



NMPP Alliance

Transnet Limited

**New Multi Product Pipeline
(NMPP) Project**

The Mitigation Of All Heritage
Sites Affected By The NMPP

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Revision 00



NMPP Alliance

Transnet Limited

**New Multi Product Pipeline
(NMPP) Project**

<Heritage Impact
Assessment >

<August 2011>

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**New Multi Product Pipeline
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1 Introduction

1.1 Scope of work

Umlando was contracted to undertake the mitigation for all heritage sites identified during the HIA survey, and any further heritage sites that were identified during the course of the project.

1.1.1 The general scope of services are

- Consulting on Cultural Heritage Impact Management issues in General,
- Survey of Cultural Heritage Impact Management issues at sites during the construction phase,
- Meet with the *Employer* to discuss initial findings and agree on additional cases,
- Report on findings,

1.1.2 In Performing the services the *Consultant* provides

- A Heritage Management Plan (HMP),
- A Palaeontology specialist, all adequate and competent manpower,
- Investigations and report as per heritage resource findings,
- Cultural Heritage Impact Management Recommendation,
- All adequate and competent labour,
- Supervision on heritage matters,
- Each and every item of expenses necessary for the services,
- Monthly status/progress reports.

1.1.1 The Specific Scope of services

- The *Consultant* acts as an independent Cultural Heritage Specialist and no actions from other parties compromises this responsibility,
- The *Consultant* performs the following during the Pre-construction Phase:
 - The *Consultant* conducts pre-construction heritage surveys in order to effect rerouting to avoid heritage sensitive sites,
 - The *Consultant* provides Cultural Heritage awareness training so that all persons are informed of heritage significance as part of compliance to the Environmental Management Plan,
 - The *Consultant* ensures general Cultural Heritage Impact Management assistance and inputs in respect of the National Heritage Resources Act, 999 (Act 5 of 999) in line with Environmental Authorization as issued for this project by the national Department of Environmental Affairs and Tourism (DEAT). E.g. Archaeological Permit applications *et al* as and when required,
 - Attendance of staff at Aconex training (approximately two hrs).
- The *Consultant* performs the following during the Construction Phase

- The *Consultant* prepares Heritage Management Plan (HMP) and monitors its implementation during the construction phase and liaises between the *Employer* and relevant Contractor. In accordance with the EMP, the following tasks are performed by the *Consultant*:
 - The *Consultant* educates the project team on the mitigation measures of the HMP to ensure that any person who finds heritage resource reports it to their supervisor and/or Environmental Control Officer (ECO) immediately,
 - The *Consultant* ensures that all contractors/sub-contractors/employees are fully aware of their cultural heritage responsibilities. This will take the form of an initial heritage awareness-training program in which legislative obligations will be explained, as well as follow-up or additional training sessions as required,
 - Review and approval of Heritage Awareness Training material to be undertaken by the relevant Contractor or other suitable service provider (e.g. Toolbox talks and Posters),
- The *Consultant* sets up a procedure to guide the relevant contractor on heritage site reporting and provide ad hoc advice and clarification on compliance issues to the responsible contractor,
- The *Consultant* identifies those heritage areas that still require mitigation against construction activities e.g. blasting operation along heritage sites,
- The *Consultant* undertakes the necessary mitigation at the various sites that have been identified as being heritage significant,
- The *Consultant* ensures that appropriate heritage permits have been obtained by all relevant parties and that all finds have adequate temporary storage for preservation before transfer to their final preservation place,
- The *Consultant* needs to inform the relevant heritage authorities for all damaged heritage remains,
- The *Consultant* conducts a monthly heritage audit on all sites and heritage work undertaken and provides feedback to the *Employer*. This audit report shall have a rating of the compliance with the HMP and should include a description of all activities on site, problems identified, transgressions noted and remedial action implemented. The reports must be thorough yet concise, logically structured and understandable. The report must reflect the reference number of the project on the cover page,
- The *Consultant* keeps a photographic record of any heritage damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable,
- The *Consultant* monitors HMP compliance and recommend corrective action for any non-compliance incidents on the construction site,
- Any additional work excluding Archaeological, Historical and Palaeontological specialist investigations falls outside this contract.

1.2 Background

The Transnet New Multi Product Pipeline (NMPP) Project is designed to efficiently transport refined petroleum products from Durban to inland South Africa (fig. 1). The project consists of a new 24" multi-products liquid fuel pipeline ("trunkline") including eight pump stations along the route from Durban, KwaZulu-Natal to Jameson Park near Heidelberg in Gauteng. The pipeline will be buried for its entire length.

Fig 1: Location of the NMPP



The NMPP Project was approved by the Department of Environmental Affairs (DEA) in February 2009 (DEA Ref Nr 12/12/20/735). Subsequent to the DEA approval, and prior to construction, Transnet appointed an independent heritage specialist, UMLANDO: Archaeological Tourism & Resource Management, to undertake a detailed survey of the proposed route or Trunkline (PL1). UMLANDO identified and provided a list of all known heritage features and sites along the proposed route.

The locations of the heritage features requiring protection from construction activities were provided to the construction team, prior to and during the initial right of way (RoW) clearing operations. The provided list was further used by the contractors fencing crews in conjunction with the on-site assistance of the heritage specialist to demarcate and fence all known heritage features identified. As another precautionary measure as required by the approved Environmental Management Plan, a preconstruction survey was undertaken by the project's independent Environmental Control Officers (ECOs) and the contractor's Environmental Officers (EOs) where further possible heritage features were identified. Thus, the list of heritage features on the trunk line route was updated from time to time to reflect the changes and to include new features and sites where applicable. The necessary recommendations for these new sites were proposed by the Heritage specialist on each occasion that a new potential site was identified by one of the project staff, which were either later confirmed or rejected.

Umlando was contracted to undertake the mitigation for those sites identified in the RoW. The mitigation varied from site to site, but included the following types:

- Survey sensitive sites with a land surveyor,
- Excavations at specific sites,
- Map in recent historical sites,
- Photograph artefacts and features,
- Monitor areas where earth moving activity occurred and sample where necessary,
- Battlefields: survey affected area with a metal detector and sample where necessary.

1.3 Definitions, Symbols and Abbreviations

2ABW: Second Anglo-Boer War,

ECO: Environmental Control Officer – a range of people who undertake environmental monitoring and in some cases heritage monitoring,

Feature: Something modified by humans in the past to create a structure. This could be a grave, stone wall, engraving, etc,

HIA: Heritage Impact Assessment/Assessor,

HP: Historical Period – in Kwazulu-Natal the Historical Period post dates 1829, and consists of indigenous and colonial people,

KP: Kilometre Point – every kilometre along the line is given a KP number and used as a reference point. The KP is then subdivided by the meters within the KP, e.g. KP500+500 would be at 500km from the start, and then another 500m north (or positive) towards KP600,

JV: Joint Venture between Group 5 (South Africa) and Spiecapag (International). This is the construction company,

LIA: Late Iron Age – Iron Age farmers dating from c AD1100 – AD 1820,

NMPP: New Multi Purpose Pipeline – the pipeline for the project,

RoW: Right of Way - This is a 30m wide strip from start to finish where the impact zone of the pipeline will occur. The RoW is levelled by removing the upper 30cm of topsoil,

Significance of impact (in this instance all are negative impacts):

- High negative: site is destroyed and cannot be fixed,
- Medium negative: site is partially damaged or affected and may be mitigated and salvaged,
- Low negative: the site has been minimally affected, and for this report, it refers to the fact that the heritage area has been affected, and not the site.

Stone Age: is divided into three phases

- **LSA:** archaeological sites dating from 30 000 – 100 years ago occupied by hunter-gatherers,
- **MSA:** archaeological sites dating from 120 000 – 30 000 years ago occupied by hunter-gatherers,
- **ESA:** archaeological sites dating from 2 million – 30 000 years ago.

1.4 Legislation pertaining to heritage resources

All heritage resources fall under the jurisdiction of Amafa KZN, in KZN, or SAHRA in the other provinces. The legislation pertaining to each organisation is very similar.

1.4.1 KZN Heritage Act No. 4 of 2008

• 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.” (KZN Heritage Act of 2008)

1.4.2 National Heritage Resources Act Of 1999

- For the purposes of this Act, those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate and fall within the sphere of operations of heritage resources authorities.
- Without limiting the generality of subsection (1), the national estate may include—
 - Places, buildings, structures and equipment of cultural significance;
 - Places to which oral traditions are attached or which are associated with living heritage;
 - Historical settlements and townscapes;
 - Landscapes and natural features of cultural significance;
 - Geological sites of scientific or cultural importance;
 - Archaeological and palaeontological sites;
 - Graves and burial grounds, including—
 - Ancestral graves;
 - Royal graves and graves of traditional leaders;
 - Graves of victims of conflict;
 - Graves of individuals designated by the Minister by notice in the Gazette;
 - Historical graves and cemeteries; and
 - Other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
 - Sites of significance relating to the history of slavery in South Africa;
 - Movable objects, including—
 - Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
 - Objects to which oral traditions are attached or which are associated with living heritage;
 - Ethnographic art and objects;
 - Military objects;
 - objects of decorative or fine art;
 - Objects of scientific or technological interest; and
 - 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).

- Without limiting the generality of subsections (1) and (2), a place or object is to be considered part of the national estate if it has cultural significance or other special value because of—
 - Its importance in the community, or pattern of South Africa's history;
 - Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
 - Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
 - Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
 - Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
 - Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
 - Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
 - Its strong or special association with the life or work of a person, group or organization of importance in the history of South Africa; and
 - Sites of significance relating to the history of slavery in South Africa".

2 Methodologies

2.1 Stages of Heritage management for the project

Each site that was impacted, or had the potential to be impacted had some form of mitigation. The mitigation included photography, mapping, collections and/or excavations. The heritage management for this pipeline has various stages and these have been undertaken in mostly conjunction with the construction phases.

The summarized stages are as follows:

2.1.1 Initial Survey

- Approximately 200 sites were observed within a 400m corridor of the proposed line
- The line was rerouted at various stages for various factors, of which heritage was one factor.
- Management plans for each site were submitted and formed part of the general EIA.

2.1.2 Excavations

- Some sites were excavated. Excavations occurred along the direct impact zone of the pipeline within 5m of each side of the line.
- At this stage Umlando was informed that the impact zone would be a 30m wide strip, where the upper 30cm of topsoil would be removed.
- All structures and features within this 30m zone, but not in the 10m centre line corridor, were demarcated and designated as 'no-impact' zones.
- These sites and features were submitted to Transnet and line reroutes were undertaken.

2.1.3 Pre-RoW reconnaissance

- The ECOs and someone from the construction company undertaking the RoW clearance surveyed ahead of the starting position to make notes of possible features etc. These included ones that were known and unknown.
- It is at this stage that the 30m RoW had been finalized.
- The ECOs and construction company reported any features or graves to Umlando and Transnet, and site management decisions were made via electronic media and site visits. At least 25 new sites were reported to Umlando, by using this method of communication.¹
- All reported sites were demarcated as a matter of course until Umlando had made a final decision.
- The email correspondences between the project staff and Umlando is available if needed.

2.1.4 Monitoring and RoW clearance

- All sensitive areas were noted and one or more heritage practitioners, or archaeologists, had to be on site during RoW clearance.
- Sensitive sites in the RoW had been demarcated with red-white metal poles and/or wooden poles that had been painted blue and marked "Heritage site".
- The fencing team was given instructions to fence off sensitive areas, and this happened either before, during, or after RoW monitoring. Instructions for RoW fencing came from the foreman or the ECO, who were instructed by Umlando.
- During RoW clearance, the HIA was on site to ensure that no unknown features or graves were uncovered beneath the topsoil, that any significant artefacts were collected, and that the demarcated areas were not damaged.
- There are a few exceptions where the HIA was not on site, and this is because the mitigation had already been undertaken and instructions for fencing had been given. For example, on the Vaalkrans Battlefield Umlando had surveyed the area with metal detectors before the ROW clearance team arrived, in order to get better artefact provenience. All graves in the Battlefield were demarcated by Umlando and instructions were given to have them fenced off.

2.1.5 Line reroutes

- All graves that appeared to be less than 60 years in age, or those that may have living relatives, were not excavated, and were thus not given permission to be destroyed.
- The pipeline was rerouted accordingly away from the graves.
- An important point to note is that all 'possible graves' were given the status of being 'graves' for this project. This is especially the case for graves that are less than 60 years in age, as they would require a social impact assessment if they were to be disturbed. Given the time limitations to this project, Umlando decided that a demarcation and reroute would be more feasible than a social impact assessment.

¹ The original survey was undertaken in February to April where the vegetation was very dense in areas. The dense vegetation made it impossible to see small structures that were ~20-40cm above the ground. In some areas the grass was over 2m tall.

Only archaeological graves in the direct line of the pipeline, i.e. 5m each side of centre point, were excavated. These excavations occurred in 2009 – 2010.

2.1.6 Post-RoW monitoring

- After the above steps had been undertaken, Umlando and the contractor, with Transnet, did not see the need to have further on-site monitoring, as all sensitive areas were in the system and had been demarcated.
- Umlando was satisfied that the reroutes had been made and that the instructions had been given for sensitive areas to be fenced off.
- All areas that were demarcated with fencing and/or poles were considered heritage sites, and thus were not allowed to be damaged, regardless of its significance and/or content.

2.2 Desktop survey

The desktop study consisted of several studies. The NMPP route alignment was overlaid on aerial photographs and then printed for the entire route. These maps were then studied for potential heritage sites, in addition to the known sites, or to note sensitive sites. These notes were then used for the RoW monitoring.

The NMPP, with the KP numbers, was plotted onto Google Earth, and then studied for potential sites and sensitive areas. The known sites and sensitive areas requiring monitoring were also placed in reference to the KP numbering system.

Various aerial and topographical maps were used as image overlays on Google Earth with the NMPP. Umlando used 1937 aerial photographs, and the oldest and most recent 1:50 000 topographical maps currently available. The oldest topographical maps can date from the 1940s to 1980s and the dates are specified below in the report. This is important when determining the potential age of a settlement and/or graves. That is if a settlement does not occur on any of the maps then it probably predates 1937. Conversely, if the settlement does not occur on the 1937 aerial photograph, but does occur on the 1950s topographical map one can assume that the settlement dates between 1937 and 1950s. The potential dates of settlements, and thus graves, are important as different legislation applies to different ages of graves and heritage sites.

These maps were also used when sites, especially recent graves, were observed by the pre-RoW survey teams. The ECOs would notify Umlando of a potential site, with the KP reference, and Umlando would study the various maps to make a decision on the potential age of a feature. This would then allow for a decision on whether the area could be excavated, or if a line reroute would be necessary.

2.3 Archaeological survey with land surveyor

Several sites were mapped with a land surveyor and these were given XY co-ordinates and submitted to the NMPP Alliance. Umlando walked with the surveyor to demarcate the various features. Features outside of the RoW were surveyed in case the RoW changed and Umlando

would not have to return and undertake more work. These features were also included in case they were damaged and Umlando would thus have proof of their existence by means of location and photographs.

All of these sites have a double reference, e.g. GLK0122b_4 refers to the heritage site GLK0122b, while the '4' suffix refers to the specific feature (number reference used by the surveyor and is on the CAD files). Each CAD file feature reference has a further sub-division that refers to specific points. These are the near precise locations of specific points of the features.

All data was stored in CAD format, and was plotted onto aerial photography and stored as a pdf file. Based on these surveys, poles were placed along the NMPP trench at sites that would be excavated.

2.4 Archaeological excavations

Archaeological excavations occurred at a few sites with the necessary permits from Amafa KZN and SAHRA. The aim of the excavations was to obtain a representative sample of artefacts from a site, and not to excavate the entire site.

The centre line (i.e. where the pipeline trench would occur) was demarcated with string and an excavation square was placed at every 10m along the line at that specific site. Each excavation square was 2m x 2m in size and these were extended if necessary. Each square was excavated in 10cm spits, and hardly ever extend to beyond 20cm. If excavation squares contained many artefacts, then that square would be extended.

Only archaeological features 5m each side of the centre line were excavated and all other features were demarcated as 'no-go' zones. This was done as the original quote was only for the excavation along the line, and not the entire RoW. All (possible) graves associated with the archaeological site were excavated. These graves were first halved and then excavated. The second half was then excavated if Umlando could not observe human remains, or if Umlando felt that the grave may extend further.

Umlando hired several people from the Bluebank area and trained them to undertake basic excavations. These people were supervised by Umlando. Umlando undertook the excavations of all the features and graves that required more technical work. If the excavators located potential graves and/or features, then they would be moved to a new square while Umlando excavated that specific square.

All excavations occurred in 2009 and early 2010 and were completed by the time of the RoW demarcations.

2.5 Archaeological survey - battlefields

The battlefields were surveyed by means of a metal detector. The two northern battlefields, Langverwag and the skirmish at Herbsfontein, were not directly affected by the RoW, as it occurred on the very margins of the battlefield. These two were briefly surveyed with a metal detector.

The main battlefield at Vaalkrans, as well as the Weston Remount Depot, was systematically surveyed by four archaeologists working in groups of two. The lines for the fencing of the RoW were first surveyed before the fencing team began their work. This was to detect potential artefacts, such as unexploded especially bullets and bombs. While it was unlikely that there would be unexploded bombs in the area, it was a precaution. If Umlando did locate anything that appeared to be a bomb, then Umlando would have demarcated the area and called in specialists. Once the RoW was fenced, Umlando walked the entire 10km of the battlefield in sections of 50m. Each group would start from one side of the RoW, and then walk back and forth with the metal detector. The second person in the group would mark the line to walk. When an artefact was located, the marker would excavate, while the walker would note a feature on the landscape and continue walking the line.

Umlando used two types of metal detectors: Garrett Ace 250, and Elcometer p500, both of which could locate iron, brass, and lead. The first metal detector was more advanced and could locate a wider variety of metal objects. All artefacts were plotted with a GPS, and then bagged (with a reference number).

2.6 Monitoring during RoW Clearance

All excavated sites and other sensitive areas were monitored by Umlando during RoW clearance. These were monitored in case artefacts and/or features were exposed during clearance. Umlando would then sample the artefacts if necessary, or excavate the feature. The entire RoW for that area would be monitored, and RoW clearance was not allowed unless an HIA was on site. At a later stage either the HIA, ECOs, or someone specifically trained to be an observer, were on site during construction activity at any demarcated site.

2.7 Palaeontology

Dr G. Groenewald was subcontracted to assess the palaeontological sites along the route, initially this was done at a desktop level and then later followed up with field surveys. All palaeontological information included in this report is taken directly from his report.

All geological information was taken from the existing geological maps of South Africa, as supplied by the Council for Geosciences in Pretoria. The area between Verkykerskop and Villiers however falls within the study area of a very detailed Masters Degree (Groenewald, 1984) for which very detailed field maps (1:50 000 scale) were available. Where applicable, reference was made to specific areas on this route where there could have been very high probabilities of finding unique remains of plants and animals that dated back to the Permian (250 million years) and Triassic (245 million years). The route of the pipeline crosses the

Permian Extinction Zone in several places between the bottom of Van Reenens Pass and Cornelia, where unique finds of fossils from the *Dicynodon lacerticeps* Assemblage Zone and *Lystrosaurus* Assemblage Zone might be made.

This desktop study entailed a study of the geological maps (1:250 000 scale) along the route of the pipeline (as supplied in points referenced on a Google image) and a discussion on the sensitivity of the specific areas in terms of palaeontological data. All geological information was taken from the existing geological maps of South Africa, as supplied by the Council for Geosciences in Pretoria.

Due to the differences in sensitivity, the report will be presented in subsections – referring to specific locality points along the route, starting from point 1 at Durban.

Where applicable, reference was made to specific areas on this route where, in the authors professional opinion, there could have been very high probabilities of finding unique remains of plants and animals that date back to the Permian (250 million years) and Triassic (245 million years) eras. The route of the pipeline crosses the Permian Extinction Zone in several places between the bottom of Van Reenens Pass and Cornelia where unique finds of fossils from the *Dicynodon lacerticeps* Assemblage Zone and *Lystrosaurus* Assemblage Zone were expected to occur.

Following a comprehensive desktop survey, past experience, it was decided to concentrate the fieldwork in areas where the pipeline route cuts the Permian and Triassic Extinction zones. The fieldwork was undertaken during December 2009 and March 2010.

The fieldwork consisted of a palaeontology team that surveyed the RoW of the identified Permian and Triassic Extinction zones and recorded and removed all palaeontological materials found in the corridor of the development.

The palaeontology team informed the Environmental Control Officer (ECO) and Site Contractors of any highly sensitive palaeontological areas. The Site Contractors then follow the mitigation procedures as described by the ECO. The methodology of trenching was however highly mechanised and fossil material was destroyed during this process. In cases where silica concretions containing fossils were located, the excavating machine did not break the concretions and these fossiliferous remains were recorded. In many instances this would be one of the few ways in which material could be salvaged. The palaeontological survey thus recorded finds from the surface and undertook enough mitigation to comply with Amafa KZN requirements.

Comment [t1]: Gavin this sounds bad
Umlando need to say something to the
effect that yes they may have been
destroyed but this was not considered
to be an issue for such and such a
reason. Need to draw a conclusion for
the Paleo side of things to say that the
project complied to what they were
required to do.

Comment [u2]: Have done

3 Results and Discussion

3.1 Surveys with land surveyor

The surveys with the land surveyor were undertaken in 2009 over a two week period. The aim of this study was to accurately record the various features into a useable geographical grid that can be linked to the NMPP data base. It is also a means of mitigation in that the basic site plan has now been recorded. The pipeline route was to take into account the various features for final route planning. The sites that were mapped were either excavated or monitored during RoW clearance. Most of the mapped features were photographed. The photographs of the features are not inserted into this report for practical reasons. The photographs are available on DVD from Amafa KZN, Natal Museum (Pietermaritzburg), or NMPP. The benefit of this study was that when features were damaged, or disturbed, Umlando was able to resurvey the locations of these features and decide if they still existed. The site maps are given below. A total of 19 sites, 590 features, and 2654 points were surveyed over a two week period. It is not our intention to give an explanation of each site, but to state briefly what was recorded and provide an age to the site and features. Table 1 summarises the data.

Table 1: Summary of features per site

	Total Graves	Total Walls	Total Houses	Granary Floor	Other	Total Features
GLK062	4	16	0	0	4	24
GLK063a	29	53	16	2	0	100
GLK063b	3	18	4	0	0	25
GLK064a	0	2	3	0	0	5
GLK064b	0	11	13	0	5	29
GLK066	19	44	11	0	2	76
GLK078	47	95	5	1	21	169
GLK080	1	5	1	0	1	10
GLK081	2	7	0	0	0	9
GLK092	13	16	1	0	0	30
GLK093	13	24	0	1	6	44
GLK094	0	5	2	0	3	10
GLK118	2	1	1	0	0	4
GLK121	2	18	1	0	2	23
GLK122a	2	5	0	0	0	7
GLK122b	9	14	0	2	7	32
GLK122c	0	2	0	0	0	2
GLK123	4	7	0	0	0	11
GLK124	1	0	0	0	0	1
GLK125	1	7	0	0	0	8
Total	143	336	58	6	51	590

3.1.1 GLK062

GLK062 is located between KP 275 and 276. It consists of LIA stone walling, with graves and more recent farm buildings (probably feeding troughs, etc.). The nearest LIA feature was 40m from the pipeline centre line, and thus the line was not monitored during RoW clearance (fig. 2).

A total of 24 features were observed at the site. There are four graves associated with the LIA part of the site. Most of the 16 stone walls are associated with the LIA.

3.1.2 GLK063a

GLK063a is located between KP273.5 and KP274.5. It consists of LIA stone walling and graves, as well as more recent (post 1950s) settlements with many graves (fig. 3). The RoW went through the more recent part of the settlement and avoided the graves. The site was monitored and the graves were fenced off during RoW clearance, however, the graves were slightly damaged during construction. The damage was mitigated and is discussed below. Both sides of the hill of GLK063a were surveyed in case the RoW was moved. One of the original options had the RoW to the right of the western and middle hills.

A total of 100 features were recorded at this site. There are 53 stone walls that form byres of various sizes and ages. Associated with these byres are 29 graves, 16 houses, and 2 granary floors. Most of the graves and houses date to the 20th century.

3.1.3 GLK063b

GLK063b is located between KP273 and KP273.5. It is located on a small hill to the southwest of the RoW. Most of the stone walling appears to date to the Historical Period, or more recent past. A few LIA stone walled byres occur on the hill. There are at least two graves on this hill (fig. 4). The area was ~70m from the RoW and was not monitored during RoW clearance or construction.

A total of 25 features were recorded at the site. There are 18 stone walls that are associated with 3 graves and 4 houses.

3.1.1 GLK064a

GLK064a is located between KP272 and KP273. It is located ~150m southwest of the RoW. It was surveyed, as part of the original route was located nearby the site. The site consists of LIA and more recent stone walling. The stone walling includes LIA byres, and more recent house foundations. No human burials in the form of graves were located near the houses (fig. 5).

The site was not monitored during RoW clearance and construction as it occurred outside of the final RoW route.

A total of 5 features were recorded at this site. There are 3 HP, or recent past houses, and 2 circular stone walled byres that likely date to the LIA. The grass was dense in this area during the recordings and more features may occur on the site.

3.1.2 GLK064b

GLK064b is located between KP272 and KP273. It consists of several sites in close proximity. The original route was located ~65m southwest of the more recent site, and ~45m near the southern sites. The more recent site consists of a modern settlement dating from the 1960s to

possibly the 1980s. No graves were noted at this settlement. The southern site consists of a LIA and HP stone walling. No graves were associated with the features.

The site was not monitored during RoW clearance and construction as it occurred outside of the final RoW route.

A total of 29 features were recorded at this site, of which most of these are walls and foundations related to the houses (fig. 6). The more southern stone walled features are byres that probably date to the HP and are thus not associated with the main house.

Fig. 2: Site Map for GLK062

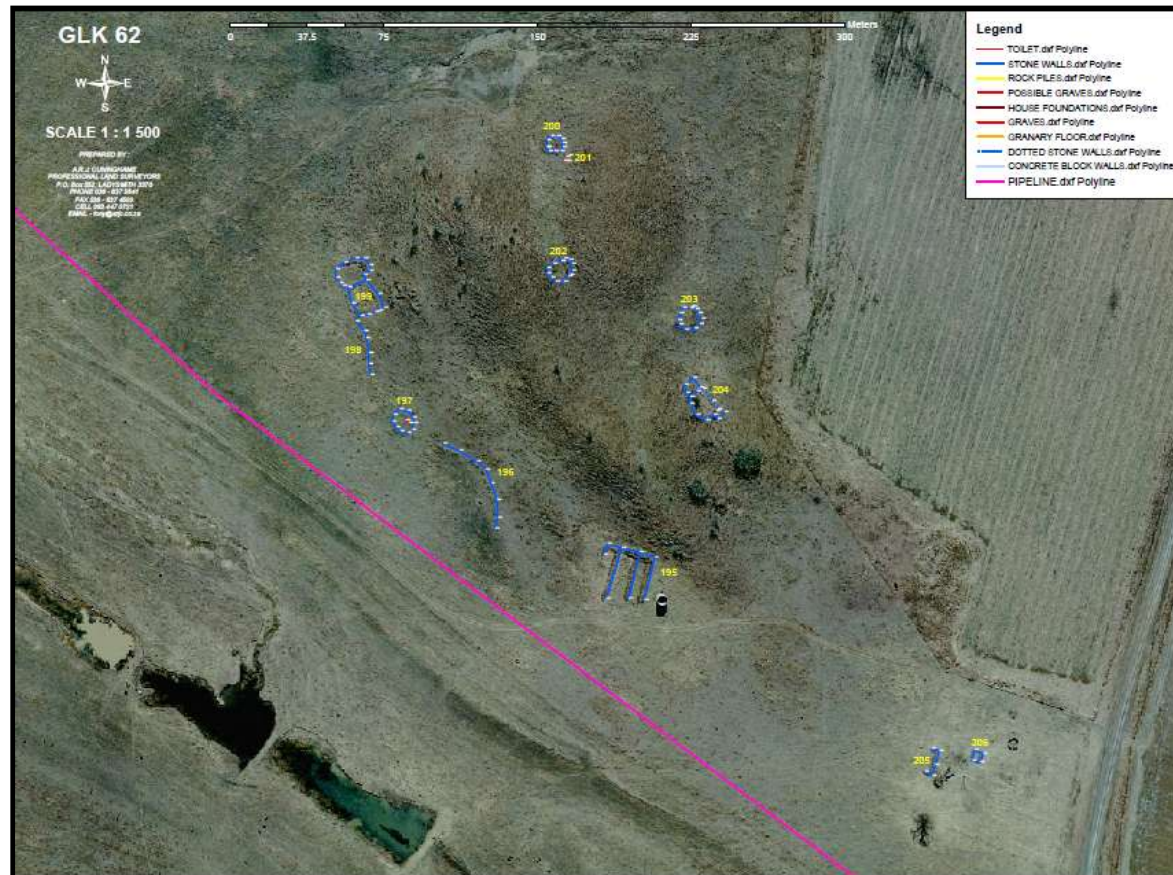


Fig. 3: Site Map for GLK063a

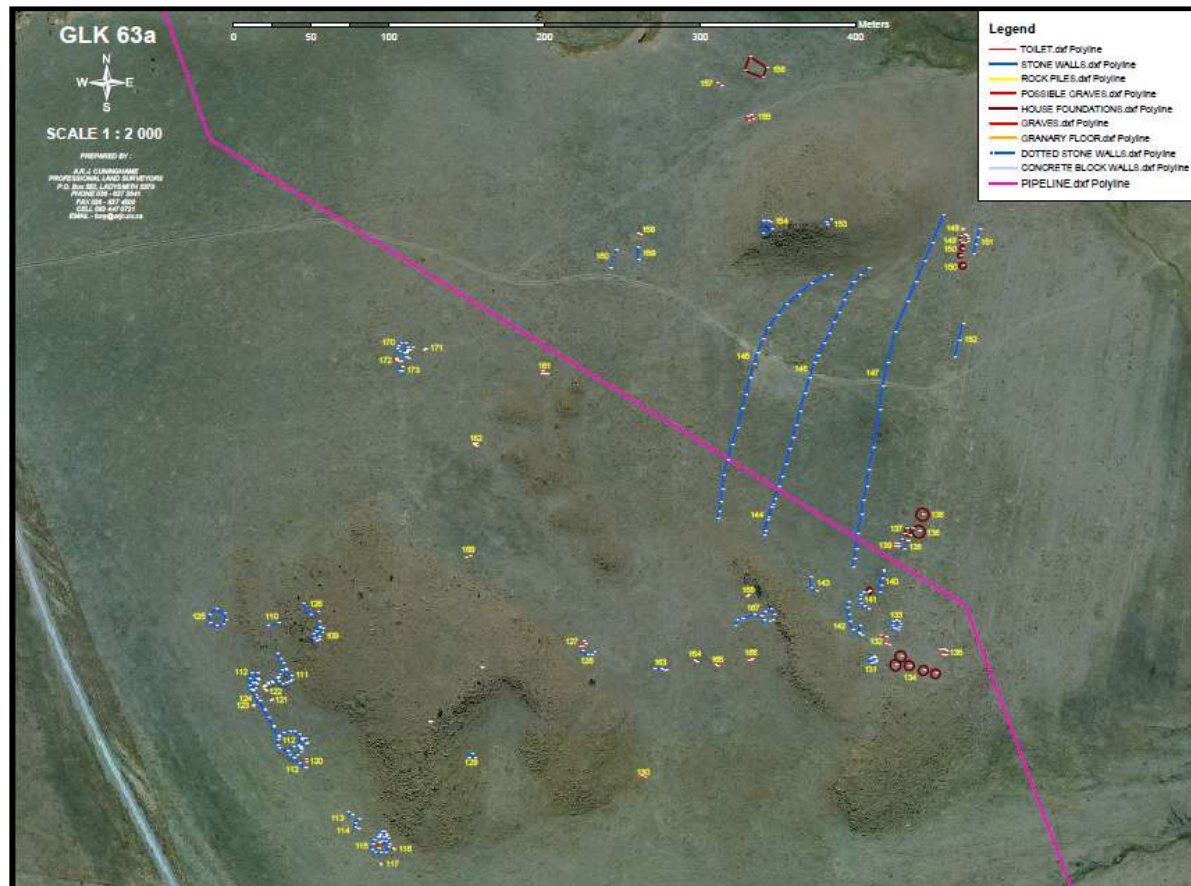


Fig. 4: Site Map for GLK063b

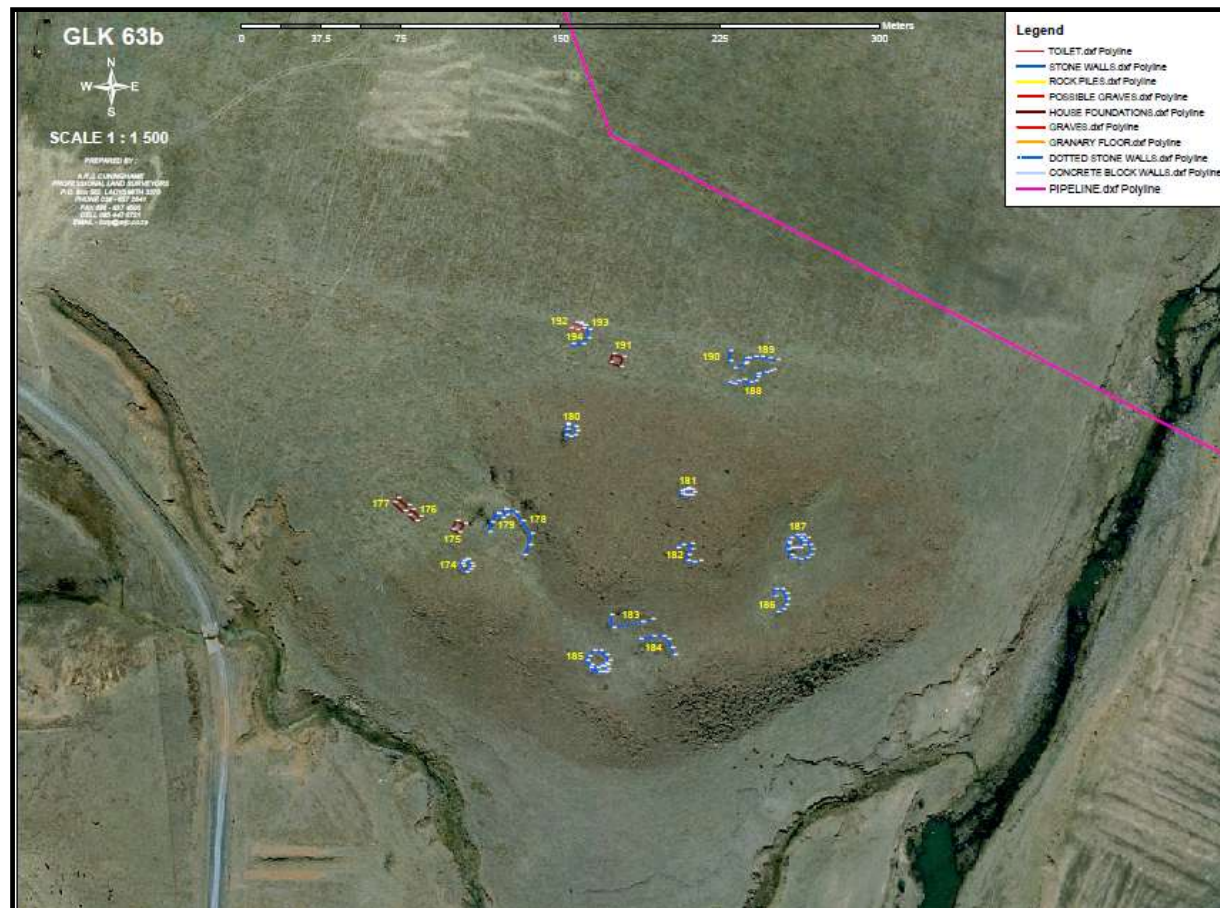


Fig. 5: Site Map for GLK064a

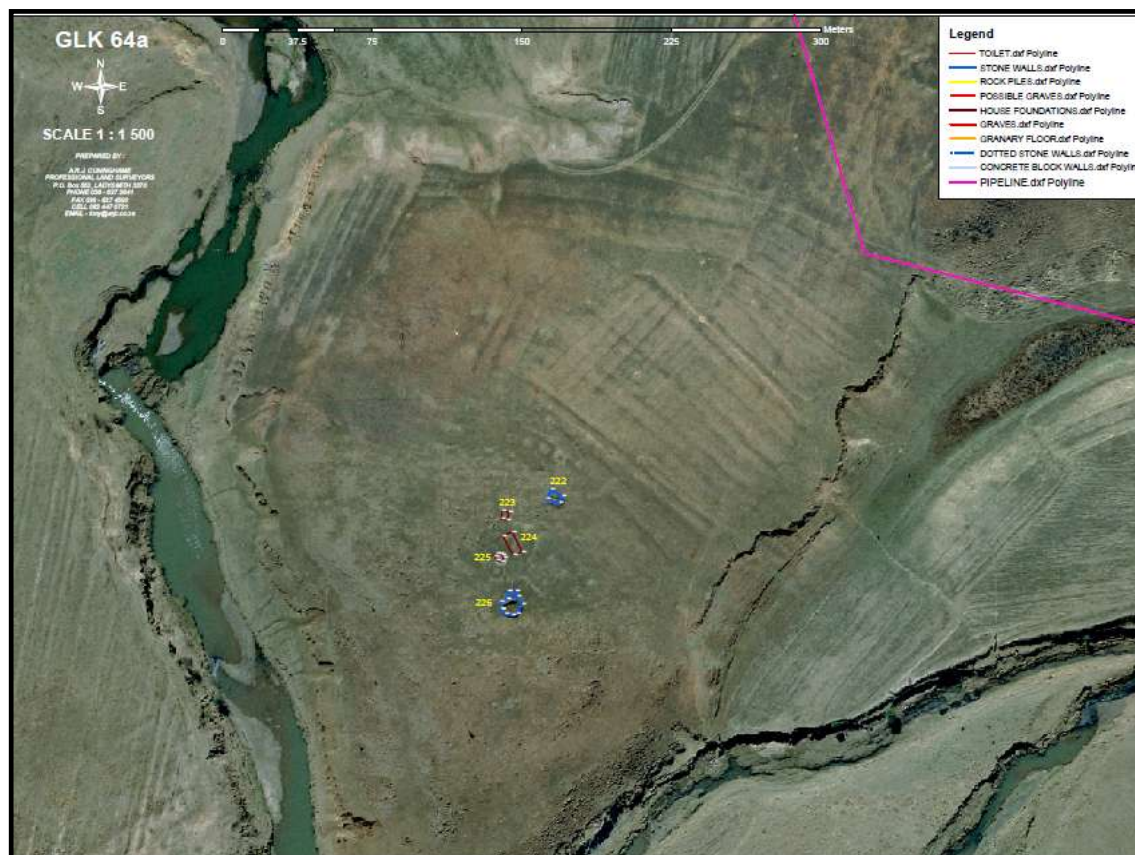
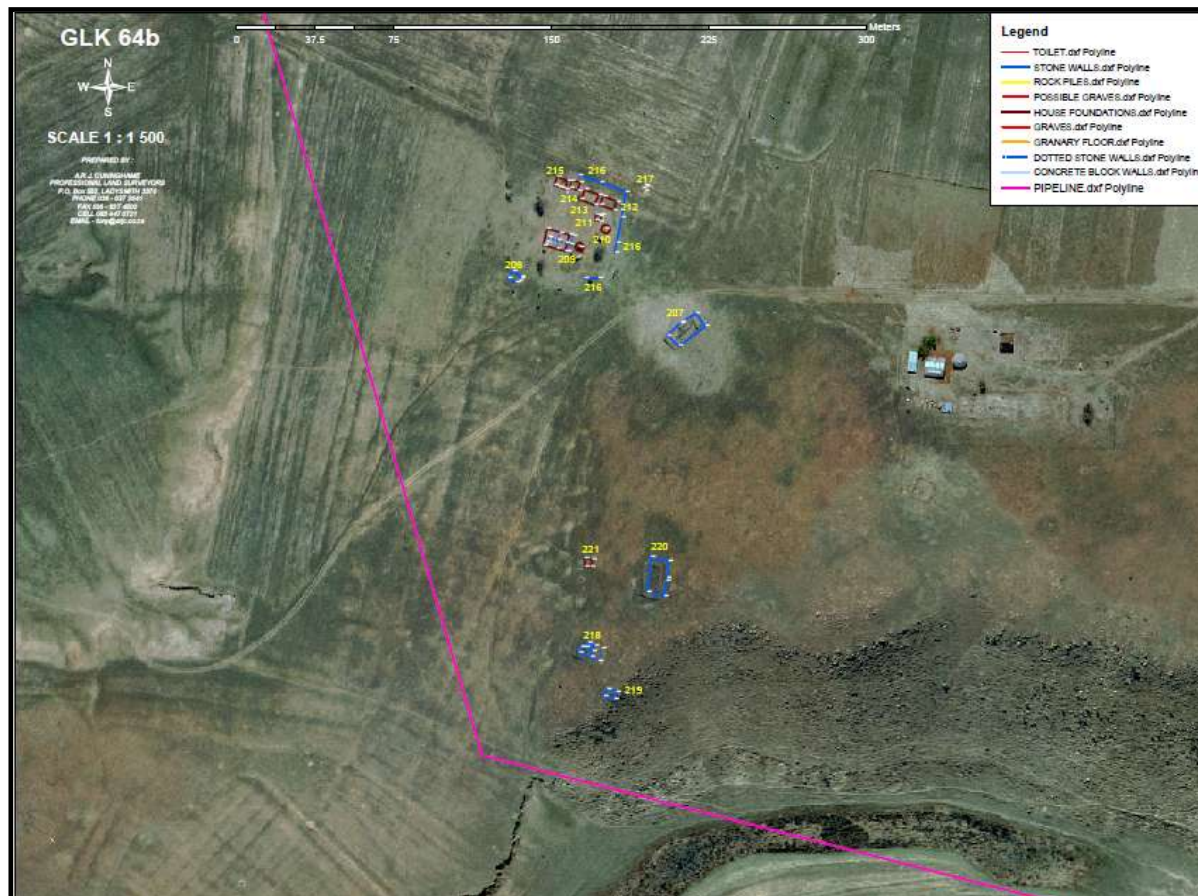


Fig. 6: Site Map for GLK064b



3.1.3 GLK066

GLK066 is located between KP268.5 and KP269.5. It is a very large area covering several types of sites. The site extends over the gravel road. These include LIA, HP, early colonial farmer, and more recent (1930-1970) farm labourer's buildings. Graves and stone walling are associated with each of these occupations.

The RoW went through the northern section of the site. This area was excavated and then monitored during RoW clearance. The excavations are discussed in 3.2.1. The site was partially damaged by the construction team.

A total of 79 features were recorded at this part of the site (fig. 7). Subsequent to the survey, at the end of winter, Umlando observed several more features on the site, especially along the dirt track. A total of 44 stone walls were noted and these date to the LIA, HP and more recent past. There are 19 graves associated with 11 houses in this area.

3.1.1 GLK078

GLK078 is located between KP237 and KP239. It is situated just south of the Tugela River and extends for ~1.2km. Most of the site consists of LIA stone walling with graves, and LIA engravings, with a few HP stone walls and graves. Most of the site is to the west of the pipeline; however, some of the site was affected. The site was excavated (see 3.2.2) and monitored during RoW clearance. Some of the site was damaged after RoW clearance. GLK078 extended over the dirt road, but was omitted from the survey as it was not to be affected.

A total of 169 features were recorded at this site (fig. 8). Most of the 95 stone walled features date to the LIA, and these are byres of various sizes. Only 5 house floors were observed, however 47 graves were recorded. The number of graves, and the number of byres, suggests that more house floors exist in the area – poor visibility was a factor at this site.

The site had ~100 engravings on the three hills, although only a few were recorded with the surveyor (and the rest later). These engravings have not been recorded before. The engravings are mostly related to the LIA part of the site. However, there are several rectangular engravings that may date to the more recent HP. There are two engravings that are initials and are probably related to 19th -20th century colonial period. The engravings are related to Nguni-speaking people and probably reflect the cultural settlement pattern and the importance of cattle (Maggs and Ward 1995). The engravings vary in style and include the following:

- Engraved
- Pecking
- Scratching

Fig. 7: Site Map for GLK066

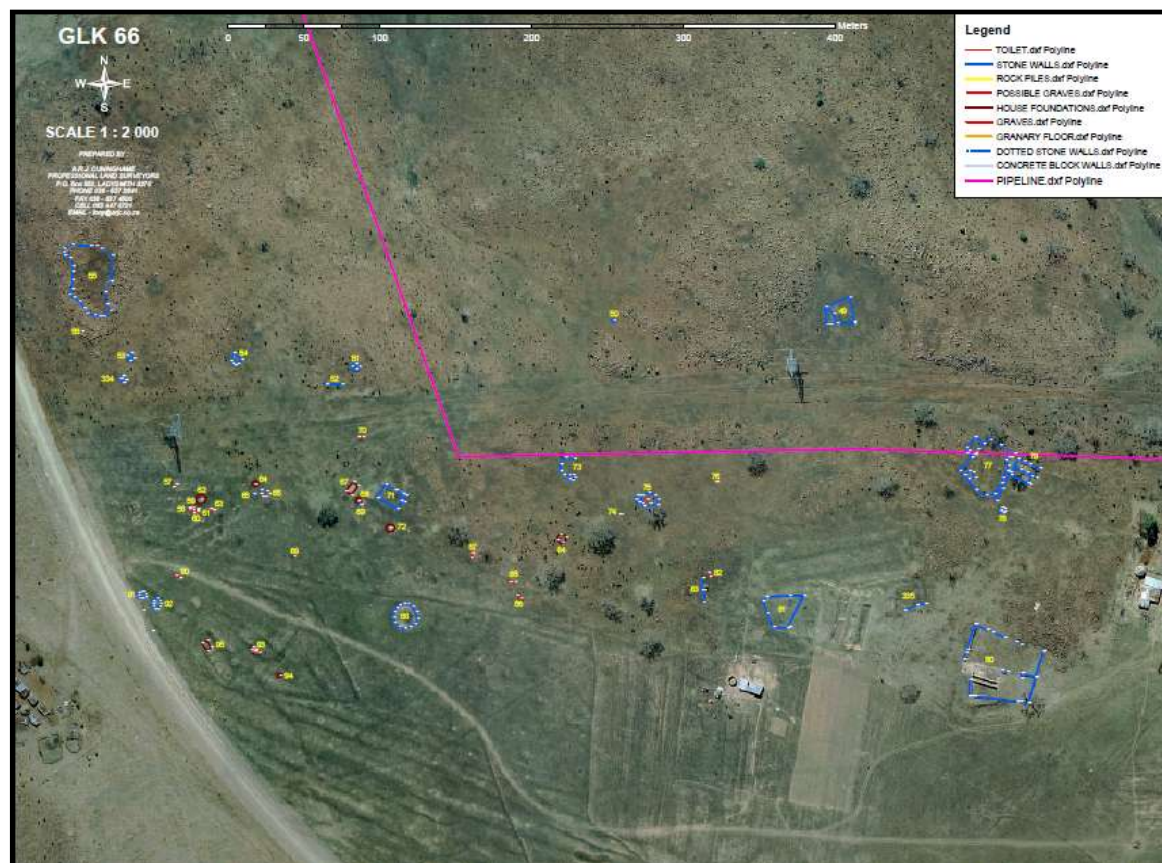
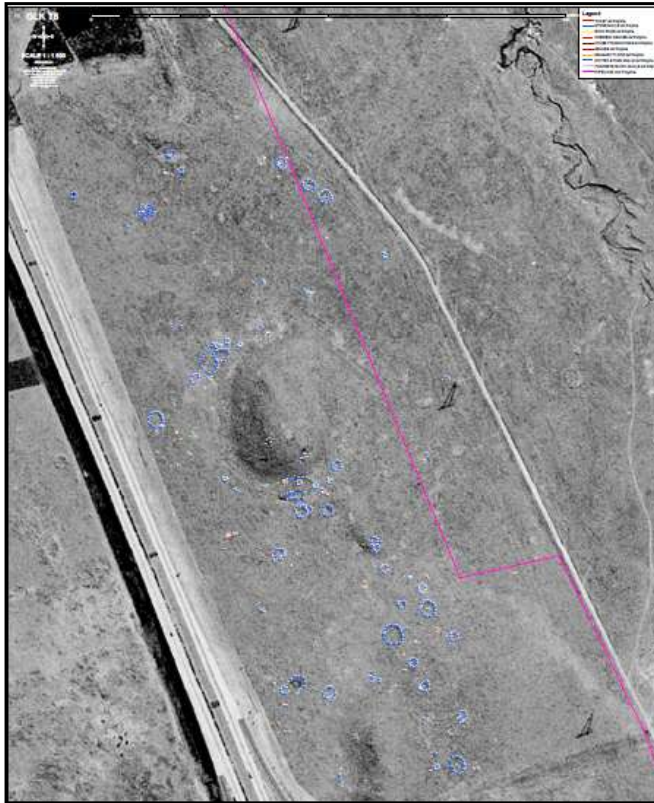


Fig. 8: Site Map for GLK078²



² The maps are very big and unfortunately become unclear when placed in the report. The originals are in pdf format and have been submitted to NMPP, SAHRA and Amafa KZN

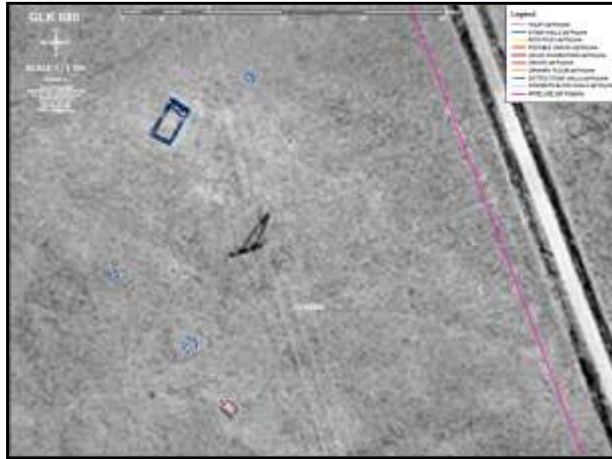
3.1.2 GLK080

GLK080 is located between KP235 and KP236. It occurs about 100m west of the RoW. The site consists of rectangular and circular stone walling that date to the HP and LIA, respectively.

The site occurs outside of the RoW and was not monitored.

A total of 8 features were recorded at this site, of which 5 were stone walls (and secondary and tertiary walling). The 1 grave is related to the 1 house and rectangular byres (fig. 9). These graves probably date to the 20th century.

Fig. 9: Site Map for GLK080

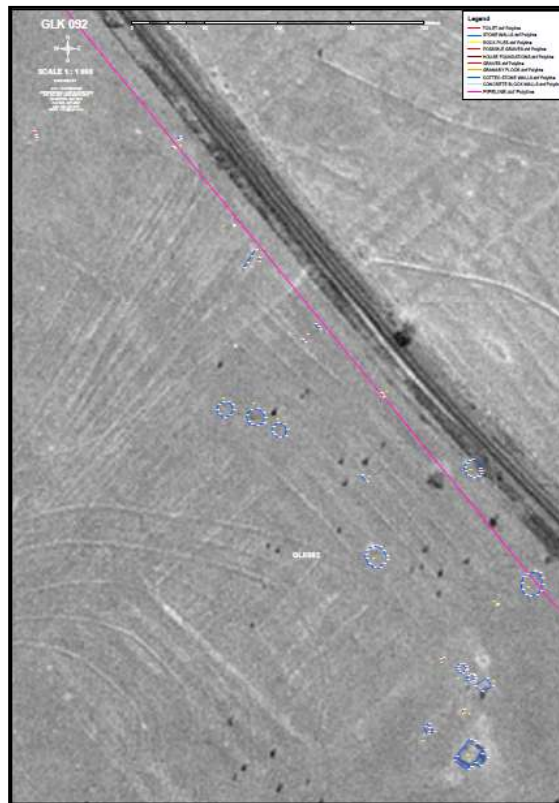


3.1.3 GLK081

GLK081 is located between KP235 and KP236, and just south of GLK080. The site consists of HP stone walling, house floors and graves. A total of 6 stone walled features were recorded and these are associated with 2 graves (fig. 10). One of the graves has a headstone. The site dates to the 20th century.

The site occurs outside of the RoW and was not monitored.

Fig. 11: Site Map for GLK092



3.1.5 GLK093

GLK093 occurs at KP217 on the top of a hill. Two broken lower grinding stones were observed in the RoW, and the nearest grave was ~60m to the southwest of the RoW. The main site is ~100m southwest of the centre line. The site consists of a circular LIA byre that was subsequently modified in the HP, or even more recent times, to a rectangular byre with secondary walling (fig. 12). More LIA stone walling occurs to the southwest.

The site occurs outside of the RoW and was not monitored.

3.1.6 GLK094

GLK094 occurs at KP216.5 and just south of the Drake Spruit. The stone walling was initially noted for its uniqueness, as it did not conform to LIA, HP, or Nguni-style architecture. There was a tentative suggestion that it could relate to a Voortrekker Laager, as the map at Zaailaager indicated such a Laager along the Drake Spruit. More recent evidence, and a survey northeast across the R102 found similar structures. These structures, but not GLK094, occur on the 1945 2829DD Frere topographical map. Some of the structures occur on the 1937 aerial photographs. This suggests that GLK094 post-dates the older stone walled settlements, but is related architecturally. The entire area, of similar architecture, is probably part of a larger family living in the area for some time.

The site consists of several stone circles made from shale that was sourced from the local river bed (fig. 13). These stone circles consist of a double row of shale that appears to be triangular in shape above the surface. There is some rubble infill within the double row. Some of the slabs have the grooves from when they were tied with (presumed) rope and hauled from the river. There are areas from the river where the "quarrying" is still visible.

The area was excavated (see 3.2.4) and monitored during the RoW clearance.

Fig. 12: Site Map for GLK093

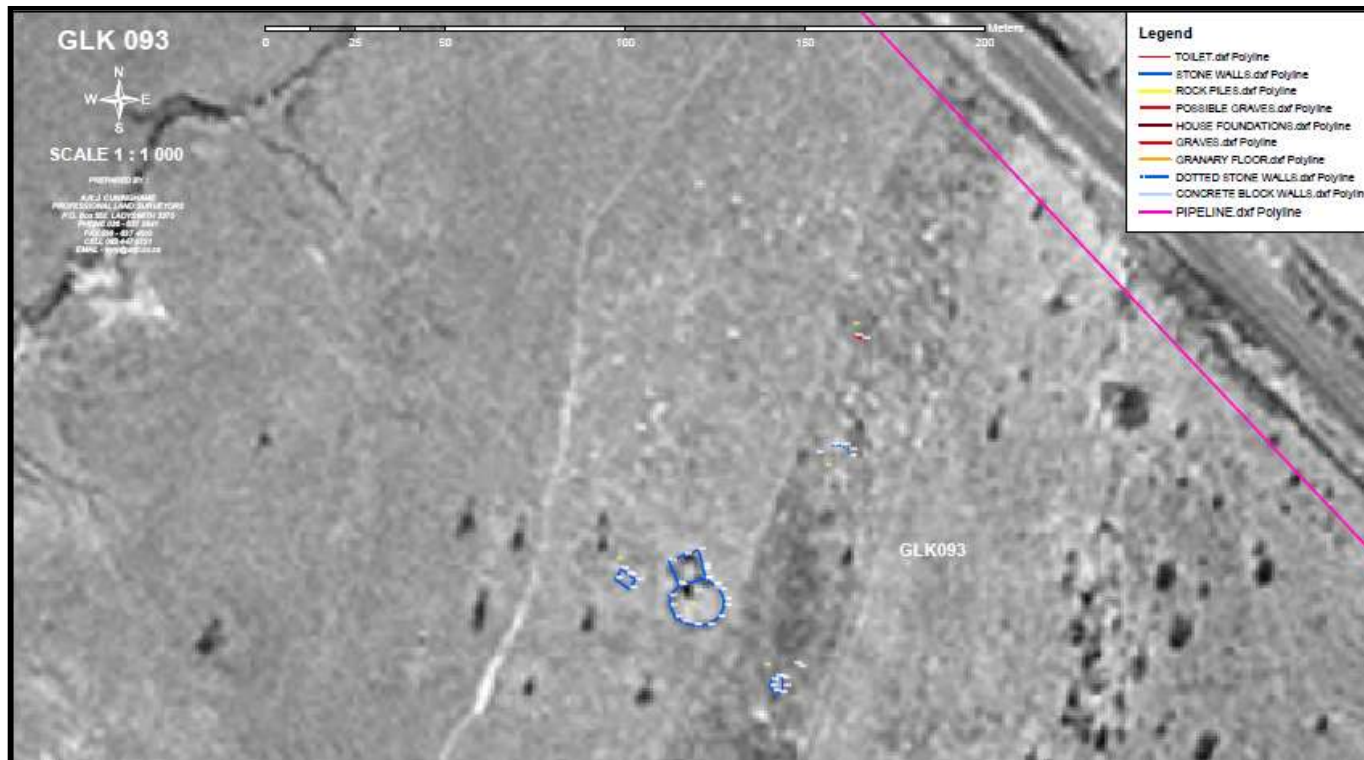
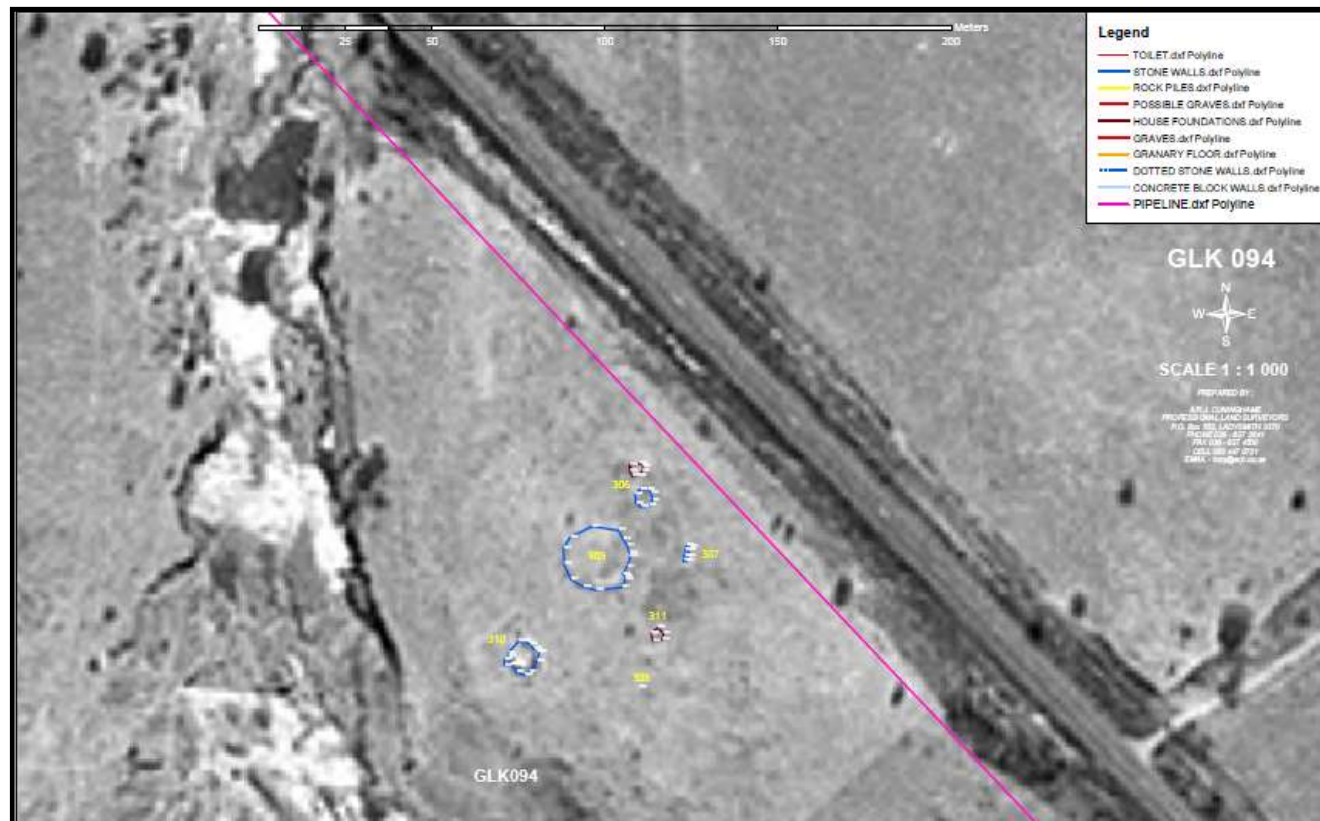


Fig. 13: Site Map for GLK094



3.1.7 GLK0118

GLK118 and GLK118a are located between KP268 and KP269. The site consist of graves and small house foundations nearby each other that probably date to the 1950s (fig. 14). The graves were demarcated and the line was rerouted to avoid the graves.

The line, and RoW, initially went through the middle of the graves, but it was then rerouted with the graves located outside of the RoW. Fig. 14 indicates the line before rerouting.

The graves were covered with soil and rocks during the construction phase.

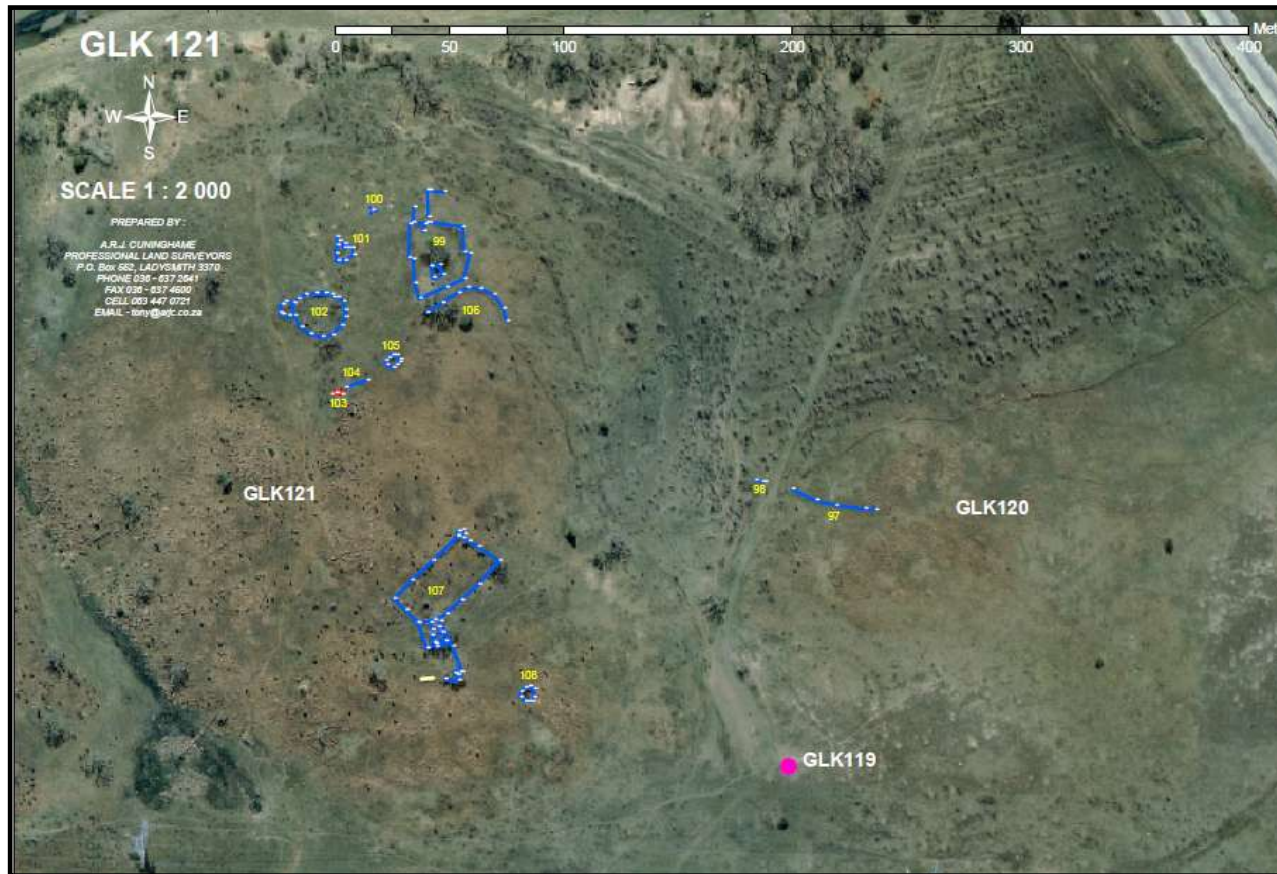
Fig. 14: Site Map for GLK118



3.1.1 GLK0120

GLK0120 is located near KP268. The site consists of a long stone wall at the edge of a terrace and may be a retaining wall (fig. 15). It is probably related to the original farm buildings and thus dates to the 20th century.

Fig. 15: Site Map for GLK120 and GLK121



3.1.2 GLK121

GLK121 is located between KP268 and KP269. The site can be divided into a northern and southern part (fig. 15). The northern part of the site consists of LIA circular stone walling and graves. Some of the outer walling may extend further along the eastern side; however the grass was too tall and dense to make an accurate observation.

The southern part of the site is probably related to the original farmstead. It consists of a large rectangular stone wall with secondary and tertiary walling added onto the southern corner. A LIA circular stone wall is located to the southeast of this feature.

3.1.3 GLK122a

GLK122a is located between KP263 and KP264. The site consists of LIA stone walling and graves, as well as a well defined hut floor (fig. 16).

Most of the site occurs outside of the RoW and part of it was excavated (see 3.2.5). The site was monitored during RoW clearance.

3.1.4 GLK122b

GLK122b is located between KP263 and KP264. The site consists of LIA, HP, as well as more recent stone walling, granary floors and graves (fig. 17). The more recent features date to the 1950s-1960s and some of these include graves. It appears as if the LIA byres were re-used in the HP and more recent past.

Most of the site occurs outside of the RoW and was not affected. The three recent graves inside the RoW were fenced off, as were the two stone walled byres, of which one had two graves inside it. This part of the site was not excavated; however, it was monitored during RoW clearance. One of the recent graves was completely removed during the construction phase.

3.1.5 GLK122c

GLK122c is located just south of KP263. It consists of circular LIA stone walling and graves, although the graves may date to the HP or more recent past (fig. 18). The graves and walling that occurred in the RoW were fenced off, and the area was monitored during RoW clearance.

One grave was removed/ damaged during the construction phase.

Comment [HL3]: Gavin is this correct did Umlando not find later that it was not impacted- I will need to go back and look at our other report xx

Comment [u4]: This grave was completely removed. It is the upper grave near the blue gum tree

Comment [HL5]: Is this the same as the one above xx

Comment [u6]: No it occurs 400m to south. 2 graves were destroyed in this area.

Fig. 16: Site Map for GLK122a



Fig. 17: Site Map for GLK122b

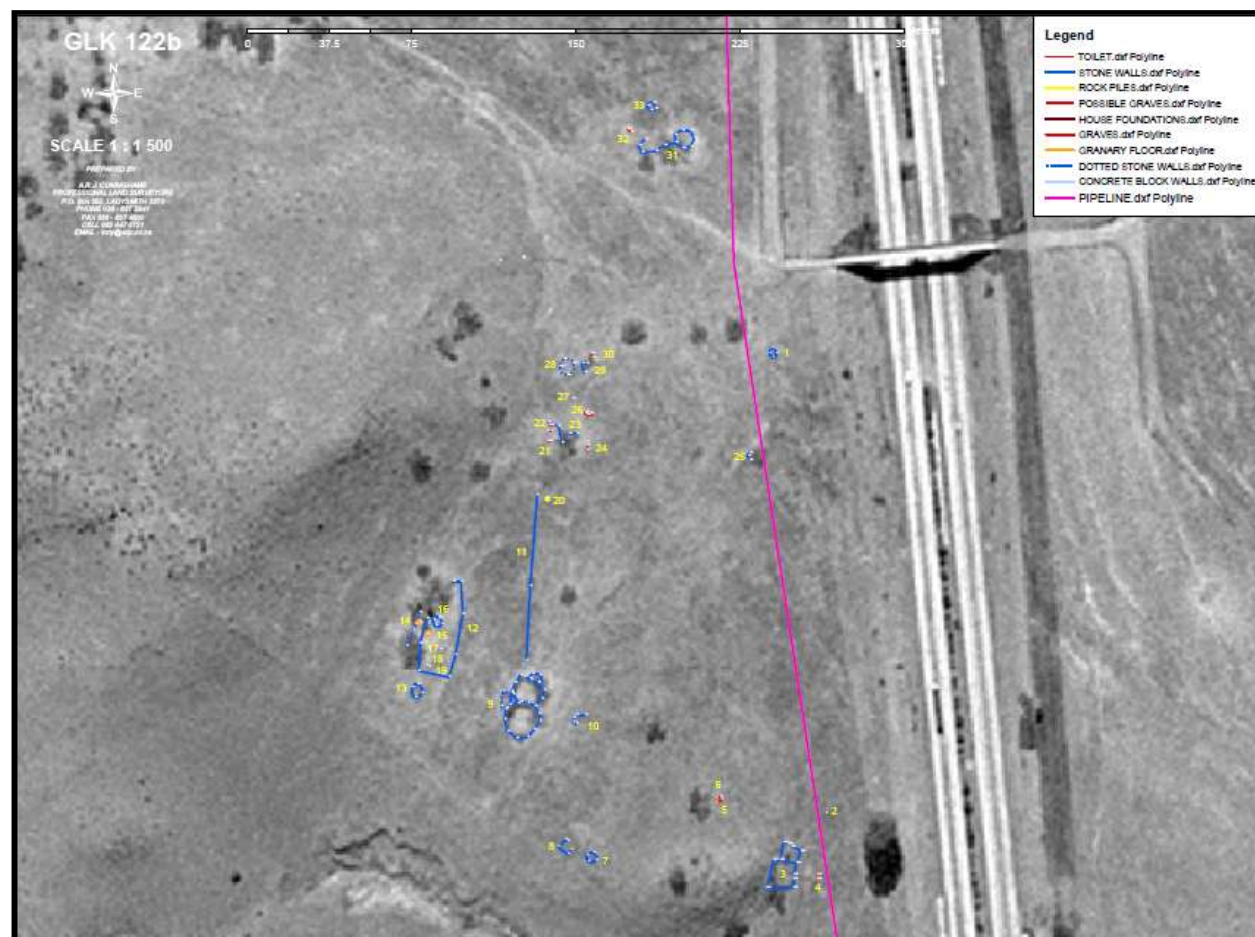
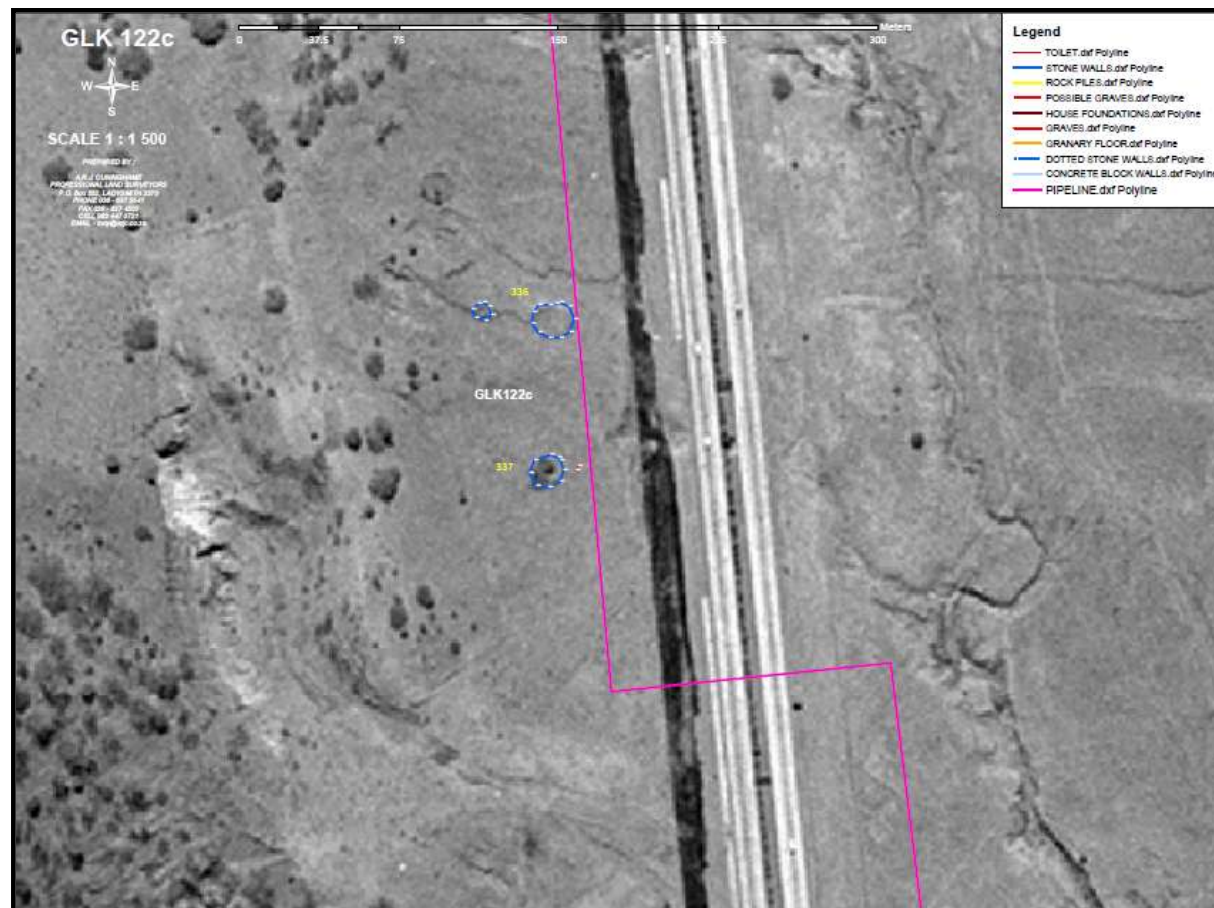


Fig. 18: Site Map for GLK122c



3.1.6 GLK123

GLK123 is located between KP253.9 and KP264.1. The site is situated adjacent to the N3, and on a gentle slope. The site consists of three stone walled byres, four possible graves, and a small stone cairn. The three stone walled byres are all sunken into the ground.

The site was excavated and monitored during the right of way clearing. Some areas were fenced off during right of way clearance, as these had features that were not to be damaged.

3.1.7 GLK124

GLK124 is located between KP264.1 and KP264.2. The site consists of a single grave ~70m from the centre line (fig. 19). The site merges with GLK123 and was partly excavated. The site was monitored during RoVW clearance.

3.1.8 GLK125

GLK125 is located KP264.9 – KP265. The site consists of low stone walling and two graves (fig. 20). The walling consists of a large circular cattle byre, with a smaller circular structure to the northeast. The two graves are situated in this smaller circle.

The stone features were demarcated, fenced off and monitored during RoW clearance.

Fig. 19: Site Map for GLK123

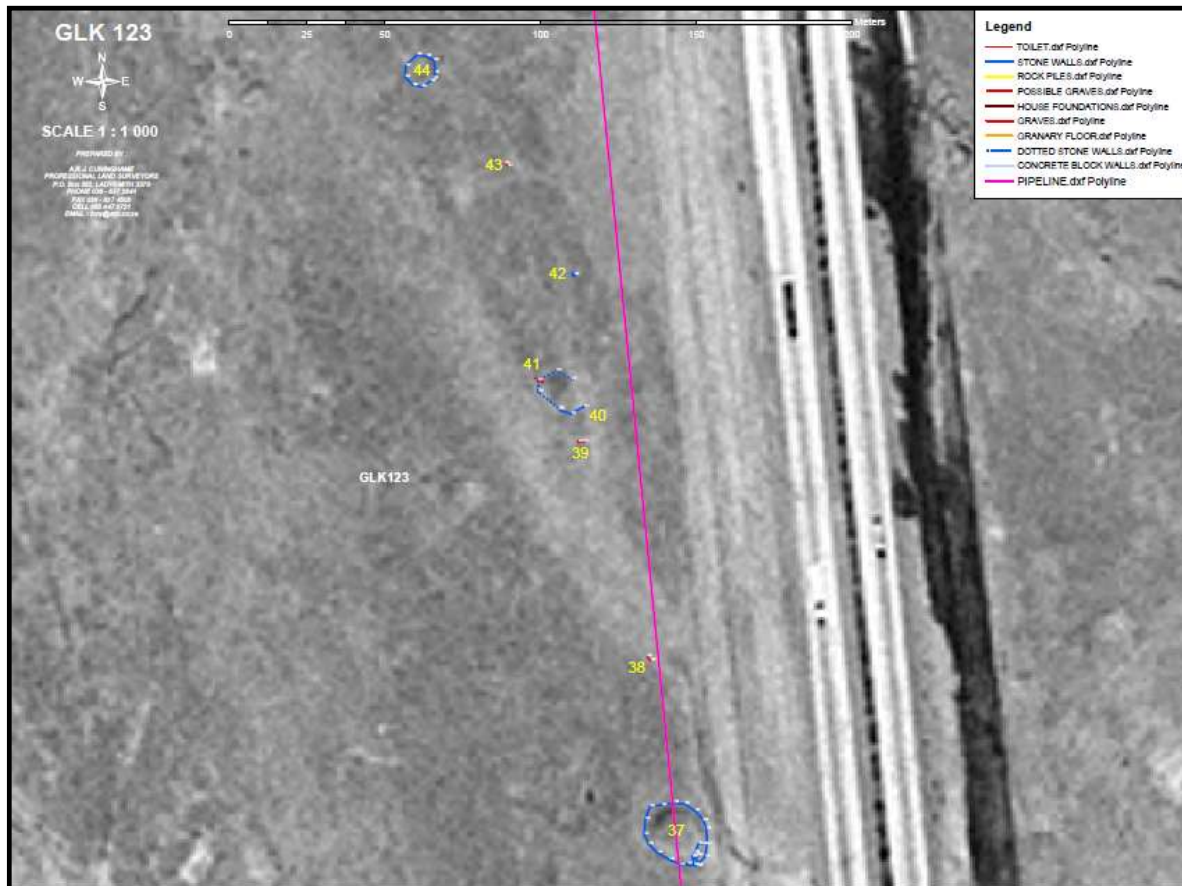


Fig. 20: Site Map for Northern GLK124



Fig. 22: Artefact Percentages per Site for Excavated Sites

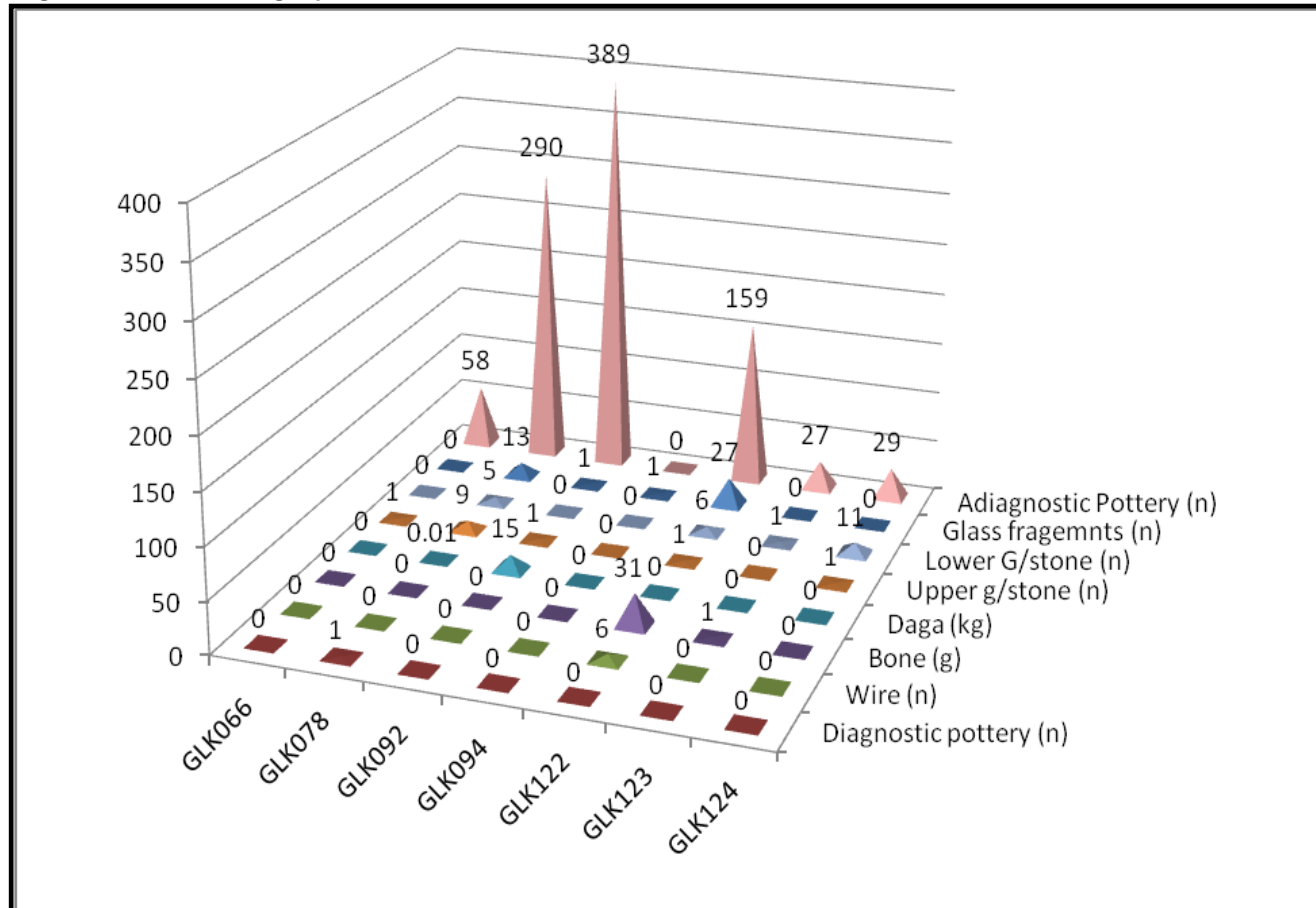


Table 2: Summary of Artefacts per Site

Site	Total No. Squares	Max. Depth (cm)	Pottery		Other				Historical	
			Diagnostic (rim/lip)	Adiagnostic	Bone fragments	Daga (kg)	Upper G/Stone	Lower G/stone	Glass fragments	Wire
GLK066	14	20	0	58	0	0	1	0	0	0
GLK078	80	30	1	290	0	0.1	9	5	13	0
GLK092	59	30	0	389	0	15	1	0	1	0
GLK094	10		0	0	0	0	0	0	1	0
GLK122	16		0	159	31	0	1	6	27	6
GLK123	4		0	27	1	0	0	1	0	0
GLK124	9		0	29	0	0	1	11	0	0
Total	192		1	952	32	4	12	23	42	6

3.2.1 GLK066

GLK066 is located on a hill above the Sandspruit River. The site extends over a large area, however only a small part was affected by the pipeline (fig. 7). The pipeline occurred in a rocky area where the soil was very shallow and few archaeological features were present. A total of 14 squares were excavated along the line (fig. 23 - 25).

The site was excavated as it had several stone walled features and potential deposit. There was one possible burial in the RoV.

Fig. 23: Excavation Plan for GLK066³



³ Yellow squares = excavation squares; red cross is a grave

Fig. 24: Excavation Squares for GLK066, facing west



Fig. 25: Excavation Squares for GLK066, facing east



3.2.1.1 Stratigraphy

The site had no stratigraphy and was excavated in 10cm spits. Most of the squares went down for 15cm – 20cm in depth. Below this was a hard rocky floor of dolerite (fig. 26). Most of the artefacts occurred between 5cm – 15cm below the surface.

Fig. 26: Excavation of GLK066, Sq. 124



3.2.1.1 Artefacts

The site yielded 58 pieces of pottery and one upper grinding stone. The pottery sherds are all adiablastic, thin-walled and brown in colour. Most of the sherds came from Squares 110 – 114. The sherds date to the LIA or HP; however without decorations one cannot be more precise. The pottery appears to date more to the LIA.

Comment [B7]: Spelling? Correct spelling xx

Comment [u8R7]: Correct spellings. Can be shards or sherds of pottery. We use 'sherds' in SA.

A single upper grinding stone was recovered from Sq. 62.

3.2.1.1 Features

Only one feature occurred in the RoW: a stone walled byre (GLK066_73; fig. 27) with a possible grave (fig. 30). An excavation square occurred on the inside (Sq. 68) and outside (Sq. 62) of the byre. A few sherds were noted in Sq. 62, but none in Sq. 68.

The stone wall is a primary enclosure ~6m in diameter (fig. 28) and has secondary walling along the southern side (fig. 29). The possible grave is located on the interior and western side of the byre. This wall was 'sacrificed' for the line, in order to save GLK075_75 and similar walls.

Fig. 27: Location of the Stone Walled Kraal and Possible Grave at GLK066⁴



Fig. 28: Primary Walling At GLK066_73

⁴ Yellow arrow indicates location of grave

Fig. 29: Secondary Walling At GLK066_73



Sq. 68 contains a possible grave (fig. 30). The grave consists of a stone cairn 1m wide and ~2m long. The cairn abuts the primary enclosure but was added on after the enclosure was made. The stones on the cairn were removed approximate layer by layer. This was made difficult by the fact that there was a termite mound within this feature (fig. 31). Umlando did attempt to keep some form of levels. The cairn consisted of various layers of rocks reaching a depth of ~90cm. Under the last layer of rocks was an area of ~20cm of sand, which contained termites. Below the sand layer was bedrock. No artefacts or bones (animal or human) were observed in this feature.

This feature is either a collapsed secondary enclosure, or a grave. A problem with termite mounds in graves is that they tend to move rocks (up and down) as the mound is formed, broken down and reformed. Moreover, the humidity and changing pH within the termite mound appears to increase the deterioration of any potential skeletal remains. This was a recurring theme for the various excavations on this contract, and excavations elsewhere in KZN.

3.2.1.1 Discussion

The excavated material was too ephemeral to place the site in a chronological context. The stone walling in the RoW dates to the LIA, however, parts of the walling may have been robbed in historic times for the rectangular byres.

Fig. 30: Possible Grave at GLK066_73



Fig. 31: Second Tier of Removed Rocks at GLK066_73

3.2.2 GLK078

GLK078 was the largest excavated site along the NMPP. The site extended for 1.1km, of which Umlando excavated 0.95km. The RoW occurred in the area of least stone walled features and graves. The entire site consists of circular and rectangular stone walled byres (95), graves (47), house floors (5), granary floor (1), and individual engravings or artefacts (21) – see fig. 8. The main occupations occur at the base of the hill on relatively flat ground. Parts of the site have been affected by the freeway, the original Colenso Road and the transmission line. The site is made up of LIA and HP stone walls.

The following features were in the RoW:

- Three stone walled byres
- Five engravings
- Six possible graves

All of these features were demarcated with danger tape before RoW clearance. The features were fenced off and the area was monitored during Row clearance.

A total of 80 squares were excavated (fig's 32a-b, 33). Some areas along the line were not excavated as it was on a rocky spur with no deposit. The southern part of the line, where it runs adjacent to the dirt road, was partially excavated, as the archaeological deposit had petered out.

The excavations began at the original fence besides the road and moved southward with the numbering system. As a reference point KP238+0 is at Square 670, or the 672m mark from the fence.

3.2.2.1 General Stratigraphy

The ground was a uniform brown colour with no visible stratigraphy (fig. 34). It went from a sandy brown in the north to clay-like in the south. Most of the squares were excavated down to 20cm below the surface, and only two went down to 30cm. The artefacts tend to occur between 5cm – 15cm below the surface.

3.2.2.2 Artefacts

The most commonly occurring artefact is pottery sherds, followed by upper and lower grinding stones, and glass (fig. 23). The pottery is all thin walled and brown in colour. Only one decorated sherd was observed in the RoW (fig. 35). The decoration consists of two vertical triangular impressions adjacent to a row of vertical grooves. The pottery tends to be concentrated along the northern part of the site, especially between squares 200 – 300.

Fig. 32a: Excavation Plan at GLK078 (Northern Half)



Fig. 32b: Excavation Plan at GLK078 (Southern Half)



The grinding stones that were noted are mostly upper grindings stones. The lower grinding stones that did occur were basin-shaped, but fragmented.

The frequency of glass fragments is skewed in that it all came from one square, and is probably from the same bottle.

Approx. 100 engravings were recorded at the site on two hills and a rock outcrop. The engravings consisted of rectangular and/or circular pecking, striations and engravings. All engravings were photographed and have a GPS reference. There were 5 engravings in the RoW and these were fenced off. These engravings are discussed later under "Damaged Sites"

Fig. 33: Excavations along the Northern Part of GLK078⁵



Fig. 34: Excavations along the Northern Part of GLK078



⁵ White arrow indicates row of excavations squares.

Fig. 35: Decorated Sherd at GLK078



3.2.2.3 Excavations

A total of 80 squares were excavated across the site. Umlando did not excavate any features except possible graves that occurred within 10m of the central line- all other features were fenced off. Four possible graves were excavated.

The main excavations went to a maximum depth of 20cm below surface, except for two squares where it was 30cm deep. Below this was a very hard clay or bedrock. The only time the excavations extended beyond 30cm was for the possible graves where Umlando continued to bedrock.

Since there was such a low frequency of artefacts (on average 3.5 sherds per square), Umlando did not extend the excavations beyond the minimal required. Umlando expect the higher densities of artefacts to occur to the west of the RoW.

3.2.2.4 SQ. 175a

The survey reference for this feature is GLK078_253_1509-1511. The feature occurred 5m east of the centre line and consisted of a stone cairn 1.2m x 3.6m long (fig. 36). Umlando originally thought it was part of a wall; however it did not continue either side. The square was placed so that it extended beyond the edges of the feature. In this way Umlando would be able to observe any changes in the soil profiles, and thus observe a possible pit/grave. A square was excavated in the middle of the feature ~1.5. X 1.5m (fig. 37) down to bedrock. Bedrock was reached at 45cm below the surface. There was no indicator that there was a burial pit underneath the stones. The feature was probably the remains of a wall that has been robbed.

Fig. 36: Stone Feature at GLK078 Square 175a



3.2.2.1 SQ. 258b

This survey reference for this feature is GLK078_243_1555-1556. Square 258b occurs ~6.5m to the east of the centre line. It consists of a sunken stone cairn ~1.5m x 1.8m in size (fig 38). Umlando removed the first layer of stones and found an active termite mound. The second layer was more of a sunken layer of stones. Below the stone layer was ~40cm of hard sand (and termites) before bedrock was reached. There was no indication of a grave or pit from the excavations.

3.2.2.1 SQ. 817b

This survey reference for this feature is GLK078_294_2139_2140 (fig. 40). A second smaller feature was located ~3m to the north of it. The main feature was divided in half and excavated down to bedrock. Bedrock was reached at ~50cm below surface. Termites were observed in both features. There were no artefacts below the feature, nor was there any sign of a pit or grave. The same occurred for the second feature. These two are probably granary floors.

Fig. 37: Excavated Stone Feature at GLK078 Square 175a



Fig. 38: Stone Feature at GLK078 Square 258b – Vegetation Cleared



Fig. 39: Excavated Stone Feature at GLK078 Square 258b

Fig. 40: Excavated Stone Feature at GLK078 Square 817b



Fig. 41: Completed Excavated Stone Feature at GLK078 Square 817b

3.2.3 GLK092

GLK092 is located between KP217.300 and KP217.800. The site is located along the top of a broad hill that overlooks the Drake Spruit (fig. 42). The hill has been systematically ploughed in the past; however, it tends to have missed the larger features.

The RoW occurs near the R103. A total of 67 squares were excavated of which 62 squares were in the trench (fig. 43) down to a maximum depth of 30cm for normal squares and 85cm for features. Only 8 of the 30 features occurred in the RoW. These were either excavated, if they were potential burials, or fenced off and monitored during RoW clearance.

Fig. 42: View Of GLK092: North and Middle Sections,



Fig. 43: Excavation Plan for GLK092



3.2.3.1 Stratigraphy

The site had no visible stratigraphy and the soil was a uniform brown colour. The soils varied from a sandy to a clay-like texture; however this was dependant on its location to a wetland or underwater "spring". The deposit thinned out along the slopes of the hill, where it became rockier.

The site was excavated down to 20cm in most squares, except in the middle where it went down to ~30cm. From Square 450 onwards the soil was only 3cm deep onto bedrock.

3.2.3.2 Artefacts

The main type of artefact present at GLK092 is pottery (fig. 23). There is an average of 6.5 sherds per square; however, most of these were concentrated around Squares 340 – 430, i.e.

in the middle of the excavations, and northeast of the largest stone walled byre. The pottery is thin-walled and brown in colour and probably dates to the LIA.

Three daga floor fragments were observed with the main (or LIA) part of the site, and all came from Square 420. Square 470 had 15kg of daga floor fragments. This was a single hut floor on the southern slope of the hill. The floor was very fragmented and thinner than the fragments from the previous square. The house floor was associated with a smaller stone walled feature and the recent HP part of the site.

One piece of recent HP glass was observed in the excavations.

One upper grinding stone was recorded at Sq. 480A. This grinding stone is associated with maize.

3.2.3.3 Excavations

A total of 67 squares were excavated of which 62 squares were in the trench. The other 5 squares were features that were assumed to be graves. Most of the artefacts were consistently located in the upper 15cm of the excavation, and the excavations always continued to the 20cm or 30cm mark. Not every 10m had an excavation due to ploughing activity or watercourses.

No features were observed in the excavated squares along the line, with the exception of Squares 440 - 444 and Square 470. All squares were similar in content and did not yield any significant finds.

Features were labelled in two ways. The first refers to a GPS Waypoint (WP) from the initial surveys while the others refer to a Square number.

3.2.3.4 WP99

WP99 is located 9m southwest of Square 60. The feature consists of a stone cairn ~1.5m x 1m in size, and ~40cm above the surface (fig. 44). The circle of stones was removed to the surface level, where Umlando noted termite activity. The stones extended for another 40cm below the surface. Below this was ~20cm of soft brown sand, and then bedrock. One sherd (with a rim and lip) was found amongst the upper layer of rocks.

Umlando excavated outside of the feature as well but could not discern any changes in the soil colour and texture to indicate a pit. Termite activity occurred throughout the excavated feature.

Fig. 44: Excavation of WP99



3.2.3.5 WP555

WP555 is located ~10m southwest of Square 120. The feature is a stone cairn ~1.5m x 1m in size and 10cm above the surface (fig. 45). It appears to have been disturbed on the top, in that there are missing stones. Three-quarters of the cairn was excavated. The stones continued for ~40cm below the surface. Beneath the stones was ~15cm of brown sand, followed by bedrock. There was no indication of a burial pit in the excavations. Termite activity occurred throughout the excavations. The feature is a pit of stones.

Fig. 45: WP555 Excavations



3.2.3.6 WP558

WP558 is located at ~2m northeast of KP217.503. It was initially noted as a grave because of the cairn and size. WP558 was a semicircular stone feature 2m x 1.5m in size (fig. 46). The feature was mapped in and excavated – the excavations extended beyond the length and width of the feature, with the exception of ~30cm along the western section so as to leave a profile.

The excavations cleared the vegetation from the feature, and removed the rocks in stratigraphic layers, where possible. This area was filled with small rocks similar to those on the surface, extended for 70cm below the surface (fig. 47). Below these rocks was ~15cm of clay-like soil. There was no change in the soil profiles to indicate a feature had been excavated, even though this was the case

There was a natural spring from the 70cm mark, allowing water to slowly trickle into the excavations. This is probably a seasonal spring. The lack of space between the rocks and the bedrock suggests that this was not a grave, but probably a granary pit. No artefacts were associated with this feature.

Fig. 46: Stone Feature at GLK092 WP558



Fig. 47: Stone Feature at GLK092 WP558



3.2.3.7 WP579

WP579 was located at ~KP217.542, and 15m east of the central line. The feature consisted of a stone cairn ~3m long and 1.5m wide (fig. 48). It is thus longer than the average grave. Umlando excavated a small (30cm wide) cross section to determine if it was similar to the other 'graves' (fig. 48). The excavation showed a high concentration of termite activity and only one layer of stone below the surface. As with other features there was no change in soil colouration to indicate a feature. A similar feature was located outside of the RoW, but in line with WP579, and Umlando concluded that it was the remains of a stone wall. This feature was monitored during the RoW clearance, and no human remains, or indications of a grave, were observed.

Fig. 48: Stone Feature at GLK092 WP579



Fig. 49: Stone Feature at GLK092 WP579



3.2.3.8 WP582

WP582 is located 13m east of KP217.278 and is probably related to the feature at Sq. 470. The feature consists of a circle of stones, on the surface, that is ~1.5m in diameter (fig. 50). The circle of stones was excavated. It consisted of a single layer of stones lying on 5cm - 10cm of soil before bedrock was reached. The feature is probably a granary floor associated with the hut floor and byre nearby.

Fig. 50: Granary Floor at GLK092 WP582

3.2.3.9 Sq. 440 - 444

The feature in this square is located at KP 217.308 the feature consists of a dry stone wall byre ~6m in diameter. The centre line for the pipe was to go through the middle of the byre. A 2m wide trench was excavated through the middle in order to look at its architecture and if any human remains occurred in the centre.

The byre had been extensively robbed as it consisted of one – two rows of stones above the surface. This is also indicative of its age. The wall is just less than 1m in length and consisted of a double row or large rocks with a rubble infill (fig. 51). It appears as if a trench of ~30cm was dug into the soil to form the foundations.

There were no human remains or potential graves within the byre; however, forty-six pottery sherds were recovered from the inside. The sherds were thin-walled and adiaagnostic. The byre probably dates to the LIA, and was re-used several times.

Fig. 51: Trench across North Section of the Byre at Sq. S 440 - 444



3.2.3.10 Sq. 470 – 470A

This square is located at KP217.282. The feature consists of two 2m x 2m squares. The surface soil was very thin in this area as the area is on a slope with the basal layer near the surface. This feature consists of a fragmented daga floor ~4m in diameter. The daga occurred in concentrations within the two squares. 104 Pottery sherds came from this square and are probably the remains of two – three pots. A part of a knife handle was observed on the surface. The handle is probably post depositional.

Fig. 52: Daga Floor at GLK092 Sq. 470



3.2.3.11 Discussion

The site is a LIA settlement dating between AD1200 and AD 1829. The lack of decorated sherds suggests that it is more on the recent side. Most of the site occurs outside of the RoW, and these features (and the associated artefacts) would have given a more precise date. The site did yield the largest amount of pottery from all of the excavated sites, as well as the best preserved hut floor.

Five possible graves were excavated, but these did not yield any human remains. The general pattern is that human remains would not last long in this area due to post depositional factors such as termites, aardvark, and water. Other features were excavated to indicate the domestic component of the site. These were the granary floor and daga floor for a house.

In general the RoW missed the main part of the site, and had little impact on the site as a whole.

3.2.4 GLK094

GLK094 is located between KP216.530 and KP216.700. The site overlooks the banks of the Drake River, and most of the site occurs outside of the RoW (fig. 53). Only one byre and one house foundation occur within the RoW. These were demarcated and the area was monitored during RoW clearance.

The site was initially noted as being sensitive for its unique architecture. It was atypical of LIA and HP stone walling, and was initially thought that it may relate to Voortrekker walling. The final assessment is that the site dates to the mid 20th century onwards and is part of a unique system of architecture that is found between KP216 and KP218. It is probably related to a single extended family.

A total of nine 2m x 2m squares were excavated at the site (fig. 54) and yielded hardly any artefacts.

3.2.4.1 Stratigraphy

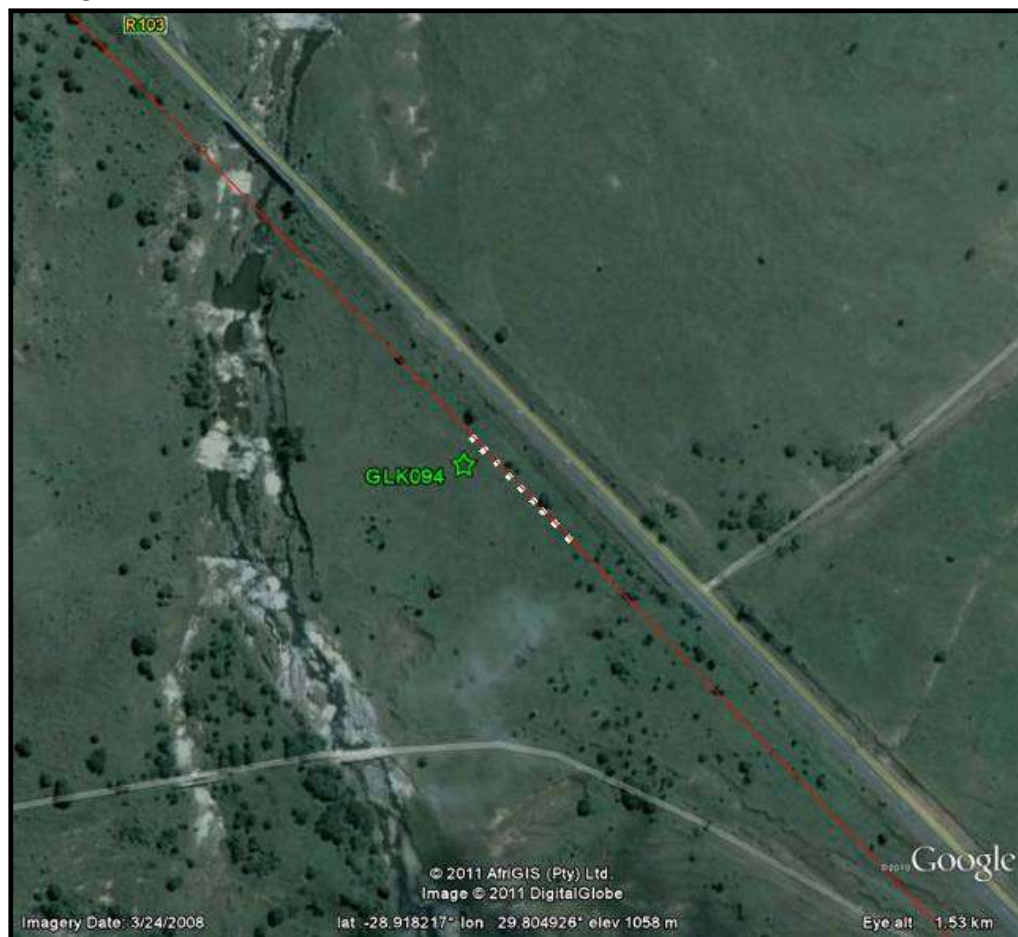
The site was a uniform light brown colour, and powdery in texture when dry. The soil was exceedingly hard – so hard that the bulldozers had to rip the soil first during RoW clearance. The soil was more than 30cm deep; however the excavations only went down to the first 20cm.

3.2.4.1 Artefacts

Very few artefacts were observed during the survey. One glass fragment and an adiaagnostic ceramic fragment (from a modern cup) were observed.

Fig. 53: Upper Excavations at GLK094

Fig. 54: Excavation Plan of GLK094



3.2.4.1 Discussion

The area in the RoW yielded very little information regarding the site. However Umlando had purposefully demarcated the house and byre that was in the RoW as a 'no-go' area. These two features may have yielded more artefacts.

There are about six settlements along the Drake Spruit that all have similar architecture. That is, the use of shale slabs in an upright position to demarcate byres. The byres have a double row of shale slabs, but no infill. At least one of these settlements occur on the 1937 aerial photographs and all (except GLK094) occur on the 1945 1:50 000 topographical map. Only GLK094 does not occur on either historical map, suggesting that it post-dates 1945. Judging by the material observed on the site during the end of winter, I would even suggest it post dates the 1960s. One site has had a continual occupation since (at least) 1937 up to the present.

The entire group of settlements are significant in that it appears to be the remaining settlement of an extended family spanning at least 80 years. There are several graves, byres, chicken 'coops' and homesteads in a 2km radius. This would give ideal intra site information on a family's daily life spanning the 20th century in rural KZN.

3.2.5 GLK122/GLK122a

GLK122 is located between KP263.633 and KP263.794. GLK122a and 122b is located on the top of a hill and extends ~300m x 200m in total. GLK122a is located on the top of the hill and the northern slope, while GLK122b is located on the top of the hill and along the southern slope (fig. 55). The site is a multi-component site with LIA and HP settlements, as well as settlements dating to the 20th century. The settlements include houses, byres and several human graves.

The site was excavated where the line would have biggest impact, and the RoW was monitored during clearance. All sensitive areas were demarcated before RoW clearing; however one grave was destroyed during the construction phase.

Most of the features for this site occurred outside of the RoW, and any features on the margins of the RoW were demarcated so as not to be damaged. A total of 13 squares and three features were excavated at this site (fig. 56). The squares have a suffix of 'N' or 'S'. This refers to a line running along the bridge, and the squares are to the north or south of this line. The features consist of a possible grave, a byre, and an intact stone lined hut floor.

3.2.5.1 Stratigraphy

The site was a uniform dark brown sand and very clay-like when wet; powdery in texture when dry. The soil was more than 30cm deep, however the excavations only went down to the first 20cm, as most of the artefacts occurred in the upper 10cm. Only Square 135 extended to 30cm below the surface.

Fig. 55: View of GLK122 (North & South Sides)



Fig. 56: Excavation Plan of GLK122a



3.2.5.2 Artefacts

The excavations yielded few artefacts. The main type of pottery was thin-walled adiabatic pottery sherds. Two small white glass beads were excavated from the hut floor. Several fragments of glass were excavated from the potential grave. They fragments probably come from a single bottle that was identified as a "Case Gin" bottle. This bottle dates to the late 19th and early 20th century. Most of the artefacts came from the excavations near the top of the hill.

3.2.5.3 Fire pit

The fire pit was located at Sq. 105N, or KP263.779. The feature was originally recorded as a grave as it was a stone cairn ~1.5m x 1m in size, and resembled other graves in the area (fig. 57). The cairn was ~1m from the wall of a byre.

Fig. 57: Stone Cairn at GLK122, Sq. 105N⁶



The cairn was systematically removed, but with the outer ring of stones kept in place (fig. 58). The cairn consisted of four layers of stone, with a 35cm ash layer. Within the ash were bone fragments, wire and Case Gin glass fragments. The bone remains consist of a metapodial and tibia of a domestic bovid.

The feature is thus not a grave but a fire pit. The type of artefacts associated with the fire pit suggests that the feature is an early 20th century feature where the people re-used the older byre as a fireplace. It is well known that people have used the older byres for shelters through time, and that fires were made within these byres. However, since the grass is very flammable in winter, they had to be doused in the evenings to prevent potential run-away fires. The occurrence of wire fragments within the fire pit suggests that these were farm labourers, and not casual passers-by.

⁶ The scales outline the northern (red tip on scale) and eastern side of the cairn

Fig. 58: Stone Cairn at GLK122, Sq. 105n



3.2.5.4 Stone lined hut floor

The stone lined hut floor is located at Sq. 14N, or KP263.687. The floor occurred ~5cm below the surface and was ~3.5m in diameter. It consisted of a single layer of flat stones in a circular pattern (fig. 59). This could have had a lining above it; however there was no evidence for a daga or dung floor.

The excavations were extended to an additional three squares to uncover the floor. Only four adiablastic sherds were observed on the floor. Once the floor had been cleared, the stones were removed and a further 15cm – 20cm were excavated, before the gravel 'bedrock' was reached. This was undertaken as infants, stillborn or other, are occasionally buried under a hut floor.

Fig. 59: Stone Lined Hut Floor at GLK122, Sq. 14N



3.2.5.1 Stone feature at Sq. 56N

A stone feature was excavated at Sq. 56N, or KP263.729. The cairn is ~80cm x 50cm in size (fig. 60). It consisted of a circle of rocks above the surface. There was no pit below the stones. The feature is probably the foundation of a granary floor.

Fig. 60: Stone Granary Floor at GLK122, Sq. 56N



3.2.5.1 Stone Feature at Sq. 10S & 12S

This feature was located at Sq. 10S, and extended into Sq. 12S, or at KP 263.662. The feature consisted of a semi-circle of stones just above the surface. Two squares were opened and the feature was excavated (fig. 61). The feature consisted of a ~1m diameter circle of stones. It had four layers of stones and was slightly damaged by a termite mound. The stones were removed; however, no pit occurred underneath.

The feature is probably a foundation for a granary floor. A few adiablastic pottery sherds were recovered from this square.

Fig. 61: Stone Floor at GLK122, Sq. 10S & 14S



3.2.6 GLK123 & GLK124

GLK123 and GLK124 are situated ~150m down slope of GLK122a, or between KP263.900 and KP264.202. GLK124 consisted of a single grave (Sq. -52). A total of 15 squares were excavated down to a maximum of 30cm, although some were only 15cm deep (fig. 62). Most of the features were outside of the RoW.

Fig. 62: Excavation Plan of GLK123 & GLK124



3.2.6.1 Stratigraphy

The soil was a uniform brown colour, and very hard in texture (fig. 63). Bedrock occurred from ~20cm in places and was defined by the gravel-like deposit.

Fig. 63: Soil profile at GLK124



3.2.6.2 Artefacts

The main type of artefact at the site is pottery, followed by a few fragments of modern glass and one piece of animal bone. The pottery is thin walled and brown in colour and similar to pottery found at the other excavated LIA sites. All of the pottery was adiaagnostic.

3.2.6.3 Granary Pit Sq. -52

This feature was located at the southernmost part of the excavations, at 1.5m east of KP264.188. The feature is ~1m x 80m in size, and was originally thought to be a juvenile grave (fig. 64). The entire feature was excavated to a bedrock layer. The feature consisted of several layers going to a depth of 60cm. These are, from top to bottom:

- Circular ring of stones, with sand at base
- Single slab ~50cm in diameter in the centre
- Layer of 20 pottery sherds and sand
- Single shale slab in a vertical position along the southern side
- Two shale slabs on top of each other
- Layer of very hard clay with no artefacts

The feature is probably a granary pit.

Fig. 64: Stone Feature at GLK123 Sq. -152



3.2.6.4 Granary Pit Sq. 67

This granary pit is referred to as GLK123_38_637/638 in the survey data, and is located at ~2m east of KP 264.068. It was originally thought to be a grave as it was 1.5m x 1m in diameter. This feature turned out to be a double layer of stones with no pit underneath it, and it is probably a granary floor (fig. 65).

Fig. 65: Granary Pit at GLK123 Sq. 67, before clearance.



3.2.6.5 Stone walled Cattle Byre Sq.'s 113 - 135

The stone walled cattle byre is located between KP264.001 And KP264.022. The cattle byre was 20m in diameter, and mostly complete. (Fig. 66). It was excavated in order to salvage potential human remains within the byre and to record its architecture.

Two squares were excavated on either side of the wall and up to the wall. An additional four squares were excavated within the byre. All squares are 2m x 2m. The wall was 1m wide and consisted of a row of three rocks loosely packed into a possible trench with the soil itself was used as the infill (fig. 67 - 68). The excavations show that the soil inside of the byre was excavated. The entrance of the cattle byre could not be located. The original survey noted secondary walling on the inside of the southern end of the byre, however, this was in fact broken walling. Only four sherds were recovered from this byre.

Fig. 66: Stone Walled Cattle Byre at GLK123 Sq. -152



Fig. 67: Stone Walled Cattle Byre at GLK123 Sq. 135 to Sq. 113



Fig. 68: Stone Walled Cattle Byre at GLK123 Sq. 135



Fig. 69: Section Drawing Of Cattle Byre at GLK123 Sq. 113 – Sq. 135

20m

3.2.6.6 Discussion

The main site is outside of the RoW, and some of it was destroyed by the construction of the N3. There are sites on the eastern side of the N3 that are similar to GLK122, 123, 124 and 125. The excavations did not yield any significant finds, but did provide a good example of the construction of stone walled cattle byres.

3.2.7 General Discussion Of Excavated Sites

The excavations in general did not yield any significant finds or information. Very few artefacts were recorded; however this is the norm for LIA sites in the KZN interior (see Maggs 1988). Very few sites have extensive deposits, such as Moor Park (Davies 1976), and an abundance of artefacts. This is in contrast to the coastal LIA sites that have a significant amount of artefacts and archaeological deposits (Anderson.1995 – 2011).

In one sense it is a positive outcome that there were no significant finds, as this means that no significant sites were damaged by the overall project. The pipeline was rerouted around all significant sites. The aim of the mitigation was to "sacrifice" sites of low significance with controlled and systematic excavations. All features in the centre of the RoW were excavated, while those along the edges were demarcated and not damaged.

All of the excavated sites date to the LIA. Only one decorated sherd was observed (at GLK076) and is associated with Moor Park pottery (c. 1300AD). Some of the sites may date to the terminal LIA (late 18th to early 19th century). Several of the sites had additional settlements and were occupied in the Historical Period and up to the mid 20th century, however, these areas were not excavated.

The excavation results conform to the results undertaken by other people in the area (Maggs *et al* 1986). That is the sites are the remains of formative Nguni-speakers who had an agro-pastoralist socio-economy.

The only significant features were the human graves. There were consistently no human remains within the (possible) graves, nor any grave goods. Umlando believe that the human remains have disintegrated through time with the assistance of termites. They would favour the graves as they provide 'natural' hollows for the nest. The continual horizontal and vertical moving (and disintegrating) of the termitarium would reposition several rocks within the grave. Through time these graves would sink into the soil, and thus remove the features normally associated with classic stone cairn graves. The increased humidity inside the termitarium would also increase the rate of decay of organic remains.

While the graves did not yield human remains, their position within the settlement is important, and these were recorded.

The value of the excavations, and the field survey, is that a sample of artefacts was taken, and that the spatial component of the site has been recorded.

3.3 Monitoring of Heritage Sites

Several areas and/or sites were monitored during RoW clearance. These were areas that were regarded as being sensitive either because of artefactual material or because of human graves. The RoW clearance phase had the potential to do the most damage to heritage sites as 30cm of topsoil, and anything on the surface, was removed. These areas were designated 'no-go' areas unless a Heritage Practitioner was on site.

It was at this stage of the contract where heritage awareness was mainly undertaken with the construction teams. All sensitive areas within the RoW were fenced off and demarcated, and HME operators and site foremen were shown the sensitive areas. There were no major incidences of damage to heritage sites during the RoW clearance phase.

A total of 19 sites were monitored during RoW clearance. They are as follows (from Durban to Heidelberg direction):

- GLK107 at KP94 - 95
- GLK106 at KP94 – 95
- 2930CB066 at KP96
- GLK105 at KP96 – 97
- 2930CB067 at KP96 – 97
- GLK094 at KP216-217
- GLK092 at KP217 – 218
- GLK090 at KP222
- GLK090 (extension) at KP222-223
- GLK128 at KP223 – 225
- GLK078 at KP237 – 239
- GLK122a-d at KP262.800 – 264
- GLK123 at KP263 – 264
- GLK124 at KP264
- GLK125 at KP265
- N3 at KP265 – 266
- GLK118 at KP268 – 269
- GLK066 at KP269 – 269.500
- GLK063a at KP273.500 – 274.500

This excludes some sites such as GLK070a-e where other forms of mitigation were undertaken. Monitoring involved walking behind the bulldozer or grader and noting any possible features or artefacts. The appropriate safety tool box talks were given each day during monitoring so that HME operators were aware of our presence. In general there was very good communication between the operators and the heritage practitioners, and instructions were carried out correctly. Each scrape by the bulldozer or grader was ~5cm - 10cm deep. In some areas the soil was too compacted and hard, and a ripper was used. This had the same effect

as a plough would have, i.e. it would bring up any sub surface artefacts, and stone features would offer resistance. If this happened, the ripper would stop ripping in that area and continue ahead so Umlando could determine the cause of resistance. Monitoring on site also included creating awareness of demarcated areas such as graves, and Umlando often stood beside the feature as the area was cleared. No demarcated areas were damaged during RoW clearance with monitoring.

The main aim of monitoring was to ensure that unknown graves and large concentrations of artefacts were salvaged. The results from the excavations would also be able to indicate which areas along the line were more sensitive than others.

3.3.1 GLK107 at KP94 - 95

GLK107 was monitored between KP94 and KP94.558. The area was noted for having MSA tools and IA pottery, and Umlando were concerned that subsurface features would occur.

Finds: No additional finds

Demarcated features: No demarcated features

3.3.2 GLK106 at KP94 – 95

GLK106 was monitored from KP94.625 to KP264.680. The area was noted as having MSA tools while LIA /HP pottery was observed northwest at GLK108.

Finds: No additional finds

Demarcated features: No demarcated features

3.3.3 2930CB066 at KP96

2930CB066 was monitored from KP95.545 to KP95.765 the area was noted as having MSA tools, and northern section consisted of the original farm gateway and an old pin-cushion euphorbia. Umlando had to confirm that the gateway was not in the RoW. The *Euphoria ingens* is often associated with human remains in historical Zulu society, and thus Umlando monitored this area.

Finds: No additional finds

Demarcated features: No demarcated features

3.3.4 GLK105 at KP96 – 97

GLK105 is located between KP95.879 and KP96.474. This site is the ruins of the original Ashburton farmhouse. The RoW occurs below the farmhouse 'boundary'; however the area was monitored for potential historical middens. This area was also a possible extension of the site 2930CB 067 that required monitoring (discussed below).

Finds: the ruins of a bricked furrow occurred on the edge of the RoW and extended ~2m into it. This structure was part of the farm complex.

Demarcated features: The bricked furrow was demarcated with poles and danger tape, with instructions for it to be fenced off and not damaged.

3.3.5 2930CB067 at KP96 – 97

This site is located between KP96.400 and KP97. The site is mainly an EIA site dating to ~1500 years ago. The site is an Msuluzi Phase village that was partially excavated in 2001 (Anderson 2001), as well as a MSA scatter. The site had already been disturbed by two Petronet lines; however the 2001 excavations uncovered several intact features and pots adjacent to the original Petronet line. Since the site had already been excavated, yielding a substantial sample size, Umlando decided that monitoring in this small area would suffice.

Finds: Several concentrations of pottery were observed along the northern section of the site, and these were sampled. In addition to this MSA and LSA stone tools were observed. These included generic flakes and cores related to that time period, as well as a LSA adze.

Demarcated features: No features were demarcated.

3.3.6 GLK094 at KP216-217

This site was monitored from KP216.442 to KP216.697. The site was initially thought to pre-date the 1850s due to its unique architecture; however the excavations and subsequent surveys placed the site from at least the 1950s to 1980s. Very few artefacts were recovered from the excavations, as was expected since the RoW was moved to run adjacent to the R103 as a direct result of the site.

Finds: No additional finds were recovered during the monitoring.

Demarcated features: Two features were demarcated before the RoW clearance. Both features have the survey reference of GLK094_306, while their feature numbers are 2283 – 2289 & 2290-2297. The former is the foundations of a house, while the latter is the foundations of a cattle byre. The house foundations have a possibility of human remains underneath the floor, while the byre was part of the site's unique architecture.

The two features were left undamaged after RoW clearance. There are no photos of these two features due to the tall grass that obscured the foundations. They were; however, surveyed by the land surveyor.

3.3.7 GLK092 at KP217 – 218

GLK092 was monitored between KP217.221 and KP217.822. The site was first surveyed with a land surveyor, then excavated, and then monitored during RoW clearance. Several features were monitored during the RoW clearance. This included all possible graves that were excavated such as GLK092_317, GLK092_318, GLK092_319, GLK092_320, GLK092_321 and GLK092_322. These features consist of graves, walls and cattle byres, and

were cleared by means of our excavations and then a TLB/back actor. The latter HMM was considered to be more agile than the bulldozer and grader.

In retrospect Umlando believe some of the walls are more recent in age and were used to divert water, as these are in line with the (ploughed) drainage lines.

Finds: A few additional pottery sherds were observed during the RoW clearance.

Demarcated features: Only one feature was demarcated and this was KP092_322. This feature consisted of a very low stone walled byre and a grave. This feature was not damaged during RoW clearance.

3.3.8 GLK090 at KP222

GLK090 is located from KP222 to KP223.110. The site forms part of several overlapping sites in this area. These sites include the possible outskirts of the Frere Military Camp from the 2nd Anglo-Boer War and labourer houses with graves dating from at least 1945. The area was also surveyed with a metal detector before RoW clearance since it was related to Frere Military camp and the ambush site of the train carrying Sir Winston Churchill. Several graves were observed during the metal detector survey; however these were outside of the RoW. The possible graves at KP222.105 were fenced off during RoW clearance.

GLK090 (extension) at KP222-223.

Finds: Several modern finds were recovered during the metal detector survey and RoW clearance. These included metal tent pegs, locks (with key), and generic rusted metal objects.

Demarcated features: All of the (possible) graves within the RoW were demarcated. No features were demarcated. None of the graves were damaged during RoW clearance.

3.3.9 GLK128 at KP223 – 225

GLK0128 is located from KP223.164 to KP224.144. The site was noted as being sensitive as it is related to the 2nd Anglo-Boer War. This area is the flank of one of the Boer positions along the hill, when the train with Sir Winston Churchill on it, was ambushed. The area was surveyed with a metal detector before, and monitored (with metal detectors) during, RoW clearance.

Finds: No additional finds were observed.

Demarcated features: No features were demarcated.

3.3.10 GLK078 at KP237 – 239

GLK078 is located between KP237.577 and KP238.680. GLK078 was initially excavated along the centre line. Few artefacts were found during these excavations and monitored (with metal detectors) during RoW clearance.

Finds: The area was monitored during RoW and a few more pottery sherds were observed.

Demarcated features: Two cattle byres, and two areas containing engravings were fenced off and demarcated. These areas were not damaged during RoW clearance, but the one area with engravings was damaged during the construction phase.

3.3.11 GLK122a-d at KP262.700 – 264

GLK122a-d occurs between KP262.750 and KP263.840. The site was partially excavated and then monitored during RoW clearance.

Finds: A few fragments of 20th century porcelain was located, as well as a whet stone. These occurred along the southern side of the hill, or GLK122b.

Demarcated features: Several features were demarcated before RoW clearance with fencing and barbed wire. These features include:

- GLK122b_1_1-4
- GLK122b_3_2666-2676
- GLK122b_4_2677-2678
- GLK122c_336_2636_2647
- GLK122c_336_grave (noted after surveyor recordings)
- GLK122c_337_2664_2665

Subsequent to RoW clearance, the following sites (all graves) had been completely removed:

- GLK122b_4_2677-2678
- GLK122c_336_grave (noted after surveyor recordings)
- GLK122c_337_2664_2665

3.3.12 GLK123 at KP263 – 264

GLK123 occurs between KP264.100 and KP264.280. This site was partially excavated before, and monitored during, RoW clearance. The monitoring concentrated on the main cattle byre, as well as other features that could have been granary pits or graves.

Finds: No additional finds were observed

Demarcated features: No features were demarcated.

3.3.13 GLK124 at KP264

GLK124 occurs between KP263.900 and KP264.100. This site was partially excavated before, and monitored during, RoW clearance. The monitoring concentrated on the features that could have been granary pits or graves.

Finds: No additional finds

Demarcated features: No features were demarcated.

3.3.14 GLK125 at KP265

GLK125 is located between KP264.900 and KP265.030. The site was monitored during RoW clearance as there was a LIA cattle byre with two graves on the edges of the RoW. These features were demarcated.

Finds: No additional finds

Demarcated features: The cattle byre (GLK125_46) was demarcated on the outside as the two graves were located within the byre. These features were not damaged during the RoW clearance.

3.3.15 GLK118 at KP268 – 269

GLK118 is located between KP268.590 and KP268.592. The line was rerouted as there were two sets of human graves. The RoW was placed between the graves, and the graves were outside of the RoW. The graves were indirectly damaged by the construction phase when the spill from the trenching was placed over the graves.

Finds: No additional finds

Demarcated features: They were not demarcated with fencing, but were demarcated with the Red-White painted fence droppers Umlando initially used.

3.3.16 GLK066 at KP269 – 269.500

GLK066 occurs between KP 268.807 and KP269.210. The site was excavated before RoW clearance where only one feature occurred within the 30m. All the other features such as cattle byres and graves were located outside of the RoW. The site was monitored during RoW clearance.

After RoW clearance one area was widened for a stock pile area. Two graves and one cattle byre (all dating to the LIA) were destroyed in this process. This occurred between KP269.075 and KP269.150. These features were demarcated with red-white pole droppers before the RoW clearance. There was no need for more visible demarcation as the RoW itself was a boundary with fencing on each side.

Finds: No additional finds were observed,

Demarcated features: No features were demarcated within the RoW.

3.3.17 GLK063a at KP273.500 – 274.500

GLK063a is located between KP 273.710 and KP274.276. The RoW area was not excavated, as only modern graves occurred within it. There was no social impact assessment for these graves and they could not be removed as they date to the 1950s to 1980s. It was decided that it would be better to demarcate the graves, and slightly reroute the RoW.

Finds: Several modern finds were observed during RoW clearance. These included enamel bowls/plates, bicycle cog and spokes, shoes, etc.

Demarcated features: The following features were demarcated:

- GLK063a_161_956-959
- GLK063a_139_817-820

The following graves resulted in a small rerouting of the RoW:

- GLK063a_132
- GLK063a_133
- GLK063a_135
- GLK063a_141

None of the graves or features was damaged during the RoW clearance. The graves at GLK063a_139 were covered with trench spoils during the construction phase (discussed below. Umlando were fortunately on site just before the graves would have been totally destroyed by construction equipment.

3.4 Graves

Several graves were found between the original survey and the construction phase. These graves were missed for two main reasons. First, the vegetation, especially in KZN, was too dense at the time of the survey to observe old graves, unless Umlando was physically taken there. For example, in some areas the grass was over 2m in height, but the graves were only 10-50cm above surface, and thus were invisible. Second, the original survey had a buffer zone of 400m, but a limited time to undertake the survey. It was thus not possible to cover the entire area, but only to use experience to note sensitive areas and survey those. Given these two factors, the line route, specifically the RoW, was resurveyed by an ECO and one of the NMPP staff. This was also undertaken at a different season when the grasses/vegetation was much lower. All cairns (natural or human), "piles of rocks", circular stone structures, or comments from a community, were passed onto Umlando. Each query had a GPS co-ordinate, basic photos of the feature, and a brief description. In this way Umlando could make an initial assessment of the feature, and decide if a site visit was required. Our policy was if there was any doubt about a feature, then it would require a site visit. On occasions Umlando would resurvey an area with the ECO or engineer and re-assess several sites. On several occasions the site foreman would inform us of possible graves when they did their pre-construction walk.

A second reassessment was inadvertently undertaken during the metal detector surveys. These areas could only be surveyed, after the grass had been burnt, or at the end of winter. Since the metal detector survey was undertaken at a slow pace over the entire affected RoW, many more graves were observed. This occurred before RoW clearance. This is further discussed in detail under 'CONCLUSIONS AND RECOMMENDATIONS'

A final problem area in the management of human graves is that of contemporary rural and peri-urban communities. In several instances the human graves were unmarked cairns, often hidden by vegetation, or unmarked graves below the surface. These are near impossible to

observe in a survey unless a member of the community informs the team about the graves. Understandably the client has to take all claims seriously; however, there were occasions when the claims were dubious. All of these types of graves are less than the 60 year limit, and thus fall under the social impact assessment side. The standard response for all claims of human graves was as follows:

- Claimant needs to provide a death certificate, and thus name, of the deceased.
- Claimant needs to provide proof that the deceased was buried in this location. This may be harder than what it seems, but normally there would be municipal records or notes from the Tribal Authority, or land owner.
- Claimant needs to provide an indication as to where the burial was located, if not proof.
- If the 'grave' was covered by topsoil or spill, then the area would be systematically cleared to attempt to locate the graves.
- If graves were observed or proven to exist, then (non-monetary) compensation would occur.

The aim was to provide a balance that protects the claimant and the client in a reasonable manner. At no stage was this given to be the only solution, but the best cordial arrangement. All of these claims came from Pietermaritzburg to Durban side of the line.

This section of the report deals with all graves that were recorded in the RoW, after the original survey and several meters outside of the RoW. **Umlando has not undertaken a site visit to all of the graves, especially those that are more recent in age, as this is not part of our Terms of Reference. The Heritage Audit will note these sites and their condition.**

3.4.1 KP3.500

These graves were located under dense bush adjacent to the canal and in the middle of a highly industrialized area of Wentworth. The area has been occupied by homeless people for a while, who claimed that several human graves occurred in this area. These people had subsequently vacated their "premises" and could not be recalled for an interview regarding the graves. The ECO had barricaded the area and Umlando had a site meeting regarding options for the alleged graves. I used the same principle for determining human graves in a heritage perspective.

Some of the graves were mounds of sand with small rocks as head/foot stones. These are probable graves (fig. 70). There are ~10 of these mounds in the area. A person living in the bushes mentioned to the ECO that several of the rock piles (of industrial rubble) were also graves. These were dubious graves, but treated as such until proven otherwise.

The client was given two options for these graves:

- Contract an undertaker to excavate each 'grave' to determine if there were human remains. If human remains were to be found, then the undertaker would not disturb the remains, and close the excavations. This also gave room for compensation claims.

- The area was to be demarcated and the RoW moved to the north. This involved removing the concrete fencing of the adjacent property for the HME to pass through (fig. 71).

The result was to remove the fencing and not disturb the assumed graves.

Fig. 70: Possible Graves at KP3.500



Fig. 71: Aerial View Showing Route Re-Alignment at KP3.500



3.4.2 Graves identified by the community

Several graves were identified by the community before, or during, RoW clearance. All of these are recent (i.e. less than 60 years old). These graves were recorded and noted by NMPP. The graves were demarcated when noted. Only one grave (KP37.090) was slightly damaged when the topsoil was skimmed. The grave was not clearly visible and marked and was hidden by low bushes. The grave was demarcated and not further impacted

KP28.600 is located at KP28.725. There is no associated settlement.

KP30.800 is located at KP30.850. It appears to be outside of the RoW.

KP31 is located at KP31.206. The grave is located amongst trees beside the RoW.

There are two graves near each other and are located at KP37.070 and KP37.128. KP37.070 is ~8m outside of the RoW, while KP37.128 appears to be on the edge of the RoW. This grave may be the same as B34G (see below).

Comment [HL9]: Umlando should be able to say if it is or is not?

Comment [u10]: Never seen it as it was recent grave and not part of our ToR. I can only view from Google earth and estimate

KP37.950 is located at KP37.928. This grave was not well marked and hidden amongst bushes. The person, to whom the grave is related, only informed NMPP during RoW clearance of its existence. The grave was demarcated after it was **noted** and no further impact occurred.

Comment [HL11]: Is this all that was required

Comment [u12R11]: As previous comment. As far as we know there were no further complaints

KP39.500 is located at KP39.185 and consists of several graves within the RoW. The graves were clearly marked.

KP39.600 is located at KP39.276 and consists of several graves within the RoW. The graves were clearly marked.

KP42.100 is located near KP42.093. The site consists of two areas of multiple graves within the RoW. The graves were clearly marked.

KP73.200 is located at KP73.176, KP73.215 and KP73.365. The first two areas consist of stone cairns that appear to be graves. These were demarcated (fig. 72) and treated as being graves. The third site was not a grave, but was demarcated nonetheless.

Fig. 72: Possible Graves at KP73.200



KP75 is located at KP74.990. The site consists of a single grave within the RoW. The graves were clearly marked.

KP75.600 consists of two sets of graves near KP75.760. The settlements relating to these graves occur on the 1937 aerial photographs and the 1968 1:50 000 topographical maps.

KP133 is located between KP133.000 and KP133.675. The graves are unconfirmed, but local residents have made a claim that one (or several) graves have been demolished. The 1973 and 2000 topographical maps, as well as the 1937 aerial photographs indicate that this area has been used for pasturage and then private land. There is no indication of any settlement in this area, unless it post-dates 2000.

KP200.300 occurs at KP200.283. This has not been confirmed as being a grave, but was demarcated.

3.4.3 Golder Graves

Several recent graves were recorded by Golder and Associates in the Golokodo Area. Umlando did not record or visit these graves during the contract as they are recent graves and did not form part of the ToR., but any of the graves near the RoW will be visited during the heritage audit. Following is a brief description of these graves near the RoW:

- C21G is located at KP35.393 and is a modern grave. The grave is associated with a settlement that is on the border of the RoW.
- B34G is located at KP37.115 and is just outside of the RoW.
- C13G is located at ~KP37.700 and is just outside of the RoW.
- B60G is located at ~KP39.025 and is just outside of the RoW. There is a settlement associated with this grave.
- B66G1 is located at KP40.110 and is just outside the RoW. There is a settlement associated with this grave.
- B66G2 KP40.137 and is just outside the RoW. There is a settlement associated with this grave.
- A88G and A88G1 are located near KP41.365. There is a settlement associated with these graves.
- C58G is located at KP43.850. There is a settlement associated with this grave.
- A107G is located at KP48.654 and is located on the edge of a maize field near the right of way.
- A109GB is located near KP48.020 and appears to be just outside of the RoW. There is no associated settlement.

3.4.4 Graves recorded by Umlando

In addition to the above, Umlando recorded another ~135 grave (yards) along the route since the original survey. Table 3 summarises all of these graves and the documentation is available on request and has been submitted to NMPP, Amafa KZN and SAHRA. A total of 159 graves, or areas with multiple burials were recorded after the original survey. This excludes the graves that were excavated or located outside of the RoW when the area was surveyed with the surveyor. Most of these occur in the northern section of KZN, where the grass/vegetation was very dense, resulting in very poor visibility. Umlando had even stood 5m from some of the larger and more recent graves, and did not see them due to the tall grass. The important point is that these graves were noted and mitigated for before the RoW clearance started. Of these graves only 49 occurred in the RoW. Of the 11 that were damaged, 5 were completely destroyed during the construction phase, while 6 were covered with spoil and could be cleared. All graves that were in, or near, the RoW, will be visited during the close out audit.

Table 3: List of Graves Recorded After Initial Survey⁷

Name	Single or Multiple	Latitude	Longitude	Between KP	In RoW	Route Re-aligned	Damaged since 1st recording ⁸	Visited by HIA
A8G	S	-30.0250552	30.8506321	27-28	N	N	?	N
KP28.600	M	-30.019361	30.835361	28-29	Y	Y	Y	Y
A31G	S	-30.010200	30.825920	30-31	N	N	?	N
KP31	S	-30.008056	30.816778	30-31	N	N	?	N
KP30.800	unknown	-30.0074	30.82011	31-32	N	N	?	N
KP42.101	M	-29.997028	30.717944	42-43	Y	Y	?	N
KP42.100	M	-29.996833	30.718	42-43	Y	Y	?	N
KP43.850	M	-29.995278	30.701222	43-44	N	N	?	N
C58G	?	-29.99514	30.701326	43-44	N	N	?	N
C21G	?	-29.994791	30.7821128	35-36	N?	N	?	N
A88G	?	-29.9946707	30.724194	41-42	N	N	?	N
A88G1	?	-29.9945874	30.7244662	41-42	N	N	?	N
KP39.600	M	-29.993167	30.744083	39-40	Y	N	?	N
B66G1	?	-29.9931062	30.7357013	40-41	N	N	?	N
KP39.500	M	-29.993083	30.745028	39-40	Y	N	?	N
B66G2	?	-29.9930684	30.7354221	40-41	N	N	?	N

⁷ Yellow shading = Golder & Associates, Orange = NMPP, Blue = Umlando

⁸ A '?' refers to the fact that the site has not been visited since initial recording

Name	Single or Multiple	Latitude	Longitude	Between KP	In RoW	Route Re-aligned	Damaged since 1st recording ⁸	Visited by HIA
KP37.950	S	-29.992722	30.757806	37-38	Y	N	Y	N
B60G	?	-29.9924239	30.7463807	39-40	N	N	?	N
C13G	?	-29.9923946	30.7601155	37-38	N	N	?	N
B34G	?	-29.9913976	30.765651	37-38	N	N	?	N
KP37.100	S	-29.991361	30.766361	37-38	N	N		N
KP37.250	S	-29.991306	30.765611	37-38	N	N		N
KP37.200	S	-29.991083	30.765806	37-38	Y	N	?	N
KP48.250	M	-29.987917	30.660417	48-49	N	N	?	N
A109GB	?	-29.9876005	30.6626643	48-49	?	N	?	N
A110GB	?	-29.9875426	30.6596483	48-49	N	N	?	N
KP45.650	M	-29.987139	30.684806	45-46	N	N	?	N
A107G	?	-29.9865794	30.6662659	4748	N	N	?	N
KP3.500	M	-29.917233	30.992191	3-4	Y	Y	?	Y
KP73.1	S	-29.8179722	30.5220556	73-74	Y	N	N	Y
KP73.200	S	-29.817972	30.522056	73-74	Y	N	N	Y
KP73.2	S	-29.8176389	30.5218334	73-74	Y	N	N	Y
KP75	S	-29.802806	30.520444	75	Y	Y	?	N
KP75.600	M	-29.79725	30.520528	75-76	Y	N	N	Y
KP75.601	M	-29.797111	30.520444	75-76	Y	N	N	Y
KP189*13	S	-29.07919	29.97545	189-190	Y	N	Y	Y
319	S	-29.075401	29.97703	189-190	N	N	N	Y
320	S	-29.074337	29.979716	189-190	N	N	N	Y
318	S	-29.0736	29.981635	189-190	N	N	N	Y
317	S	-29.073441	29.981744	189-190	N	N	N	Y
KP200.260		-29.02085	29.9005	200-201	Y	?	?	N
B04a	S	-28.998299	29.893221	203-204	Y	?	N	Y
KP210.100	S	-28.9580194	29.8539167	209-210	N	Y	N	Y
98	S	-28.915797	29.80127	216-217	N	N	N	Y

Name	Single or Multiple	Latitude	Longitude	Between KP	In RoW	Route Re-aligned	Damaged since 1st recording ⁸	Visited by HIA
563	S	-28.913987	29.798248	217-218	N	N	N	Y
562	S	-28.913944	29.7983889	217-218	N	N	N	Y
561	S	-28.913567	29.798302	217-218	N	N	N	Y
578a	S	-28.91285	29.800075	217-218	N	N	N	Y
577	S	-28.912802	29.799706	217-218	N	N	N	Y
1504a	S	-28.912744	29.800078	217-218	N	N	N	Y
559	S	-28.912317	29.798507	217-218	Y	N	N	Y
564b	S	-28.910364	29.795434	217-218	N	N	N	Y
322	S	-28.888445	29.774782	220-221	Y	N	N	Y
321	S	-28.888442	29.774961	220-221	Y	N	N	Y
564b	S	-28.88236	29.765944	222-223	Y	Y	N	Y
VAL25	S	-28.8794444	29.7613611	222-223	N	N	N	Y
VAL24	S	-28.8793889	29.7613056	222-223	N	N	N	Y
VAL23	S	-28.8793333	29.7612222	222-223	N	N	N	Y
005A	S	-28.861568	29.730888	226-227	N	N	N	Y
006A	S	-28.861416	29.731048	226-227	N	N	N	Y
314	M	-28.850311	29.722526	227-228	Y	Y	N	Y
315	m	-28.850112	29.722466	227-228	Y	Y	N	Y
GLK082a	m	-28.79615	29.69095	235-236	Y	Y	N	Y
607	M	-28.78379	29.686523	236-237	N	N	N	Y
96	S	-28.794824	29.687202	235-236	N	N	N	Y
94	S	-28.792591	29.687537	235-236	N	N	N	Y
Grave	S	-28.7761878	29.6826038	237-238	N	N	N	Y
630	S	-28.770652	29.676872	238-239	N	N	N	Y
VAL8	s	-28.7421111	29.6525556	242-243	N	N	N	Y
VAL136	S	-28.7404167	29.6510833	242-243	N	Y	N	Y
VAL135	S	-28.7403917	29.651	242-243	N	Y	N	Y
VAL1	S	-28.7361667	29.64775	243-244	N	Y	N	Y

Name	Single or Multiple	Latitude	Longitude	Between KP	In RoW	Route Re-aligned	Damaged since 1st recording ⁸	Visited by HIA
VAL9	S	-28.7327222	29.6483056	243-244	N	Y	N	Y
KP243.580	S	-28.73255	29.64834	243-244	N	Y	N	Y
VAL3	S	-28.727479	29.650073	244-245	N	Y	N	Y
VAL2	S	-28.727421	29.649688	244-245	N	Y	N	Y
VAL1A	S	-28.726984	29.648957	244-245	N	Y	N	Y
VAL3A	S	-28.7269722	29.6489444	244-245	N	Y	N	Y
VAL7	S	-28.7266944	29.6491944	244-245	N	Y	N	Y
VAL6	S	-28.7259444	29.6488611	244-245	N	Y	N	Y
GLK075 GRAVE	S	-28.71974	29.648031	245-246	Y	N	N	Y
VAL14	S	-28.7190278	29.6499722	245-246	N	N	N	Y
VAL13	S	-28.7185278	29.6510278	245-246	N	N	N	Y
B05a	S	-28.718504	29.650972	245-246	N	N	N	Y
VAL12	S	-28.7182222	29.6506944	245-246	N	N	N	Y
VAL11	S	-28.7180833	29.6508889	245-246	N	N	N	Y
VAL63	S	-28.7171667	29.6480278	245-246	N	N	N	Y
VAL65	S	-28.7171389	29.64875	245-246	N	N	N	Y
063 1	S	-28.717124	29.648793	245-246	N	N	N	Y
VAL62	S	-28.7171111	29.6479444	245-246	N	N	N	Y
VAL66	S	-28.7171111	29.6488056	245-246	N	N	N	Y
VAL067	S	-28.716964	29.64869	245-246	N	N	N	Y
VAL61	S	-28.7168889	29.6481111	245-246	N	N	N	Y
VAL57	S	-28.7101667	29.6438889	246-247	Y	Y	N	Y
VAL55	S	-28.6973056	29.6405	247-248	Y	Y	N	Y
308	S	-28.689033	29.635798	249-250	N	N	N	Y
VAL53	S	-28.6878333	29.6358333	249-250	N	N	N	Y
VAL52	S	-28.6877222	29.6359722	249-250	N	N	N	Y
050 1a	S	-28.687713	29.635962	249-250	N	N	N	Y
VAL51	S	-28.6875898	29.6356514	249-250	N	N	N	Y

Name	Single or Multiple	Latitude	Longitude	Between KP	In RoW	Route Re-aligned	Damaged since 1st recording ⁸	Visited by HIA
VAL50	S	-28.6875833	29.6356389	249-250	N	N	N	Y
VAL47	S	-28.6862778	29.6343056	249-250	Y	Y	N	Y
043 1	s	-28.686265	29.634292	249-250	Y	Y	N	Y
307	S	-28.686165	29.633944	249-250	Y	Y	N	Y
305	S	-28.685989	29.633968	249-250	Y	Y	N	Y
306	S	-28.68595	29.633939	249-250	Y	Y	N	Y
304	S	-28.685459	29.633678	249-250	N	N	N	Y
VAL41	S	-28.6839722	29.6338889	249-250	Y	Y	N	Y
VAL40	S	-28.6836389	29.6336389	249-250	Y	Y	N	Y
VAL42	S	-28.6836389	29.6344167	249-250	N	N	N	Y
VAL43	S	-28.6836389	29.6344444	249-250	N	N	N	Y
VAL44	S	-28.6836389	29.6344722	249-250	N	N	N	Y
41	S	-28.683636	29.634436	249-250	N	N	N	Y
42	S	-28.683632	29.634487	249-250	N	N	N	Y
44	S	-28.683486	29.633903	249-250	N	N	N	Y
VAL38	S	-28.6796944	29.6344722	250-251	N	N	N	Y
VAL37	S	-28.6796667	29.6344167	250-251	N	N	N	Y
GR1	S	-28.6792778	29.6341111	250-251	Y	Y	N	Y
VAL36	S	-28.6789722	29.6343889	250-251	Y	Y	N	Y
VAL35	S	-28.6778333	29.6348333	250-251	Y	N	N	Y
337	S	-28.572714	29.606476	262-263	Y	Y	Y	Y
578	S	-28.572107	29.606459	262-263	Y	Y	Y	Y
569	S	-28.56805	29.605845	263-264	Y	Y	Y	Y
569a	S	-28.5680166	29.6056674	263-264	Y	Y	N	Y
570	S	-28.567739	29.605397	263-264	N	N	N	Y
026A	S	-28.564169	29.607436	263-264	N	N	N	Y
N3	S	-28.550725	29.602088	265-266	Y	Y	Y	Y
B02	S	-28.54958	29.587747	265-266	N	N	N	Y

Name	Single or Multiple	Latitude	Longitude	Between KP	In RoW	Route Re-aligned	Damaged since 1st recording ⁸	Visited by HIA
B03	S	-28.549053	29.584934	265-266	N	N	N	Y
B01	S	-28.547751	29.587893	265-266	N	N	N	Y
A23	S	-28.546721	29.596541	265-266	N	N	N	Y
A03	S	-28.546632	29.596402	265-266	N	N	N	Y
567	S	-28.533641	29.574306	269-250	N	N	N	Y
568	S	-28.533539	29.574299	269-250	N	N	N	Y
009b	S	-28.532789	29.571595	269-250	N	N	N	Y
315	S	-28.532595	29.57446	269-250	N	N	Y	Y
022b	S	-28.532525	29.571776	269-250	N	N	N	Y
314	S	-28.532403	29.574552	269-250	N	N	Y	Y
GLK118A	S	-28.532226	29.579783	268-269	Y	Y	Y	Y
025c	S	-28.5322	29.571564	269-250	N	N	N	Y
026c	S	-28.531931	29.572773	269-250	N	N	N	Y
027c	S	-28.531925	29.572776	269-250	N	N	N	Y
029c	S	-28.500747	29.546637	269-250	N	N	N	Y
KP273.75	s	-28.5000167	29.5485667	273-274	N	N	N	Y
030c	S	-28.499933	29.548218	273-274	Y	Y	N	Y
031a	S	-28.49939	29.548304	273-274	Y	Y	Y	Y
KP273.95	M	-28.4993833	29.5482333	273-274	N	N	N	Y
564a	M	-28.499319	29.546975	273-274	N	N	N	Y
KP274.08	M	-28.49875	29.5462	274-275	Y	Y	N	Y
ABC	M	-28.437489	29.4907617	283-284	N	N	N	Y
019c	M	-28.384048	29.402974	294-295	N	N	N	Y
KP303.900	M	-28.3155139	29.3749306	303-304	Y	?	?	N
KP304.010	M	-28.3145583	29.3750444	303-304	Y	?	?	N
KP344.34	M	-27.9898	29.2501333	343-344	Y	Y	?	N
KP426.130		-27.3820362	29.1005483	426-427	Y	Y	?	N
S349		-27.3563611	29.0615556	431-432	?	Y	?	N

Name	Single or Multiple	Latitude	Longitude	Between KP	In RoW	Route Re-aligned	Damaged since 1st recording ⁸	Visited by HIA
graves	M	-26.5744419	28.4814966	540-541	Y	Y	?	N
GLK008n2	M	-26.5511539	28.4660332	544-545	N	N	N	Y

3.5 Walls

Only one historical wall occurred in the RoW, at KP154.760 to KP154.953. The wall is either related to the original farm buildings or was added onto it in the late 1930s (according to the oral history of the current landowner). The wall is a rectangular boundary wall that will be affected in two places by the RoW. The RoW had to go through this area, as there was a wetland to the east and steep slopes to the west. The management plan was that the RoW could extend up to the wall, however, only a small section of the wall could be broken and recorded and then rebuilt after construction phase. The NMPP requested a 5m wide section of the wall to be removed to allow for construction activity at each wall, and Umlando extended it to 6m for safety.

Before the RoW clearance began, the wall was fenced off and demarcated with orange tape. In addition to this, sandbags were placed against the upper section of the wall to stabilise the walling during the blasting phase. After blasting, the area was cleared of vegetation, and the systematic breaking of the wall began.

A base line was set up through the centre of the wall with a positive and negative side. A base line is a level line used for drawing profiles on archaeological sites. The wall each layer of rocks was given an alphabetical number followed by a numerical number. These were mapped to scale. The underneath left corner of each rock was labelled with its alphanumeric number in permanent marker. The rocks were then placed to the side in groups according to the alphabetical number. Fig. 73-7 illustrates this process. The same method was used at both walls.

The wall was to be rebuilt once construction and rehabilitation phases were completed.

The wall was made from local dolerite rock that was probably quarried from the top of the hill. The method of making the wall was dry stone walling, i.e. there was no cement or plaster as a binder. The initial basal layer was a trench dug into the ground where large boulders were placed as the foundations/ these rocks would have needed oxen or about 4-5 people to move into place. The next layer was a layer of rocks about half the size of the foundation rocks, while the third – fifth layers were a bit smaller. Each layer had two large outside rocks, with smaller rocks placed into the middle and cracks between the rocks.

The final wall was approximately 1m high and 1m wide, and very stable. The making of the wall would have been labour intensive, and it was not a case of just packing rocks on top of each

other. Rather the rocks from each layer fitted on, and around, each other creating a stable platform for each layer.

Unfortunately the wall was bulldozed by a further 12m – 15m by one of the construction teams. Transnet then had to pay for the rebuilding of both walls, and a building company who had some experience in dry stone walling was hired to complete the walls under our supervision. Figures 76 – 78 show the rebuilding of both walls.

Fig. 72: Vegetation Clearance Exposing Southern Wall at GLK097



Fig. 73: Vegetation Clearance Exposing Northern Wall at GLK097

Fig. 74: Upper Half of Northern Wall Removed At GLK097



Fig. 75: Basal Layer of the Northern Wall at GLK097

Fig. 76: Rebuilt Basal Layer of the Southern Wall



Fig. 77: Rebuilt Layer of the Southern Wall



Fig. 78: Rebuilt Layers of the Northern Wall



3.6 2nd Anglo-Boer War Sites

Five areas relating to the 2nd Anglo-Boer War were affected in some degree: the far margins of the Battle of Langverwag, a skirmish at Herbsfontein, The Battle of Vaalkrans, The Sir Winston Churchill Ambush site, and the Royal Mounted Cavalry at Weston. Each area was surveyed with a metal detector, and at a later stage the bigger areas were surveyed with two types of metal detectors. Every artefact was given a number and GPS co-ordinate.

3.6.1 The Skirmish at Herbsfontein

The skirmish at Herbsfontein is unknown, or unrecorded, as one of the major battles. According to Mr. G. Torlage (pers. comm.), minor skirmishes such as these occur all over southern Africa and the accounts of the battles would only be located at the national archives in Pretoria. The 'Skirmish of Herbsfontein' resulted in several rifle and cannon shots being fired. The house was partially burnt down by the British in 1899 (A. Ramos pers comm.). The shells and bullet heads (and in some cases unfired bullets) occur in the fields northwest of the farm. One bullet is of interest in that it the cartridge has been re-used and fired several times.

Fig. 79 indicates the area that was surveyed with a metal detector. The original line went through the main skirmish area and it was re-aligned. Umlando interviewed the landowners regarding the artefacts that they found in the fields in the area. In this way were able to determine the area of the main skirmish. The line was rerouted to the margins of the skirmish area, and surveyed with a metal detector. No artefacts were found in this area.

3.6.2 The Battle of Langverwag

The Battle of Langverwag can be summarised as follows:

"During the second of the new-style drives in the eastern Orange Free State, General Christiaan de Wet decided to break through the British cordon at Langverwag Hill, a point on the line held by the Seventh Contingent. The New Zealand line consisted of small posts of five or six men in small trenches or sangars. On the night of 23-24 February a picked force of guerrillas overwhelmed one of the New Zealand posts, and then turned left and advanced up the hill destroying each of the posts in turn in ferocious close-quarter fighting. The Boers succeeded in opening up a gap through which most of their force escaped.

The New Zealanders, who were reported to have 'displayed great gallantry and resolution', lost 24 men... and 41 wounded - a very high proportion of the 80 men engaged. Despite this setback, the drive was a qualified success, with 50 guerrillas killed and nearly 800 taken prisoner" ('A brief history - New Zealand in the South African ('Boer') War', URL: <http://www.nzhistory.net.nz/war/new-zealand-in-the-south-african-boer-war/a-brief-history>, (Ministry for Culture and Heritage), updated 4-Dec-2007)⁹

⁹ Other sources have it as 14 Boers killed, 20 wounded and undisclosed taken as prisoners with cattle (G. Torlage pers comm. 2008).

Fig. 79: Locality Map of the Skirmish at Herbsfontein¹⁰



¹⁰ White arrow = start/finish of the survey, shaded polygon main skirmish area.

"On the evening of 22 February, the groups of Boers made contact. De Wet decided to break out and chose to fight at once at Holspruit to the south of Vrede. There the two British columns encountered were those of Remington in the west and Byng in the east. The Boers concentrated at the farm Brakfontein, and, soon after sunset on 23 February, set their horsemen, cattle and vehicles in motion.

The Boer force of 800-900 men advanced. In the middle of the force were De Wet and Steyn, behind who were the vehicles, followed by the cattle. On approaching Holspruit, De Wet detailed a force under Ross, Manie Botha and Alberts to ride forward and breach the British line. The spruit was crossed on the farm Kalkrans, and the advance party, skirting the slopes of a spur on the farm Langverwag, attacked the 7th New Zealand Mounted Infantry under Col Porter. Heavy Boer rifle fire enfiladed the adjacent defensive posts.

On top of the spur, the Boers, then with the main body in support, directed their fire on to a pom-pom under Capt Begbie, which, after having been fired at the cattle, jammed and Begbie was killed. The New Zealanders' right flank fell back and formed a fresh front, rallying on the New South Wales Mounted Regiment under Lt Col F Cox. There were no reserves and the only support available were the picquets along the line. The concentration of rifle fire could not halt the stampeding cattle, many of which drove through the British line. At that stage of the action the Boers had breached a gap some 800m wide, through which poured a large number of men. Manie Botha, after guiding his men through, returned to the breach to render further assistance. By the time he rejoined those in the rear the British had rallied their men and made passage through the lines dangerous." (<http://archive.birchanger.com/archive-Watney.html>)

The exact location of the Battle of Langverwag, or Langverwag, is relatively unknown as it consisted of a raiding party and several skirmishes at various locations along the British defence line. The reason for recording this site is that it is at the edges of pipeline buffer, and that De Wet's commandos would have come along this general area (from the south of Vrede). The pipeline may transverse one of these lines of advance.

The line was surveyed with a metal detector from KP384 to KP388. A few metal artefacts were recovered from the survey. All of these were modern artefacts and not related to the battle. One would not expect to find artefacts related to the battle in this section, as the Boers were trying to sneak past the British line, and would thus not have wanted to attract attention so far from the main house. The shaded PolyGram shows the main area of the battle.

Fig. 80: Locality Map of the Battle of Langverwag



3.6.1 The Battle of Vaalkrans

"This area formed the extreme left of the Boer defence line during the time that General Buller's forces were attempting to break through to relieve Ladysmith in January and February 1900. After failing to succeed in their objective in the Spionkop area, the British forces made for the Vaalkrans positions on 5 February 1900. They drove the Boers out of some of their positions forcing them to retire eastwards. From there and from the northern part of Vaalkrans they grimly resisted the British forces, inflicting considerable casualties for a period from 5 to 7 February 1900, until the British retired back across the Thukela River. The Boer positions lay to both east and west of the line while the British positions and cemetery all lie west of the line."

Watt (1985) also describes the battle and its significance in detail. The preparations by the British began on 27 January 1900, where they positioned various guns (12 and 15 pounders,

and two 5" guns). The Boer forces were made up of various commandos from the Free State and Transvaal Republic. The battle was significant for the Boers as there were 3 600 Boers versus 21 402 British. The British also had more weapons: 72 guns (cannons) and 19 machine guns versus ~7 cannons¹¹. The odds thus favoured the British. Despite the heavy advantage, the British forces retreated from the Vaalkrans area after two days of battle. The defeat of the British at the Battle of Vaalkrans was thus a significant victory for the Boers. At the end of the battle between 330 and 370 British and 39 Boer (excl. five missing in action) soldiers had been killed (Watt 1985). The entire battle has been mapped by the British where the localities of the various fortifications and positions are clearly located.

The British did, however, leave a token force further south near the Thukela River. This was under the command of a Colonel Beatheun. His command was to make the Boers believe that the British were still on campaign in this area (G. Torlage pers. comm.). This may tie in with the historic wall at GLK072.

The battle covers an area of ~10km x 4.5km in area and thus covers the tops of hills, slopes, flat areas, and river crossings. Many of the sangars, gun mounts, and general fortifications have not been surveyed and mapped, and are thus unknown.

Fig. 81 shows the area covered by the metal detector. This is an area 13km long and 30m wide: from KP241 to KP254. A group of four archaeologists covered this area over a 2 week period. The initial metal detector survey covered the pipeline trench. This was undertaken by walking twice on one side of the line, and then twice on the other side. In this away a ~4m wide stretch was covered. Umlando were later informed that the RoW would be 30m wide with 30cm of topsoil removed. Umlando first decided that Umlando would walk behind bulldozers and graders, with metal detectors, and then observe if any artefacts were detected. Umlando tried this in one small area ~1km, which had been systematically surveyed with one metal detector the previous year, and decided to rather work ahead of the bulldozers. This was for safety reasons, and because the bulldozers had a large impact, and tended to place all of the artefacts into the spoil heap.

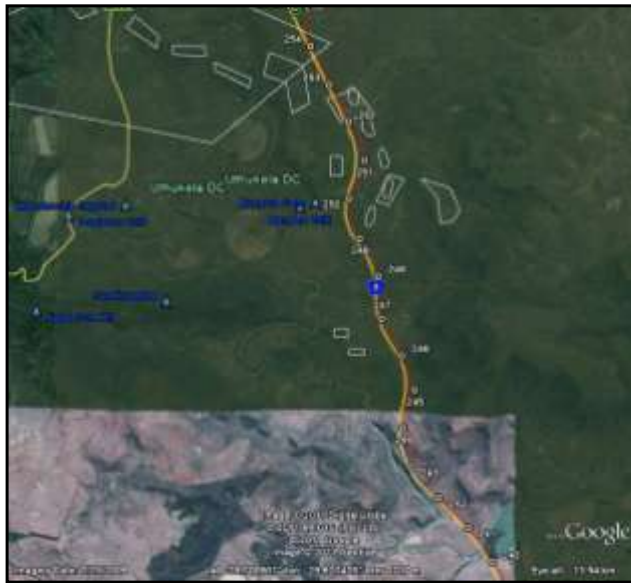
Several new sites, especially graves, were recorded during the survey, as the grass had been recently burnt. These were noted, and the line was re-aligned. A total of 52 artefacts, probably relating to the 2ABW, were recovered from this section of the battlefield.

It was pure coincidence that the main metal detector survey began on the 5 February 2010. This part of the work consisted of surveying in the lines for the RoW fencing. Umlando had to issue a safety notification for potential unexploded bullets and/or bombs in this area. The construction of the RoW fencing could have detonated one of these items. Umlando did find one unexploded bullet on the battlefield and were informed that they are highly unstable. The safety notification and pre-emptive work was thus justified. The survey along the fencing line did not locate any artefacts.

¹¹ 9559 shells were fired by the British in these two days.

Fig. 81 illustrates the area surveyed as well as some of the main areas in the battle held by the British (blue) and the Boers (white polygons). One must note that these positions are not fixed, and that during the actual battle the lines would have changed several time, even within one day. This figure illustrates the positions at the start of the battle.

Fig. 81: Locality Map of the Battle of Vaalkrans¹²



A Total of 51 metal artefacts were recovered from the battlefield. While most are directly related to the battle itself, some artefacts may be more recent, e.g. the possible 'tractor peddle'. The artefacts have not been handed over for detailed analyses and thus the 'tractor peddle' could belong to a moving part of a cannon. Table 4 lists the artefacts recovered from the metal detector survey.

The artefacts were concentrated between KP250-252, and some between KP246 and KP247.

¹² White polygons indicate Boer locations, blue arrows indicate British Locations

Table 4: List of Artefacts from the Battle of Vaalkrans Metal Detector Survey

Name	Comment	GPS Coordinates	
		Latitude	Longitude
172D	Bomb/irrigation casing?	-28.75125	29.665222
64	Case Gin bottle base (sherd)	-28.717126	29.647973
60	metal wedge	-28.71646	29.64755
160D	Lock	-28.712696	29.645459
59	shotgun casing	-28.712684	29.645673
141D	Brass ID tag (Soldiers' regiment nr) Private Benson B7443	-28.711117	29.644408
140D	Base of Long Tom casing	-28.709579	29.643214
139D	Bolt	-28.705583	29.641203
138D	Grape shot	-28.705566	29.641303
134D	Grape shot	-28.695368	29.640025
133D	Handmade grape shot?	-28.695368	29.640134
136D	Grape shot	-28.694216	29.639758
137D	Metal gun clasp	-28.694206	29.639787
135D	Unfired Martini Henry casing with bullet	-28.694074	29.639649
56?	?	-28.69266	29.638941
49?	?	-28.688447	29.6358
132D	Bronze with cricketer	-28.682992	29.633575
131D	metal clasp with Prince of Orange insignia	-28.682801	29.633501
39	metal cap	-28.682272	29.633416
34	Metal sherd/shrapnel?	-28.677823	29.634791
130D	Iron object with the word RANSON	-28.676983	29.63491
33?	?	-28.67645	29.6354
129D	rivet	-28.676002	29.635603
126D	Bullet	-28.674504	29.637039
128D	Bullet Martini Henry	-28.67448	29.636876
127D	Brass top of snuff box. Illegible embossing	-28.674478	29.637142
32	metal sherd	-28.673028	29.637519

Name	Comment	GPS Coordinates	
118D	Casing sherd	-28.672833	29.637556
115D	Metal object	-28.671515	29.636799
125D	Flat piece of iron	-28.669817	29.636767
123D	Bullet head	-28.669695	29.636672
124D	Metal fragment	-28.669663	29.636936
122D	Suspension?	-28.668954	29.636852
121D	Bomb/irrigation casing	-28.668794	29.636776
119B	Remains of a bullet that made impact	-28.668793	29.636588
120A	Large square bolt	-28.668724	29.636728
312	Metal wire	-28.666416	29.634518
311	Tin	-28.666323	29.63472
123	Cartridge? Bullet?	-28.666296	29.634826
303	Metal object	-28.666292	29.635185
28	Bomb/irrigation casing	-28.66627	29.634763
310	Tractor brake	-28.665999	29.634234
31	Long Tom casing	-28.665198	29.63376
313	Tin	-28.664481	29.633492
30	Bridal tack	-28.663633	29.632984
316	Flat bullet	-28.662503	29.632314
315	Martini Henry Bullet	28.66268	29.632363
314	Pedal	28.66443	29.633535
307	Belt Clip	28.666111	29.635098
309	Grape shot	28.666147	29.635081
308	Bullet	28.666297	29.634957
22	Railway rivet/ tent peg?	28.87833	29.761004

The most common artefacts were bullets, grape shot (from the larger shells), and Long Tom casing fragments. Most of the bullets had been fired and had either hit something, or missed and lost momentum. Apparently the curved bullet is an example of the latter. One complete unfired 'Boer' bullet was recovered. Most of the bullets appear to be from the Martini Henry. Fig. 82 shows some of the bullets

Fig. 82: Bullets, Shot, and Cartridges from the Battle of Vaalkrans



Fig. 83: Shell Casings from the Battle of Vaalkrans¹³



¹³

Bottom left may be old irrigation pipe

Document Location On J. Drive

Most of the grape shot was located around KP247 and KP248, while large shell fragments were located to the north between KP250 – 252. The shell casing may be either from the Long Tom, or from the British shells, and this still needs to be verified. The grape shot is probably from the British shells. Two metal fragments could be either shell casings or part of old irrigation piping.

Four interesting metal objects were found. These are: a snuff box (fig. 84a), Prince of Orange clip (fig. 84b), and a 'Cricketer badge' (fig. 85), British 'tag' with a serial number (fig. 86).

The 'snuff' box is the lid of a small brass artefact. There is an insignia, or writing, on the lid; however Umlando undertook basic curation, and did not want to damage the artefact.

Fig. 84a: 'Snuff' Box



The 'Prince of Orange' artefact is made of a heavy metal (alloy). The Dutch were known to support the Boers, however Umlando cannot state whether this was from a Dutch soldier, or someone who was of Dutch descent. The coat of arms is that of a lion holding seven arrows in the left paw and a sword in the right. This coat of arms was in use in the 19th century to at least the early 20th century, and is originally associated with William I. The current Dutch coat of arms incorporates this insignia.

Fig. 84b: Metal Clasp with 'Prince of Orange' Coat Of Arms



The 'badge' with a cricketer is an enigmatic find that occurs ~20m from the Prince of Orange clasp (fig. 85). The Dutch, Boers and the British played cricket so Umlando cannot ascribe the badge to anyone specific. The important feature is that the bowler is bowling underarm, a technique used in pre20th century cricket, as over-arm bowling became popular in the early 20th century. Umlando could not get further detail on this badge, without more detailed research.

Fig. 85: Cricketer Badge



A brass 'tag' with the numbers B 7443 was located near the southern part of the battlefield. An internet search associated the number to Private H Benson of the New England Mounted Rifles (http://www.justdone.co.za/ROH/main.php?page=View_Person&PersonNumber=). This name and the association with the Battles of Colenso, Spionkop and Vaalkrans have not been confirmed. This was located at KP246.355, which is ~4km south of the main battlefield.

A non-metal find during the survey was that of a Case Gin bottle. These bottles date to the 1890s. It was found next to a grave, but also along the route the Boers used after the Battle of Colenso. It may be associated with either the grave, or the Boers.

Fig. 86: British ID 'Tag'



The rest of the artefacts include metal objects that may or may not relate to the battle of Vaalkrans.

3.6.2 The Frere Train Ambush

On the 15 November 1899, Boer forces ambushed an armoured train near Frere. In the ensuing battle, Sir Winston Churchill, a war correspondent, was captured and taken prisoner. He was imprisoned overnight at Doornkop (the site called GLK083b in the original survey), and then taken to Pretoria. He escaped Pretoria and ended in Mozambique, with a large reward for his recapture offered by the Boers. The area is important for several reasons.

- It is another skirmish related to the 2ABW and is thus automatically protected.
- Several soldier's graves, and now a memorial occur here.
- Sir Winston Churchill was captured here (and not killed).
- The Frere military camp occurred to the west.

The surveyed area occurs between KP222 and KP224. The area between KP221 and KP222 had been severely disturbed, by roads and railways, and was not regarded as being significant.

Table 5 summarises the artefacts located during the survey. Few, if any, of the artefacts relate to the 2ABW, and specifically to the farm labourers occupation from the 1930s onwards. The line is situated along the extreme eastern Boer flank, and would thus have minimal impact.

Table 5: Artefacts from the Churchill Train Ambush Site

Name	Comment	GPS Coordinates	
		Latitude	Longitude
169F	"The Crown Patent" Double Hanged lock	-28.8795	29.762444
170F	Metal screws, glass? porcelain sherd	-28.879111	29.762139
27	Metal object	-28.878397	29.761321
27	Metal object	-28.878397	29.761321
22a	Flat bullet	-28.87833	29.761004
19	Metal tent peg	-28.877878	29.760361
167F	Pottery	-28.873883	29.753383

3.6.1 Weston College

The No. 6 Remount Depot (1899-1902) was situated at the Weston College during the 2ABW. Most of the rubbish dumps occur to the west of the college, and are currently illegally excavated for metal. The line occurs along the eastern side of Weston College, in an area that is not known for much activity. Nonetheless, it was surveyed with a metal detector to make sure it could be impacted. Table 6 summarises the finds. It was not surprising that most of the nine artefacts related to horses, e.g. horse shoes and a bridal bit. The one find consisted of a brass button with the British coat of arms (fig. 87). It is called a 'General Service Button' that dates from 1902 – 1952.

Fig. 87: Button with British Coat Of Arms

Table 6: Artefacts from Weston College

Name	Comment	GPS Coordinates	
		Latitude	Longitude
158D	Horse Shoe	-29.208441	30.041848
159D	Bridal horse tack	-29.208299	30.041732
157D	Weston metal object	-29.208164	30.041887
156D	Iron plate with holes	-29.207826	30.041766
155D	Horse shoe	-29.207717	30.041767
152D	Iron object (pot leg?)	-29.207414	30.04161
154D	Bridal tack	-29.206901	30.0416
153D	Horse shoe	-29.20685	30.042000
155D	Button	29.207717	30.041767

3.7 Trees

Several trees occur in the RoW that form part of the cultural landscape. That is, the landscape has been modified by people often to invoke a (historical) memory. For example, using alien trees to line driveways, farm boundaries, etc. These cultural landscapes are protected by the heritage legislation.

Four sites were identified as having cultural landscapes during the initial survey: GLK101, GLK102, GLK103, and GLK104. The line was moved so that none of these would be damaged. The trees predate 1937. This occurred between KP170 and KP177. Fig. 88 and 89 show these two areas. GLK103 are pine trees related to Weston College, while those at GLK104 are oak trees.

The trees were not damaged during the RoW clearance, as the RoW had been moved away from the trees. KZN Heritage should note that Weston College is removing felling the trees that Umlando indicated should be saved.

Fig. 88: Row of Trees at GLK103



Fig. 89: Row of Trees at GLK104



3.8 Buildings

No buildings (recent or historical) occurred in the RoW, and none were damaged during the construction phase. Umlando did survey some historical buildings at the beginning of the project. The management plan was to survey all buildings within 100m of the line in case they were damaged. However, after Umlando were informed about the RoW, and how the 30m wide impact zone, Umlando changed our initial management plans to only mitigate those buildings within the RoW. In some instances the line had been moved after the mitigation was undertaken. These sites are: GLK008, GLK009, GLK010, GLK012, GLK013, GLK015, GLK022, GLK025 and GLK035a.

3.8.1 GLK008

The site is located between KP544 and KP545. GLK008 was divided into two areas: on top of the hill, and below the hill (fig. 90). The lower part of the site consists of two small byres (fig. 91) approximately 80m southeast (and upslope) from the two houses. These byres are at right angles to each other and are 5m x 3m in diameter. The pipeline passes between these two byres and the house. The houses consist of two rectangular houses and a long low stone wall. The smaller house is a mud-brick construction with some mud plaster on both sides of the wall. The main house is built from sandstone blocks with a mud plaster on both sides of the wall (fig. 92). The interior dividing walls do not appear to have plaster, although this may have disintegrated. Only two exterior walls, and a small section of one interior wall, of the main building, remain. The rest of the building has collapsed. The main entrance has been filled in, and presumably relocated to another part of the building. Fig. 93 illustrates the site. The site is outside of the RoW.

The upper part of GLK008 consists of stone foundations, where there were presumably wattle and daub walls. There is no visible evidence for mud-brick structures. There are four rectangular features of various sizes (fig. 94), and a larger central foundation. There is a stone circle foundation and a stone cairn to the north of the main buildings (fig. 95). A cemetery occurs ~120m north-northwest from the low stone walls of lower GLK008¹⁴. This cemetery was omitted from the original survey, but the pipeline does not affect it, as the nearest point to the pipeline is ~120m away.

Fig. 90: Site Map of GLK008



¹⁴ S26°33'2.68", E28°27'57.23" to S26°33'4.15", E28°27'57.72"

Fig. 91: Small Kraal Upslope of GLK008



Fig. 92: Two Types of Structures at GLK008

Fig. 93: Plan of Lower Houses at GLK008

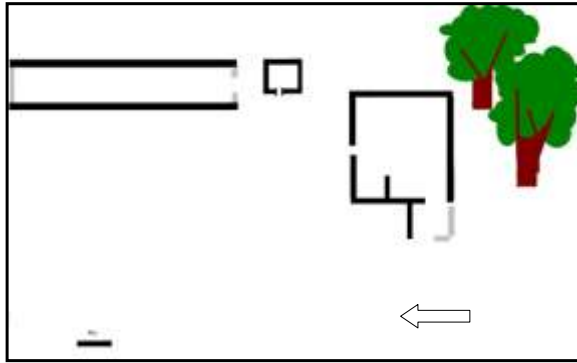


Fig. 94: Stone Foundations at Upper GLK008

Fig. 95: Stone Circle & Cairn at Upper GLK008



3.8.2 GLK009

The site is located between KP544 and KP545. GLK009 is located at the base of the koppie on the south-western slope, and northeast of the stream in front of it. The site consists of three stone walled houses and one byre. Some of the stone walling is amongst the blue gum trees. There are normally graves associated with these types of settlements, as in GLK010, but Umlando did not observe any. The house probably dates to the historical period.

The site has been mapped and photographed. The site consists of several buildings and features. The "entrance" to GLK009 appears to have been from the northwest (towards GLK008), and is marked by two stone plinths (fig. 96). The plinths are about halfway between GLK008 and GLK009, and ~2m away from the centre of the pipeline and may be affected. While the plinths are not significant, there should be little impact on them. If they are knocked over, or removed, for the pipeline, then they should be erected in the same position afterwards.

GLK009 consists of two houses and a few byres. The first is a rectangular stone-walled house 11m x 5m in size (fig. 97). There is an internal dividing wall with a door, along the southern part of the house. The main door and two windows are southwest facing, while another window is south facing. The site is outside of the RoW.

Fig. 96: Two Stone Plinths at Upper GLK009



Fig. 97: North & South Facing Wall of GLK009



The main part of GLK009 consists of a house with several rooms and stone walled byres. This is ~100m southeast of the other house. The main house is ~7m x 5m in size (fig. 98). The windows are southwest facing, while the main door is east facing. There is a dividing wall in the interior of the house with a presumed doorway. There are two stone cairns outside the windows of the house. These initially appear to be small graves; however, they are probably related to some other activity¹⁵. The house has had three rooms added on at a later stage: these are at the northeast, southeast and southern sides of the house. Only the southern room is mostly intact. All rooms, or houses, have plastering on the inside and outside walls.

Fig. 98: Southern Room Extension and Plastering at GLK009



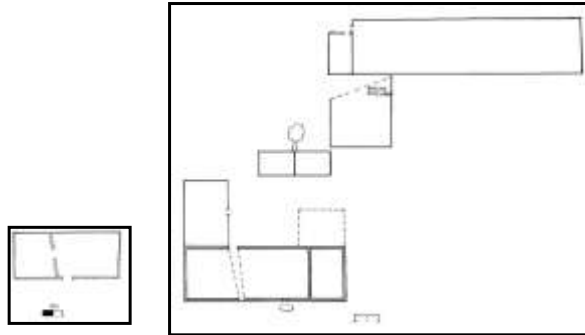
To the east of the house, and against the rocky hill, are several byres. The first two byres are small (3m x 2m) byres that abut a natural rock outcrop. To the southeast of these two small byres is a large (17m x 6m) with three smaller byres attached to it (fig. 99). These smaller byres are 2m x 3.5m, and 4m x 5m in size. All of these use the natural rock outcrop as part of the walling. Fig. 100 illustrates these houses.

¹⁵ The settlement pattern would have graves placed elsewhere, and not in front of the windows of the house.

Fig. 99: Large Kraal at GLK009



Fig. 100 Site Plan of GLK009



3.8.3 GLK010

The site is located between KP429 and KP430. GLK010 is located ~450m south of GLK009, and on the western bank of the stream. The site consists of four stone walled houses and two byres. These are grouped together as two houses and one byre (GLK010). There is a long stone wall between the two houses. The house further southeast may have a grave. The site is outside of the RoW.

GLK010 was mapped and photographed. The site consists of two stone walled houses ~120m apart (fig's 101 - 102). There is a low wall, or terrace that connects the two houses (fig. 103). The northern house consists of a main house with a dividing wall. There are two rooms added to the north eastern and south-eastern part of the house. Only parts of the main house are intact, while the other rooms have collapsed. There is a small stone cairn to the north of the extended room: this is unlikely to be a grave.

Fig. 101: Northern House at GLK010



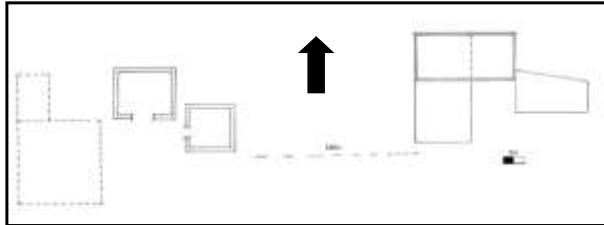
Fig. 102: Southern House at GLK010

The southern house (fig. 102) consists of two buildings and a large area of basal foundations. The two rooms have doors that face each other. Fig. 104 illustrates GLK010.

Fig. 103: Connecting Wall between the Houses at GLK010¹⁶



Fig. 104: Site Plan of GLK010



3.8.4 GLK012

The site is located between KP429 and KP430. GLK012 is situated along the eastern side of the Cornelia Road from Vrede towards Seven Oaks Farm. The site consists of an old school (?) building and one possible grave. The building is made with old red bricks and the lintels are made from wood. The building is indicated as a school on the 1:50 000 map. The bricks and cadastral map suggest that the building is older than 60 years. The site is outside of the RoW.

The site was mapped and photographed. The area was densely vegetated during mitigation, making photography difficult. The site is on the opposite side of the road of the proposed pipeline, and is thus unlikely to be directly affected. More of the walling has collapsed since our original recording in 2008 (fig. 105). The site consists of a school building (11m x 8m) in size, with steps along the northern wall. The building consists of a stone foundation and a double

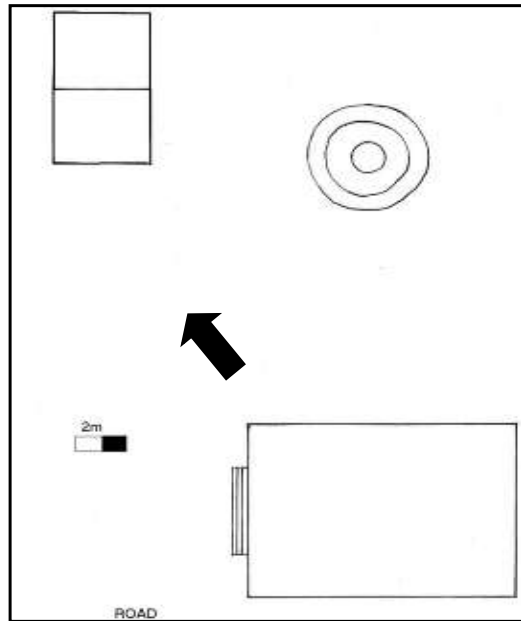
¹⁶ Facing north

row of bricks in an English Bond for the wall. To the northeast of the buildings stairs, are the foundations of two rooms and these are possible toilets. Between these two buildings is a three-tiered circle that was presumably a flowerbed. There is a small stone cairn ~16 northwest of the school building. Fig. 106 illustrates this site.

Fig. 105: Remaining Wall of GLK012



Fig. 106: Site Plan of GLK012



3.8.5 GLK013

The site is located between KP431 and KP432. GLK013 is located on the western side of the road. The site consists of several farm labourers' houses in various stages of abandonment. These houses are mud-brick construction, and conform to the general Sotho architecture. Umlando did not observe any graves at this site. The abandoned houses appear to be less than 60 years in age. The site is outside of the RoW.

Only the most eastern house at GLK013 was photographed and mapped (fig. 107), as this was the only feature that fell within the 100m boundary. I did however photograph nearby houses that still had *ilemba* designs on their walls¹⁷. The eastern house consists of a mud-brick house with five connecting rooms in an L-shape (fig. 108). There are two smaller mud-brick buildings on each side of the main building, and are not attached to it. The rooms varied in size, but were consistently 3m wide. Umlando surveyed the immediate area for graves, and did not locate any.

Fig. 107: West View of GLK013



Fig. 108: Site Plan of GLK013

North

¹⁷ These photographs form part of the general photographs that will be submitted with the final report to SAHRA and Amafa KZN.

3.8.6 GLK015

The site is located between KP444 and KP445; however the line has moved more than 500m away from the site. GLK015 is located at the base of a hill on the north-eastern side of the road (or pipeline). It consists of two mud-brick households, one more recent than the other. No graves were observed at either homestead. The homesteads are Sotho in architecture, with the more northern homestead being the oldest. The site is outside of the RoW.

GLK015 was photographed and mapped, and the area was resurveyed. The pipeline will not directly affect the site. The site consists of two households with similar architectural designs. The southern household is built in the 'wattle and daub' style, with some mud-bricks (fig. 109). Several items have been placed within the daub to strengthen the structure. This includes, glass, wire, metal rods and plastic. The main doors face north, although one faces west. Some of the rooms have interconnecting doors, while others can only be entered via the outside. There is a separate house next to the main house. The interior and exterior walls are plastered and decorated with *ilemba*. It is interesting to note that the plaster consists of several coats, and each coat has *ilemba* on it. This suggests that the plaster is not pasted in one episode, but repeatedly over several years. The plaster in fig. 110 has at least six layers.

The northern household is much older than the southern house, and only the foundations are visible. This house is made from mud-bricks. The walls have collapsed and nearly disintegrated. This household consists of a double row of rooms with extended rooms at the east and western sides of the house. No entrances were visible. The entire settlement is illustrated in figure 112.

There is a family cemetery to the 20m southeast of the southern house. There are ~40 graves at the cemetery and many of these predate the 1960s. The cemetery is about 100m long and 20m wide.

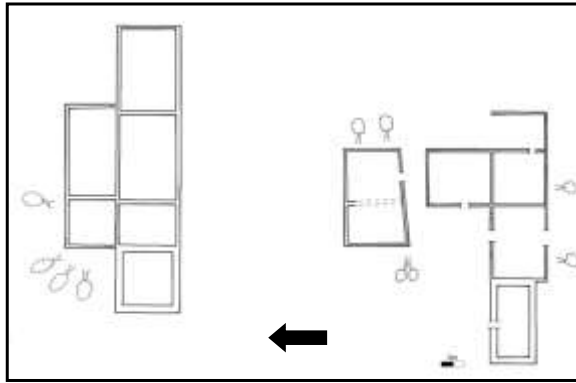
Fig. 109: View of Recent House at GLK015

Fig. 110: Close Up of Plaster Layers Showing Different Ilemba



Fig.111: View of the Northern House at GLK015

Fig. 112: Site Plan of GLK015



3.8.7 GLK022

The site is located between KP519 and KP520. GLK022 is located ~200m north of GLK021; below the rocky outcrop. The site consists of stone walling foundations and mud-brick ruins. The landowner stated that people were staying here until 1996, although he was unsure as to when they built their houses. There may also be older foundations below these 1960's foundations.

GLK022 is located on the border of the 100m mark. Since the settlement is fairly recent and unlikely to be affected by the pipeline, Umlando only photographed it. The settlement consists of four unattached mud-brick houses that have collapsed and are now covered with grass (fig. 113). There is a small stone walled byre at the north-eastern part of the settlement. The byre consists of a double row large stones that have a "rubble" infill (fig. 114).

The site is outside of the RoW.

Fig. 113: House Remains at GLK022



Fig. 114: Kraal Remains at GLK022

3.8.8 GLK035a.

The site is located between KP349 and KP350. GLK035a is located on the old Verkykerskop dirt road. The site consists of a small rectangular byre 10m x 15m ~10m from the road (fig. 115). No other stone walling was observed in the area. There is a very recent abandoned settlement to the east. This was not recorded as it was too recent. The site is outside of the RoW.

GLK035a was mapped and photographed. Our original co-ordinates placed the site ~70m to the west of the pipeline. However, the site is now located on the pipeline (27°57'9.90"S, 29°12'45.02"E). While the original GPS co-ordinates were incorrect, the pipeline has also moved more to the east, and thus it affects directly on the byre. The byre is still of low significance and requires no further mitigation, and may thus be damaged if needs be.

The byre is a large rectangular byre (21m x 17m), with a small secondary byre (5m x 7m) attached to it (fig. 116). There is a small semi-circular byre within the main wall and abutting the northern wall. The main byre consists of a double row of large boulders with a small stone infill (fig. 117). The byre probably relates to the colonial occupation of the area; however, it will be difficult to date. Fig. 119 illustrates the site.

Fig. 115: Outline of Kraal at GLK035a

Fig. 116: Outline of Small Kraal at GLK035a

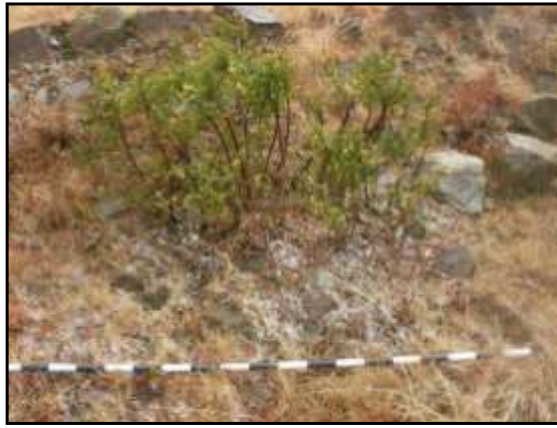
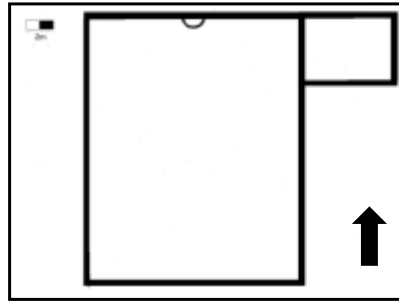


Fig. 117: Stone Walling Infill at GLK035a

Fig. 118: Site Map at GLK035a



3.8.1 GLK111.

GLK111 is located near the Tala Game Reserve entrance. The site consists of an old ruin of a house on the line. The site is outside of the RoW.

The structure is younger than 60 years in age, and is of low significance. It appears to be a storage room with an office. Since law does not protect it, Umlando briefly photographed the buildings, but did not map it (fig. 119). No further mitigation is required.

Fig. 119: Building at GLK111

3.9 Palaeontology: desktop

The palaeontological study was undertaken by Dr Gideon Groenwald of Metsi Metseng cc. The following is an insertion of their two reports.

3.9.1 Geology of the first section of the route - point 1 to 110

The geology comprises Pre-Karoo Natal Group Sandstone and Natal Metamorphic Province rocks (Fig 120 - 121). Although Metsi Metseng expected trace fossils in the Natal Group Sandstones, these fossils are extremely rare and very difficult to identify. All exposure of slabs of sandstone on which bedding planes are identified should be inspected for possible trace fossils. This can be done after excavation but before the trenches are filled in again. The Natal Metamorphic Province rocks are unlikely to be of significant importance for palaeontology. The deep weathering in this part of Kwazulu-Natal will probably result in very few excavations into bedrock on this route.

The Dwyka Formation is a tillite and contains important remains of very early fossils of the Karoo. Depending of the depth of weathering, it is of significance to walk the outcrops of this formation where it is exposed, before and after excavation, to confirm possible fossil sites. The important heritage information from this formation is also related to the glacier striations that can be associated with the base of the formation – where it is in contact with the underlying Pre-Karoo rocks. These structures are important and should be recorded where possible. The contractor must report exposure of hard rock in regions underlain by contact material of the Dwyka Formation and Natal Group Sandstone. Deep weathering and lack of exposure will result in very few recordings of this nature.

The Eccra Group in this part of the basin is mainly a deep marine shale formation and it is likely that this sequence will yield some important trace fossils that might be unique. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin siltstone that might be exposed during excavation. The palaeontologist must be notified of the chance excavation of slabs of shale from this Group close to Pietermaritzburg.

More recent geology

Younger geological formations in Kwazulu-Natal might yield unique fossil assemblages. The identification of young deposits (5 million years) with significant fossil remains close to Welkom in the Free State (July 2009) is now in the news and one needs to be sensitive to the fact that these young deposits have been neglected. Due to the rugged landscape and deep incision by the rivers in the section between Durban and Pietermaritzburg these deposits are very difficult to identify and will probably be associated with alluvial fills in the valleys where deep weathering will result in very clay-rich deposits where excavation will destroy most of the remains of fossils before they are noticed.

3.9.2 Geology of the second section of the route - point 111 to 150

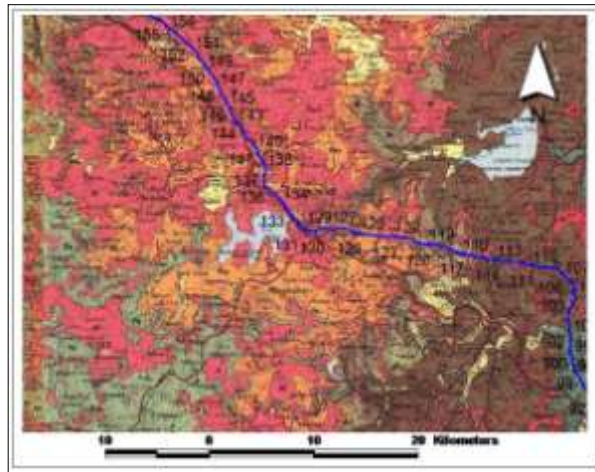
The Eccra Group in this part of the basin is mainly a deep marine shale formation and it is likely that this sequence will yield some important trace fossils that might be unique. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin siltstone that might be exposed during excavation. The palaeontologist must be notified of the chance excavation of slabs of shale from this Group. The sensitivity for Palaeontological finds is very low due to the deep weathering in this part of KZN.

Large dolerite sills underlie large parts of this section and excavations will expose deep red-brown soils. These sections (fig. 122) have no palaeontological value.

More recent geology

Younger geological formations in Kwazulu-Natal might yield unique fossil assemblages. Younger deposits will be associated with valley floors but the methodology of excavation through these sections will make it difficult to identify fossil material before destruction. This statement will hold for the entire route of the pipeline.

Fig. 122: Points of Pipeline from Pietermaritzburg to Balgowan



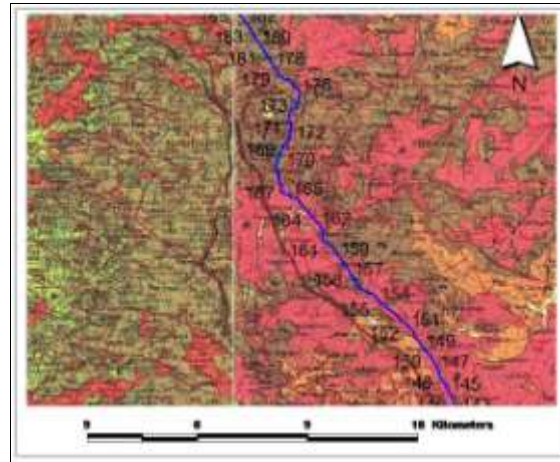
3.9.3 Geology of the third section of the route - point 150 to 180

The Eccra Group in this part of the basin is mainly a deep marine shale formation with the same sensitivity as for the above points.

Large dolerite sills underlie large parts of this section and excavations will expose deep red-brown soils. These sections have no palaeontological value.

At Moorriver the route of the pipeline cuts into the Beaufort Group. The Permian Estcourt Formation is well-known for rich deposits of plant material and unique wings of insects have been recorded from these rocks. Exposure of green and khaki coloured mudstone, with bands of dark grey, coal rich layers must be indicated to the palaeontologist for inspection. Inspection can be on a specific day basis when these rocks have been exposed. Outcrops of these rocks are known at Moorriver (points 168 to 180) and in the surrounding area as indicated in Fig. 123.

Fig. 123. Points of Pipeline from Balgowan to Moorriver



3.9.4 Geology of the fourth section of the route - points 180 to 212

At Moorriver the route of the pipeline cuts into the Beaufort Group. The Permian Estcourt Formation is well-known for rich deposits of plant material and unique wings of insects have been recorded from these rocks. Exposure of green and khaki coloured mudstone, with bands of dark grey, coal rich layers must be indicated to the palaeontologist for inspection. Inspection can be on a specific day basis when these rocks have been exposed. Outcrops of these rocks are known at Moorriver (points 180 to 184) and in the surrounding area as indicated in Figure 124.

The Beaufort Group in this part of the basin is mainly a deltaic shale formation and it is likely that this sequence will yield some important trace fossils that might be unique. Very important palaeontological discoveries of trees and body fossils of animals and trace fossils have been recorded from Estcourt during 2008 (Prof Bruce Rubidge, Pers Comm 2009) and it is essential that the section between points 198 and 212 (Fig. 124) be inspected during excavation. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin siltstone that might be exposed during excavation. The palaeontologist must be notified of the chance excavation of slabs of shale from this Group. Important fossils of insect wings have been recorded from the Estcourt Formation near Estcourt (Prof Eddie van Dyk, Natal Museum, 1980's and 1990's). Large dolerite sills underlie large parts of this section (184 to 198) and excavations will expose deep red-brown soils. These sections have no palaeontological value.

Fig. 124: Points of Pipeline from Moorriver to Estcourt

3.9.5 Geology of the fifth section of the route - point 212 to 240

The route of the pipeline follows the road reserves over most of the way and the contractor must report sites where the mudstone is exposed during excavation. The entire route is underlain by the Adelaide Subgroup of the Beaufort Group in this part of the basin is mainly a deltaic shale formation and it is likely that this sequence will yield some important trace fossils that might be unique. Very important palaeontological discoveries of trees and body fossils of animals and trace fossils have been recorded from Estcourt during 2008 (Prof Bruce Rubidge, Pers Comm 2009) and it is likely that the section between points 212 and 240 (Figures 125-126) will yield specific plant fossils of Permian age. The contractor must inspect the excavation and report any exposure of green or khaki coloured mudstone to the palaeontologist for inspection. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin siltstone that might be exposed during excavation. Body fossils of reptiles are normally encased in hard concretions and the presence of these concretions must be reported as well.

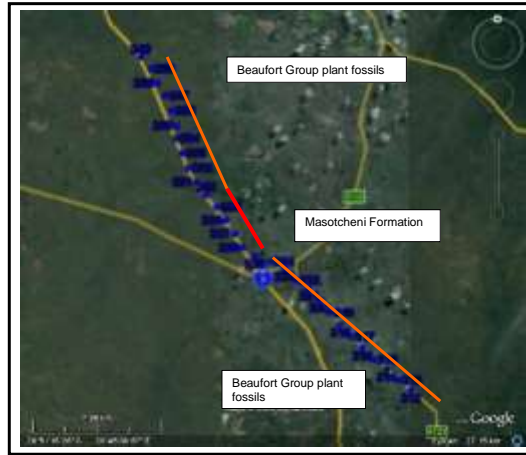
Important fossils of insect wings have been recorded from the Estcourt Formation near Estcourt (Prof Eddie van Dyk, Natal Museum, 1980's and 1990's). Several small dolerite sills underlie large parts of this section (212 to 240) and excavations will expose deep red-brown soils. These sections have no palaeontological value.

More recent geology

Younger geological formations in Kwazulu-Natal might yield unique fossil assemblages.

Fig. 125: Geology of Estcourt to Tugela River

Fig. 126: Points of Pipeline from Estcourt to Tugela River



The route of the pipeline cuts the Masotcheni Formation at several places along this section but most prominently between points 225 and 230.

3.9.6 Geology of the sixth section of the route - point 240 to 265

The route of the pipeline follows the road reserves over most of the way and the contractor must report sites where the mudstone is exposed during excavation. The entire route is underlain by the Adelaide Subgroup of the Beaufort Group, which in this part of the basin is mainly a deltaic shale formation and it is likely that this sequence will yield some important trace fossils that might be unique. Very important palaeontological discoveries of trees and body fossils of animals and trace fossils have been recorded from Estcourt during 2008 (Prof Bruce Rubidge, Pers Comm. 2009) but due to the fact that excavation will be in the road reserve, the section between points 240 and 265 (Fig. 127) will only yield specific plant fossils of Permian age if bedrock is exposed.

The contractor must inspect the excavation and report any exposure of green or khaki coloured mudstone to the palaeontologist for inspection. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin siltstone that might be exposed during

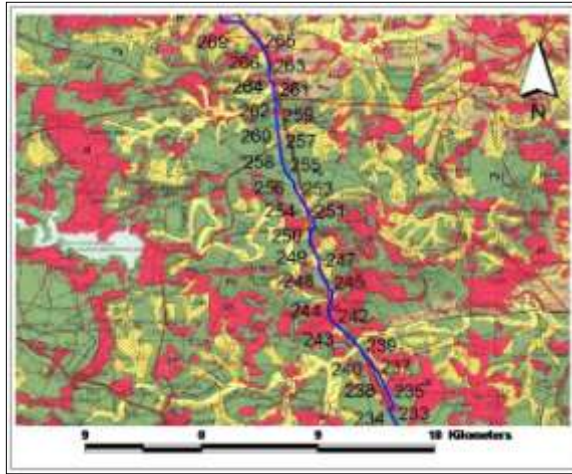
excavation. Body fossils of reptiles are normally encased in hard concretions and the presence of these concretions must be reported as well.

An extensive dolerite sill underlies the route (240 to 251; Fig. 128) and excavations will expose deep red-brown soils. These sections have no palaeontological value.

Fig. 128: Points of Pipeline from Tugela River to Bergville Toll Plaza



Fig. 128: Geology of Tugela River to Bergville Toll Plaza



Comment [HL13]: Gavin is it possible to put the NMPP pipeline on these maps?

Comment [u14R13]: Done

More recent geology

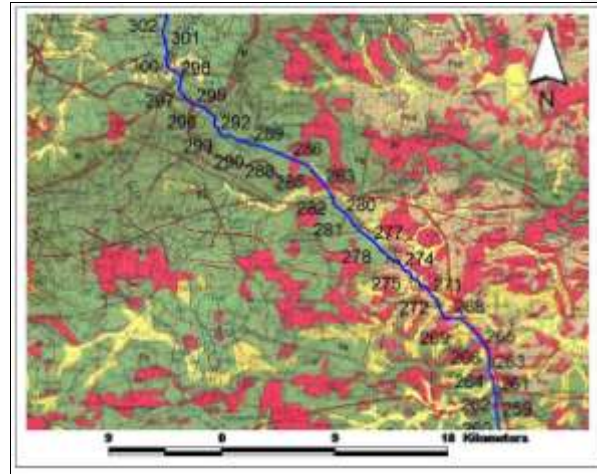
The route of the pipeline cuts the Masotcheni Formation at several places along this section but most prominently between points 250 and 255.

3.9.7 Geology of the seventh section of the route - point 265 to 300

The route of the pipeline follows the road reserves between points 265 and 270 and the contractor must report sites where the mudstone is exposed during excavation (fig. 129). The section from 275 to 281 is underlain by dark shale of the Volksrust Formation in the Eccia Group. This specific section has a very low potential for palaeontological material.

From point 281 to 300 the entire route is underlain by the Adelaide Subgroup of the Beaufort Group, which in this part of the basin represents a very important summary of the Permian Extinction in South Africa. This section cuts the Normandien Formation, including the plant rich Frankfort and Rooinek Members with remains of the important indicator Gondwana flora of the *Glossopteris* Assemblage, The Schoondraai Sandstone Member with associated *Dicynodon lacerticeps* Assemblage Zone as well as the Harrismith Member with associated globally significant *Lystrosaurus* Assemblage Zone. It is likely that this sequence will yield some important trace fossils that might be unique.

Fig. 129: Points of Pipeline from Bergville Toll Plaza to Van Reenen

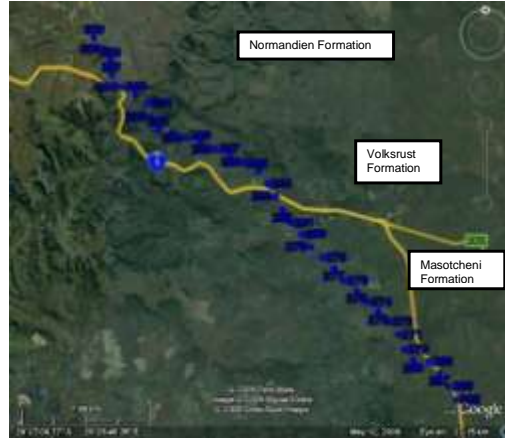


Very important palaeontological discoveries of trees and body fossils of animals and trace fossils have been recorded from the Drakensberg Escarpment in this region, but the excavations will only yield specific plant and animal fossils of Permian age if bedrock is exposed. The contractor must inspect the excavation and report any exposure of green or khaki coloured mudstone to the palaeontologist for inspection. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin siltstone that might be exposed during excavation. Body fossils of reptiles are normally encased in hard concretions and the presence of these concretions must be reported as well. Small dolerite sills underlie the route (Fig. 129 – 130) and excavations will expose deep red-brown soils. These sections have no palaeontological value.

More recent geology

The route of the pipeline cuts the Masotcheni Formation at several places along this section but most prominently between points 265 and 274.

Fig. 130: Points of Pipeline from Bergville Toll Plaza to Van Reenen



Very important palaeontological discoveries of trees and body fossils of animals and trace fossils have been recorded from the Drakensberg Escarpment in this region, but the excavations will only yield specific plant and animal fossils of Permian age if bedrock is exposed. The contractor must inspect the excavation and report any exposure of green or khaki coloured mudstone to the palaeontologist for inspection. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin siltstone that might be exposed during excavation. Body fossils of reptiles are normally encased in hard concretions and the presence of these concretions must be reported as well. Small dolerite sills underlie the route (Fig. 131) and excavations will expose deep red-brown soils. These sections have no palaeontological value.

3.9.8 Geology of the eighth section of the route - point 300 to 325

From point 300 to 325 the entire route is underlain by the Adelaide Subgroup of the Beaufort Group, which in this part of the basin represents a very important summary of the Permian Extinction in South Africa. This section cuts the Normandien Formation, including the plant rich Frankfort and Rooinek Members with remains of the important indicator Gondwana flora of the *Glossopteris* Assemblage. The Schoondraai Sandstone Member with associated *Dicynodon lacerticeps* Assemblage Zone as well as the Harrismith Member with associated globally significant *Lystrosaurus* Assemblage Zone. It is likely that this sequence will yield some important trace fossils that might be unique. Very important palaeontological discoveries of

trees and body fossils of animals and trace fossils have been recorded from the Drakensberg Escarpment in this region, but the excavations will only yield specific plant and animal fossils of Permian age if bedrock is exposed. The contractor must inspect the excavation and report any exposure of green or khaki coloured mudstone to the palaeontologist for inspection. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin siltstone that might be exposed during excavation. Body fossils of reptiles are normally encased in hard concretions and the presence of these concretions must be reported as well. Small dolerite sills underlie the route (Fig. 131 – 132) and excavations will expose deep red-brown soils. These sections have no palaeontological value. In this specific section the dolerite intrusions are small and not very significant.

More recent geology

The route of the pipeline cuts the Masotcheni Formation at several places along this section and any fossil finds in this Formation is of significance to science.

Fig. 131: Geology of Van Reenen to Kiesbeen

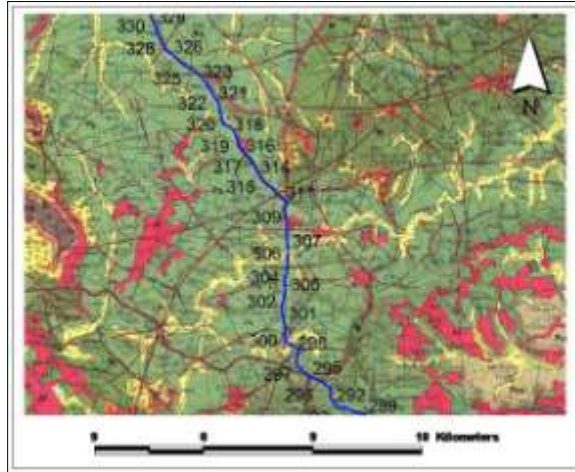


Fig. 132: Points of Pipeline from Van Reenen to Kiesbeen



3.9.9 Geology of the ninth section of the route - point 325 to 350

From point 325 to 350 most of the route is underlain by the Adelaide Subgroup of the Beaufort Group, which in this part of the basin represents a very important summary of the Permian Extinction in South Africa. A small section (points 339 to 341) cuts into the Triassic Verkykerskop Formation of the Tarkastad Subgroup. This pipeline route cuts mainly into the Normandien Formation, including the plant rich Rooinek Member with remains of the important indicator Gondwana flora of the *Glossopteris* Assemblage. The Schoondraai Sandstone Member with associated *Dicynodon lacerticeps* Assemblage Zone as well as the Harrismith Member with associated globally significant *Lystrosaurus* Assemblage Zone is present over most of the route. It is likely that this sequence will yield some important trace fossils that might be unique. Very important palaeontological discoveries of trees and body fossils of animals and trace fossils have been recorded from this region (Groenewald, 1984), but the excavations will only yield specific plant and animal fossils of Permian age if bedrock is exposed.

The contractor must inspect the excavation and report any exposure of green, red or khaki coloured mudstone to the palaeontologist for inspection. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin siltstone that might be exposed

during excavation. Body fossils of reptiles are normally encased in hard concretions and the presence of these concretions must be reported as well.

Small dolerite sills underlie the route (Figures 133 – 134) and excavations will expose deep red-brown soils. These sections have no palaeontological value. In this specific section the dolerite intrusions are small and not very significant.

More recent geology

The route of the pipeline cuts the Masotcheni Formation at several places along this section and any fossil finds in this Formation is of significance to science.

Fig. 133: Geology of Kiesbeen to Meulrivier

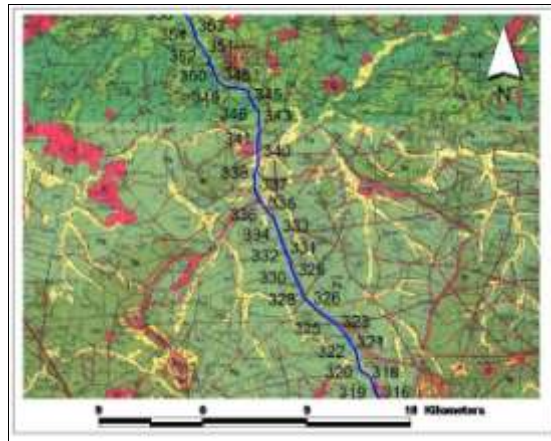


Fig. 134: Points of Pipeline from Kiesbeen to Meulrivier



3.9.10 Geology of the tenth section of the route - point 350 to 375

From point 350 to 375 the route is underlain by the Adelaide and Tarkastad Subgroup of the Beaufort Group, which in this part of the basin represents a very important summary of the Permian Extinction in South Africa. Large sections cut into the Triassic Verkyerskop Formation of the Tarkastad Subgroup where the palaeontology is less critical, but forms a very important marker bed for the underlying *Lystrosaurus* Assemblage Zone or Harrismith Member. This pipeline route cuts mainly into the Normandien Formation, including the plant rich Rooinek Member with remains of the important indicator Gondwana flora of the *Glossopteris* Assemblage. The Schoondraai Sandstone Member with associated *Dicynodon lacerticeps* Assemblage Zone as well as the Harrismith Member with associated globally significant *Lystrosaurus* Assemblage Zone is present over most of the route. It is likely that this sequence will yield some important trace fossils that might be unique. Very important palaeontological discoveries of trees and body fossils of animals and trace fossils have been recorded from this region (Groenewald, 1984), but the excavations will only yield specific plant and animal fossils of Permian age if bedrock is exposed.

The contractor must inspect the excavation and report any exposure of green, red or khaki coloured mudstone to the palaeontologist for inspection. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin siltstone that might be exposed during excavation. Body fossils of reptiles are normally encased in hard concretions and the presence of these concretions must be reported as well. It is essential that the palaeontologist inspect this section of the pipeline before excavations are done. Small dolerite sills underlie the route (Figures 135 – 136) and excavations will expose deep red-brown soils. These sections have no palaeontological value. In this specific section the dolerite intrusions are significant and it is possible that the planners of the project would have planned to route the excavations out of the dolerite regions for ease of excavation.

More recent geology

The route of the pipeline cuts the Masotcheni Formation at several places along this section and any fossil finds in this Formation is of significance to science.

Fig. 135: Geology of Meulrivier to Warden

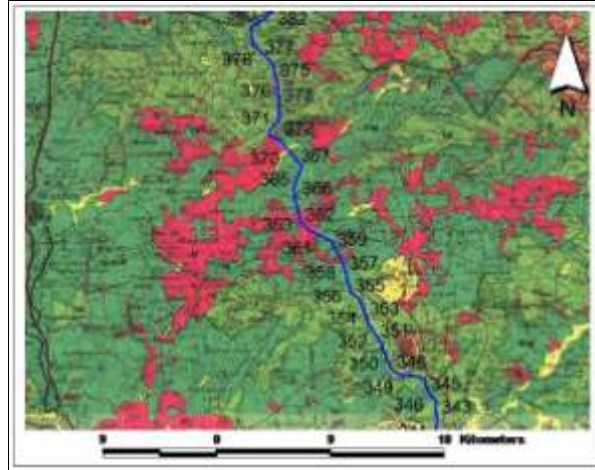
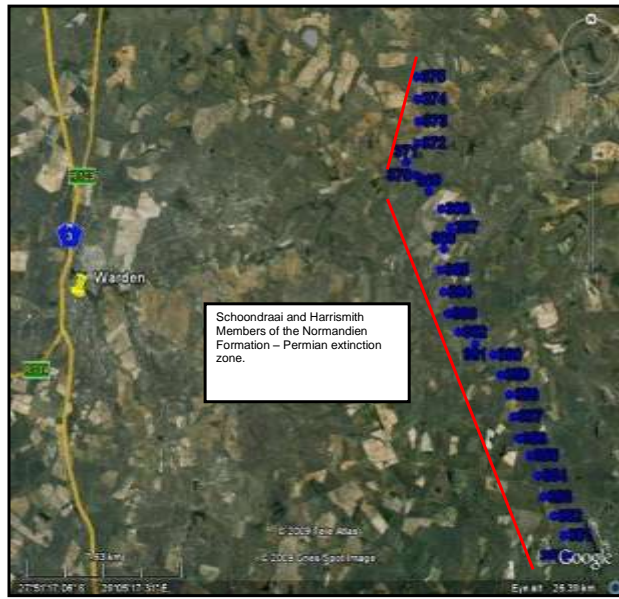


Fig. 136: Points of Pipeline from Meulrivier to Warden



3.9.11 Geology of the eleventh section of the route - point 375 to 400

The geology and potential for fossil finds is similar to that of the region between points 350 to 375 as described above. Figures 137 – 138 illustrate this area.

Fig. 137: Geology of Warden to Presentskraal and Vrede

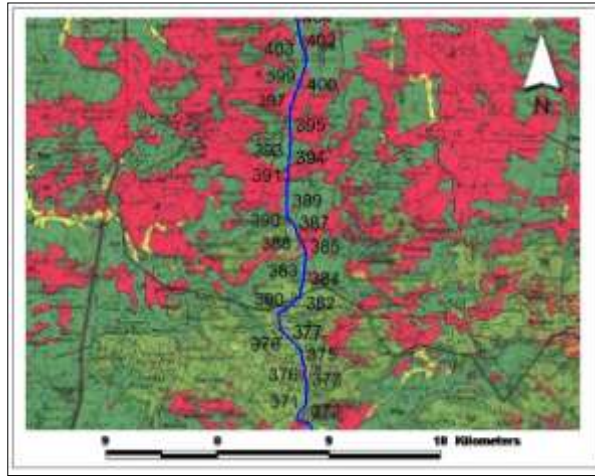


Fig. 138: Points of Pipeline from Warden to Presentskraal



3.9.12 Geology of the twelfth section of the route - point 400 to 430

From point 400 to 430 the route is underlain by the Adelaide Subgroup of the Beaufort Group, which in this part of the basin represents a very important summary of the Permian Extinction in South Africa. This part of the pipeline route cuts mainly into the lower Frankfort Member of the Normandien Formation, and might include the plant rich Rooinek Member with remains of the important indicator Gondwana flora of the *Glossopteris* Assemblage. It is likely that this sequence will yield some important trace fossils that might be unique. Very important palaeontological discoveries of trees and fossils of insect wings as well as indicator trace fossils have been recorded from this region (Groenewald, 1984). The excavations will only yield specific plant and animal fossils of Permian age if bedrock is exposed. The contractor must inspect the excavation and report any exposure of green or khaki coloured mudstone as well as dark grey to black shale formations to the palaeontologist for inspection. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin siltstone that might be exposed during excavation. Body fossils of reptiles are normally encased in hard concretions and the presence of these concretions must be reported as well. Extensive dolerite

sills underlie the route (Fig. 139-140) and excavations will expose deep red-brown soils. These sections have no palaeontological value. In this specific section the dolerite intrusions are significant and it is possible that the planners of the project would have planned to route the excavations out of the dolerite regions for ease of excavation.

More recent geology

Younger geological formations in this part of the Free State Province might yield unique fossil assemblages.

Fig 139. Geology of Presentskraal to Vrede

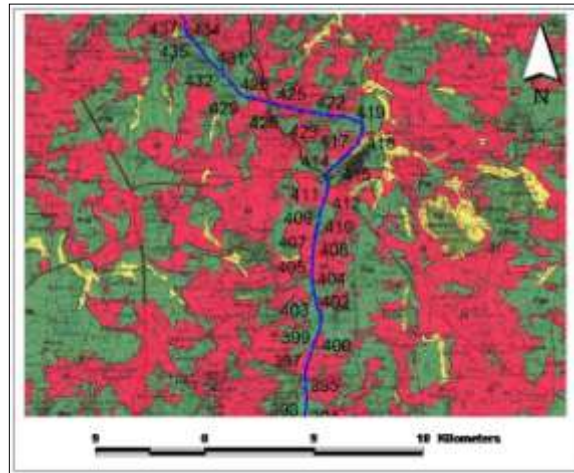


Fig. 140: Points of Pipeline from Presentskraal to Vrede



3.9.13 Geology of the thirteenth section of the route - point 430 to 455

From point 430 to 455 the route is underlain by the Adelaide Subgroup of the Beaufort Group, which in this part of the basin represents a very important summary of the Lower Beaufort Group in South Africa. This part of the pipeline route cuts mainly into the lower Frankfort Member of the Normandien Formation, and will include the plant rich Frankfort Member with remains of the important indicator Gondwana flora of the *Glossopteris* Assemblage. This sequence will yield some important and unique trace fossils. Very important palaeontological discoveries of trees and fossils of insect wings as well as indicator trace fossils have been recorded from this region (Groenewald, 1984). The excavations will only yield specific plant and animal fossils of Permian age if bedrock is exposed. The contractor must inspect the excavation and report any exposure dark coloured grey to black shale formations to the palaeontologist for inspection. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin dark coloured siltstone that might be exposed during

excavation. Body fossils of reptiles are normally encased in hard concretions and the presence of these concretions must be reported as well.

Limited dolerite sills underlie the route (Fig. 141 - 142) and excavations will expose deep red-brown soils. These sections have no palaeontological value. In this specific section the dolerite intrusions are not significant and it is possible that the planners of the project would have planned to route the excavations out of the dolerite regions for ease of excavation.

More recent geology

The route of the pipeline cuts the Masotcheni Formation at several places along this section and any fossil finds in this Formation is of significance to science.

Fig. 141: Geology of Vrede to Cornelia

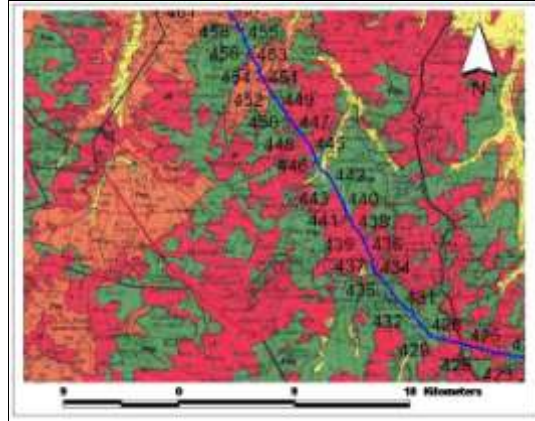


Fig. 142: Points of Pipeline from Vrede to Cornelia



3.9.14 Geology of the thirteenth section of the route - point 450 to 480

From point 455 to 460 the route is underlain by the Adelaide Subgroup of the Beaufort Group, which in this part of the basin represents a very important summary of the Lower Beaufort Group in South Africa. This part of the pipeline route cuts mainly into the lower Frankfort Member of the Normandien Formation, and will include the plant rich Frankfort Member with remains of the important indicator Gondwana flora of the *Glossopteris* Assemblage. This sequence will yield some important and unique trace fossils. Very important palaeontological discoveries of trees and fossils of insect wings as well as indicator trace fossils have been recorded from this region (Groenewald, 1984). The excavations will only yield specific plant and animal fossils of Permian age if bedrock is exposed. The contractor must inspect the excavation and report any exposure dark coloured grey to black shale formations to the palaeontologist for inspection. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin dark coloured siltstone that might be exposed during excavation. Body fossils of reptiles are normally encased in hard concretions and the presence of these concretions must be reported as well.

From route point 460 to 472 the route cuts through the black shale of the Volksrust Formation, Eccia Group. This formation represents a deep marine deposit that is not known to yield any significant fossils.

Limited dolerite sills underlie the route (Fig. 143 – 144) and excavations will expose deep red-brown soils. These sections have no palaeontological value. In this specific section the dolerite intrusions are not significant and it is possible that the planners of the project would have planned to route the excavations out of the dolerite regions for ease of excavation.

More recent geology

Younger geological formations underlie points 472 to 480. These alluvial deposits of the Vaal River may yield unique fossil assemblages.

The route of the pipeline cuts the Masotcheni Formation at several places along this section and any fossil finds in this Formation is of significance to science.

Fig. 143: Geology of Cornelia to Villiers

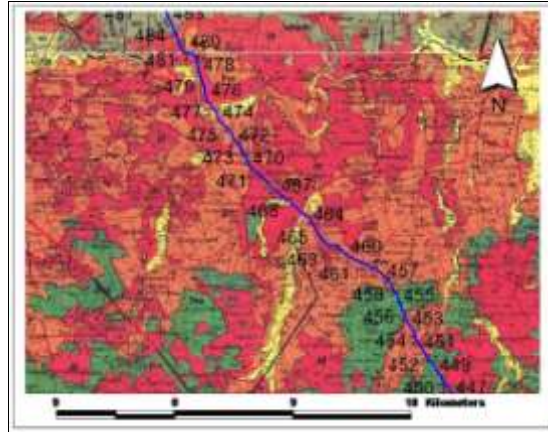
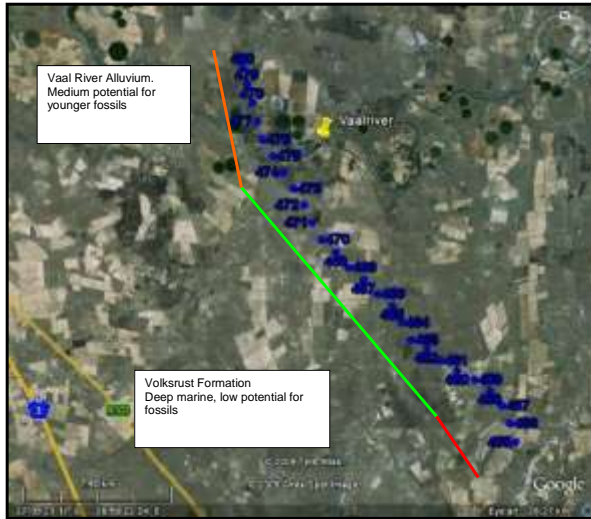


Fig. 144: Points of Pipeline from Cornelia to Villiers



3.9.1 Geology of the thirteenth section of the route - point 481 to 510

From point 481 to 491 the route is underlain by dolerite and no fossils is expected.

From route point 491 to 510 the route is underlain by the Vryheid Formation of the Ecca Group, which in this part of the basin represents a very important summary of the Middle Ecca Group in South Africa. This part of the pipeline route cuts mainly into the sandstone deposits of the Vryheid Formation, and will include the plant rich coal deposits with remains of the important indicator Gondwana flora of the *Glossopteris* Assemblage. This sequence will yield some important and unique trace fossils. The excavations will only yield specific plant fossils of Permian age if bedrock is exposed. The contractor must inspect the excavation and report any exposure of dark coloured grey to black shale formations to the palaeontologist for inspection. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin dark coloured siltstone that might be exposed during excavation.

Limited dolerite sills underlie the route (Fig. 145 – 146) and excavations will expose deep red-brown soils. These sections have no palaeontological value. In this specific section the dolerite intrusions are not significant and it is possible that the planners of the project would have planned to route the excavations out of the dolerite regions for ease of excavation.

More recent geology

Younger geological formations underlie part of the route. The alluvial deposits of the Vaal River may yield unique fossil assemblages.

The route of the pipeline cuts the Masotcheni Formation at several places along this section and any fossil finds in this Formation is of significance to science.

From point 481 to 491 the route is underlain by dolerite and no fossils are expected.

From route point 491 to 510 the route is underlain by the Vryheid Formation of the Ecca Group, which in this part of the basin represents a very important summary of the Middle Ecca Group in South Africa. This part of the pipeline route cuts mainly into the sandstone deposits of the Vryheid Formation, and will include the plant rich coal deposits with remains of the important indicator Gondwana flora of the *Glossopteris* Assemblage. This sequence will yield some important and unique trace fossils. The excavations will only yield specific plant fossils of Permian age if bedrock is exposed. The contractor must inspect the excavation and report any exposure of dark coloured grey to black shale formations to the palaeontologist for inspection. Inspection of the excavations will be important and observation will be best done after excavation but before the trenches are filled in again. Most of the trace fossils will occur on slabs of thin dark coloured siltstone that might be exposed during excavation.

Limited dolerite sills underlie the route (Figures 146 - 147) and excavations will expose deep red-brown soils. These sections have no palaeontological value. In this specific section the dolerite intrusions are not significant and it is possible that the planners of the project would have planned to route the excavations out of the dolerite regions for ease of excavation.

More recent geology

Younger geological formations underlie part of the route. The alluvial deposits of the Vaal River may yield unique fossil assemblages. The route of the pipeline cuts the Masotcheni Formation at several places along this section and any fossil finds in this Formation is of significance to science.

Fig. 145: Geology of Villiers to Grootvlei

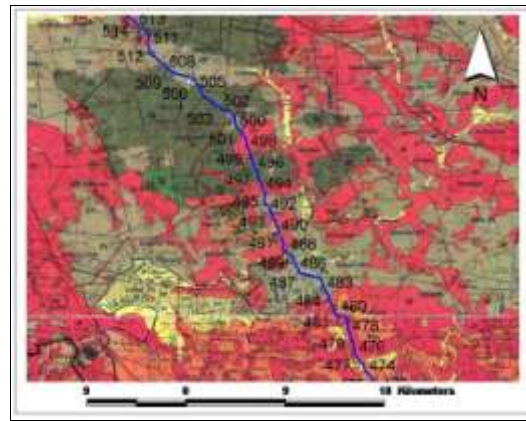


Fig. 146: Points of Pipeline from Vaal River to Grootvlei

Vryheid Formation

Dolerite

3.9.2 Geology of the thirteenth section of the route - point 510 to 554

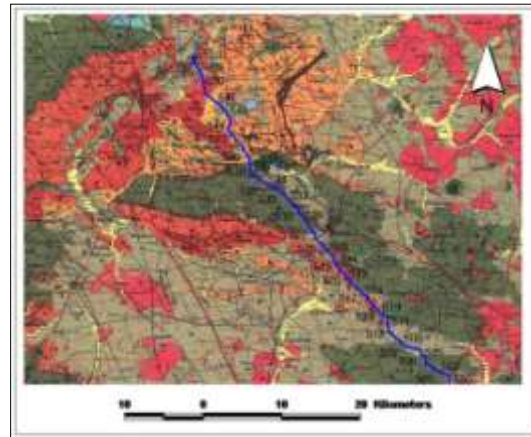
From point 510 to 554 the route is underlain by several formations of the Witwatersrand Supergroup of pre-Karoo age and no fossils is expected in these older geological formations (figures 147 – 148).

Isolated sections of the route will cut through rocks of the Ecca Group Vryheid Formation, and the contractor must record the presence of shale with imprints of *Glossopteris* leaves where encountered.

More recent geology

Younger geological formations underlie part of the route. Where the route of the pipeline cuts the Masotcheni Formation, fossil finds in this Formation is of significance to science. Younger deposits will be associated with valley floors but the methodology of excavation through these sections will make it difficult to identify fossil material before destruction. The excavation sites should however be inspected on a regular basis to report on any chance finding of fossil material. These finds will be unique.

Fig. 147: Geology of the Area from Grootvlei to Heidelberg (Gauteng)



3.10.1 Alignment Points 1 To 110 – Fig. 149

The pipeline alignment follows predetermined access routes in highly developed urban and sub-urban areas underlain by deeply weathered rocks varying in age from Pre-Karoo to effectively middle Beaufort Group. Field investigations confirmed that the chances of finding fossil remains are extremely slim and limited time was spent to confirm that no fossils were present in deeply weathered rocks in this part of the RoW and no fossils were recorded during excavation of the trenches.

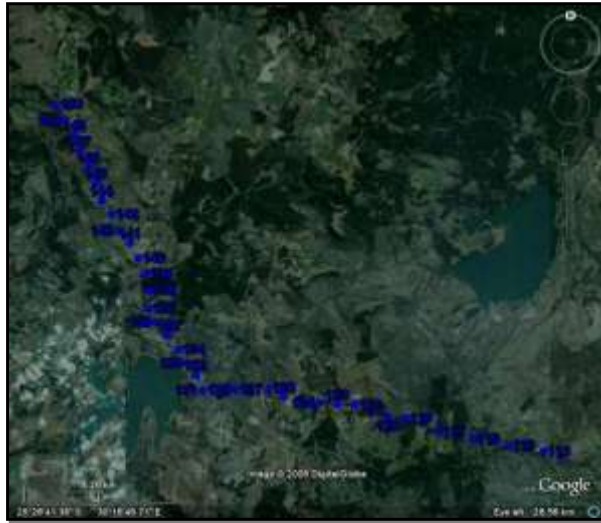
Fig. 149 Pipeline Route from Durban to Pietermaritzburg



3.10.2 Alignment Points 111 to 150 – Fig. 150

The pipeline route is underlain by deeply weathered rocks varying in age from Pre-Karoo to effectively middle Beaufort Group. North of KP 131 the route cuts across extensive dolerite sill exposures with no possibility of finding fossils in these zones. Field investigations confirmed that the chances of finding fossil remains are extremely slim and limited time was spent to confirm that no fossils were present in deeply weathered rocks in this part of the RoW and no fossils were recorded during excavation of the trenches.

Fig. 150: Pipeline Route from Pietermaritzburg to Balgowan



3.10.3 Alignment Points 150 to 180 Fig 151

Field investigations confirmed that the chances of finding fossil remains are extremely slim and limited time was spent to confirm that no fossils were present in deeply weathered rocks in this part of the RoW and no fossils were recorded during excavation of the trenches.

Fig. 151 Pipeline Route from Balgowan to Moorriver



3.10.4 Alignment Points 180 to 212 – Fig 152

The results can be summarised as follows

- 191 to 195
 - Weathered Beaufort Group mudstone with prominent layers of plant rich material (Fig. 154). Glossopteris flora recorded. Thin zones of "algal" mats and Stromatolite structures. One record of bone fossils - very small - possibly bony fish. Remains too damaged for identification (Fig. 1556).
 - Located at 29 03' 44.03"S 29 56' 24.58"E
- 196 to 200
 - Deep soil on Beaufort Group mudstone. Field inspection on RoW completed. No indication of fossil remains.
- 200 to 211
 - Beaufort Group mudstone and dolerite outcrop areas. Large concretions with potential for fossils of Dicynodon lacerticeps - no remains recorded during field inspection on Saturday 20 March 2010. Lystrosaurus fossils recorded (Fig. 157) from high ground to the west of the RoW as would be expected. Fossils collected for confirmation of species at BPI Wits.

Fig. 152: Pipeline Route from Mooiriver to Estcourt

High potential for remains of *Dicynodon lacerticeps* – must be inspected

Dolerite sill – no fossils

Plant fossils

Fig. 153: Glossopteris Flora (Fossilised Tree) between Points 191 -195



Fig. 154: Small Bone Fish Remains (To be confirmed) at Point 191 – 195

Fig. 155 Lystrosaurus Skull, Recorded outside of the RoW at KP209



3.10.5 Alignment Points 212 to 240 – Fig. 156

Deeply weathered soils with very little chance of recording any fossils before clearing of RoW. Following the clearing the palaeontologist inspected the route of the pipeline and specifically looked at spoil material to ensure that all concretions were rescued for inspection. Contractor was made aware of the possibility of uncovering important tree fossils in this section. Site visits on 12 March and 21 March 2010 did not reveal any large fossils of trees.

Fig. 156: Pipeline Route from Estcourt to Tugela River



3.10.6 Alignment Points 240 to 265 - Fig. 157

RoW crossing dolerite outcrops areas as well as outcrops of Volksrust Formation shale. No fossils found in these geological environments.

Fig. 157: Pipeline Route from Tugela River to Bergville Toll Plaza



3.10.7 Alignment Points 265 to 300- Fig. 158

Inspection of the low lying areas RoW before clearing did not reveal any *in situ* fossils and most of the fossil plant material are related to pieces of petrified trees that occur higher up in the sequence of the Normandien Formation. Inspection of the entire escarpment revealed extremely weathered character of the entire Normandien Formation. It is characterised by deep weathering with very few rock outcrops. Broken pieces of fossil wood abundantly present in the field on the last section of the route.

The contractor was however made aware of the fact that this section of the pipeline will cross several extinction zones and that he should record the presence of tree fossils which are abundantly present in this geological sequence. Fossilised remains of *Dicynodon lacerticeps* and *Lystrosaurus* Assemblage Zones are present in the outcrops area away from the RoW and it is noteworthy that the excavators did not encounter some concretions with fossils of both assemblage zones.

Fig. 158: Pipeline Route from Bergville Toll Plaza to Van Reenen



3.10.8 Alignment Points 300 to 325 – Fig. 159

Section inspected and no fossils recorded before clearing of RoW. Outcrops of *Dicynodon lacerticeps* Assemblage Zone observed very close to route at GPS 28° 09' 13, 4' S; 29° 18' 33, 6' E. Subsequent inspection during excavations revealed that although the excavation is highly destructive, some of the concretions are resistant and are left in the spoil as boulders. Further inspection of these concretions might lead to the discovery of *Lystrosaurus* sp.

Fig.159: Pipeline Route from Van Reenen to Kiesbeen



3.10.9 Alignment Points 325 to 350- Fig. 160

The finds can be summarised as follows

KP Numbers	Type of fossil observed in field	GPS
331 to 340	Field inspection completed. Outcrops of <i>Dicynodon lacerticeps</i> Assemblage Zone very close to the route at KP335. Well preserved fossils of wood and remains of <i>Dicynodon lacerticeps</i> bones at KP340. (Fig. 161)	Fossil Wood 28 01 45,7S 29 14 58,3E Skull Material 28 01 43,9S 29 14 58,8E Skull Material 28 01 37,2S 29 15 01,7E Fossil Bones 28 01 36,5S 29 14 53,7E Body Fossil 28 01 36,8S 29 14 53,7E
341 to 350	Field inspection completed. Outcrops of <i>Lystrosaurus</i> Assemblage Zone with very well preserved fossil material. Fossils occur in well-defined concretions that will be recognised as hard blocks by contractors at KP 343 (Fig. 162). The concretions are silicified and might damage the teeth of the digging machine and need to be assessed by the responsible engineer before excavations.	5 x Skull Material 28 00 11,0S 29 15 3,45E 2 x Skull Material 27 59 14,12S 29 11 17,20E

Figure 161: Outcrop at Meul River where 5 Fossils were recorded – Point 340



Fig. 162: Lystrosaurus Burrow with Bones at Point 343.

3.10.10 Alignment Points 350 to 375 – Fig. 163

Inspections indicated deep soil with very few outcrops and dolerite outcrops that will not have any fossils at most of the alignment. The Normandien Formation mudstones found were deeply weathered. Fossils were recorded from zones associated with KP371. These included skull material recorded at 27° 45' 47,3" S and 29° 16' 23,9" E. Silicified concretions found and moved were extremely big (6 000 mm long and 500 mm thick) because it might damage the teeth of the digging machine.

Fig. 163: Pipeline Route from Meul River to Warden



3.10.11 Alignment Points 375 to 400- Fig. 164

Observations indicated deep soils with very few outcrops of bedrock. Verkykerskop Formation and *Lystrosaurus* zone excavated at KP383. ECO and contractors were informed to record fossils or big tree trunks if observed.

Fig. 164: Pipeline Route from Warden to Presentskraal



3.10.12 Alignment Points 400 to 430- Fig. 165

Field Survey Results

Deep soils with deep weathering and extensive outcrops of dolerite and lower-most Normandien Formation were mostly encountered. Potential for large tree fossils during excavation did not materialise.

Fig. 165 Pipeline Route from Presentskraal to Vrede



3.10.13 Alignment Points 430 to 455- Fig. 166

Field inspection completed. Deep soils with outcrop of Frankfort Member sandstone in very specific localities. Transition to Eccca Group shale in most cases difficult to observe and choice of pipeline route deliberately planned to follow zones of deep weathering.

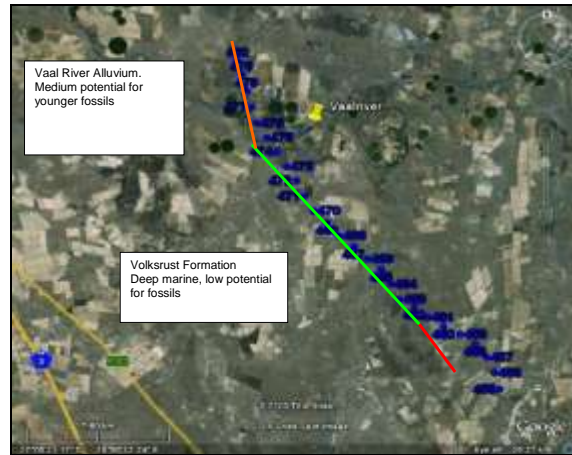
Fig.166: Pipeline Route from Vrede to Cornelia



3.10.14 Alignment Points 455 to 480 – Fig. 167

Deeply weathered soils with very low potential to find fossil remains during clearing of RoW from 456 to 460. Unlikely that trenching will lead to the recovery of any recognisable fossil material. Deeply weathered soils on the Volksrust Shale Formation of the Ecca Group from 461 to 473. No record of fossils before or during the clearing operation as expected. Recent alluvial material found along the Vaal River from 474 to 480. No record of palaeontological material in this section of the RoW before clearing or after clearing.

Fig. 167: Pipeline Route from Cornelia to Villiers



3.10.15 Alignment Points 481 to 510 – Fig. 168

The first part is mostly dolerite outcrops on the high ground and deeply weathered soils, mostly ploughed, in the valleys. This is followed by deeply weathered soils, highly disturbed by ploughing. No record of plant fossils.

Fig.168: Pipeline Route from Villiers to Grootvlei



3.10.16 Alignment Points 510 to 554 – Fig. 169

Weathered Pre-Karoo geology exposed in most of the excavations. No fossil material recorded prior to clearance of RoW and no material recorded during trenching.

Fig.169 Pipeline Route from Grootvlei to Heidelberg



3.10.17 CONCLUSION

The entire length of the New Multi Product Pipeline was investigated for possible fossil assemblages from mainly the Karoo Supergroup. A comprehensive desk top survey was done to determine possible hot spots for Palaeontology along the route. In order to stay within the limits of the allocated budget it was decided to concentrate most of the fieldwork in areas where the pipeline route cuts the Adelaide Subgroup and the Permian and Triassic Extinction zones between Harrismith and Verkykerskop. The fieldwork was done during December 2009 and March 2010.

The entire outcrop region of the Lower Beaufort Group, known as the Adelaide Subgroup, yielded remains of tree and plant fossils of Permian age, including the abundant tree fern

Glossopteris. The most likely regions where vertebrate fossils were expected were the outcrops associated with the Permian/Triassic extinction zone between Harrismith and Verkykerskop. As predicted, several well-preserved fossils of *Dicynodon lacerticeps* and *Lystrosaurus* sp were discovered and recorded.

Most of the fossils found were lifted in the form of rocks or concretions and moved out of the construction area to be left in the adjacent field for collection.

Tree Fossils

Although fossilised remains of trees are abundantly present in the lower Beaufort Group sediments, the deeply weathered nature of most of the geology along the route made it very unlikely to find significant fossils. In the specific case of areas where outcrops were recorded, samples of the fossils were recorded as examples of the kind of fossils present in the sequence. Several finds of fossil trees were recorded from the RoW at KP338 to KP342.

The fossils are associated with the base of the prominent sandstone that is mapped as the Schoondraai Sandstone of the Normandien Formation. Representative samples of the fossils were recorded and in discussions with the "Clearing the Right of Way" contractor (Wessel Campher), bigger fossil trees if present, would have been removed from the right of way before clearing. Following discussions with Mr Campher no big tree fossils were encountered during clearing of the RoW.

Outcrops are not good between KP296 and KP338, leading to a lack of information on fossils in this section. Deeper weathering of the mudstone lead to the destruction of most of the fossils and new finds were only predicted during the planned deeper excavation of the trenches. No further fossil finds were recorded after completion of trenching.

Fossil trees are abundantly present in rocks associated with the lower Beaufort Group at KP180 to KP212. No fossils were however recorded in this section of the RoW.

Fossils of Vertebrates

The fossil beds are best exposed in the Verkykerskop area and the RoW crosses the Permian extinction zone associated with the Schoondraai member of the Normandien Formation at several points along this route.

The extinction zone is best exposed at KP 340 to 345 and both Permian *Dicynodon lacerticeps* and Triassic *Lystrosaurus* fossils were collected. Vertebrate burrows of *Lystrosaurus* are also abundantly present. Some remains of the amphibian *Lydekerina* were also recorded. Although the vertebrate fossils are mostly encased in very hard siliceous concretions, none of these structures containing fossil remains were recorded during this project.

It was expected that some palaeontological finds would be made when the RoW is cleared for KP180 to KP184 and then also KP198 to KP212. Deep weathering and poor outcrop did however lead to the loss of information and the expected discovery of fossils in these sections did not realise.

4 Damaged sites

The following is a list of sites that have been impacted in some manner during the construction of the pipeline. It needs to be clearly stated that all of these impacts occurred after the RoW clearance had occurred, with the possible exception of one site, KP189.130. The Transnet investigation will confirm this as all work activity is logged.

The sites and their damage is summarised in Table 7. The names for each site are listed as named in the spreadsheet submitted to the JV that included all sites within the RoW and their co-ordinates.

The initial damage was near GLK066 (west of KP269) and was noted by the ECO. Umlando undertook an additional survey of nearby sites and noted several others sites that were damaged. Since damage appeared to be mostly to graves, Umlando undertook a small survey of graves along the route where graves and sites were previously recorded and monitored.

This section of the report appears in full in another report (Umlando NMPP 2684358-UM-PL1- ENV-RP-003) and summarised in this report (see Table 7 for a summary). The NMPP has undertaken a full investigation of these incidents. The damage has been reported to Amafa KZN, who has taken it to the public prosecutor.

Comment [HL15]: Which site. You talk about a Transnet Investigation which investigation for which site?

Comment [u16]: The NMPP was supposed to investigate this after damage report was finalised for their response, which was undertaken reported

Comment [HL17]: Should the title of this report not be stated here and the report appended to this report?

Comment [u18]: It is repeated in the next few pages, so no need for a n appendix

Table7: List of Affected Sites

KP	Heritage Specialist No:	Type of Heritage Structure:	Type of Impact	Site Significance	Demarcation	Type of Mitigation: Undertaken	Assumed Intensity of impact
KP269	GLK066_75	Kraal	Bilobial byre walling has been mostly removed by clearance of the topsoil.	Low	Features were demarcated with blue poles, but were out of the impact zone (RoW)	Most of Kraal cannot be located by excavation	High negative
KP269	GLK066_75	2 Graves	stone cairns missing due to clearing of topsoil	High	Features were demarcated with blue poles, but were out of the RoW	One grave partially damaged, one grave mostly damaged	Medium and high negative
KP268	GLK118_96	1 Grave	stone cairns missing, grave thought to be under the topsoil stockpile	High	Grave was demarcated with blue poles and danger tape. Fell out of the RoW	Are was cleaned and graves located	Low negative
KP268	GLK118a	2 Graves	Indications are that these graves have been excavated as the positions indicate that they fell in the middle of the pipe trench	High	Grave was demarcated with blue poles and danger tape	Are was cleaned and graves located	Low negative
KP 265+286	N3	1 (possible) Grave	Stone cairns missing due to trenching spoil material being placed on top of them. Blasting occurred	High	Grave was demarcated with blue poles and was fenced in to the RoW by the fencing crew	Excavations located some of the cairns	Low negative
KP264+500	GLK122b_4	1 Grave	stone cairns missing due to clearing of topsoil	High	Grave was demarcated with blue poles and was fenced in to the RoW by the fencing crew	Cairns, and thus grave, cannot be located	High negative
KP261	GLK122c grave 031a	1 Grave	stone cairns missing due to trenching spoil material for the auger bore being placed on top of them	High	Grave was demarcated with blue poles and was fenced in to the RoW by the fencing crew	Cairns, and thus grave, cannot be located	High negative
KP238+101	GLK 078 Engravings	N/A	Engravings are covered with blast material from blasting activity, and trenching spoil	Low-medium	Engravings were demarcated with blue poles and were fenced in to the RoW by the fencing crew	All 6 engravings located. 3 engravings damaged by blast material.	Low negative for undamaged; medium negative for damaged
KP239	GLK078	Kraal	Slightly damaged the outskirt of byre by excavator driving over it	Low	Kraal was demarcated with blue poles and danger tape and or fencing	Left as is since damage is not severe. The rocks will resettle.	Low negative
KP273.800	GLK063a grave 16a	Graves	Graves covered by trenching spoil	High	Grave was demarcated with blue poles and danger tape and fencing	Grave was located and cleaned	Low negative
KP273.850	GLK063a grave 17a	Graves?	Area was covered by trenching spoil	High	Areas was listed as a no-work area	Graves occur outside the RoW	No impact
KP189.130	KP189.130	1 grave	top cairns removed by RoW team	High	Area was demarcated with at least blue poles	Excavations could not locate the cairns or the grave	High negative

4.1.1 GLK066_75

This is site located on the top of a hill at KP269. The site extends over the entire hill, consists of many stone walled features, and graves. These features date from the LIA to the more recent past. The affected area consisted of one bilobial byre with two possible graves: one within the byre and the other to the west. Figures 170 – 172 indicate there are no settlements near this site from 1937 – 2000, although settlements do occur to the south and southwest. This suggests that part of the site appears to date to the LIA.

The site was originally outside of the RoW and was not fenced off, however it was demarcated with metal and wooden poles. After the original RoW was cleared (and monitored), it was extended again, without heritage approval. The second clearance caused the damage to the site. The cleared stone walling can be seen in the pile of sand and rocks near the *Acacia spp* tree.

A nearby similar site (feature 73), in the RoW, was excavated and mapped, and was a "sacrifice site", since GLK066_75 was not going to be damaged.

Significance of site: The byre is of low significance

Significance of impact: High negative

Previous mitigation: The byre was photographed (fig. 173) and mapped (fig. 174) in 2009 and thus some record of the site exists.

Occurrence of damage: The site was monitored during the RoW clearance. The RoW was extended after monitoring.

Assessment of Damage: The initial assessment suggested that the entire stone wall had been removed by RoW clearance and then topsoil was deposited on top of the site (fig. 175). The stone wall was originally ~10cm – 20cm above ground level and with a similar depth. The southern part of the byre still exists and was used as a comparison.

Umland placed several excavation lines in a wheel spoke alignment from the middle of the byre, for the assessment (fig. 176 - 177). The excavations used the site map (fig. 174) to determine where the walling would occur. The excavations went down to the original surface – visible by the layer of grass. If the stone wall existed, then the excavation lines would locate an *in situ* wall. If no walling was observed, then it implies that it has been removed by the RoW clearance.

The excavations located parts of the primary wall. These remains were the basal stone layer. Most of the secondary wall has been cleared and I only located isolated stones. It appears that at least 75% of the byre has been damaged in some manner. Fig. 177b shows parts of the undamaged wall. It is not possible to repair the byre wall.

Comment [HL19]: Gavin don't think the report should be in the 1st person. Should read the Heritage Specialist....

Comment [u20]: Passel Third person writing was on the out when I was still at varsity in the 80s/early 90s. 1st person allows the author to take responsibility. Only the science departments remained in 3rd person due to beliefs of objectivity etc. But as the client, you may request 3rd person writing. ☺

Fig. 170: Features GLK066 on the 2000 Topographical Map¹⁹

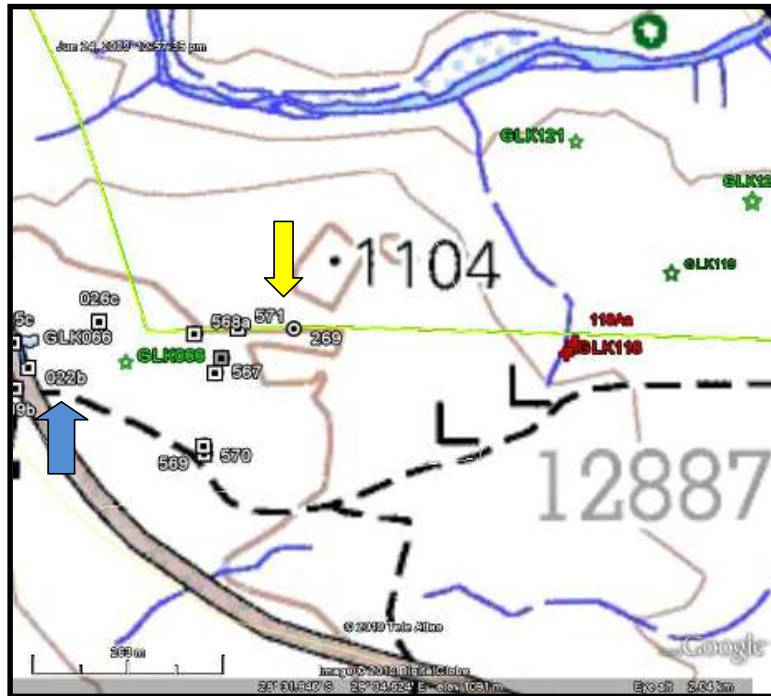
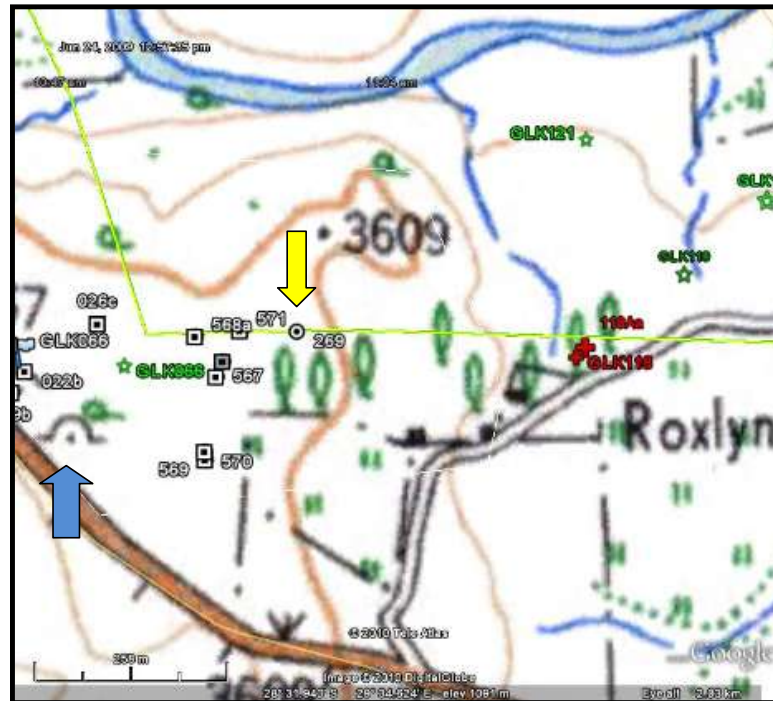


Fig. 171: Features GLK066 on the 1954 Topographical Map



¹⁹ Green star = site name; red = recent graves; white square = recent historical feature, yellow arrow= affected area; blue arrow = 20th century settlement

Fig. 172: Features GLK066 on the 1937 Aerial Map

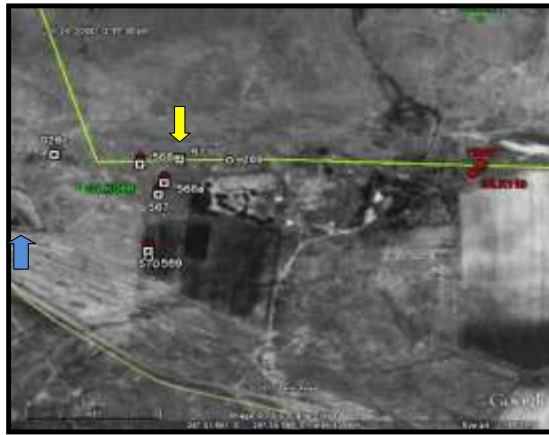
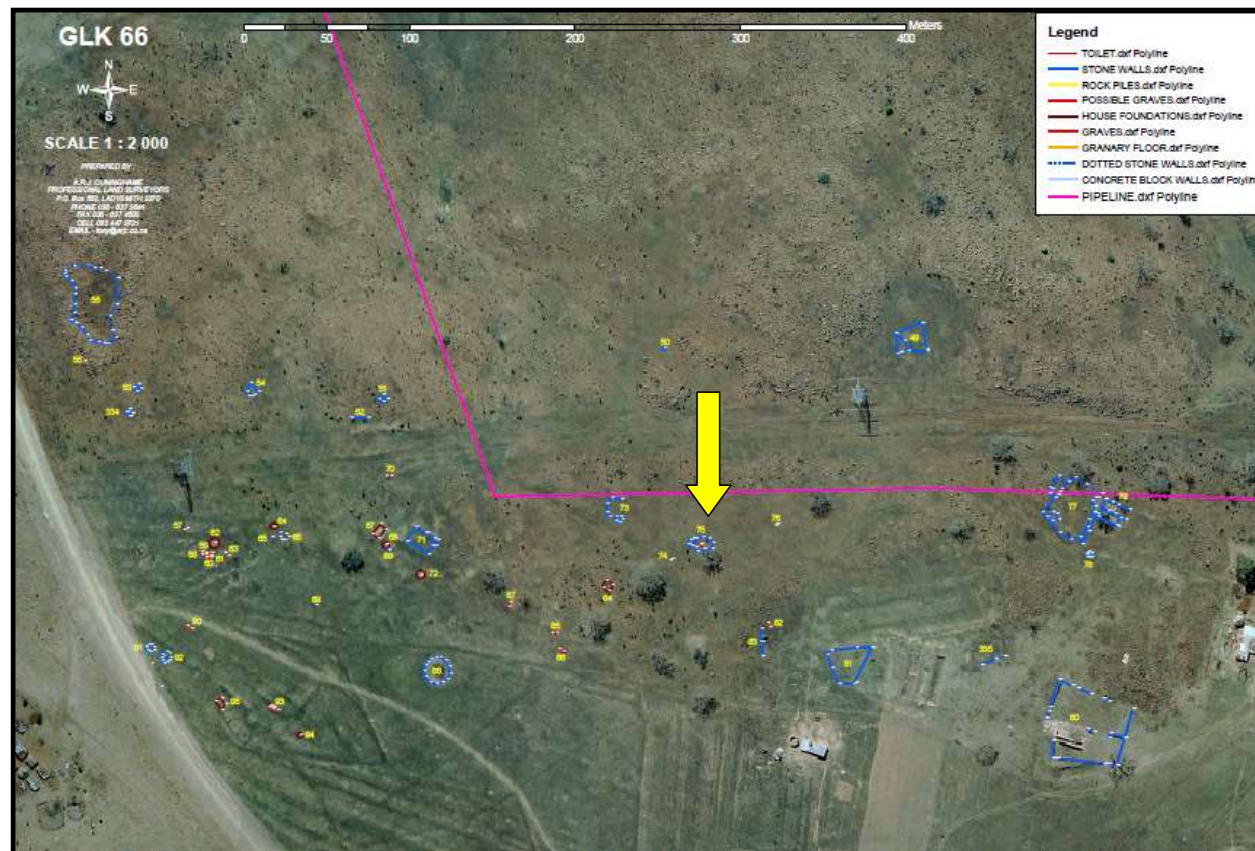


Fig. 173: Photograph of GLK066_75 In 2009

Fig. 174: Features GLK066²⁰



²⁰ Blue = stone wall; red = grave; pink = pipeline; yellow arrow = feature 75

4.1.2 GLK066_74 and 75 graves

GLK066_74 is located ~13m west of GLK066_75 (fig. 176), and it does not have any related stone walling. GLK066_75 is located inside the byre discussed above. The graves consisted of stone cairns and date to the LIA. The graves were demarcated with metal and wooden poles, but were out of the original RoW so they were not fenced off. The topsoil has been removed and thus the upper part of the grave has been removed as well.

Significance of site: The features are of high significance

Significance of impact: Medium to high negative.

Previous mitigation: The graves were photographed (fig. 178 - 179) and mapped (fig. 174) in 2009 and thus some record of the site exists.

Occurrence of damage: The site was monitored during the RoW clearance. The RoW was extended after monitoring.

Assessment of Damage: The ends of both graves were surveyed in 2009. I used these XY co-ordinates to relocate both graves. I excavated between these two points and a width of ~1m to locate the stone cairns (fig. 178 - 179).

The cairn at GLK066_74 has been mostly removed and only a few *in situ* rocks remain. The cairn at GLK066_75 has been partially affected, and minimally damaged.

Subsequent to mitigating this site, re-fencing the graves and RoW and a site visit, the one grave has been covered by sand, and all of the fencing has been removed. This was presumably undertaken by the local community.

Fig.175: Feature 75 at GLK066_75 after 2nd Row Clearance²¹

²¹ Yellow arrows indicate probable location of grave, blue arrow indicates location of the byre.

Fig. 176: Excavation Lines at GLK066_75

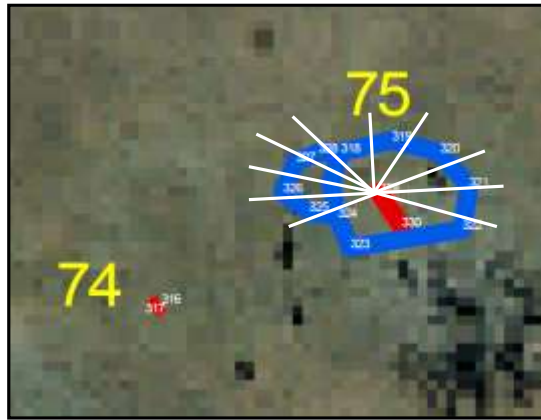


Fig. 177a: Excavation at GLK066_75²²

²² Yellow line = location of stone wall; yellow arrow = undamaged stone wall

Fig. 177b: Excavations and Remaining Part of Stone Wall at GLK066_75



Fig. 178: Before and After Photographs of Grave at GLK066_74²³



²³ Note the change in the size of the stone cairn
*

Fig. 179: Before and After Photographs of Grave at GLK066_75



4.1.3 GLK118_96

This site is located near KP268 and consists of one (recent) historical grave (fig. 180 – 183). The local community does not acknowledge these graves as being theirs, as they have been recently relocated to the area. The grave is probably related to farm labourers who worked on this farm prior to the land settlement. The graves either predate 1937 or between 1955 and 2000, and I would choose the latter date as it is in association with square, or rectangular foundations.

The grave was originally demarcated with blue poles and danger tape and an instruction was given for it to be fenced off. The grave also occurred outside of the original RoW, but it was later changed to compensate for GLK118a. There was no HIA on site during this part of the RoW clearance.

The initial site inspection could not locate the graves, or their markers, however, the grave was later located with the surveyors using our previous survey data. The grave was covered with the topsoil (fig. 181). The graves were located and the topsoil was removed to expose the graves.

Fig. 180: Location of GLK118_96

Significance of site: The site is of high significance

Significance of impact: Medium negative if affected.

Previous mitigation: There was no previous mitigation. The graves were supposed to be fenced off if they were in the RoW,

Occurrence of damage: The graves were probably affected during the RoW clearance when the topsoil was moved.

Assessment of Damage: The graves were technically not damaged and have been cleaned. The associated walling was also cleaned. There was however, an infringement on the site and this forms part of the pattern of demarcated heritage sites being ignored by the contractor.

Fig. 181: Location of GLK118_96



Fig. 182: GLK118_96 Grave after Cleaning



Fig. 183: GLK118_96 General After Cleaning

4.1.4 GLK118a

This site is located at KP268 and consists of two graves that probably date to the recent past and GLK118. The area was originally surveyed in as being possible remains of house foundations. Umlando resurveyed the site at a later stage (after notification by the ECO) when the grass had been burnt, and reclassified the site to being graves beside house foundations. The ECO demarcated the site with blue wooden poles and instructions were given for the site to be fenced off. The co-ordinates for the graves were submitted to the JV in March 2010. The line originally went through the graves, but was then rerouted. No HIA was on site during the RoW clearance, as the graves were out of the RoW.

The local community does not acknowledge these graves as being theirs, as they have been recently relocated to the area. The grave is probably related to farm labourers who worked on this farm prior to the land settlement. The graves either predate 1937 or between 1955 and 2000, and I would choose the latter date as it is in association with square, or rectangular foundations.

The graves were located with our survey data. The graves were outside of the RoW, but rocks had covered one during the trenching phase (fig. 184). The rocks were removed and the grave was cleaned up (fig. 185).

Significance of site: The site is of high significance

Significance of impact: Low negative

Previous mitigation: Area was demarcated and the line was rerouted to avoid the graves.

Occurrence of damage: During the trenching phase.

Assessment of Damage: The graves were technically not damaged and have been cleaned. The associated walling was also cleaned. There was however, an infringement on the site and this forms part of the pattern of demarcated heritage sites being ignored by the contractor.

Fig. 184: Stock Pile of Rocks over One Grave at GLK118a²⁴



Fig. 185: Cleaned Graves at GLK118a

²⁴ Top arrow indicates the covered grave
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4.1.5 N3: KP265.300

This site is located at KP265+286 and consists of one possible grave. The possible grave probably dates to the HP or more recent past. Figures 186 – 188 indicate that there is no human occupation in this immediate area in 1937, 1954 or 2000. The site was located by the ECO during pre-RoW clearance and demarcated with blue wooden poles (fig. 189). I visited the site and confirmed that it is a possible grave, and the area was fenced off and marked off by the RoW supervisor. The landowner recently stated that these features are related to the construction of the N3. This statement has no bearing on the site, as the area was demarcated as a heritage site, regardless of its content, and should have been treated as such.

The possible grave has been damaged in several ways. The fenced off area has been ignored and damaged. The stone cairns are visibly missing due to trenching spoil material being placed on top of it (fig. 190). Site instructions were given for the grave to be covered with protective material during blasting activity; however, I am not sure if this was undertaken. All work activity in the area of the grave had to cease until further notice as from June and a site directive for this was given from Transnet. This meant that the pipe could not be placed into the trench, nor could any backfilling occur. The site was visited in early July with the surveyors to demarcate its extent. At this stage, the pipe had not been placed into the trench. When Umlando visited the site in mid-September, the pipe had been placed into the trench, and the trench had been backfilled (fig. 191). This was undertaken without Umlando's permission, as they had not yet mitigated the site. There was thus a disregard for Transnet's and my directives. One reason for closing the area off was that human remains may be scattered and construction work would further affect these remains.

The trenching team has removed the poles demarcating the outer edges of the grave. The demarcated area was cleaned of the stockpile and the some of the original cairns were exposed (fig. 192). Some of the rocks are missing. I placed some stones to indicate the position of the possible grave (fig. 193). The area was also blasted without permission from me, as I was concerned the blasting debris would affect the grave. This email was dated 27/03/2010. NMPP then informed the various people (28/03/2010) to liaise with me regarding my concerns. This never occurred, and the blast went ahead without the possible grave being protected.

Significance of site: Unless proven otherwise, the site is a grave, and it is of high significance.

Significance of impact: Low negative

Previous mitigation: Site was fenced off

Occurrence of damage: During trenching and later when the trench was backfilled.

Assessment of Damage: The area was cleaned and the outline of the possible grave was demarcated. A few of the rocks from the cairn are missing.

Comment [u21]: Possible grave, landowner would say it was not a grave, and has no bearing

Comment [u22]: Landowner's comments are irrespctive and he is not the HIA person. Most landowners never have any graves on their land anyway due to them being scared of land reform. The fact that I said possible grave is enough, unless NMPP wanted me to test the graves, for which there was no time.

Comment [HL23]: But Umlando just said above that it was not a grave from what was said by

Comment [u24]: No I did not say that

Comment [HL25]: Gavin I cant remember that this happened are you sure that approval was not obtained before this was closed?

Comment [u26]: Absolutely certain. I had phoned Tim the day arrived, and the directive was given that it was closed off area. It was also during a site meeting before this was done with the contractor on site.

Fig. 186: Location of Possible Grave In 2000



Fig. 187: Location of Possible Grave In 1954

Fig. 188: Location of Possible Grave In 1937

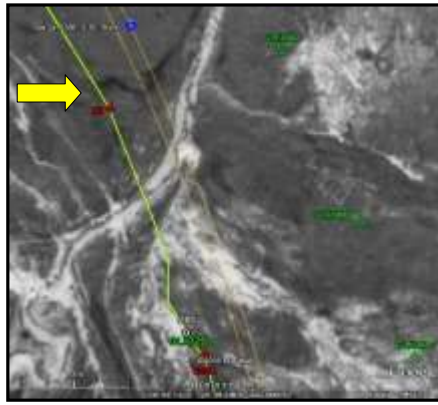


Fig. 189: Photograph of Possible Grave Submitted By the ECO In 2009

Fig. 190: Stockpile over Demarcated Fencing²⁵



²⁵ Yellow arrow indicate original fence poles
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Fig. 191: Backfilling after the Area Had Been Closed²⁶



Fig. 192: Possible Grave Is Exposed²⁷



²⁶ Red arrow indicates the location of the possible grave.

²⁷ Yellow arrows indicate the original fencing poles
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Fig. 193: Possible Grave with Stones Demarcating the Area



4.1.6 GLK122b.4

This site is located at KP264+500 and consists of one grave. The grave was in the RoW, and near the centre point, and the line was rerouted. There is a stone walled byre ~5m of the grave and the two features are probably related. The site dates to the recent past. The site is noticeable as the blue gum tree is visible in the recent aerial photographs. I could not locate the tree in the 1937 aerial photographs, but then the tree would have been much smaller. Settlements are indicated in this area in the 1954 topographical map, but not on the 2000 map. Figures 194 – 196 indicate this. The grave probably dates to 1937 – 1954. There are several graves and settlements on the hill just above this grave, and some would be contemporary with this grave, while others are much older. For example some stone walling and settlements can be seen uphill of this grave in the 1937 aerial photograph.

The byre and grave was demarcated with metal and wooden poles and danger tape, and was fenced off. Two HIAs were on site during the RoW clearance to ensure that the grave and walling was not damaged.

The stonewalling has had topsoil placed over the walls since RoW clearance. The cairn (fig. 197) does not exist anymore and Umlando had to relocate the ends of the grave with our survey data. I placed several trenches in the area of the poles to determine if any form of stone cairn or burial could be seen (fig. 198). It appears that the entire cairn has been removed and Umlando could not locate a burial pit. There was no change in

soil colours to indicate a burial however; this is expected as the bedrock is near the surface. Umlando could not observe any soil colour changes for the archaeological graves that were excavated in this area in 2009. I did observe one bone fragment from the excavation, but could not determine if it was human or animal. The fragment was kept in case it needs to be analysed. The area was fenced off after the excavations.

Significance of site: The grave is of high significance.

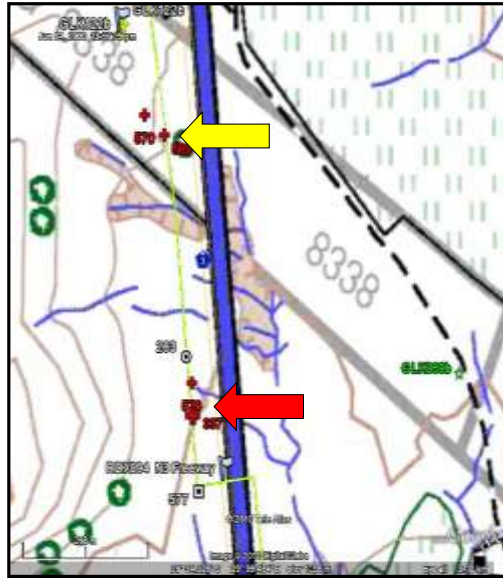
Significance of impact: The impact is high negative.

Previous mitigation: The area was demarcated and fenced off.

Occurrence of damage: After RoW clearance

Assessment of Damage: The entire cairn has been removed and presumably the grave itself.

Fig. 194: 2000 Topographical Map Indicating the Site²⁸



²⁸ Yellow Arrow indicates GLK122b_4; red arrow indicates GLK122c
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Fig. 195: 1954 Topographical Map Indicating the Site

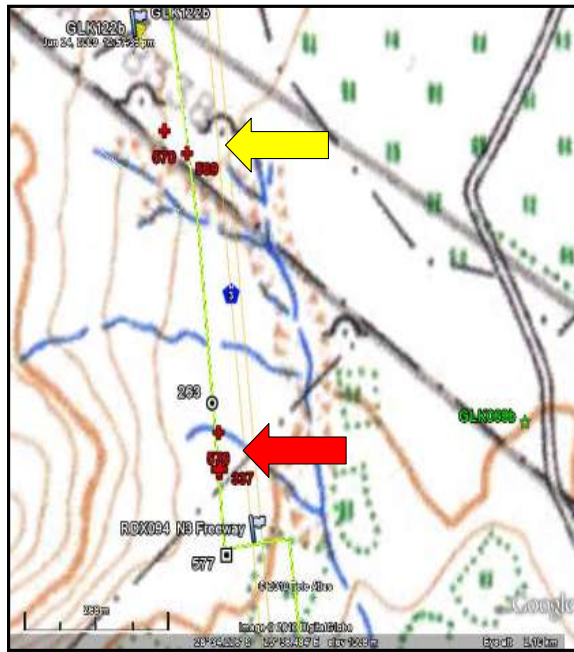


Fig. 196: 1937 Aerial Photograph Indicating the Site

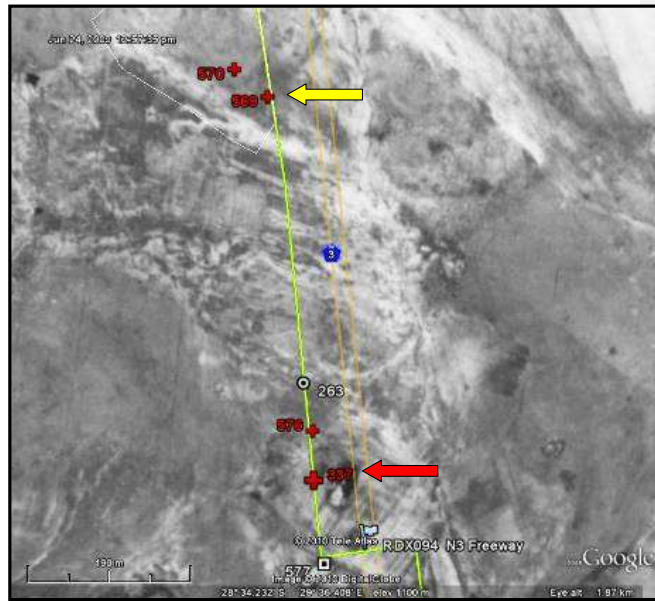


Fig. 197: Position of Grave in July 2009²⁹



²⁹ Yellow arrow & line indicate the grave
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Fig. 198: Poles Indicating the Extent of the Grave and the Excavation Trenches



4.1.7 GLK122c grave 031a

This site is located at KP261 and consisted of one grave (fig. 199 - 200). The site dates to the HP, if not the LIA. The grave was demarcated with metal and wooden poles, and fenced off at a later stage. Several JV members also saw the fenced grave during a site inspection. Two HIA were present on site during the RoW clearance. I originally thought the grave was under the trenching spoil, but I then rechecked the location and realised it was further north. I relocated the site with a GPS. I then placed a 4m x 4m excavation square around the centre point of the GPS (fig. 201). The soil was taken down to the next layer of yellowish gravel.

The stone cairns are missing due to additional construction activity. The excavations could not locate any concentration of stones, although two possible areas were noted (fig. 202). I believe that these two possible areas are the result of natural rock formations and not the graves. The area was fenced off after the excavations. The grave ~50m uphill was not damaged.

Fig. 199: Location of Grave at GLK122c



Significance of site: The site is of high significance

Significance of impact: High negative

Previous mitigation: Area was fenced off.

Occurrence of damage: After RoW clearance.

Assessment of Damage: The entire cairn has been removed and presumably the grave itself.

Fig. 200: Grave at GLK122c



Fig. 201: Cleared Area Where the Grave Occurred



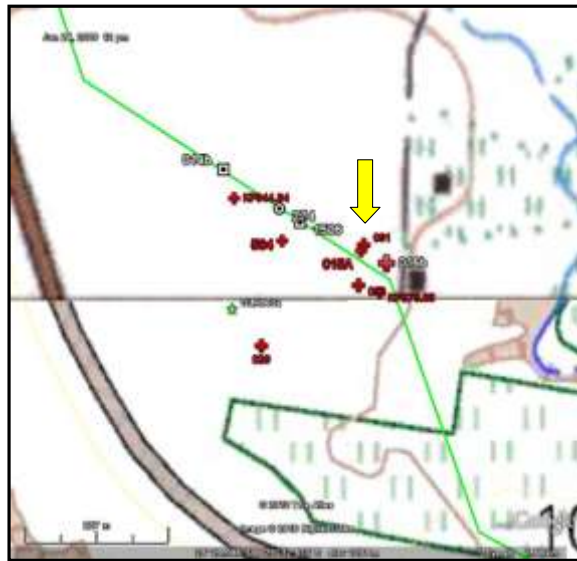
Fig. 202: Excavated Grave Area at GLK122c



4.1.8 GLK063a grave 16b

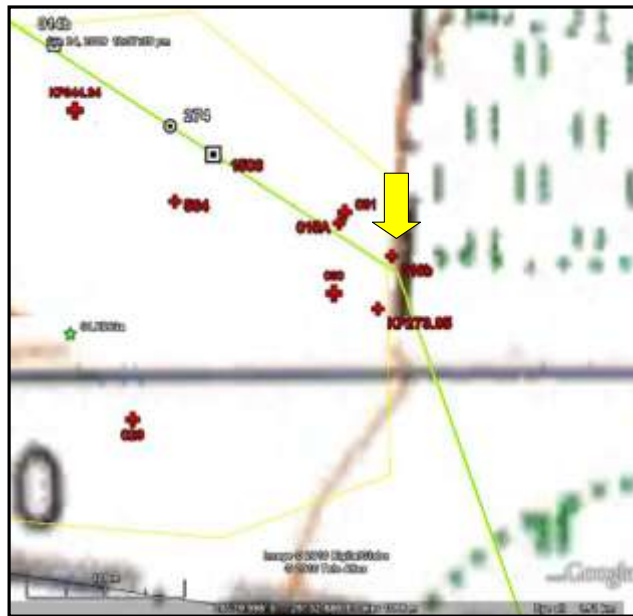
This site is located at KP273.800 and consists of several graves. The grave, and the rest of the site, are younger than 60 years in age, and living relatives may claim this graves. An informant told me, in July 2009, that people still visit the graves just outside the RoW, and these are probably related to the damaged sites. The houses of the living ancestors are shown on the 1986 topographical map, but not the 1963 topographical map, nor on the 1937 aerial photograph (fig. 203 - 205). The artefacts near the houses suggest a 1970 onwards occupation.

Fig. 203: 1986 Topographical Map Indicating the Graves at GLK063a³⁰



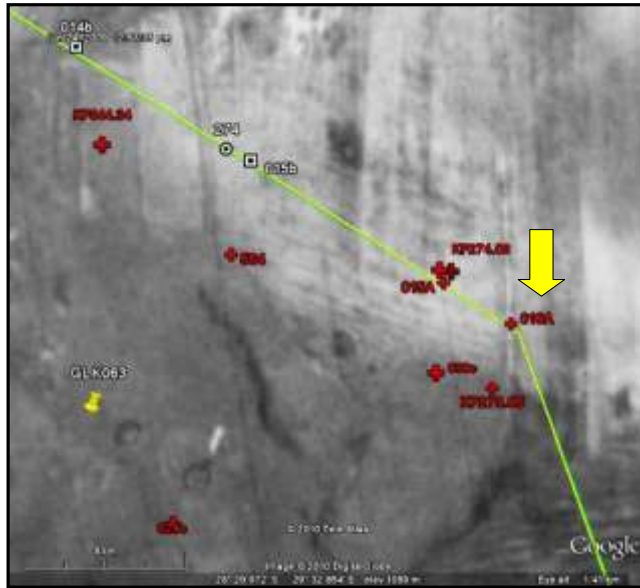
³⁰ The upper part of the map is 1986, while the lower part is 2000
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Fig. 204: 1963/1954 Topographical Map Indicating the Graves at GLK063a³¹



³¹ The upper part of the map is 1963, while the lower part is 1954
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Fig. 205: 1937 Aerial Photograph Indicating the Location of the Graves



The grave was demarcated with metal and wooden poles and was fenced off before the RoW clearance (fig. 206 shows the grave in 2009). Two HIA were on site during RoW clearance. Subsequent to RoW clearance, the grave was covered by trenching spoil (fig. 207). This is the first grave of the damaged sites that has definite living descendents. Transnet may need to compensate the descendents.

Significance of Site: The site is of high significance

Significance of Impact: the impact on the grave is low

Previous Mitigation: The graves were fenced off and clearly demarcated.

Occurrence of damage: after row clearance.

Assessment of Damage: the graves are technically not damaged and they have been cleaned. There was however, an infringement on the site and this forms part of the pattern of demarcated heritage sites being ignored by the contractor. The living descendents may claim that the ancestral spirit needs to be appeased.

Fig. 206: 2009 Photograph of the Grave



Fig. 207: Trenching Spoil over Graves at GLK063a Grave 16a



Fig.208: Cleaned Grave at GLK063a-Grave 16a

4.1.9 GLK063a grave 17a

This entire site is located at KP273 – KP274 and consists of several graves, stone walls, and house floors. The specific grave is younger than 60 years in age, and living relatives may claim this grave. I originally thought the grave was covered by trenching spoil, but it occurs outside of the RoW. It is thus not affected.

I note this grave for a specific reason. This area was demarcated as a 'no working area' in the Transnet directive. When I came back to the site in September, the pipe had been placed into the trench and the area had been rehabilitated. This should not have occurred and luckily there were no graves, else they would have been destroyed. This is another example of the contractor blatantly ignoring directives.

Significance of site: The site is of high significance

Significance of impact: There is no impact

Previous mitigation: None

Occurrence of damage: None

Assessment of Damage: No damage

4.1.10 KP189.130

This site is located at KP189.130 and consisted of two graves that date to the recent past (probably within the last 60 years). The site was first reported, via email, on 24 February 2010, and visited in early March 2010. The graves were confirmed and I requested them to be demarcated via email³². Umlando are attempting to find out what happened thereafter. The graves were at least demarcated with blue poles as I had observed one in the surface spoil heap. Someone has removed the top cairns.

The site is located near the top of the hill. The site consists of a grave (fig. 209) and two stone walled byres. There are several other recorded sites in the general vicinity. The site does not show up on the 2000 topographical map (fig. 210), but there is a single house on the 1937 aerial photograph (fig. 211). This suggests that the grave could date to at least 1937, if not a bit younger. This implies that there will be a living descendant. The grave cairn has been removed and there is no evidence of it. Both the surveyors and I relocated the grave with the GPS co-ordinate. I then placed an approximate 4m x 4m square around this marker. I initially opened several trenches length-wise and width-wise in this square. This was taken down to bedrock, which was 5cm – 10cm below the current surface. I looked for areas with concentrations of stones, however this became futile as the soil was very thin and then bedrock was reached: bedrock was the same raw material used for the cairn.

³² Email correspondences are available on request
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The excavations yielded three possible localities for the grave (fig. 212). These do not; however, appear to be the graves themselves.
Transnet may be required to undertake a social impact assessment to determine if any living relatives claim this grave.

Significance of site: The site is of high significance.

Significance of impact: High Negative

Previous mitigation: Area was demarcated at least with blue poles

Occurrence of damage: Unsure

Assessment of Damage: The grave does not exist anymore

Fig. 209: Grave at KP189.300



Fig. 210: Location of Grave at KP198.300



Fig. 211: Location of Grave & Settlement on the 1937 Aerial Photograph³³

³³ Red Cross = grave; Green circle = previously recorded archaeological site, yellow arrow indicates house
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Fig. 212: Possible Locations of the Grave KP189.300



4.1.11 GLK 078 Engravings

This site is located at KP238+101. The site consists of LIA and HP engravings and is a part of a larger engraving area. There are also several byres and graves at the site – that extends for ~1,5km. A total of 56 2m x 2m squares were excavated at this site in October 2009. The excavations occurred along the area to be affected by the trench. Kraals and graves further away, but within the RoW, were noted, and were fenced and demarcated. The engraving sites that were in the ROW were demarcated with metal and wooden poles and were fenced off before the RoV clearance began. Two HIA were on site during the RoW clearance. The entire area was considered sensitive. The general area has ~100 engravings. The engravings date to the Late Iron Age and Historical Period. The location of each engraving on a site is important, as it has been placed in a specific context. The sense of place is highly symbolic, as is the shape of the rock. Any damage to the location, or the face, of the engraving, is thus damage to the engraving itself.

An email was sent to various people within the NMPP, in early March 2010, to inform them of blasting that will be undertaken in this area. I specifically denied blasting activity at this area, as it would be affect the engraving sites. I had several concerns and requested further information. NMPP then informed the various people (28/03/2010) to liaise with me regarding my concerns. This never occurred, and the blast went ahead without the engravings being protected.

The engravings were covered with blast material from blasting activity, and with material from the trenching spoil. That is, the blasting occurred at the site without an HIA on site, nor with permission, and the trenching team has deposited spoil material over parts of the fenced off engraving area. The site instruction from June was that no work was to occur in this area until the engravings had been mitigated. I returned with the surveyors in July and pegged out the six affected engravings. No pipeline work had occurred on the site. I returned in September to find that the pipeline had been placed into the trench and that more spoil material had been placed over the engravings. So much that in one case that the pole Umlando used to demarcate one engraving was no longer visible – this was later found under the spoil material. This area was part of the no –work directive from NMPP. The NMPP environmental officer had informed that work was being undertaken and I again reiterated that the area was closed off for work. The trenching team had clearly disregarded the no-work directive.

A total of six engravings have been affected. Five of the engravings were recorded with the surveyor in 2009 and are numbered as GLK078_290_2116- 2118, and GLK078_291_2119- 2120. Umlando recorded the sixth engraving in October 2009.

High-resolution photographs exist for all engravings, and these may be viewed on request, as the photographs in the report do not do justice to the engravings. The red point on the scale in the photographs points to north.

GLK078_290

These four can be seen in figure 213. Fig. 213 also indicates the impact of blasting has had by covering most of the engravings with sand and broken rocks. Note all the broken (grey-blue) rocks around the engravings. The broken rocks are probably the cause of the scratching and impact points on the engravings.

Engraving 2116 (fig. 214) consists of several circles that have been pecked into the boulder. There is another smaller pecked circle on the outside. There are three impact points on this rock of which two are directly on the engraving.

Engraving 2117 (fig. 215) consists of a pecked rectangular image and some indeterminate pecking. This engraving has not been damaged.

Engraving 2118 (fig. 216) consists of a two rectangular-oval-type of pecking that are joined on one side. There are four impact points that have left the rock slightly scratched. The engraving itself has not been damaged. This specific engraving was spray painted by the surveyor's assistant while Umlando were locating the engravings (I was discussing the excavation method with the TLB operator while the surveyor located the next batch of engravings). He had sprayed the rock to indicate where the pole should be as it could not be placed firmly into the ground. Afterwards I asked him if he could see the engravings, and then I showed him other engravings. I then pointed out where he had sprayed, whereupon he immediately saw the engravings. The spray paint did not interfere with the engraving and it can be removed with the correct equipment. I believe this was purely accidental.

GLK078_291

Engraving 2119 (fig. 217) consists of a semi-rectangular pecking. It has not been damaged even though it was at the bottom of the spoil heap.

Engraving 2120 (fig. 218) consists of two oval circles that have been pecked. The engravings have not been damaged despite being underneath the spoil heap. The 'after' photograph in fig. 48 does not show the engravings clearly. This is because it had rained and the soil was muddy and had slightly stained the engraving. I tried to wash off the mud but it did not work. The engravings are however visible on site.

Other engravings and scratching occur on boulders in the area. These were not affected by blasting activity. All engraving areas discussed above have been fenced off.

Engraving WP20, (fig. 219) consists of indeterminate pecking and several lines that have been scratched into a checkerboard-like pattern. These scratching are very faint. There are five impact points on this engraving, of which some occur over the faint scratching.

Fig. 213: Location of Four Engravings at GLK078_290 Before/After Damage

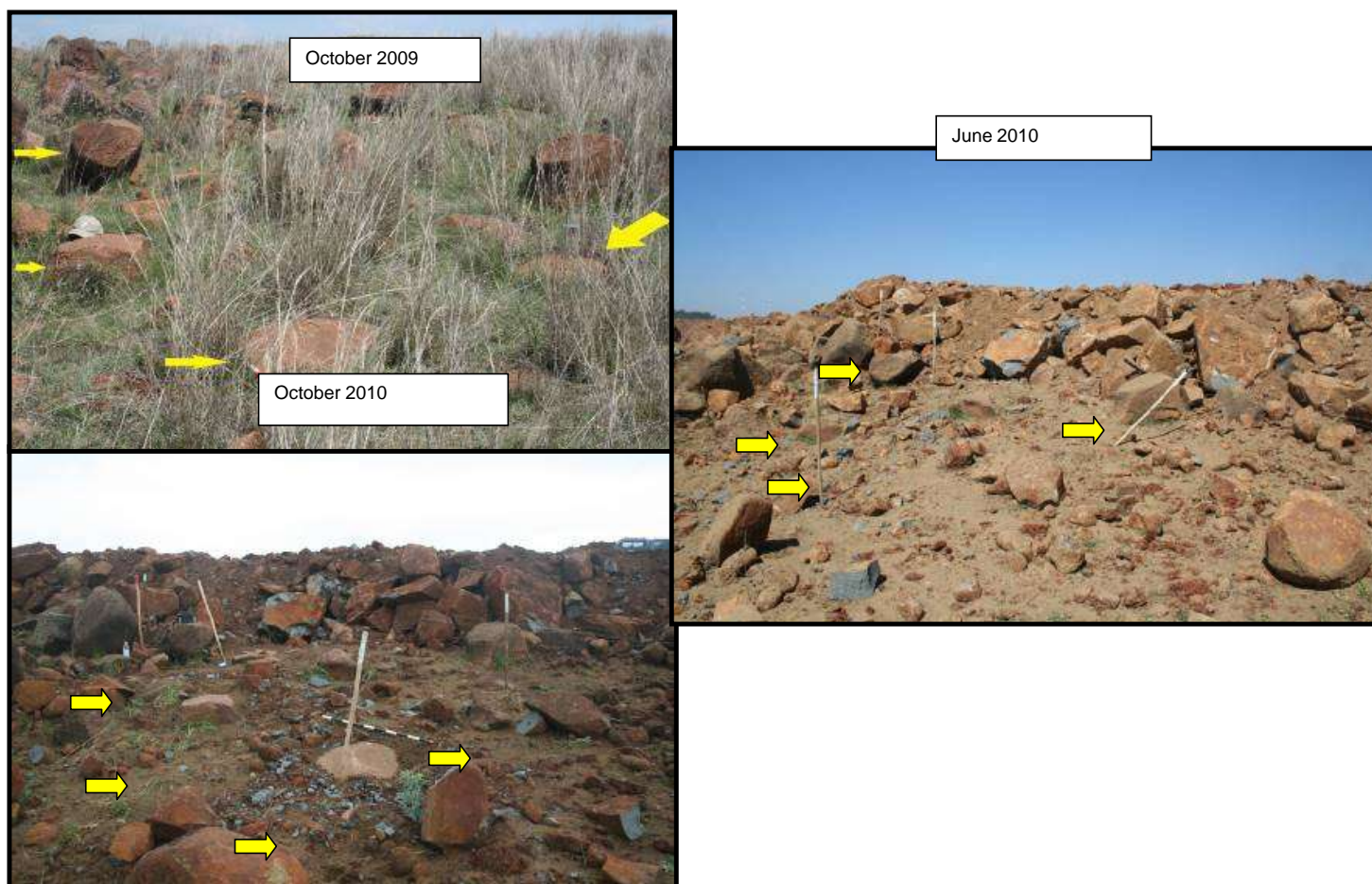


Fig. 214: Before/After Images of GLK078_290_2116

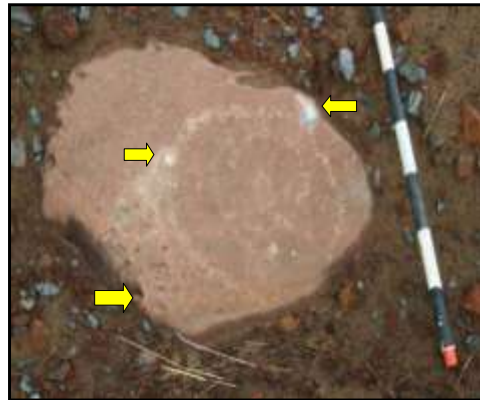


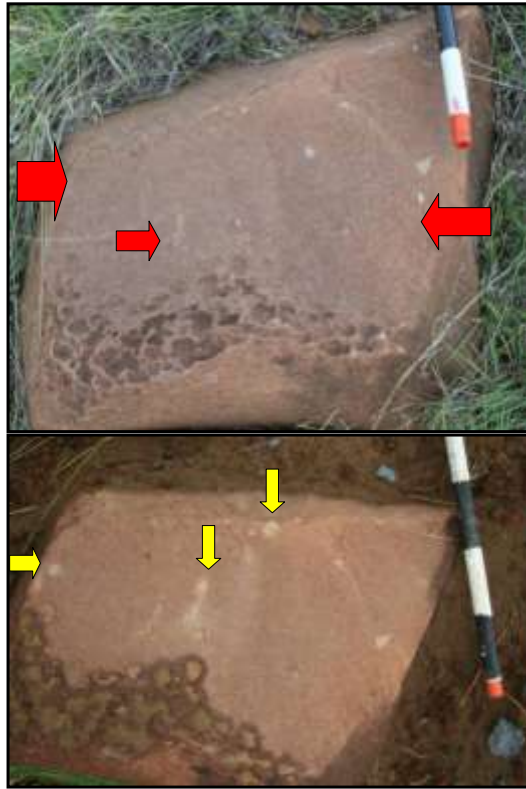
Fig. 215: Before/After Images of GLK078_290_2117



Fig. 216: Before/After Images of GLK078_290_2118



Fig. 217: Before/After Images of GLK078_290_WP20³⁴



³⁴ Yellow arrow = impact points, red arrow = area of engraving
Document Location On J. Drive

Fig. 218: Before/After Images of GLK078_291_2119



Fig. 219: Before/After Images of GLK078_291_2120



Significance of site: medium significance

Significance of impact: low-medium negative

Previous mitigation: Area was fenced off; blasting was not to occur near engravings

Occurrence of damage: After RoW clearance, during blasting, and during trenching

Assessment of Damage: Several engravings have been damaged

4.1.12 GLK078 byre

This site is located at KP239 and consists of a stone walled byre. The site dates to the LIA. The site was demarcated with wooden poles and danger tape during the RoW clearance, and was supposed to be fenced off. There were two HIA on site during RoW clearance.

The byre wall has been slightly damaged by heavy machinery driving over it (fig. 220). The byre has been fenced off.

Significance of site: The site varies from medium to high significance.

Significance of impact: low negative

Previous mitigation: Area had been demarcated

Occurrence of damage: After RoW clearance

Assessment of Damage: Byre was slightly damaged as rocks were displaced.

Fig. 220: Damaged Byre at GLK078³⁵

³⁵ Yellow arrows indicate the damaged area of the byre.

4.1.13 General sites with low negative impacts

Several gravesites have had low negative impacts. These consist of the pipeline being placed above the grave, or its fencing. The impact is thus not on the grave itself but on the heritage zone (fig. 221). All of these sites have been noted and no work was to occur at these sites unless an ECO or an HIA was on site. This was to ensure that the graves were not damaged. I was never called out to supervise these sites, and neither were the independent ECOs. I did resurvey the graves along this section, and none had been damaged. The 1953 topographical map indicates that there are houses associated with all of these graves, although there are fewer houses in 1937. There would thus be living descendants who could claim these graves, especially if any get damaged.

Fig. 221: Example of Low Negative Impact



Several sites have been negatively affected by the NMPP. These sites include human graves, engravings, and byres. In all of the cases, with the possible exception of one, these sites were clearly demarcated and most had been fenced off. Furthermore, the sensitive areas had an HIA on site during the RoW clearance on most of the sites. Some sites did not have an HIA present as most of the mitigation had occurred and the sites had been fenced off.

Umlando, Transnet and the independent ECOs have gone to great lengths to ensure that the sensitive sites were not damaged during NMPP construction. The construction activities that

were thought to have the greatest impact were monitored, and sites were demarcated. In general, there has been good communication between Transnet, JV, ECOs and Umlando regarding the heritage management, and the various emails between parties can attest to this. The emphasis for this part of the project was that heritage sites should not be damaged.

Transnet is currently investigating who damaged the sites. There is however, a consistent pattern when it comes to the damage to the sites. **All Most of those sites that were damaged** occurred during the trenching phase, except for KP189.130. The trenching teams (and related activities) appear to have disregarded many demarcated heritage sites, and have merely gone though and/or covered sites. The trenching team has also worked in three areas where they were specifically told that they could not work. I am left with the impression that the building of the pipeline and placing it into the ground was more important than the heritage sites they had damaged. I have personally spoken to the trenching team and showed the relevant people where they may not work – several people witnessed this.

Comment [HL27]: Not all sites were damaged during trenching

Comment [u28]: I did not say that. Of those that were damaged, most were....

The current management plan has been to stop all activity in the areas where sites have had any negative impact until further notice. Those sites with a low negative impact will be fenced off again and no activity may be allowed near the site unless an HIA or ECO is on site.

All the sites have been mitigated and assessed in some manner. All sites have been fenced off and someone has been trained to monitor work at all of these sites during construction activity. These sites, with all of the other sites along the NMPP, will be audited after reclamation has occurred.

The impacts are as follows:

- There are five graves that cannot be located: 2-3 of these may have living descendants.
- One possible grave has been partially damaged
- Four graves have been located and cleaned.
- Most of one stone walled byre has been irreversibly damaged
- Three engravings have been damaged by blasting activity
- **Three engravings were not directly damaged, but were covered with rocks and sand**
- Those graves that were slightly affected by the pipeline have been fenced off

Comment [HL29]: Do Umlando need to include this if there was not damage, as the heading is impacts?

Comment [u30]: changed

5 Conclusions and Recommendations

The HIA and mitigation of heritage sites began in 2008, and ended in 2011. This process involved numerous stages from initial surveys and line reroutes, to monitoring, excavations, and additional surveys. A total of 2654 photographs were taken of the sites, features, artefacts, etc., and these have been labelled according to site name and submitted to the relevant parties. In total 1180 heritage sites, artefacts and/or features were assessed.

These can be broken down as follows:

- Graves (recent and historical): 213
- Archaeological sites: 134
- Features at archaeological sites mapped: 590
- Archaeological sites excavated: 7
- Artefacts from 2ABW sites: 55
- Historical buildings: 64
- Sites related to the 2ABW: 15
- Engravings: 106
- Features on the cultural landscape: 3

Not all of these occur in the RoW, but were assessed at some stage in the project and have been documented. This is a substantial amount of new heritage data that has been captured by the NMPP. This data is a cumulative effort between the HIA, NMPP, ECOs and several sub-contractors who all assisted in the recording of sites at some stage of the process. Most of these sites and features are previously unrecorded sites.

The mitigation followed various stages. The original survey assessed various sites along different routes and management plans were suggested for each site if it was to be affected. These sites had basic mitigation in terms of site recordings and photography.

Twenty sites were noted as requiring detailed mapping by means of a land surveyor. The entire site was mapped, since only recording a partial bit of the site would have been meaningless. The individual features at these sites were allocated XY co-ordinates and this was largely to record the spatial information at each site and note their presence and location, in case some were damaged at a later stage. Maps were produced for all sites and features, and the co-ordinates were submitted to NMPP for final route planning.

Seven archaeological sites were excavated in KZN. These sites dated to the LIA and consisted of various features and artefacts. The artefacts frequencies were very low at these sites. This is the norm for inland LIA sites. However, it also means that few artefacts were "lost" to the project. Several features were identified as graves; however, none of these yielded any human remains. This is also in accordance with several other excavated LIA sites in KZN and is probably a result of poor preservation. Only features within 10m of the pipeline itself were excavated, while the rest were demarcated as 'no impact areas'.

Nineteen sites were monitored during the RoW clearance phase. The monitoring was to rescue any artefacts, features, and/or human remains that may occur below the surface and that were exposed by the RoW clearance. The monitoring was also to ensure that demarcated features were not damaged during the most destructive phase of the project. Artefacts were recovered during this phase.

2ABW sites occurred in the RoW and five of these were systematically surveyed with a metal detector. A wide range of artefacts were observed and indicate new areas of fighting where previously none were recorded. In addition to this 15 2ABW buildings and/or features were assessed.

Many historical and recent graves were recorded during the survey. A total of 213 graves dating to the last 100 years were noted, and mitigated. None of these graves were excavated and the line was moved. Where the graves occurred within the RoW, they were clearly demarcated and monitored during RoW clearance. Some of the graves were completely damaged by the construction phase through what appears to be negligence. This has been reported to Amafa KZN.

Several historical buildings and walls were recorded during the project. No buildings were affected, and only one wall was in the RoW. This historical farm boundary wall was of low significance; however, there was no reason to destroy it. The wall was systematically taken apart for 6m at two areas, with the aim of rebuilding it after construction phase and rehabilitation. The wall was however further damaged in construction phase and the client paid to have the wall rebuilt under HIA supervision.

Three sites yielded ~100 LIA and HP engravings, while two areas were noted as having 2ABW engravings. The LIA and one of the 2ABW engravings were photographed. The second set of 2ABW engravings fall outside of the RoW and have not been systematically photographed as it was outside of the ToR for this project.

The entire route was assessed for palaeontological remains and a field visit was undertaken. Several fossils were observed, recorded and sampled.

Unfortunately 12 sites, or 17 features, were damaged and/or destroyed during the construction phase of the project. The damaged occurred to features that were clearly demarcated. All of these occurred in KZN, and have been reported to KZNH. KZNH has subsequently referred this matter to the public prosecutor. Apart from the damage at these 12 sites the majority of the HIA was successfully managed, especially considering the high numbers of recorded sites and features. The damage could have been averted if site instructions were followed.

A project as large as this the NMPP would inevitably have problems, and negative impacts to heritage sites was in total very low, *albeit* permanent in a few cases. Nonetheless, Umlando would make the following recommendations for all future pipelines (of this magnitude).

Once the route alignment has been finalised, the line should be surveyed again. One must remember that the initial buffer zone was 250m each side of the line, with a limited time for the actual survey. In addition to this, the vegetation was very dense in places resulting in zero ground visibility. This occurred for several kilometres along this route. The preconstruction, or RoW, survey was undertaken with an ECO as well as contractors EO and one of the engineers. In future, it should include the HIA. While this may appear to be repetitive, it would decrease

Comment [HL31]: Think Umlando should be clear as to how many were damaged and how many destroyed.

Comment [u32]: That has been explained in full further above.

Comment [HL33]: Thought it was bigger than this all my documentation shows 500m each side of centre line

Comment [u34]: Our initial survey was 200-250m, or could have been 500m in total. Been looking for the ToR, but can't see it. ! 1km wide buffer would make it even worse. But were not given that 1km buffer during the initial surveys

the occurrence of any missed sites, as the buffer zone would now have been decreased into a more manageable size. All route changes, regardless of how small should also be resurveyed, especially for graves.

All sensitive areas should be monitored during all construction activities. The sensitive sites along the NMPP were only monitored during RoW clearance, as this was deemed the most destructive phase. It was clearly not so, as sites that were demarcated, and had route realignments, were still damaged. If an HIA was on site at these points, the sites would not have been damaged. This would also require careful planning for the route construction phase. Umlando do not believe that training a member of the local community to monitor would be as successful, as this person would not carry the same authority as an HIA or ECO.

All graves should have a 20m buffer zone regardless of one what stage of the project the graves are uncovered. Route realignment would need to occur regardless. This would be countered by the second survey mentioned above. Admittedly only 11 of the 213 (5%) graves were damaged in some way; however these are 11 graves too many.

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