.—

- 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 Council.
- 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.
- 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.
- 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.
- 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.
- 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.”

## METHOD

The method for Heritage assessment consists of several steps.

The first step forms part of the desktop assessment. Here we would consult the database that has been collated by Umlando. This databases contains archaeological site locations and basic information from several provinces (information from Umlando surveys and some colleagues), most of the national and provincial monuments and battlefields in Southern Africa (<http://www.vuvuzela.com/googleearth/monuments.html>) and cemeteries in southern Africa (information supplied by the Genealogical Society of Southern Africa). We use 1<sup>st</sup> and 2<sup>nd</sup> edition 1:50 000 topographical and 1937 aerial photographs where available, to assist in general location and dating of buildings and/or graves. The database is in Google Earth format and thus used as a quick reference when undertaking desktop studies. Where required we would consult with a local data recording centre, however these tend to be fragmented between different institutions and areas and thus difficult to access at times. We also consult with an historical architect, palaeontologist, and an historian where necessary.

The survey results will define the significance of each recorded site, as well as a management plan.

All sites are grouped according to low, medium, and high significance for the purpose of this report. Sites of low significance have no diagnostic artefacts or features. Sites of medium significance have diagnostic artefacts or features and these sites tend to be sampled. Sampling includes the collection of artefacts for future analysis. All diagnostic pottery, such as rims, lips, and decorated sherds are sampled, while bone, stone, and shell are mostly noted. Sampling usually occurs on most sites. Sites of high significance are excavated and/or extensively sampled. Those sites that are extensively sampled have high research potential, yet poor preservation of features.

### **Defining significance**

Heritage sites vary according to significance and several different criteria relate to each type of site. However, there are several criteria that allow for a general significance rating of archaeological sites.

These criteria are:

#### **1. State of preservation of:**

- 1.1. Organic remains:
  - 1.1.1. Faunal
  - 1.1.2. Botanical
- 1.2. Rock art
- 1.3. Walling
- 1.4. Presence of a cultural deposit
- 1.5. Features:
  - 1.5.1. Ash Features
  - 1.5.2. Graves

- 1.5.3. Middens
- 1.5.4. Cattle byres
- 1.5.5. Bedding and ash complexes

**2. Spatial arrangements:**

- 2.1. Internal housing arrangements
- 2.2. Intra-site settlement patterns
- 2.3. Inter-site settlement patterns

**3. Features of the site:**

- 3.1. Are there any unusual, unique or rare artefacts or images at the site?
- 3.2. Is it a type site?
- 3.3. Does the site have a very good example of a specific time period, feature, or artefact?

**4. Research:**

- 4.1. Providing information on current research projects
- 4.2. Salvaging information for potential future research projects

**5. Inter- and intra-site variability**

- 5.1. Can this particular site yield information regarding intra-site variability, i.e. spatial relationships between various features and artefacts?
- 5.2. Can this particular site yield information about a community's social relationships within itself, or between other communities?

**6. Archaeological Experience:**

6.1. The personal experience and expertise of the CRM practitioner should not be ignored. Experience can indicate sites that have potentially significant aspects, but need to be tested prior to any conclusions.

**7. Educational:**

- 7.1. Does the site have the potential to be used as an educational instrument?
- 7.2. Does the site have the potential to become a tourist attraction?
- 7.3. The educational value of a site can only be fully determined after initial test-pit excavations and/or full excavations.

## 8. Other Heritage Significance:

- 8.1. Palaeontological sites
- 8.2. Historical buildings
- 8.3. Battlefields and general Anglo-Zulu and Anglo-Boer sites
- 8.4. Graves and/or community cemeteries
- 8.5. Living Heritage Sites
- 8.6. Cultural Landscapes, that includes old trees, hills, mountains, rivers, etc related to cultural or historical experiences.

The more a site can fulfill the above criteria, the more significant it becomes. Test-pit excavations are used to test the full potential of an archaeological deposit. This occurs in Phase 2. These test-pit excavations may require further excavations if the site is of significance (Phase 3). Sites may also be mapped and/or have artefacts sampled as a form of mitigation. Sampling normally occurs when the artefacts may be good examples of their type, but are not in a primary archaeological context. Mapping records the spatial relationship between features and artefacts. Table 1 lists the grading system.

**TABLE 1: SAHRA GRADINGS FOR HERITAGE SITES**

SITE SIGNIFICANCE	FIELD RATING	GRADE	RECOMMENDED MITIGATION
High Significance	National Significance	Grade 1	Site conservation / Site development
High Significance	Provincial Significance	Grade 2	Site conservation / Site development
High Significance	Local Significance	Grade 3A / 3B	
High / Medium Significance	Generally Protected A		Site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B		Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally Protected C		On-site sampling monitoring or no archaeological mitigation required prior to or during development / destruction

## RESULTS

### DESKTOP STUDY

The desktop study consisted of analysing various maps for evidence of prior habitation in the study area, as well as for previous archaeological surveys. Few archaeological sites occur in the general area. This will be a result of a lack of surveys, rather than an indication of the amount of sites. The one site is a Middle Stone Age site, while the other is a Late Iron Age/Historical Period site. Some historical buildings do exist in the general area (fig. 5).

Using the historical maps to locate the occurrence of human settlements, or houses, is important. These houses are in rural areas where traditional burial practices would be undertaken. This means that a Nguni-speaking settlement pattern will exist where graves will occur on the outskirts of the house, normally on the opposite side of the cattle byre. The graves can be 20m – 60m from the main house, or *indlu enkulu*. It is for this reason why a 50m – 100m radius around the houses from the maps is needed.

Figures 6 – 9 show the location of houses at different times. This is summarised in Table 2.

The 1937 aerial photograph indicates that there are nine houses/settlements within 100m of the footprint. Most of these occur within 50m of the footprint (fig. 6).

The 1963 aerial photos indicate that there are ten houses within the 100m footprint (fig. 7).



The 1968-1969 topographical indicates that seventeen houses, a workshop and cattle dip fall within the 100m of the footprint. (fig. 8). The 1969 aerial photographs indicate there are four houses (fig. 9). This aerial photograph was of poor quality and could not be used reliably.

The cattle dip was destroyed before 2005 according to Google Earth imagery

Only sites H3, H13, H14, H15, H16, H17 and H25 could have been (partially) affected by the pipeline or reservoir footprint. However, it is more likely that the formal construction of the road would have had a greater effect.

The chances of the pipeline having affected any potential graves are small. If there were more recent graves along the footprint, then these should have been flagged by living descendents.

**TABLE 2: LOCATION OF OBSERVED HERITAGE FEATURES**

Name	Latitude	Longitude
H1	-30.626590996	29.761097125
H2	-30.628586330	29.758729745
H3	-30.634153248	29.752790949
H4	-30.635785759	29.751892160
H5	-30.636453297	29.747754474
H6	-30.637885872	29.743875512
H7	-30.649999033	29.739394412
H8	-30.649493052	29.738389267
H9?	-30.655996733	29.736974349
H10	-30.662324058	29.727922500
H11	-30.657032491	29.733141962
H12	-30.657507800	29.736041489
H13	-30.652184071	29.739810522
H14	-30.651285027	29.739347062
H15	-30.650373381	29.739347225
H16	-30.649721275	29.739185443
H17	-30.647016920	29.738334977
H18	-30.640820582	29.739343260
H19	-30.639183433	29.739594424
H20	-30.637988976	29.747950419
W1	-30.636496329	29.748559868

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<b>H21</b>	-30.636152701	29.751256957
<b>H22</b>	-30.634476171	29.752962024
<b>H23</b>	-30.632968856	29.753571006
<b>H24</b>	-30.630010671	29.756194027
<b>H25</b>	-30.627560236	29.758432848
<b>H26</b>	-30.626100181	29.760845895
<b>H27</b>	-30.624835642	29.762723827
<b>Cattle Dip</b>	-30.624464370	29.769571101
<b>H28</b>	-30.634697418	29.753403649
<b>H29</b>	-30.638123199	29.748014354
<b>H30</b>	-30.636829836	29.747886540
<b>H31</b>	-30.638578268	29.744530093
<b>H32</b>	-30.639704693	29.739698436
<b>H33</b>	-30.649799656	29.738601782
<b>H34</b>	-30.659158509	29.729474124
<b>H35</b>	-30.661758657	29.728001811
<b>H36</b>	-30.662350020	29.726721970
<b>H37</b>	-30.624240723	29.763030336
<b>H38</b>	-30.624502827	29.762979589
<b>H39</b>	-30.630822486	29.753757244
<b>H41</b>	-30.650857517	29.739758875
<b>H42</b>	-30.661834076	29.726011570

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

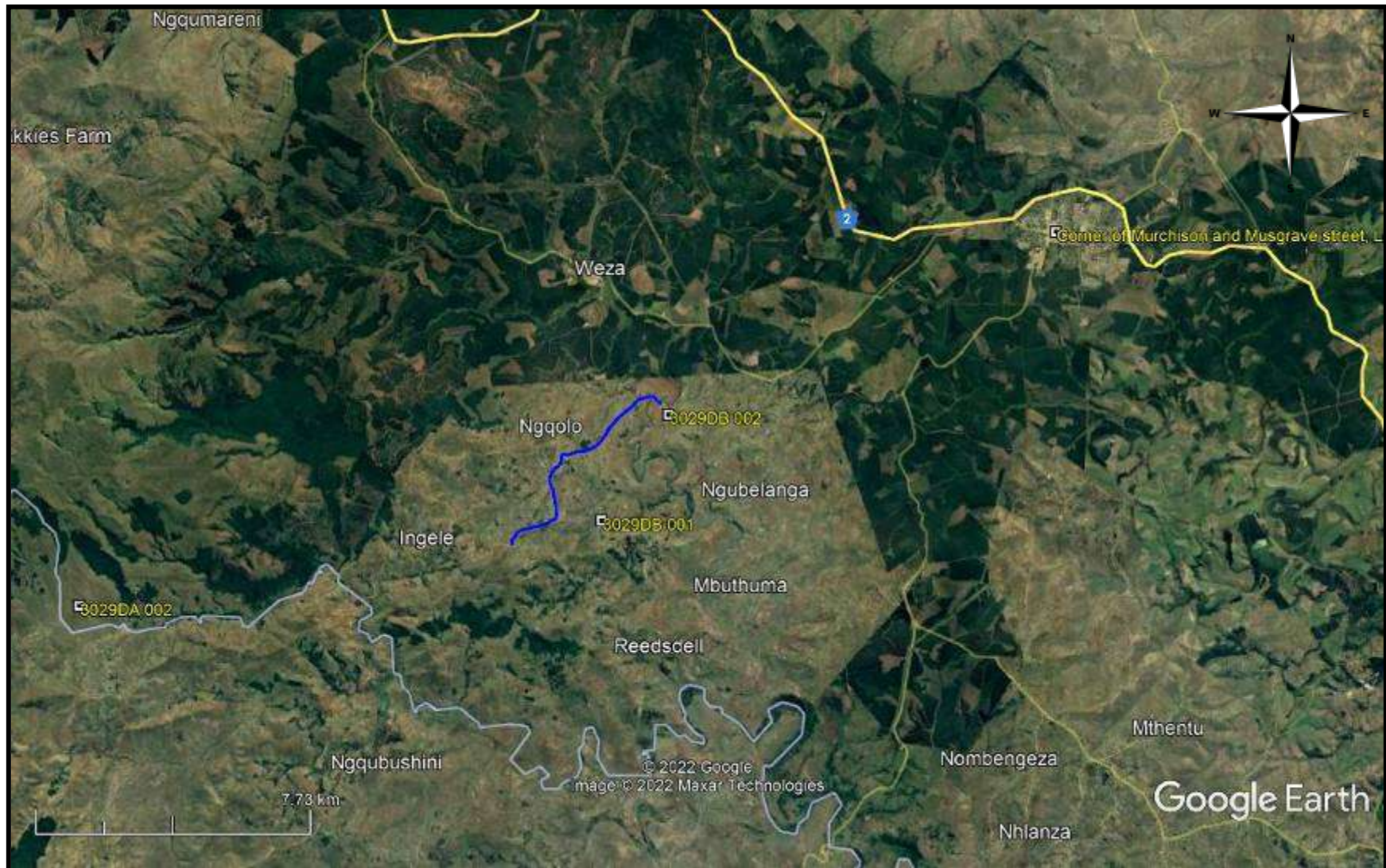


FIG. 6: LOCATION OF THE STUDY AREA IN 1937

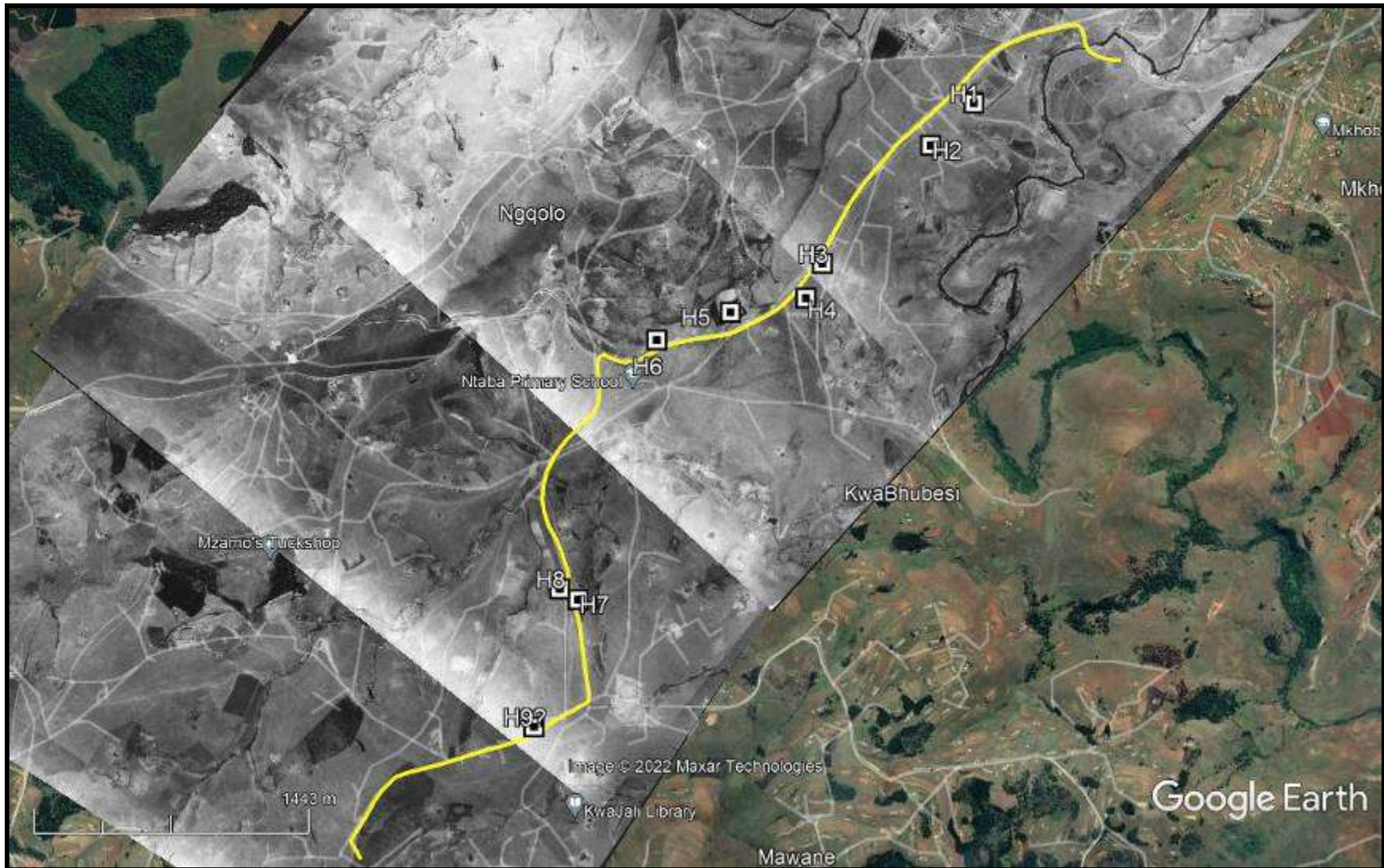


FIG. 7: LOCATION OF THE STUDY AREA IN 1963

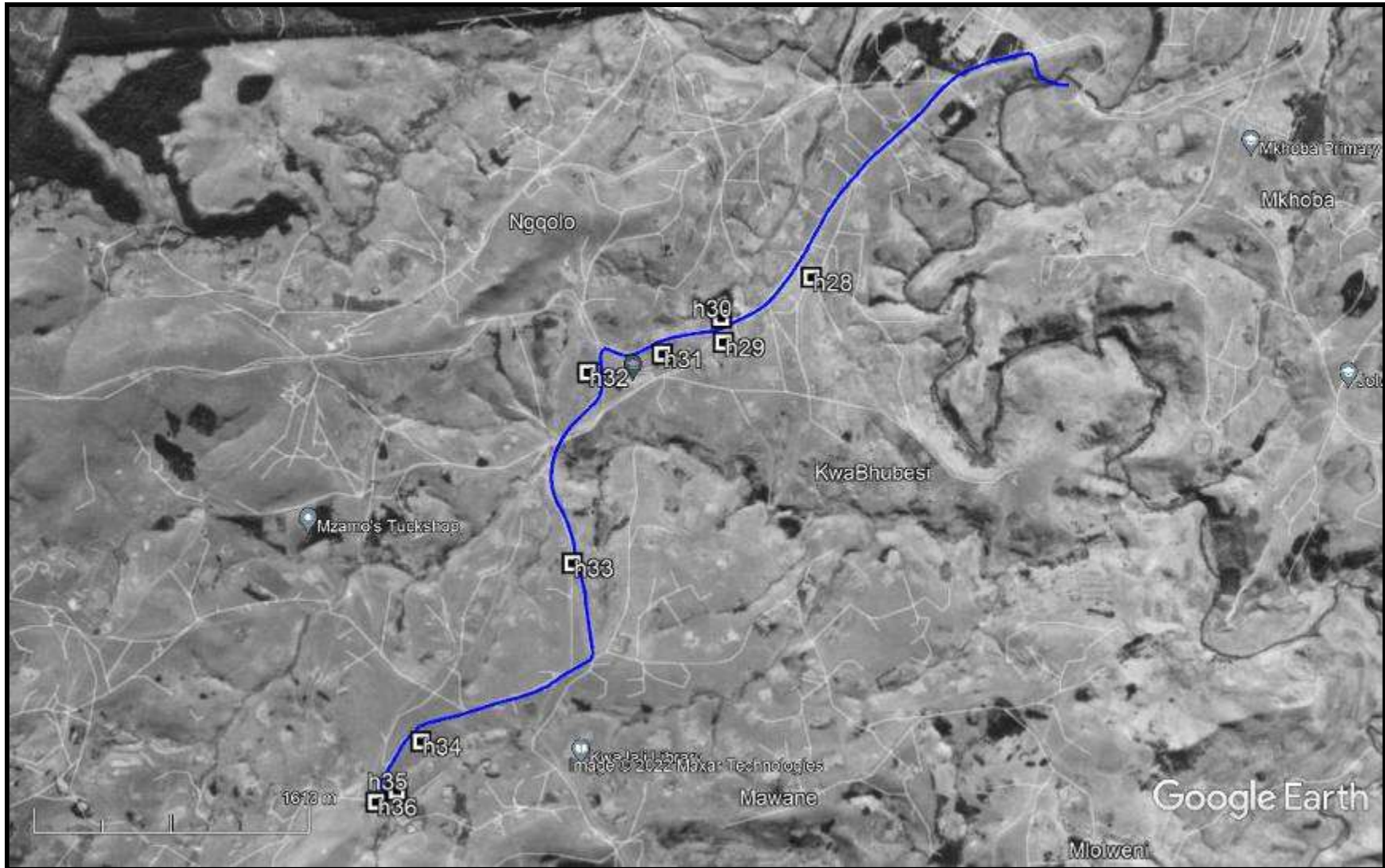
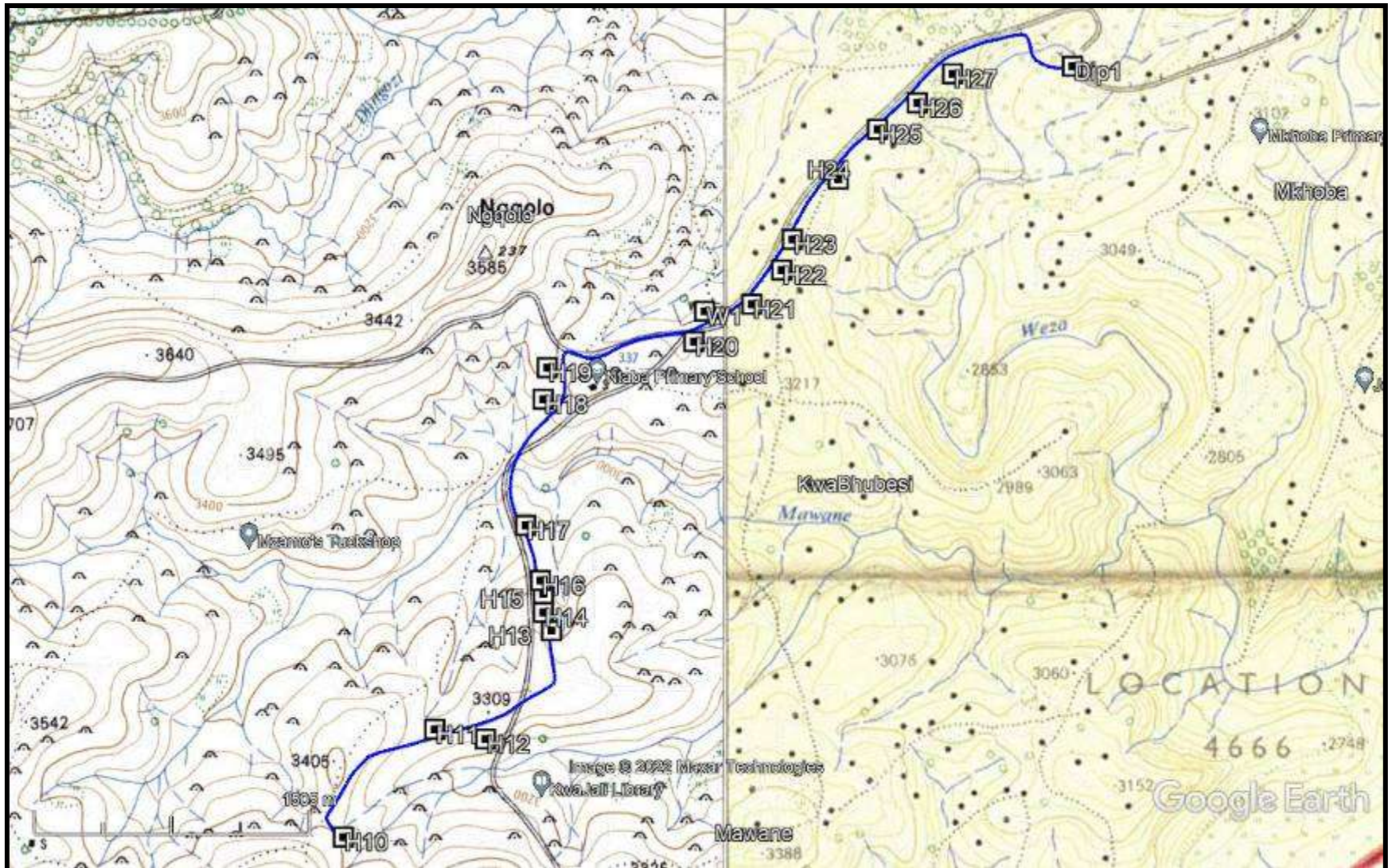


FIG. 8: LOCATION OF THE STUDY AREA IN 1968-1969





## PALAEONTOLOGICAL SENSITIVITY

The area is in an area of zero to high palaeontological sensitivity (fig. 9). Dr Alan Smith undertook a desktop PIA study of the area. This site is dominated by undifferentiated Ecca Group rocks, which are not known to be fossiliferous in this area. His desktop added a “*Chance Find Protocol*” in case fossiliferous deposits were located. However, since the pipeline has already been built, this is no longer required. Since the pipeline is less than 1.5m below the surface it is unlikely to affect and potential deposits. The pipeline impact would thus be low.

**FIG. 10: PALAEONTOLOGICAL 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.



## RECOMMENDATIONS

The rising mains upgrade should have undertaken a full HIA since there were potential human graves within the footprint and within 100m of the footprint. The upgrade is fortunate that no obvious heritage sites affected. No further mitigation should be required. It will not be possible to determine if any human graves were affected unless the (fragmented) remains occur on the surface.

KZNARI will make a ruling on the illegal pipeline upgrade.

## CONCLUSION

A desktop heritage survey was undertaken for the proposed KwaJali Rising Mains. The work had already been completed before the HIA was undertaken. This is an illegal activity in terms of the KZNARI Act of 2018. The desktop was a way to determine the potential heritage sites that could have been affected by the pipeline footprint. Forty-two houses, a workshop and a cattle dip occur within 100m of the pipeline footprint. Only seven of these could have been (partially) affected by the pipeline footprint. It will not be possible to verify if any graves were affected unless they are on the surface. It is also a very low chance that graves would have been affected

The PIA desktop study noted that there is a low probability that fossiliferous layers were affected.

## REFERENCES

### **1:50 000 Topographical Maps**

3029DA Weza 1968, 1981

3029DB Harding 1969, 1981

**Aerial Photographs**

117A\_009\_66172

117A\_009\_66173

117A\_009\_66174

117A\_009\_66175

**Database**

KZN Museum

SHARIS

Umlando

### **EXPERIENCE OF THE HERITAGE CONSULTANT**

Gavin Anderson has a M. Phil (in archaeology and social psychology) degree from the University of Cape Town. Gavin has been working as a professional archaeologist and heritage impact assessor since 1995. He joined the Association of Professional Archaeologists of Southern Africa in 1998 when it was formed. Gavin is rated as a Principle Investigator with expertise status in Rock Art, Stone Age and Iron Age studies. In addition to this, he was worked on both West and East Coast shell middens, Anglo-Boer War sites, and Historical Period sites.

### **DECLARATION OF INDEPENDENCE**

I, Gavin Anderson, declare that I am an independent specialist consultant and have no financial, personal or other interest in the proposed development, nor the developers or any of their subsidiaries, apart from fair remuneration for work performed in the delivery of heritage assessment services. There are no circumstances that compromise the objectivity of my performing such work.

A handwritten signature in black ink, appearing to read 'Gavin Anderson', with a horizontal line underneath.

Gavin Anderson  
Archaeologist/Heritage Impact Assessor

**APPENDIX A  
PIA DESKTOP**

**KWAJALI PIPELINE, WEZA, UGU REGIONAL  
MUNICIPALITY, UMUZIWABANTU LOCAL  
MUNICIPALITY, KWAZULU-NATAL: DESK-TOP  
PALAEOLOGICAL REPORT:**

**FOR**

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**7 April, 2022**

## Declaration of Independence

This report has been compiled by Dr Alan Smith (Pr. Sc. Nat.) of Alan Smith Consulting, Durban. The views expressed in this report are entirely those of the author, if not then the source has been duly acknowledged. No other interest was displayed during the decision making process for the Project.

Specialist: Dr Alan Smith

Signature:



## **EXECUTIVE SUMMARY**

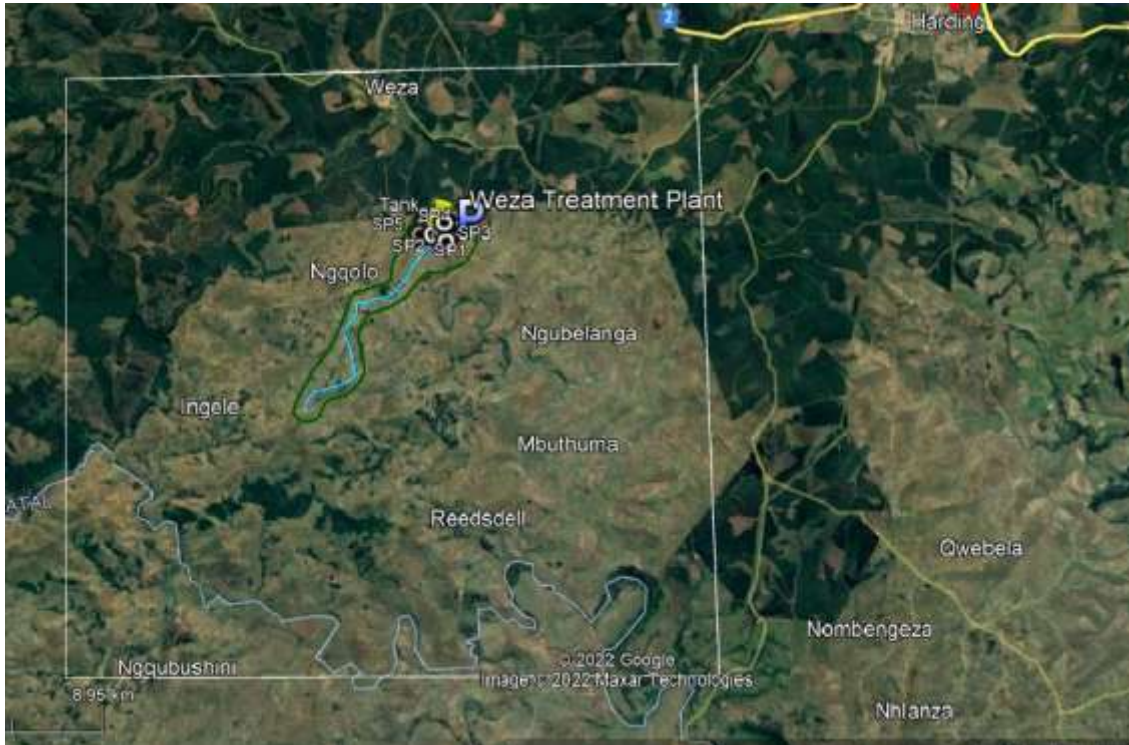
**It is proposed to construct the Kwajali pipeline near Weza, uMuziwabantu Local Municipality, This report follows the Desk-Top PIA report recommendation that a Field Investigation should be under taken.**

**This proposed pipeline is underlain by the Eccca Group (undifferentiated). The Eccca Group is known for coals and trace fossils but not for vertebrate fossils.**

**No further palaeontological work is required for this project's current footprint.**

## 1. PROPOSED PROJECT

It is proposed to construct a new pipeline near Weza, UGU Regional Municipality (Figure 1).



**Figure 1: Location of the proposed Kwajali Pipeline.**

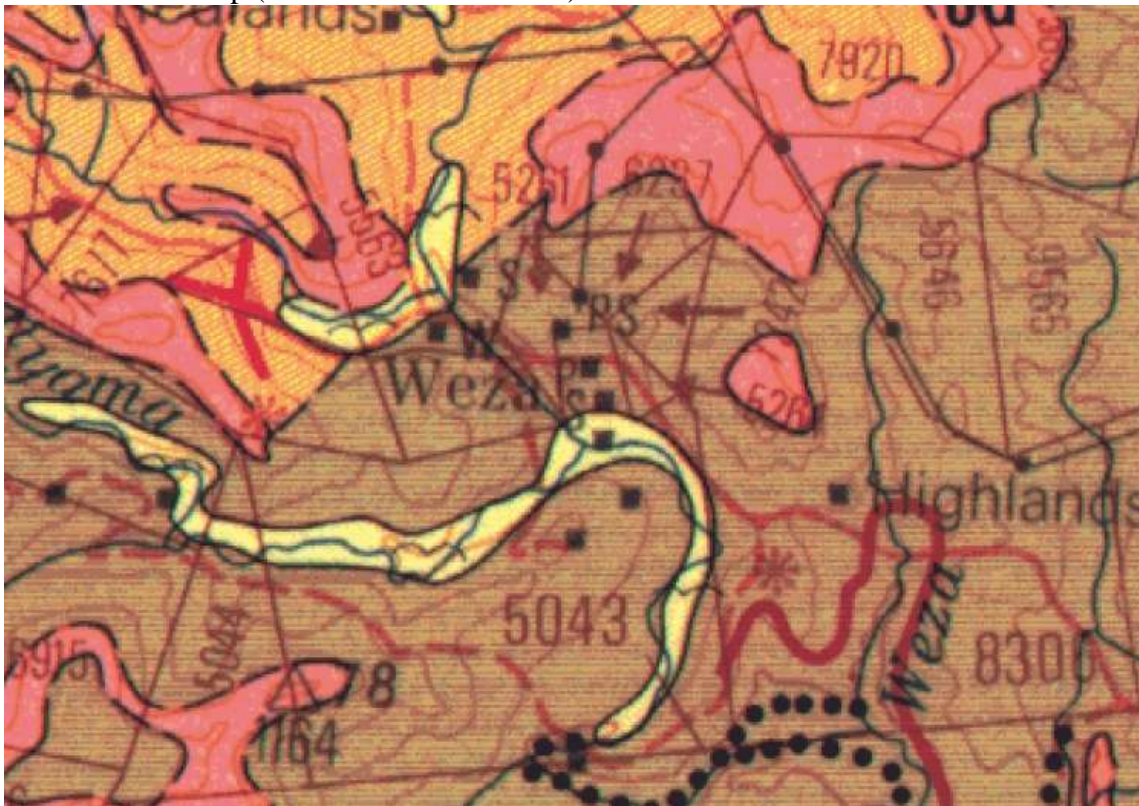
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## 2. GEOLOGY

The proposed project footprint site is located on the Ecça Group (undifferentiated) of the Karoo Supergroup (Figure 2). Anticipated lithologies are as follows:

1. Dolerite (red)
2. Ecça Group (undifferentiated: brown)



*Figure 2: Extract from the Kokstad 3028 1:250 000 Geological Map. This shows the two lithologies that will be encountered. Ecça Group (undifferentiated) is brown and dolerite (red).*

### *1. Karoo Dolerite*

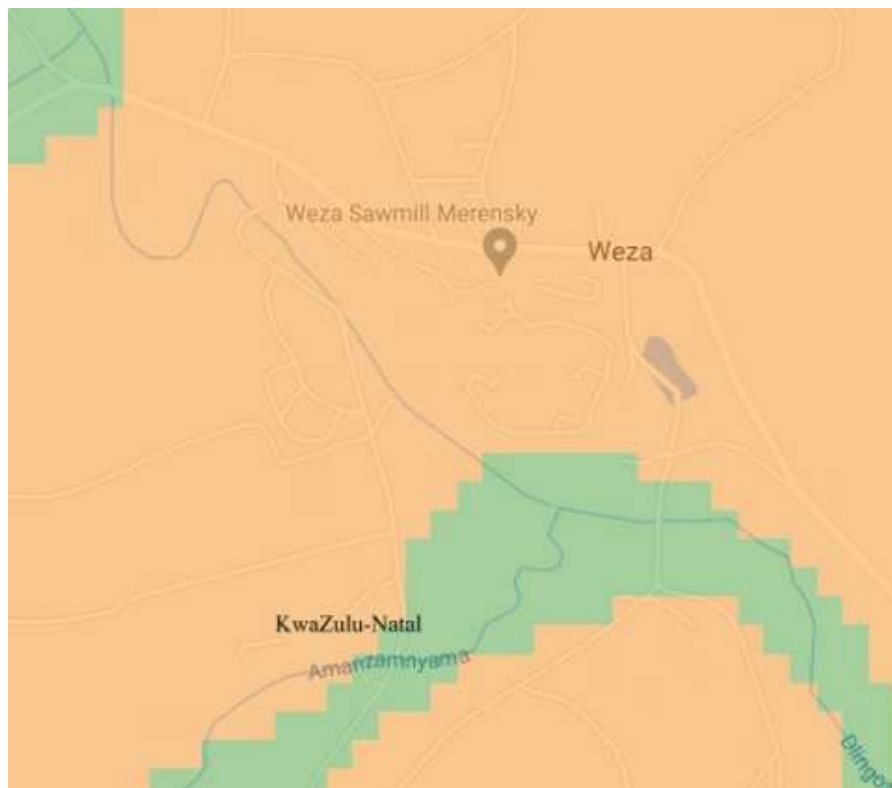
Karoo Dolerite is part of the Karoo Large Igneous Province. This dolerite was intruded 184 million years (Ma) ago and represent the onset of the break-up of the Gondwana Supercontinent (Hastie et al (2014). According to Watkeys (2006), Gondwana rifting commenced between 155 and 135 Ma. Dykes and sills are to be expected.

## 2. *Ecce Group(undifferentiated)*

In the east this comprises three units comprising the Pietermaritzburg Formation (siltstone); the Vryheid Formation (sandstone) and the Volksrust Formation (siltstone). These units were deposited within the Karoo Sea, which was probably marine. To the west the Ecce Group of KwaZulu-Natal is believed to grade into the Ecce Group of the Southern Cape but the precise relationship is unknown (Hastie et al., 2019).

## 3. PALAEOLOGY

The palaeosensitivity of this area as shown in the Sahr's Palaeosensitivity map is coded yellow (Figure 3). This is precautionary, as in practice no significant fossils have been found in this area.



**Figure 3: Palaeosensitivity of rocks in the Weza area. As seen the code is yellow, but this is precautionary as little is known from the Ecce Group in this area.**

## **Karoo Dolerite**

Karoo Dolerite is also present. Dykes and sills may be encountered. Dolerite is an igneous intrusive rock and by definition cannot be fossiliferous.

## **4. SUMMARY AND CONCLUSIONS**

This site is dominated by undifferentiated Ecca Group rocks, which are not known to be fossiliferous in this area. Simply as a precaution a “*Chance Find Protocol*” should have been added to this report.

## 5. REFERENCES

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

Kokstad 3028 1: 250 000 Geological Map. Council for Geosciences, Pretoria.

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

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

## 7. DETAILS OF SPECIALIST

**Dr Alan Smith**, Pr. Sc. Nat., I.A.H.S.

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

&

**Honorary Research Fellow:** *Discipline of Geology, School of Agriculture, Earth and Environmental Sciences, University of KwaZulu-Natal, Pietermaritzburg.*

**Role:** Specialist Palaeontological Report production

**Expertise of the specialist:**

- PhD in Geology (University of KwaZulu-Natal),
- MSc in Palaeontology (University of KwaZulu-Natal),
- Expert in Vryheid Formation (Ecca Group) in northern KZN, this having been the subject of PhD.
- Scientific Research experience includes: Stromatolites, Fluvial geomorphology, palaeoflood hydrology, Cretaceous deposits.
- Experience includes understanding Earth Surface Processes in both fluvial and coastal environments (modern & ancient).
- Alan has published in both national and international, peer-reviewed journals. He has published more than 50 journal articles with +550 citations (detailed CV available on request).
- Attended and presented scientific papers and posters at numerous international and local conferences (UK, Canada, and South Africa) and is actively involved in research.

Selected recent palaeo-related work includes:

- Desktop PIA: Proposed middle income housing units on Portion 23 of Farm Lot H Weston 13026, Bruntville, Mpofana Local Municipality. Client: UMLANDO.
- Desktop PIA: Proposed ByPass Pipeline for Ulundi bulk water pipeline upgrade. Client: UMLANDO.
- Fieldwork PIA: Bhekuzulu Epangweni KZN water reticulation project, Cathkin Park. Client: Mike Webster, HSG Attorneys.
- Desktop PIA: Zuka valley, Ballito. Client: Mike Webster, HSG Attorneys.
- Mevamhlope proposed quarry palaeontology report. Client: Enviropro.
- Desktop PIA: Proposed Lovu Desalination site. Client: eThembeni Cultural Heritage.
- Desktop PIA: Tinley Manor phase 2 North & South banks: eThembeni Cultural Heritage
- Desktop PIA: Tongaat. Client: eThembeni Cultural Heritage.

- Palaeontological Assessment Reports (3) to Scatec Solar SA (Pty) Ltd on an Appraisal of Inferred Palaeontological Sensitivity for a Potential Photo Voltaic Park at (1) Farm Rooilyf near Groblershoop, N Cape; (2) Farm Riet Fountain No. Portions 1 and 6, 18km SE of De Aar, N Cape; and (3) Dreunberg, near Burgersdorp, Eastern Cape. Client: Sustainable Development Projects.