

# HERITAGE IMPACT ASSESSMENT

(REQUIRED UNDER SECTION 38(8) OF THE NHRA (No. 25 OF 1999))

## For the Delmore Ext 8 Bulk Water Services, Ekurhuleni Metropolitan Municipality, Gauteng Province

**Type of development:**

Water Infrastructure

**Client:**

Alta van Dyk Environmental

**Client Contact:**

Suzanne van Rooy (suzanne@avde.co.za)



**HCAC - Heritage Consultants**

Private Bag X 1049

Suite 34

Modimolle

0510

Tel: 082 373 8491

Fax: 086 691 6461

E-Mail: [jaco.heritage@gmail.com](mailto:jaco.heritage@gmail.com)

Report Author:

Mr. J. van der Walt

Project Reference:

HCAC Project number 2065

Report date:

December 2020

## APPROVAL PAGE

<b>Project Name</b>	Delmore Ext 8 Bulk Water Services, Ekurhuleni Metropolitan Municipality, Gauteng Province
<b>Report Title</b>	Heritage Impact Assessment for the Delmore Ext 8 Bulk Water Services, Ekurhuleni Metropolitan Municipality, Gauteng Province
<b>Authority Reference Number</b>	TBC
<b>Report Status</b>	Draft Report
<b>Applicant Name</b>	City of Ekurhuleni

	<b>Name</b>	<b>Qualifications and Certifications</b>	<b>Date</b>
<b>Archaeologist</b>	Jaco van der Walt	MA Archaeology ASAPA #159 APHP #114	November 2020
<b>Archaeologist</b>	Ruan van der Merwe	BA Hons Archaeology	November 2020
<b>Palaeontologist</b>	Marion Bamford	PhD Paleobotany	November 2020

**DOCUMENT PROGRESS****Distribution List**

Date	Report Reference Number	Document Distribution	Number of Copies
2 December 2020	2065	Alta van Dyk Environmental	Electronic Copy

**Amendments on Document**

Date	Report Reference Number	Description of Amendment

**INDEMNITY AND CONDITIONS RELATING TO THIS REPORT**

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken. HCAC reserves the right to modify aspects of the report including the recommendations if and when new information becomes available from ongoing research or further work in this field or pertaining to this investigation.

Although HCAC exercises due care and diligence in rendering services and preparing documents HCAC accepts no liability, and the client, by receiving this document, indemnifies HCAC against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by HCAC and by the use of the information contained in this document.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

**COPYRIGHT**

Copyright on all documents, drawings and records, whether manually or electronically produced, which form part of the submission and any subsequent report or project document, shall vest in HCAC.

The client, on acceptance of any submission by HCAC and on condition that the client pays to HCAC the full price for the work as agreed, shall be entitled to use for its own benefit:

- The results of the project;
- The technology described in any report; and
- Recommendations delivered to the client.

Should the applicant wish to utilise any part of, or the entire report, for a project other than the subject project, permission must be obtained from HCAC to do so. This will ensure validation of the suitability and relevance of this report on an alternative project.

## REPORT OUTLINE

Appendix 6 of the GNR 326 EIA Regulations published on 7 April 2017 provides the requirements for specialist reports undertaken as part of the environmental authorisation process. In line with this, Table 1 provides an overview of Appendix 6 together with information on how these requirements have been met.

**Table 1. Specialist Report Requirements.**

Requirement from Appendix 6 of GN 326 EIA Regulation 2017	Chapter
(a) Details of - (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Section a Section 12
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	<i>Declaration of Independence</i>
(c) Indication of the scope of, and the purpose for which, the report was prepared	Section 1
(cA) an indication of the quality and age of base data used for the specialist report	Section 3.4 and 7.1.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	9
(d) Duration, Date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3.4
(e) Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of site plan identifying site alternatives;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 8 and 9
(h) Map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Section 8
(I) Description of any assumptions made and any uncertainties or gaps in knowledge	Section 3.7
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity <b>including identified alternatives on the environment</b> or activities;	Section 9
(k) Mitigation measures for inclusion in the EMPr	Section 10
(l) Conditions for inclusion in the environmental authorisation	Section 10
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10
(n) Reasoned opinion - (i) as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 10.2
(o) Description of any consultation process that was undertaken during the course of preparing the specialist report	Section 6
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to BA report
(q) Any other information requested by the competent authority	Section 11

## Executive Summary


Alta van Dyk Environmental Consultants (AVDE) was appointed to obtain environmental authorisation for the proposed Delmore Ext 8 Bulk Water Services project on behalf of the City of Ekurhuleni. There are two sections to the project, a bulk water pipeline and a bulk sewer pipeline. The sewer line will include a new bulk sewer line (Delmore Park Main Branch) and replacement of a section of the existing Lilianton Main Outfall Sewer. HCAC was appointed to conduct a Heritage Impact Assessment (HIA) for the project. The study areas were assessed both on desktop level and by a non-intrusive pedestrian field survey. Key findings of the assessment include:

- The study area and surrounds are characterised by mining and township developments that would have impacted on surface indicators of heritage resources if any ever-existed in the study area;
- This was confirmed during the field assessment and finds were limited to the demolished remains of a structure (Feature 1) and a stone cairn (Feature 2), both located outside the direct area of impact;
- The area is indicated as of very high palaeontological sensitivity on the South African Heritage Resource Information System (SAHRIS) and an independent study was conducted by Prof Marion Bamford. The study concluded that the routes for the Delmore Park-Lilianton BWSS upgrade and realignment are on non-fossiliferous rocks of the Johannesburg Subgroup so that section may proceed, as far as the palaeontology is concerned. The route for the Lilianton outfall sewer along Station road: This route is mostly on Vryheid Formation shales and a short section on Dwyka Group tillites and diamictites. Based on the observations made during the site visit, there are no fossils in the highly disturbed surface soils and sands. It is unlikely that any fossils would be preserved in the top few metres of soil that will be excavated for the trench in which to lay the outfall sewer pipes.
- The impact of the project on heritage resources is considered to be low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA:

### **Recommendations:**

- Implementation of a chance find procedure for both the archaeological and paleontological components.
- Feature 1 and 2 should be indicated on development plans and avoided during construction.

**Declaration of Independence**

<b>Specialist Name</b>	Jaco van der Walt
<b>Declaration of Independence</b>	<p>I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 108 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations, that I:</p> <ul style="list-style-type: none"> <li>• I act as the independent specialist in this application;</li> <li>• I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;</li> <li>• I declare that there are no circumstances that may compromise my objectivity in performing such work;</li> <li>• I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;</li> <li>• I will comply with the Act, Regulations and all other applicable legislation;</li> <li>• I have no, and will not engage in, conflicting interests in the undertaking of the activity;</li> <li>• I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;</li> <li>• All the particulars furnished by me in this form are true and correct; and</li> <li>• I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.</li> </ul>
<b>Signature</b>	
<b>Date</b>	30/11/2020

**a) Expertise of the specialist**

Jaco van der Walt has been practising as a CRM archaeologist for 15 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focussing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focussing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is an accredited member of ASAPA (#159) and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as he Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC Zambia and Tanzania. Through this, he has a sound understanding of the IFC Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.

**TABLE OF CONTENTS**

<b>REPORT OUTLINE.....</b>	<b>4</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>5</b>
<b>DECLARATION OF INDEPENDENCE .....</b>	<b>6</b>
A) EXPERTISE OF THE SPECIALIST.....	6
<b>ABBREVIATIONS.....</b>	<b>9</b>
<b>GLOSSARY.....</b>	<b>9</b>
<b>1 INTRODUCTION AND TERMS OF REFERENCE:.....</b>	<b>10</b>
1.1 TERMS OF REFERENCE.....	10
1.2 PROJECT DESCRIPTION .....	11
<b>2 LEGISLATIVE REQUIREMENTS.....</b>	<b>15</b>
<b>3 METHODOLOGY .....</b>	<b>16</b>
3.1 LITERATURE REVIEW.....	16
3.2 GENEALOGICAL SOCIETY AND GOOGLE EARTH MONUMENTS.....	16
3.3 PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT:.....	16
3.4 SITE INVESTIGATION.....	17
3.5 SITE SIGNIFICANCE AND FIELD RATING.....	19
3.6 IMPACT ASSESSMENT METHODOLOGY.....	20
3.7 LIMITATIONS AND CONSTRAINTS OF THE STUDY .....	20
<b>4 DESCRIPTION OF SOCIO ECONOMIC ENVIRONMENT .....</b>	<b>23</b>
<b>5 RESULTS OF PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT: .....</b>	<b>23</b>
<b>6 LITERATURE / BACKGROUND STUDY: .....</b>	<b>24</b>
6.1 LITERATURE REVIEW (SAHRIS) .....	24
6.2 BACKGROUND TO THE GENERAL AREA .....	25
<b>7 DESCRIPTION OF THE PHYSICAL ENVIRONMENT .....</b>	<b>33</b>
<b>8 FINDINGS OF THE SURVEY.....</b>	<b>34</b>
8.1 PALEONTOLOGICAL FINDINGS.....	35
<b>9 POTENTIAL IMPACT .....</b>	<b>37</b>
<b>10 CONCLUSION AND RECOMMENDATIONS .....</b>	<b>39</b>
10.1. CHANCE FIND PROCEDURES .....	40
10.2. REASONED OPINION .....	41



<b>11</b>	<b>REFERENCES</b> .....	<b>42</b>
<b>12</b>	<b>APPENDICES:</b> .....	<b>43</b>
	CURRICULUM VITAE OF SPECIALIST .....	43

### LIST OF FIGURES

FIGURE 1-1. REGIONAL SETTING (1: 250 000 TOPOGRAPHICAL MAP).....	12
FIGURE 1-2: LOCAL SETTING (1:50 000 TOPOGRAPHICAL MAP).....	13
FIGURE 1-3. AERIAL IMAGE OF THE PIPELINE.....	14
FIGURE 3-1: TRACK LOG OF THE SURVEY IN GREEN.....	18
FIGURE 6-1. 1937 TOPOGRAPHIC MAP OF THE STUDY AREA. THE SURROUNDING AREA IS CHARACTERISED BY MINING ACTIVITIES.....	28
FIGURE 6-2. 1941 AERIAL IMAGE INDICATING MINING ACTIVITIES AND THE DISTURBED CHARACTER OF THE STUDY AREA (BLUE POLYGON). .....	29
FIGURE 6-3. 1954 TOPOGRAPHIC MAP. MINING ACTIVITIES EXPANDED AND INFRASTRUCTURE DEVELOPMENT LIKE ROADS AND POWERLINES ARE INDICATED.....	30
FIGURE 6-4. 1975 TOPOGRAPHIC MAP OF THE STUDY AREA. INFRASTRUCTURE RELATING TO THE MINING ACTIVITIES IN THE AREA ARE EXPANDING.....	31
FIGURE 6-5. 1983 TOPOGRAPHIC MAP SHOWING SIMILAR INFRASTRUCTURE AND MINING ACTIVITIES THAN THE PREVIOUS DECADE. ....	32
FIGURE 6-6. 2001 TOPOGRAPHIC MAP OF THE STUDY AREA – TOWNSHIP DEVELOPMENTS ARE NOW VISIBLE. ....	33
FIGURE 7-1. GENERAL SITE CONDITIONS. ....	33
FIGURE 7-2. AREA CLOSE TO STREAM.....	33
FIGURE 7-3. OPEN FIELD. ....	34
FIGURE 7-4. MINING ACTIVITIES. ....	34
FIGURE 8-1. FEATURE 1 AND 2 IN RELATION TO THE PROPOSED PIPELINE.....	35
FIGURE 8-2. FEATURE 1 – REMAINS OF A BUILT STRUCTURE.....	35
FIGURE 8-3. FEATURE 2 – STONE CAIRN .....	35
FIGURE 8-4. PALEONTOLOGICAL SENSITIVITY OF THE APPROXIMATE STUDY AREA AND SURROUNDS AS INDICATED ON SAHRIS.....	36
FIGURE 9-1: RECORDED FEATURES IN RELATION TO THE OUTFALL SEWER.....	37

### LIST OF TABLES

TABLE 1. SPECIALIST REPORT REQUIREMENTS.....	4
TABLE 2: PROJECT DESCRIPTION .....	11
TABLE 3: INFRASTRUCTURE AND PROJECT ACTIVITIES .....	11
TABLE 4: SITE INVESTIGATION DETAILS .....	17
TABLE 5. HERITAGE SIGNIFICANCE AND FIELD RATINGS .....	20
TABLE 8. IMPACT ASSESSMENT TABLE. ....	38

**ABBREVIATIONS**

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
BIA: Basic Impact Assessment
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DEA: Department of Environmental Affairs
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMP: Environmental Management Programme
ESA: Early Stone Age
ESIA: Environmental and Social Impact Assessment
GIS Geographical Information System
GPS: Global Positioning System
GRP Grave Relocation Plan
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act
MSA: Middle Stone Age
NEMA National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID Notification of Intent to Develop
NoK Next-of-Kin
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

*\*Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

**GLOSSARY**

Archaeological site (remains of human activity over 100 years old)

Early Stone Age (~ 2.6 million to 250 000 years ago)

Middle Stone Age (~ 250 000 to 40-25 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

The Iron Age (~ AD 400 to 1840)

Historic (~ AD 1840 to 1950)

Historic building (over 60 years old)

## 1 Introduction and Terms of Reference:

HCAC is contracted by AVDE to conduct a HIA of the proposed Delmore Ext 8 Bulk Water Services Project located on the farms Driefontein 85-IR and Driefontein 87-IR, where it extends from Delmore Park Extension 1, encompassing Delmore Park Extension 2, 7 and 8 until it intersects with Lower Boksburg/Commissioner Road above Reiger Park Extension in the Ekurhuleni Municipality (Figure 1-1 - 1-3). The report forms part of the Basic Assessment (BA) and Environmental Management Programme Report (EMPr) for the development.

The aim of the study is to survey the proposed development footprint to identify cultural heritage sites, document, and assess their importance within local, provincial and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999). The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, review of relevant literature; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey one demolished structure and a stone cairn was recorded. General site conditions and features on sites were recorded by means of photographs, GPS locations and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report. SAHRA as a commenting authority under section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) require all environmental documents, compiled in support of an Environmental Authorisation application as defined by NEMA EIA Regulations section 40 (1) and (2), to be submitted to SAHRA. As such the Basic Assessment report and its appendices must be submitted to the case as well as the EMPr, once it's completed by the Environmental Assessment Practitioner (EAP).

### 1.1 Terms of Reference

#### Field study

Conduct a field study to: (a) locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development.

#### Reporting

Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation, SAHRA minimum standards and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999).

## 1.2 Project Description

The project comprises a bulk sewer pipeline and a bulk water pipeline as indicated in Table 2 and 3.

**Table 2: Project Description**

<b>Farm and portions</b>	Farms Driefontein 85-IR and Driefontein 87-IR, to Delmore Park Extension 1, including Delmore Park Extension 2, 7 and 8 until it intersects with Lower Boksborg/ Commissioner Road above Reiger Park Extension.
<b>Magisterial District</b>	Ekurhuleni Metropolitan Municipality
<b>Co-ordinate of the development</b>	26°12'13.78"S and 28°12'47.05"E

**Table 3: Infrastructure and project activities**

<b>Type of development</b>	Bulk water pipeline Bulk sewer pipeline
<b>Size of development</b>	Bulk water pipeline: 1600m  New bulk sewer line - Delmore Park Main Branch – 2000m Replacement of section on Lilianton Main Outfall Sewer – 600m

## 1.3 Alternatives

No alternatives were provided to be assessed.

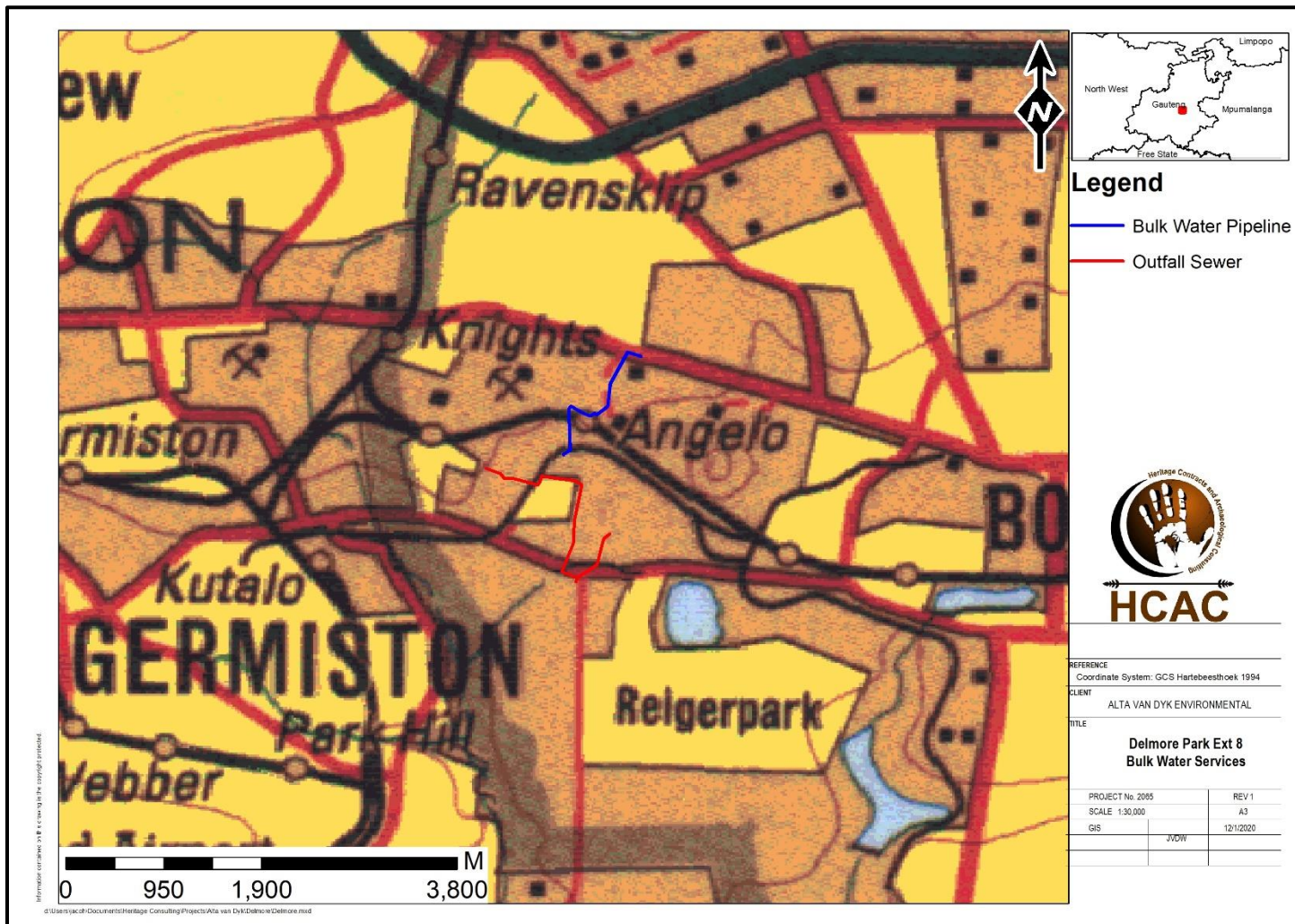


Figure 1-1. Regional setting (1: 250 000 topographical map).

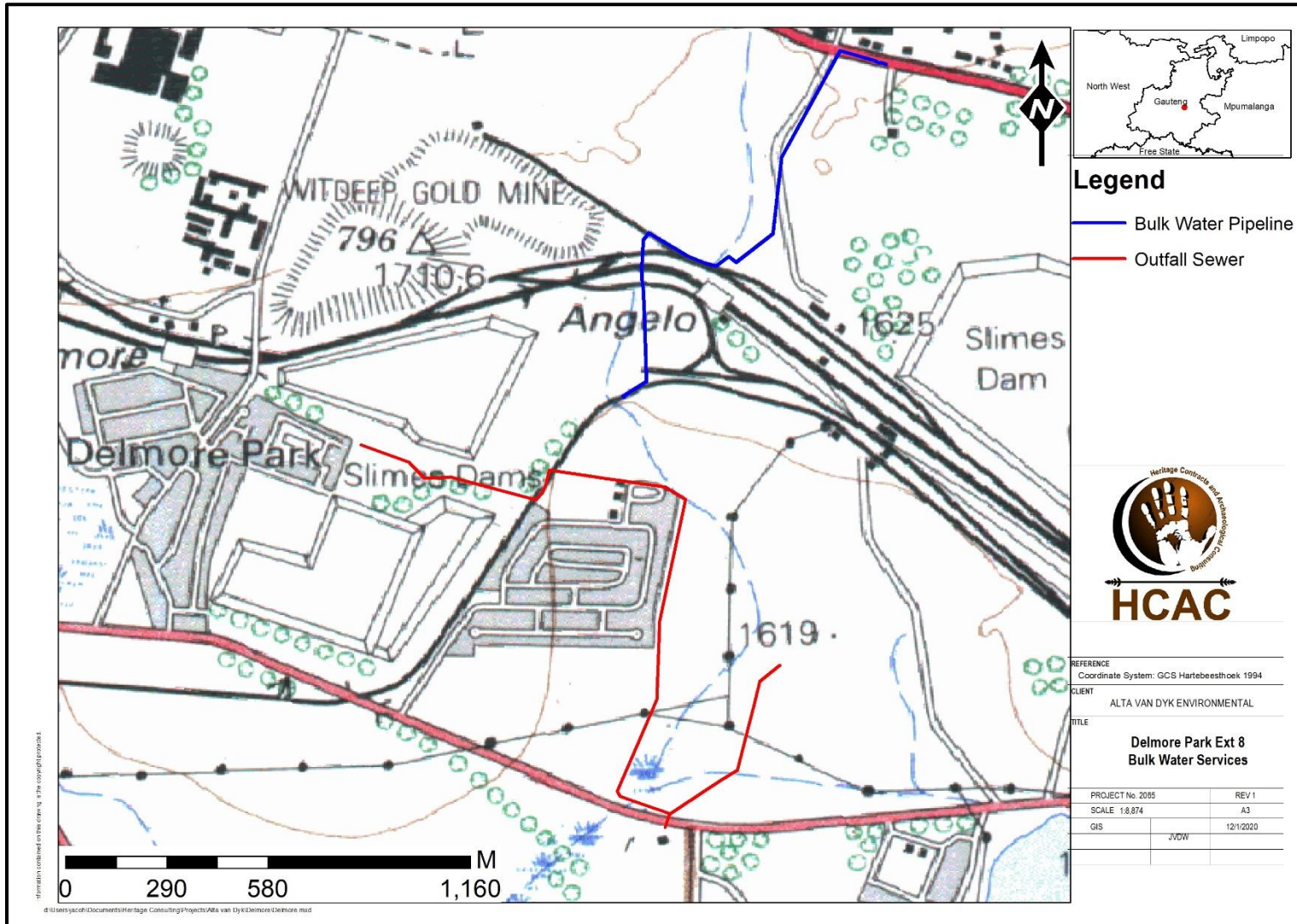


Figure 1-2: Local setting (1:50 000 topographical map).

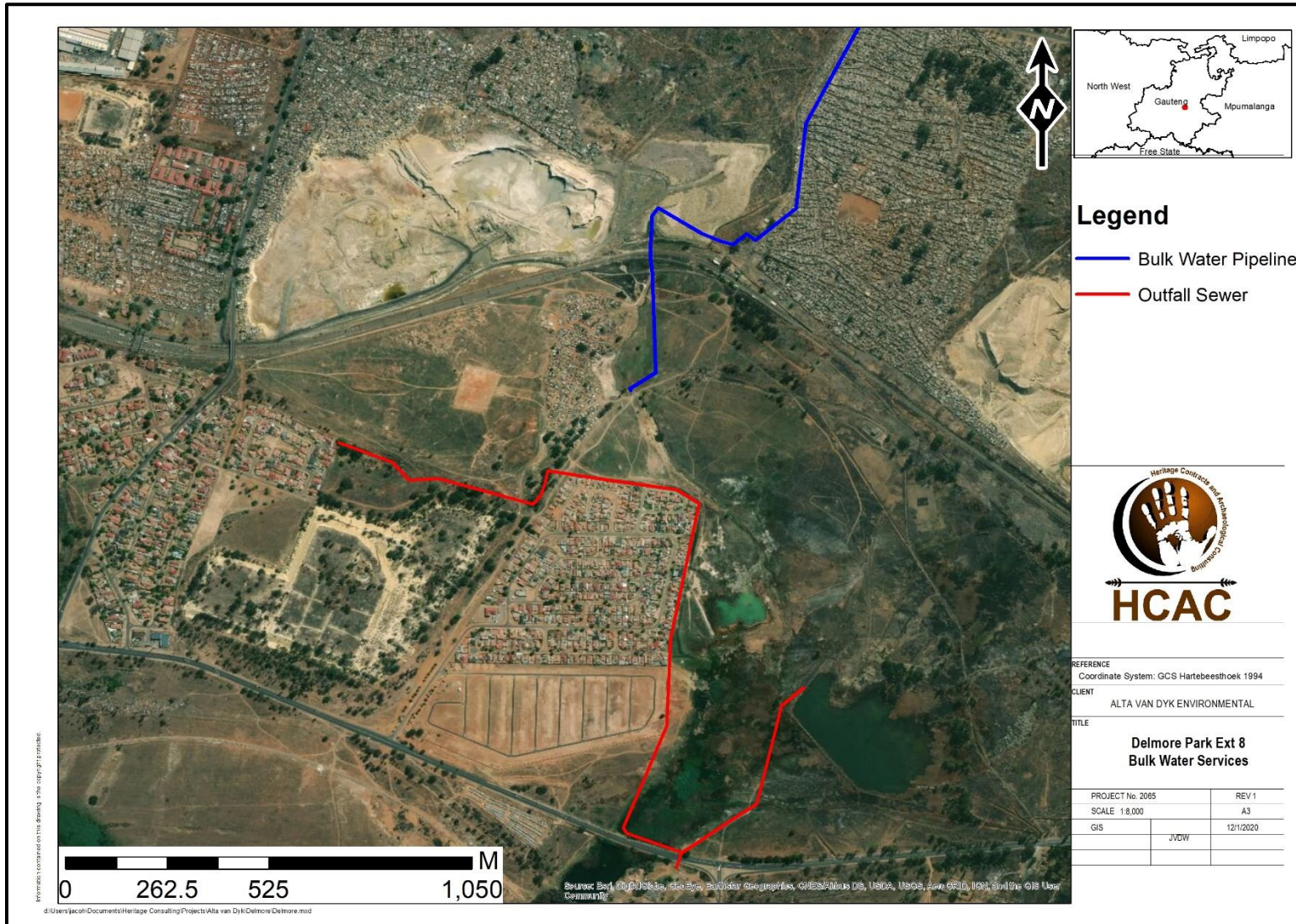


Figure 1-3. Aerial image of the pipeline.

## 2 Legislative Requirements

The HIA, as a specialist sub-section of the EIA, is required under the following legislation:

- National Heritage Resources Act (NHRA), Act No. 25 of 1999
- National Environmental Management Act (NEMA), Act No. 107 of 1998 - Section 23(2)(b)
- Mineral and Petroleum Resources Development Act (MPRDA), Act No. 28 of 2002 - Section 39(3)(b)(iii)

A Phase 1 HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of heritage specialist input is to:

- Identify any heritage resources, which may be affected;
- Assess the nature and degree of significance of such resources;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- Assess the negative and positive impact of the development on these resources; and
- Make recommendations for the appropriate heritage management of these impacts.

The HIA should be submitted, as part of the basic assessment report or EMPr, to the PHRA if established in the province or to SAHRA. SAHRA will ultimately be responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the impact assessment report and/or EMPr, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level). Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 AIA's are primarily concerned with the location and identification of heritage sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision-making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for with SAHRA by the applicant before development may proceed.



Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999 is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare. Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

### 3 METHODOLOGY

#### 3.1 Literature Review

A brief survey of available literature was conducted to extract data and information on the area in question to provide general heritage context into which the development would be set. This literature search included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS).

#### 3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located; these locations were marked and visited during the fieldwork phase. The database of the Genealogical Society was consulted to collect data on any known graves in the area.

#### 3.3 Public Consultation and Stakeholder Engagement:

Stakeholder engagement is a key component of any EIA process, it involves stakeholders interested in, or affected by the proposed development. Stakeholders are provided with an opportunity to raise issues of concern (for the purposes of this report only heritage related issues will be included). The aim of the public consultation process was to capture and address any issues raised by community members and other stakeholders during key stakeholder and public meetings. The process involved:

- Placement of advertisements and site notices
- Stakeholder notification (through the dissemination of information and meeting invitations);
- Stakeholder meetings undertaken with I&APs;
- Authority Consultation
- The compilation of an EIA Report.

### 3.4 Site Investigation

Conduct a field study to: a) systematically survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources recorded in the project area.

**Table 4: Site Investigation Details**

	Site Investigation
Date	30 November 2020
Season	Summer – Heritage visibility is low due to the extensively disturbed character of the area. Some areas were also completely inaccessible, the study area was however sufficiently covered (Figure 3-1) to understand the heritage character of the site.

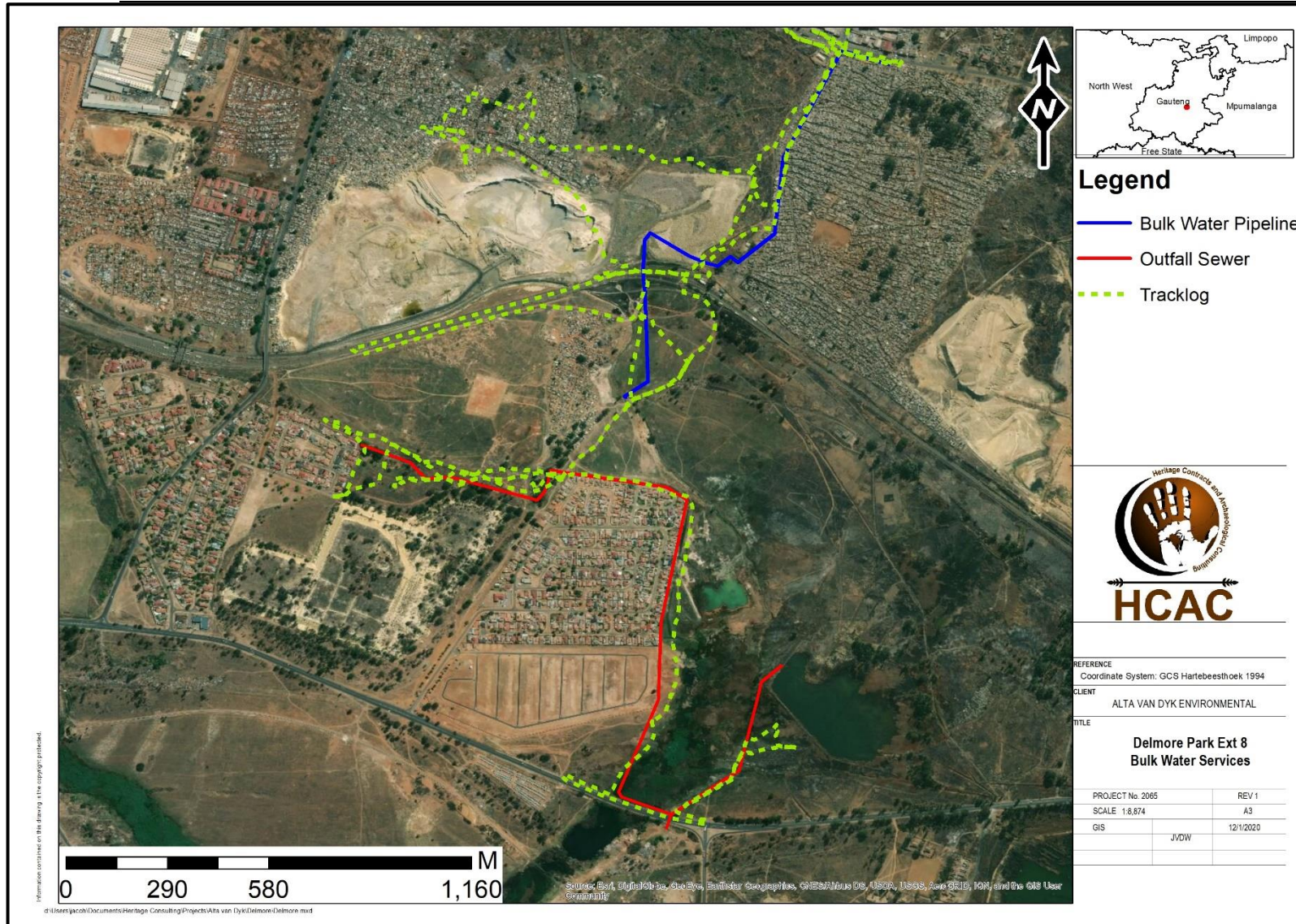


Figure 3-1: Track log of the survey in green.

### 3.5 Site Significance and Field Rating

Section 3 of the NHRA distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

- Its importance in/to 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 organisation of importance in the history of South Africa;
- Sites of significance relating to the history of slavery in South Africa.

The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed project the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface. This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance with cognisance of Section 3 of the NHRA:

- The unique nature of a site;
- The integrity of the archaeological/cultural heritage deposits;
- The wider historic, archaeological and geographic context of the site;
- The location of the site in relation to other similar sites or features;
- The depth of the archaeological deposit (when it can be determined/is known);
- The preservation condition of the sites; and
- Potential to answer present research questions.

In addition to this criteria field ratings prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 10 of this report.

**Table 5. Heritage significance and field ratings**

<b>FIELD RATING</b>	<b>GRADE</b>	<b>SIGNIFICANCE</b>	<b>RECOMMENDED MITIGATION</b>
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP. A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP. B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

### 3.6 Impact Assessment Methodology

The following impact assessment methodology was provided by the AVDE:

The significance of the identified impacts will be determined using an accepted methodology from the Department of Environmental Affairs and Tourism Guideline document on EIA Regulations, April 1998 as provided by the EAP. As with all impact methodologies, the impact is defined in a semi-quantitative way and will be assessed according to methodology prescribed in the following section.

#### Scale utilised for the evaluation of the Environmental Risk Ratings

<b>Evaluation Component</b>	<b>Rating</b>	<b>Scale</b>	<b>Description / criteria</b>
<b>MAGNITUDE of negative impact</b> (at the indicated spatial scale)	10	<b>Very high</b>	Bio-physical and/or social functions and/or processes might be <i>severely</i> altered.
	8	<b>High</b>	Bio-physical and/or social functions and/or processes might be <i>considerably</i> altered.
	6	<b>Medium</b>	Bio-physical and/or social functions and/or processes might be <i>notably</i> altered.
	4	<b>Low</b>	Bio-physical and/or social functions and/or processes might be <i>slightly</i> altered.
	2	<b>Very low</b>	Bio-physical and/or social functions and/or processes might be <i>negligibly</i> altered.
	0	<b>Zero</b>	Bio-physical and/or social functions and/or processes will remain <i>unaltered</i> .
<b>MAGNITUDE of POSITIVE IMPACT</b> (at the indicated spatial scale)	10	<b>Very high</b>	Positive: Bio-physical and/or social functions and/or processes might be <i>substantially</i> enhanced.
	8	<b>High</b>	<b>Positive:</b> Bio-physical and/or social functions and/or processes might be <i>considerably</i> enhanced.
	6	<b>Medium</b>	<b>Positive:</b> Bio-physical and/or social functions and/or processes might be <i>notably</i> enhanced.

## HIA –Delmore Ext 8 Bulk Water

December 2020

	4	Low	<b>Positive:</b> Bio-physical and/or social functions and/or processes might be <i>slightly</i> enhanced.
	2	Very low	<b>Positive:</b> Bio-physical and/or social functions and/or processes might be <i>negligibly</i> enhanced.
	0	Zero	<b>Positive:</b> Bio-physical and/or social functions and/or processes will remain <i>unaltered</i> .
<b>DURATION</b>	5	Permanent	<b>Impact in perpetuity. –</b>
	4	Long term	Impact ceases after operational phase/life of the activity > 60 years.
	3	Medium term	Impact might occur during the operational phase/life of the activity – 60 years.
	2	Short term	Impact might occur during the construction phase - < 3 years.
	1	Immediate	<b>Instant impact.</b>
<b>EXTENT</b> (or spatial scale/influence of impact)	5	International	<b>Beyond the National boundaries.</b>
	4	National	Beyond provincial boundaries, but within National boundaries.
	3	Regional	Beyond 5 km of the Impact Area and within the provincial boundaries.
	2	Local	Within a 5 km radius of the Impact Area .
	1	Site-specific	<b>On site or within 100 meters of the site boundaries.</b>
	0	None	<b>Zero extent.</b>
<b>IRREPLACEABLE</b> loss of resources	5	Definite	<b>Definite</b> loss of irreplaceable resources.
	4	High potential	<b>High</b> potential for loss of irreplaceable resources.
	3	Moderate potential	<b>Moderate</b> potential for loss of irreplaceable resources.
	2	Low potential	<b>Low</b> potential for loss of irreplaceable resources.
	1	Very low potential	<b>Very low</b> potential for loss of irreplaceable resources.
	0	None	<b>Zero potential.</b>
<b>REVERSIBILITY</b> of impact	5	Irreversible	Impact <b>cannot</b> be reversed.
	4	Low irreversibility	<b>Low</b> potential that impact might be reversed.
	3	Moderate reversibility	<b>Moderate</b> potential that impact might be reversed.
	2	High reversibility	<b>High</b> potential that impact might be reversed.
	1	Reversible	Impact <b>will be</b> reversible.
	0	No impact	No impact.
<b>PROBABILITY</b> (of occurrence)	5	Definite	>95% chance of the potential impact occurring.
	4	High probability	75% - 95% chance of the potential impact occurring.
	3	Medium probability	25% - 75% chance of the potential impact occurring
	2	Low probability	5% - 25% chance of the potential impact occurring.
	1	Improbable	<5% chance of the potential impact occurring.
	0	No probability	<b>Zero probability.</b>
<b>Evaluation Component</b>	<b>Rating scale and description / criteria</b>		

<b>CUMULATIVE</b> impacts	<p><b>High:</b> The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p><b>Medium:</b> The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p><b>Low:</b> The activity is localised and might have a negligible cumulative impact.</p> <p><b>None:</b> No cumulative impact on the environment.</p>
------------------------------	---

Once the Environmental Risk Ratings have been evaluated for each potential environmental impact, the Significance Score of each potential environmental impact is calculated by using the following formula:

- **SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.**

The maximum Significance Score value is 150.

The Significance Score is then used to rate the Environmental Significance of each potential environmental impact as per Table 8.2 below. The Environmental Significance rating process is completed for all identified potential environmental impacts both before and after implementation of the recommended mitigation measures.

#### Scale used for the evaluation of the Environmental Significance Ratings

Significance Score	Environmental Significance	Description / criteria
125 – 150	Very high (VH)	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	Medium-high (MH)	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked at.
40 – 74	Medium (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.

### 3.7 Limitations and Constraints of the study

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to safety concerns and the built-up nature of the study area not all areas were visually inspected and, the possibility exists that some features or artefacts may not have been discovered/recorded during the survey. Therefore the possible occurrence of graves/ burials and other cultural material cannot be excluded. This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

## 4 Description of Socio Economic Environment

According to Census 2011, the Ekurhuleni municipality has a total population of just under 3,2 million individuals, 78,7% of whom are black African. Whites make up 15,8%, and other race groups comprise the remaining 5,5%. Of those aged 20 years and older, 3,3% have completed primary school, 35,3% have some secondary education, 35,5% have completed matric and 14,6% have some form of higher education. Due to the presence of OR Tambo International airport, a number of airline company headquarters are located within the municipality, such as South African Airways, Comair and Kulula.com.

In terms of employment, there are about 1,6 million economically active individuals (i.e. those who are employed or unemployed but looking for work) residing within the municipality. Of these, 28,8% are unemployed. When the youth (15–34 years) are considered, there are about 840 000 economically active individuals, 36,9% of whom are unemployed ([www.statssa.gov.za](http://www.statssa.gov.za)).

## 5 Results of Public Consultation and Stakeholder Engagement:

### 5.1.1 Stakeholder Identification

Adjacent landowners and the public at large were informed of the proposed activity as part of the BA process. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process.



## 6 Literature / Background Study:

### 6.1 Literature Review (SAHRIS)

The following studies were conducted in the greater area and were consulted for this report.

Author	Year	Project	Findings
Thomas, G. and Nel, J.	2012	Heritage Statement for Lycaste Sand Dump 4/A/6 Dump	No sites.
Karodia, S., Du Piesanie, J. and Nel, J.	2012	Heritage Statement for the Central Basin, Witwatersrand AMD Project	No sites.
Fourie, W.	2014	Request for exemption from an archaeological impact study: prevention of water ingress into mined out areas of the Witwatersrand mining basin, Gauteng province	No sites
Van Schalkwyk, J.A.	2016	Cultural Heritage Statement for The Proposed Witfield Stormwater Network, Ekurhuleni Metropolitan Municipality, Gauteng Province	No sites.
Van Schalkwyk, J.A.	2017	Phase 1 Cultural Heritage Impact Assessment: the proposed construction of river crossings along underground HV feeder cables in Germiston and Croydon, Ekurhuleni district municipality, Gauteng province	No sites

#### 6.1.1 Genealogical Society and Google Earth Monuments

No known grave sites are indicated in the study area. Although an ERPM War Cemetery is indicated approximately 2 km to the east of the development.

## 6.2 Background to the general area

### 6.2.1 Archaeology of the greater study area

The archaeological record for the greater study area consists of the Stone Age and Iron Age.

- **Stone Age**

The Stone Age can be divided in three main phases as follows;

- Later Stone Age (LSA); associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago
- Middle Stone Age (MSA); associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago.
- Earlier Stone Age (ESA); associated with early Homo groups such as Homo habilis and Homo erectus. 400 000-> 2 million years ago.

Although there are no well-known Stone Age sites located in or around the study area there is evidence of the use of the larger area by Stone Age communities for example along the Kliprivier where ESA and MSA tools were recorded. LSA material is recorded along ridges to the south of the current study area (Huffman 2008). Petroglyphs occur at Redan as well as along the Vaal River (Berg 1999).

- **The Iron Age**

The Iron Age as a whole represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. It can be divided into three distinct periods:

- The Early Iron Age: Most of the first millennium AD.
- The Middle Iron Age: 10th to 13th centuries AD
- The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living. Extensive Stone walled sites are recorded at Klipriviers Berg Nature reserve belonging to the Late Iron Age period. A large body of research is available on this area. These sites (Taylor's Type N, Mason's Class 2 & 5) are now collectively referred to as Klipriviersberg (Huffman 2007).

These settlements are complex in that aggregated settlements are common, the outer wall sometimes includes scallops to mark back courtyards, there are more small stock kraals, and straight walls separate households in the residential zone. These sites date to the 18th and 19th centuries and was built by people in the Fokeng cluster. In this area the Klipriviersberg walling would have ended at about AD 1823, when Mzilikazi entered the area (Rasmussen 1978). This settlement type may have lasted longer in other areas because of the positive interaction between Fokeng and Mzilikazi.

- **5.3. Historical Information**

The Difaqane (Sotho), or Mfekane (“the crushing” in Nguni) was a time of bloody upheavals in Natal and on the Highveld, which occurred around the early 1820’s until the late 1830’s (Bergh 1999: 10). It came about in response to heightened competition for land and trade, and caused population groups like gun-carrying Griquas and Shaka’s Zulus to attack other tribes. (Bergh 1999: 14; 116-119) It seems that, in 1827, Mzilikazi’s Ndebele started moving through the area where Johannesburg is located today. This group went on raids to various other areas in order to expand their area of influence. (Bergh 1999: 11)

During the time of the Difaqane, a northward migration of white settlers from the Cape was also taking place. Some travellers, missionaries and adventurers had gone on expeditions to the northern areas in South Africa, some already as early as the 1720’s.

It was however only by the late 1820’s that a mass-movement of Dutch-speaking people in the Cape Colony started advancing into the northern areas. This was due to feelings of mounting dissatisfaction caused by economical and other circumstances in the Cape. This movement later became known as the Great Trek. This migration resulted in a massive increase in the extent of that proportion of modern South Africa dominated by people of European descent (Ross 2002: 39). By 1939 to 1940, farm boundaries were drawn up in an area that includes the present-day Johannesburg and Krugersdorp (Bergh 1999: 15).

### 6.2.2 Anglo-Boer War

Two incidents of the Anglo Boer War took place in the greater study area. An Anglo Boer War battle known as the Battle of Doornkop took place in the area on 29 May 1900. The British were advancing toward Johannesburg led by General John French. De La Rey and his men held the Klipriviersberg Ridge for the first two days but on the third day the Boers were outflanked by French's cavalry to the West, where General Sarel Oosthuizen's commando was forced to withdraw. This opened the road to Johannesburg and the British took the city peacefully on 30 May 1900 (Birkholtz 2013). Their route would have passed a few kilometers from the present study area.

Huffman (2008) recorded several sangers dating to the Boer war close to the study area on a ridge. On 18 February 1901 a British train was held up by a Boer Commando along the railway line between the Klip River and Natalspruit Stations ([www.vaalmeander.co.za](http://www.vaalmeander.co.za)) (Wallace, 1976). While Wallace (1976) states that the train was loaded with food and had been held up, the Vaal Meander website indicates that the train was derailed within the boundaries of the farm Palmietfontein after which a machine gun, cavalry greatcoats, saddles and other supplies were taken (Birkholtz 2014).

6.2.2. Cultural Landscape

The project is in an area that is characterised by mining activities from as early as the 1930's up to the 1980's (Figure 6-1 to 6-5). Township development mostly occurred around the 1990's/2000 (Figure 6-6) and the proposed development will not impact on the cultural landscape as it is in line with existing infrastructure.

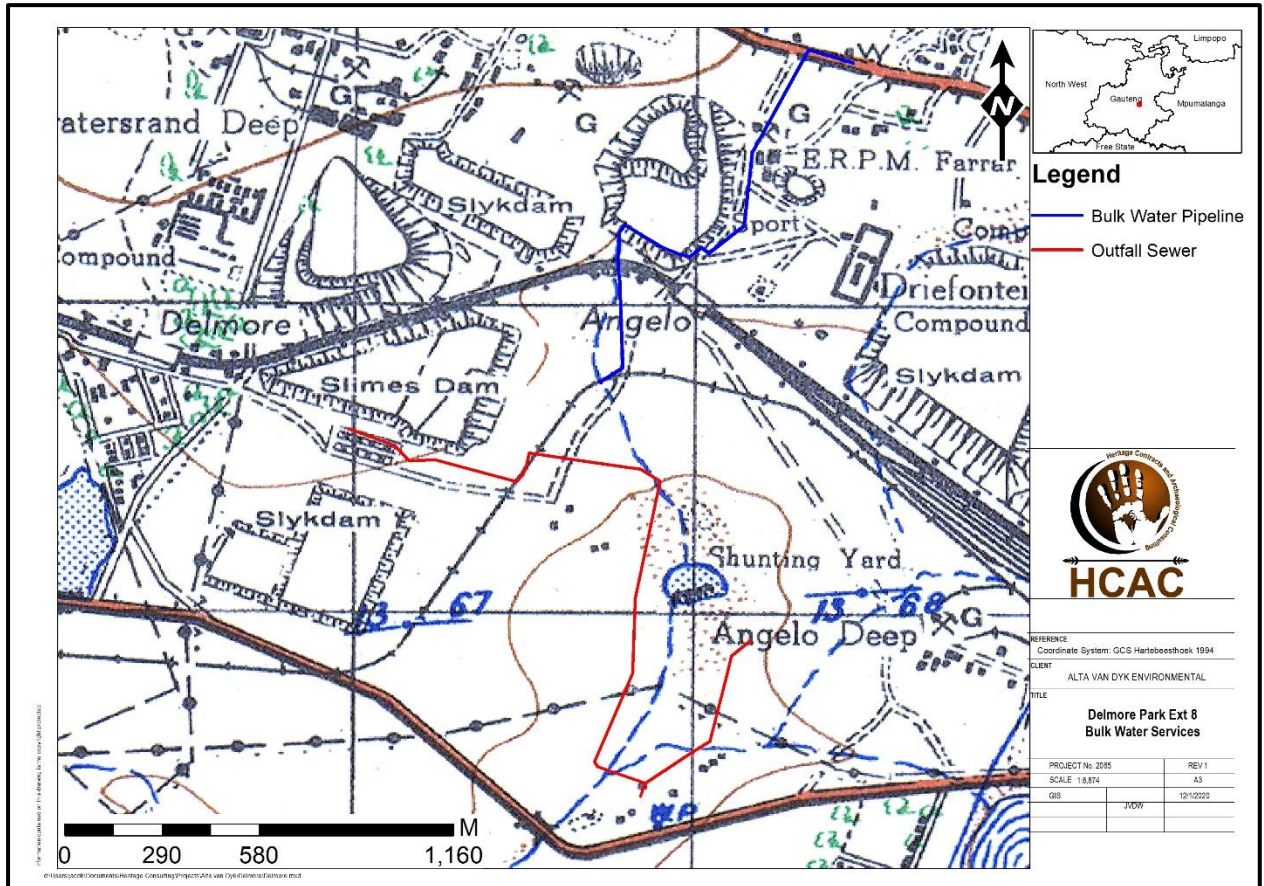


Figure 6-1. 1937 Topographic map of the study area. The surrounding area is characterised by mining activities.

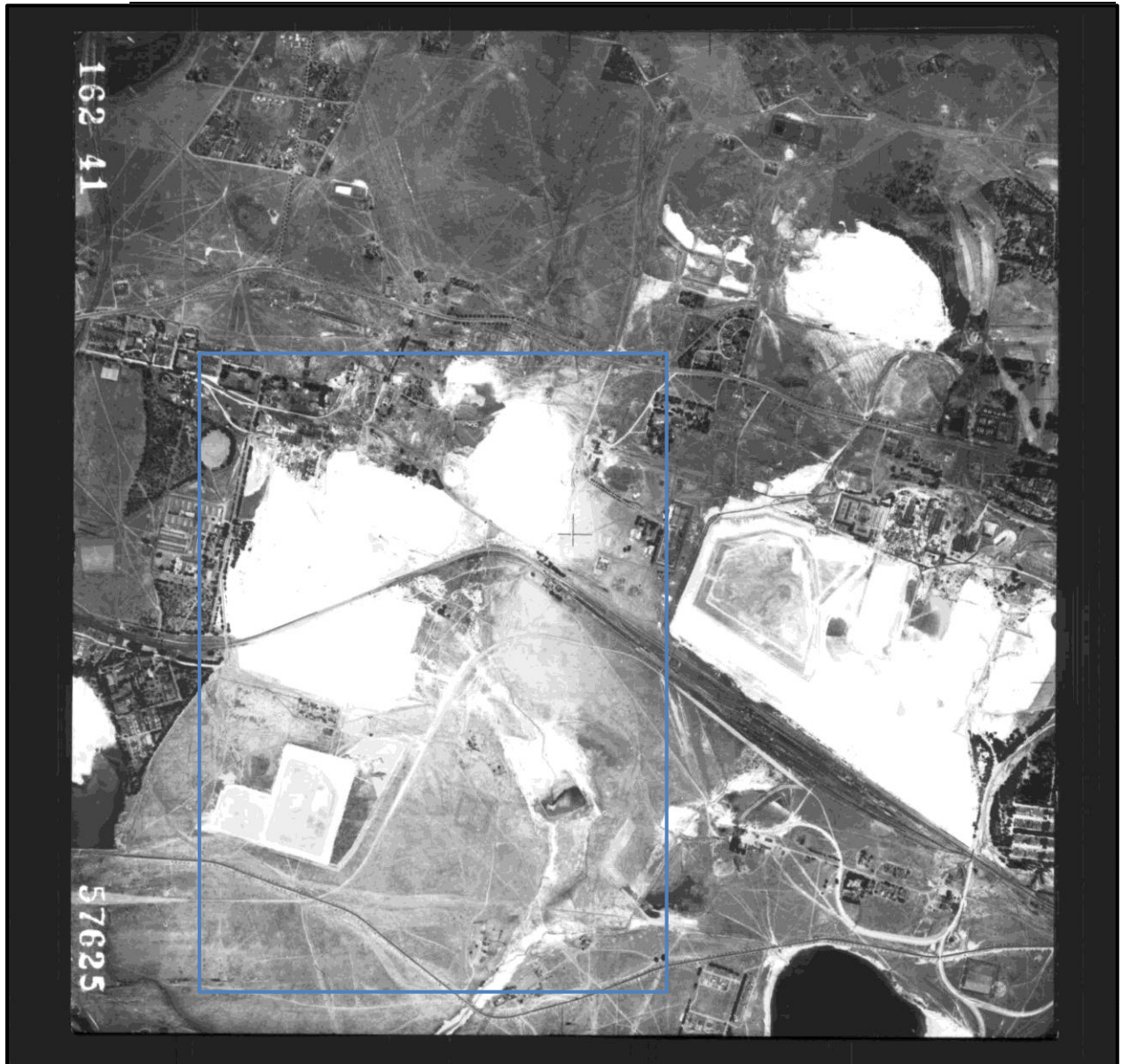


Figure 6-2. 1941 Aerial image indicating mining activities and the disturbed character of the study area (blue polygon).

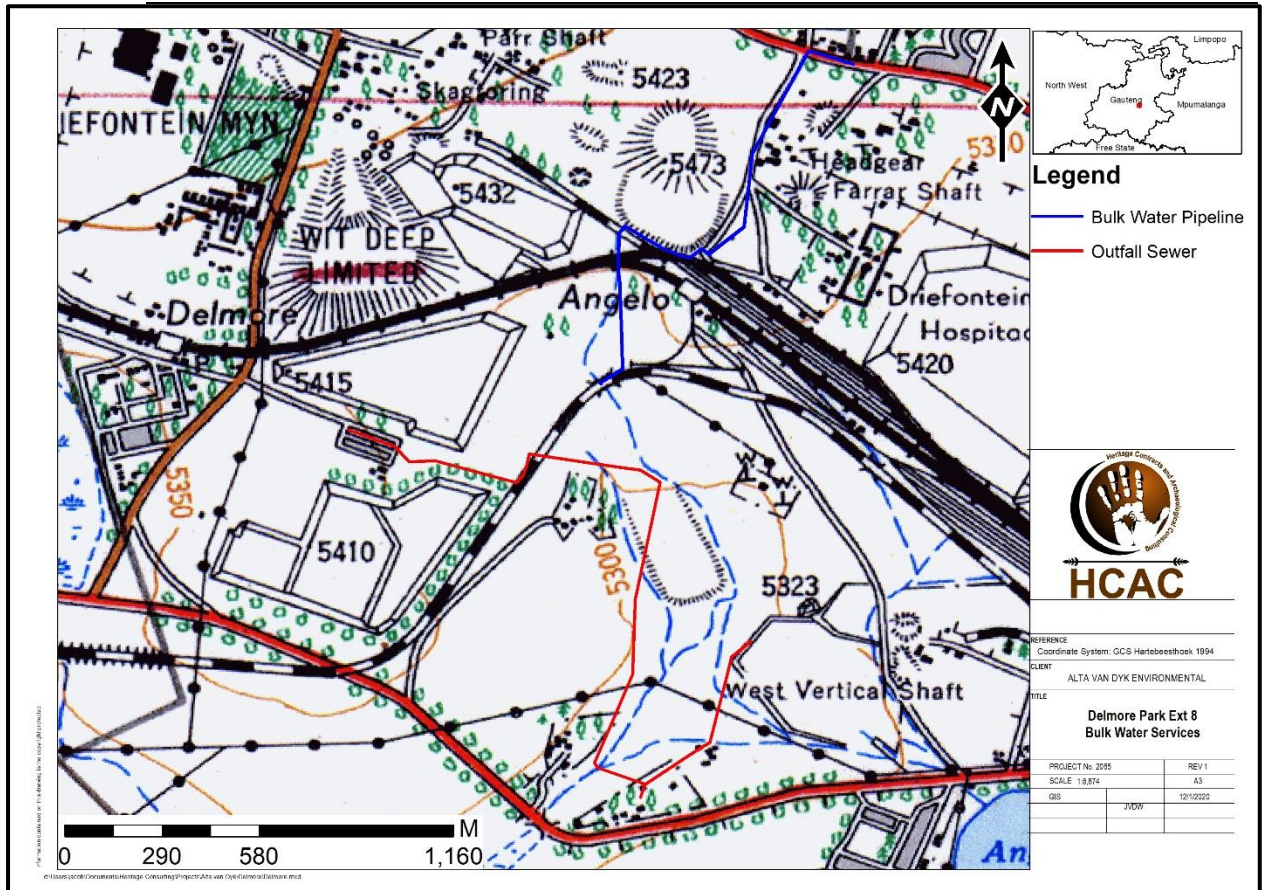


Figure 6-3. 1954 Topographic map. Mining activities expanded and infrastructure development like roads and powerlines are indicated.

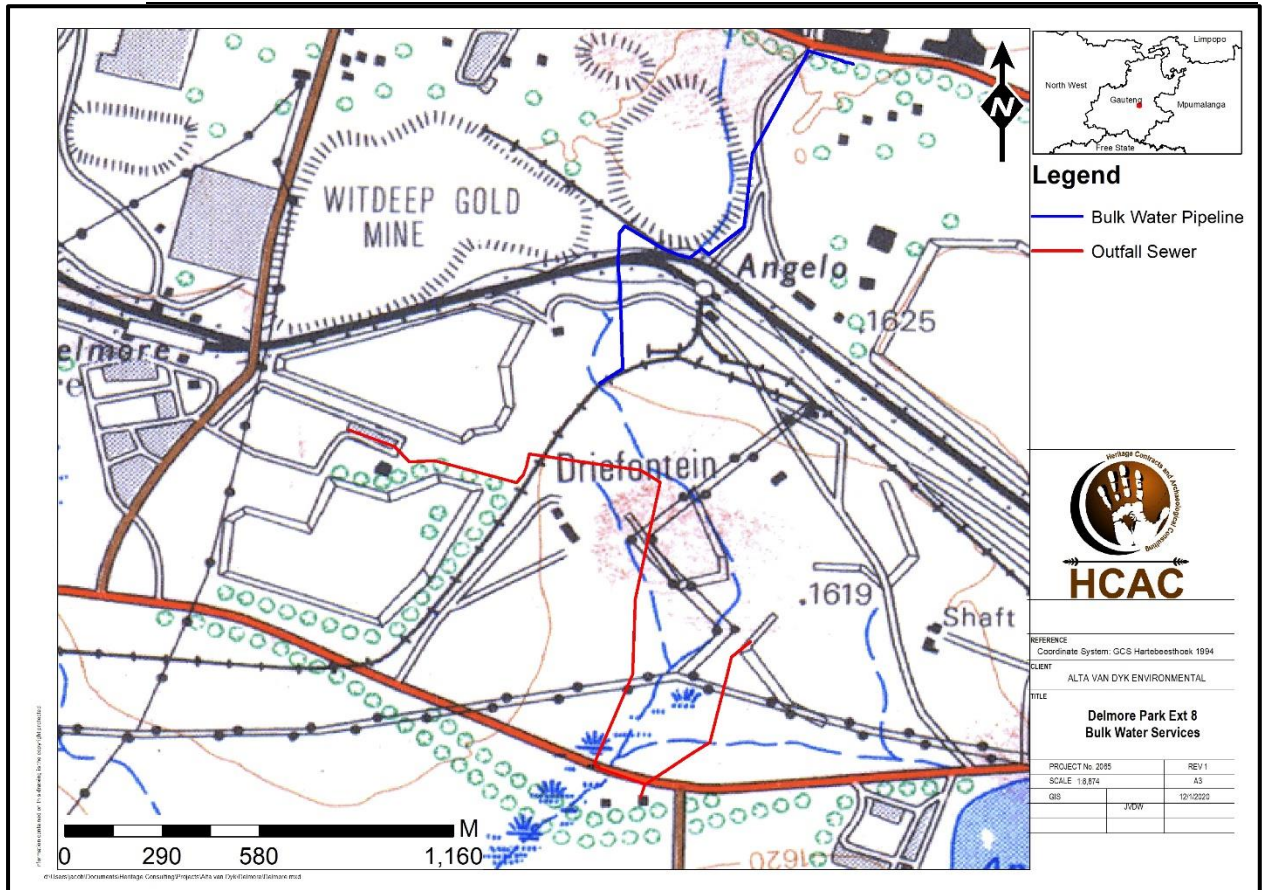


Figure 6-4. 1975 Topographic map of the study area. Infrastructure relating to the mining activities in the area are expanding.



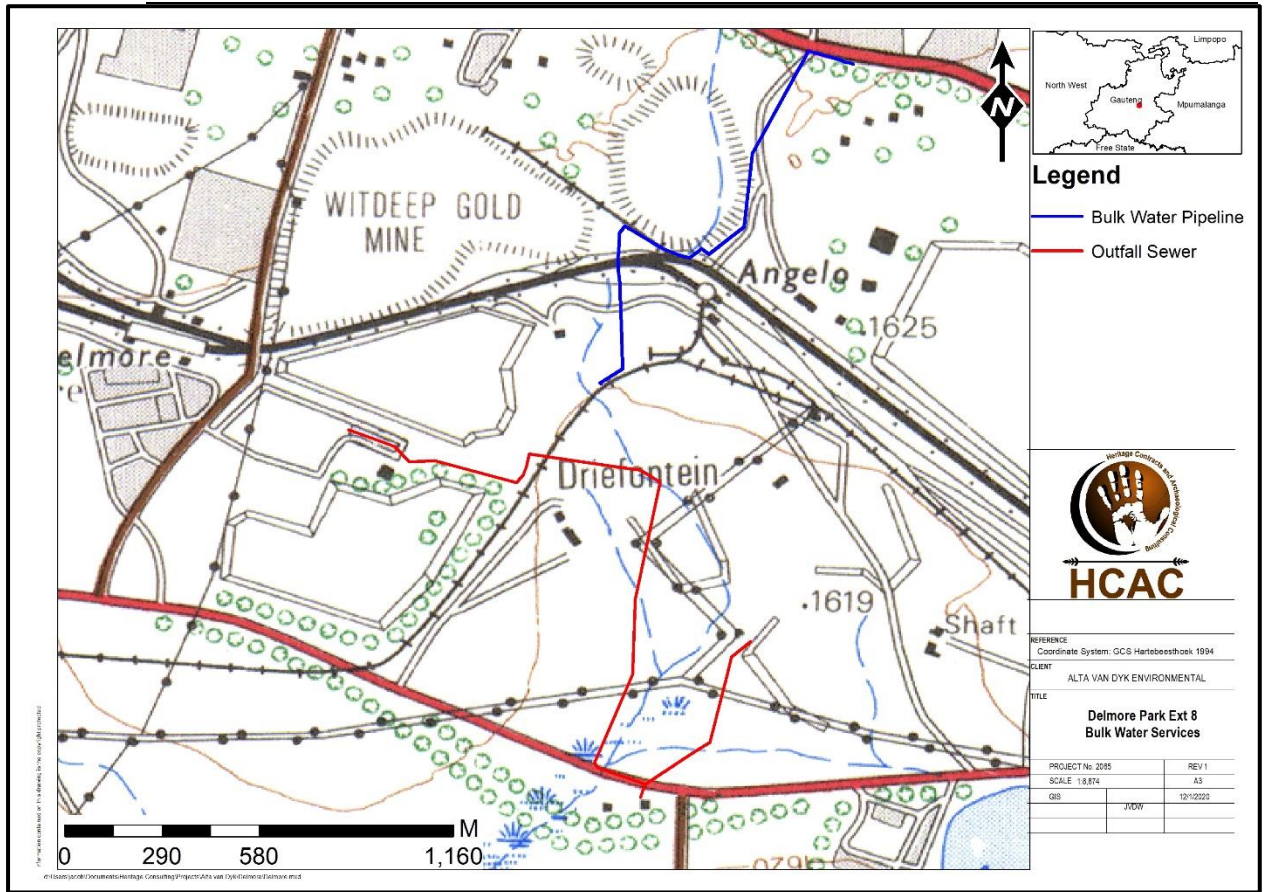


Figure 6-5. 1983 Topographic map showing similar infrastructure and mining activities than the previous decade.

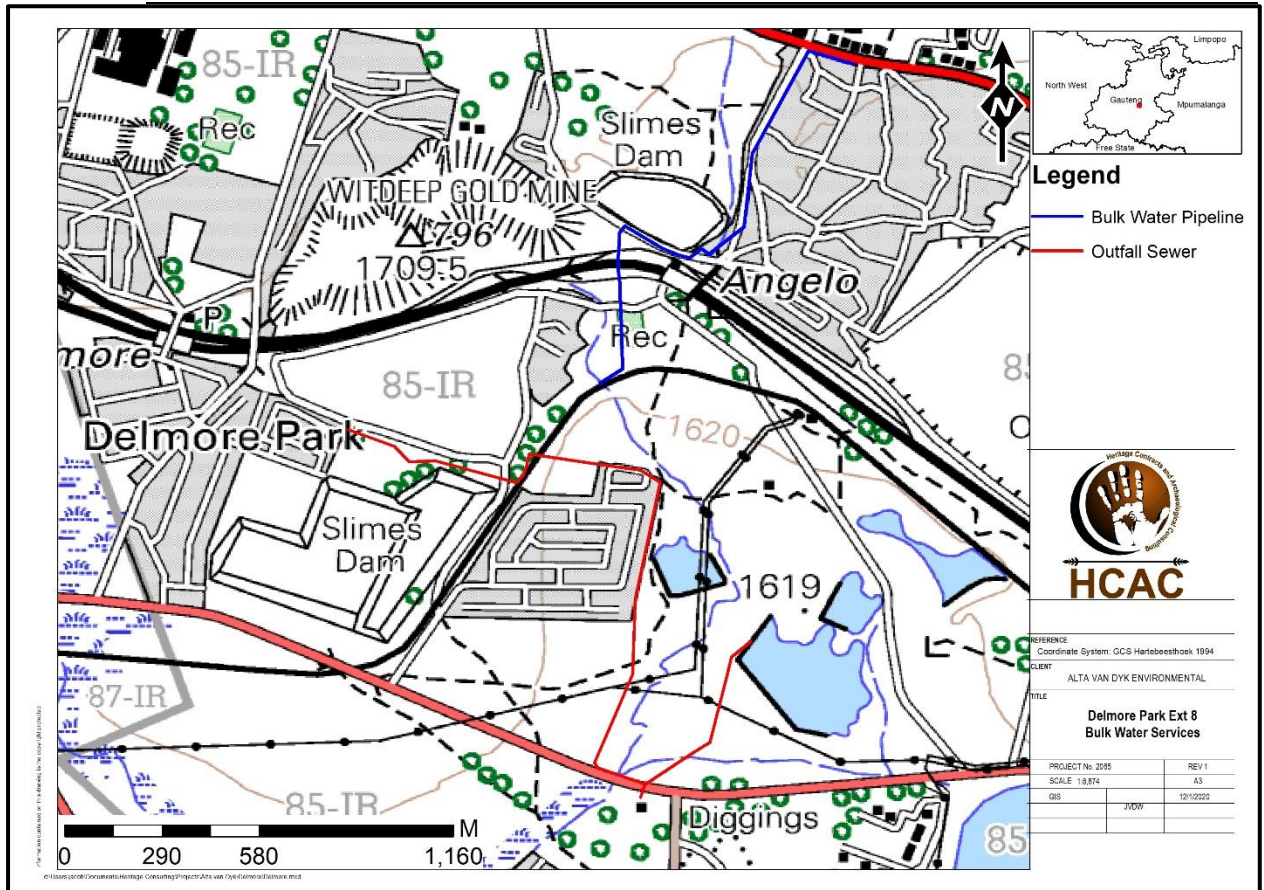


Figure 6-6. 2001 Topographic map of the study area – township developments are now visible.

### 7 Description of the Physical Environment

The project is situated within existing township developments, characterised by road and municipal infrastructure as well as residential dwellings traversing through an area where a small stream and open field occurs (Figure 7-1 to 7-3). The study area is further characterised by the remnants of mining activities (Figure 7-4) in the greater area from the Witwatersrand Gold Mining Co.



Figure 7-1. General site conditions.

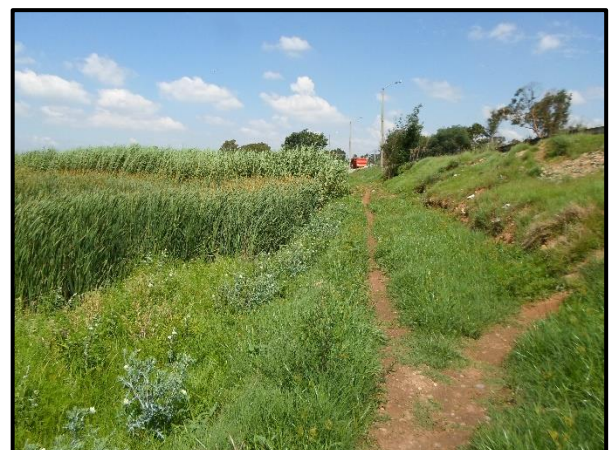


Figure 7-2. Area close to stream.



Figure 7-3. Open field.



Figure 7-4. Mining activities.

## 8 Findings of the Survey

It is important to note that the survey only focused on the impact areas as indicated in Figure 1-1 to 1-3, and was conducted on 30 November 2020. The study area is divided into two separate pipelines (Bulkwater and sewerage outfall) traversing through various township and informal settlement areas. The bulk water route is the most northerly pipeline located mostly within an existing township. This area is highly degraded and no heritage resources was located along this line.

The southern section (bulk sewer pipeline) is designated as the Delmore Park Main Branch and replacement of a section of the Lilianton Main Outfall Sewer. This line is located along a small section of open field next to a historical mine dump and further along an existing township development still under construction. The line follows the outer wall of the development area and end near the southern edge of the study area near a small stream that seems to be highly disturbed and polluted.

The section of the Delmore Park Main Branch traversing through the open field yielded remains of older infrastructure possibly relating to the extensive mining developments in the surrounding area. Two features were recorded here (Figure 8-1) as Feature 1 (26° 12' 33.8977" S, 28° 12' 22.3741" E) and Feature 2 (26° 12' 35.1071" S, 28° 12' 16.2359" E).

Feature 1 marks a partially demolished structure built from red bricks and cement (Figure 8-2). The structure has fairly thick walls and seems to have been part of older mine infrastructure possibly older than 60 years. Various other broken-down structures and dumped material litters the area, that is highly overgrown. The structure could be part of the mining history of the area and older than 60 years in which case it would be of low to medium significance with a field rating of GP B. The structure in isolation is of low heritage value and viewed on its own its potential to contribute to aesthetic, historic, scientific and social aspects is low, and it is therefore of low heritage significance.

Feature 2 marks a small stone cairn (Figure 8-3) right next to an informal road towards the mine dump. Due to the high level of disturbance within the area it is unlikely that this cairn marks an unmarked grave and is therefore of low heritage significance. Both these features are located well away from the pipeline and will not be directly impacted on by the line.

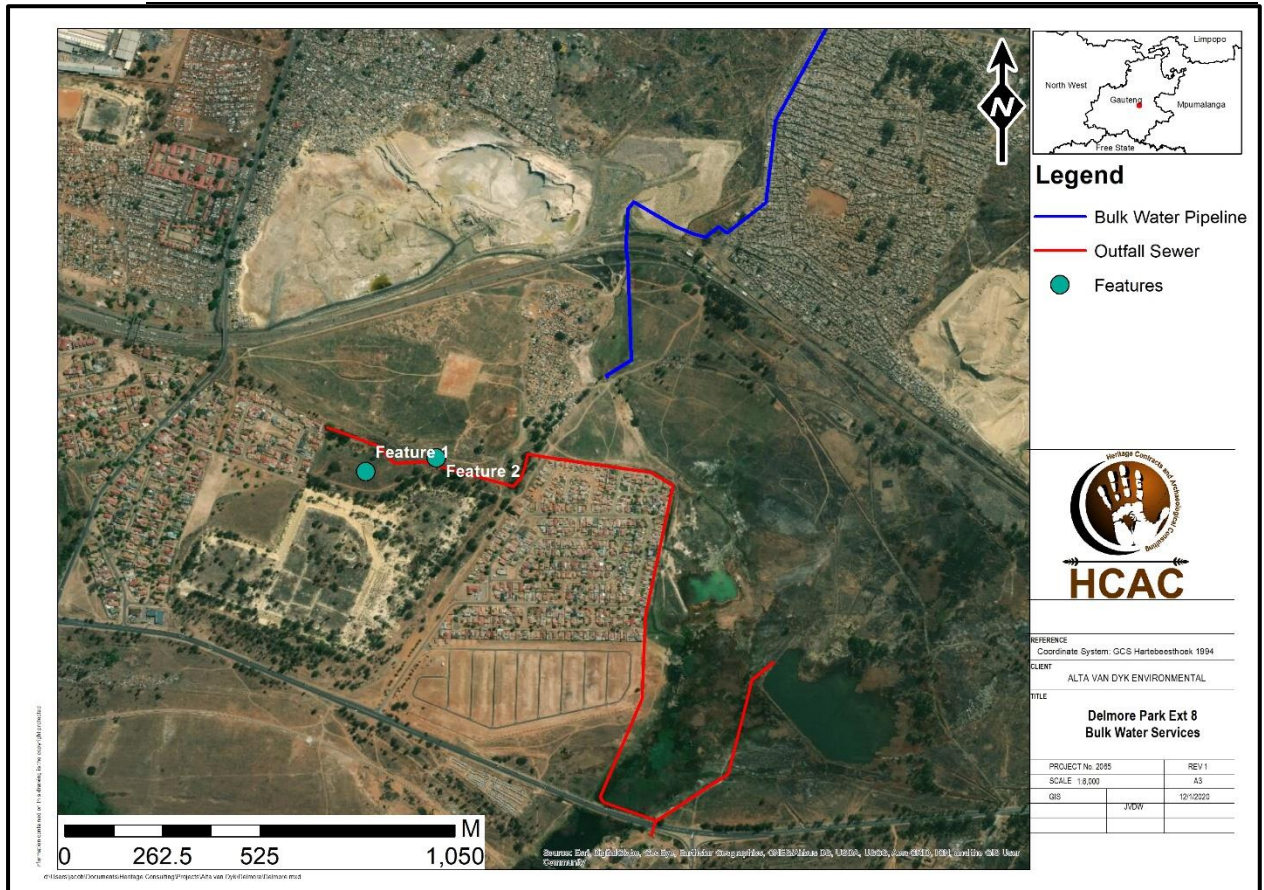


Figure 8-1. Feature 1 and 2 in relation to the proposed pipeline.



Figure 8-2. Feature 1 – remains of a built structure.

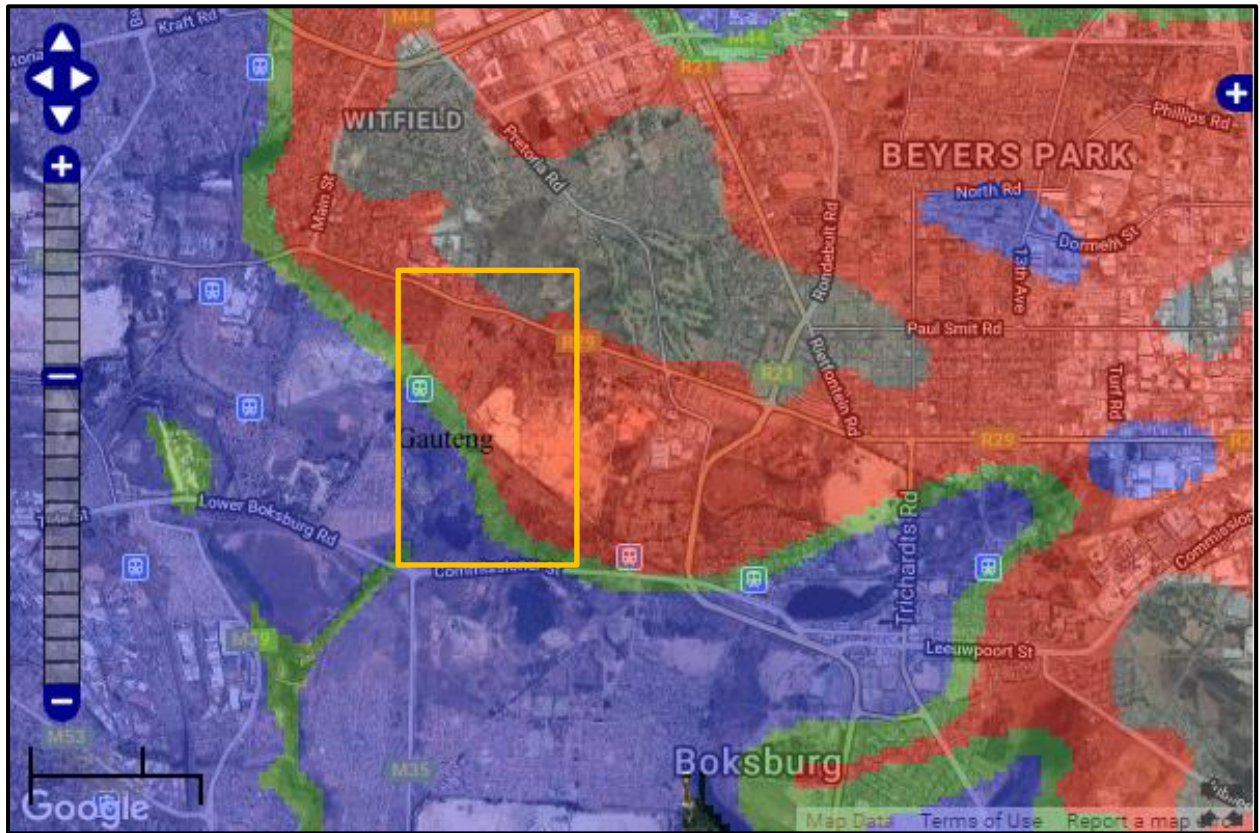


Figure 8-3. Feature 2 – Stone Cairn

### 8.1 Paleontological Findings

Based on the SAHRA Paleontological sensitivity map the area is of very high paleontological sensitivity (Figure 8-6) and an independent study was conducted by Prof Marion Bamford. The study concluded that the routes for the Bulk Sewer Line are on non-fossiliferous rocks of the Johannesburg Subgroup so that section may proceed, as far as the palaeontology is concerned. The route for the Bulk Water Pipeline: This route is mostly on Vryheid Formation shales and a short section on Dwyka Group tillites and diamictites. Based on the observations made during the site visit, there are no fossils in the highly disturbed surface

soils and sands. It is unlikely that any fossils would be preserved in the top few metres of soil that will be excavated for the trench in which to lay the outfall sewer pipes.



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

Figure 8-4. Paleontological sensitivity of the approximate study area and surrounds as indicated on SAHRIS.

The proposed development will have a low impact on the surrounding cultural landscape and is in line with surrounding and existing land use. Visual impacts to scenic routes and sense of place are also considered to be low.

## 9 Potential Impact

Due to the highly disturbed nature of the area and the relatively small impact of the pipeline the chances of impacting on heritage resources is very low. With regards to the recorded features both are located outside of the direct area of impact (Figure 9-1), Feature 1 is located approximately 76 m south of the line and Feature 2 is approximately 23 meters north from the line and no direct impact is expected on these features.

### 9.1.1 Pre-Construction phase

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure needed for the construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources, if any occur.

### 9.1.2 Construction Phase

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

### 9.1.3 Operation Phase:

No impact is envisaged for the project during this phase.

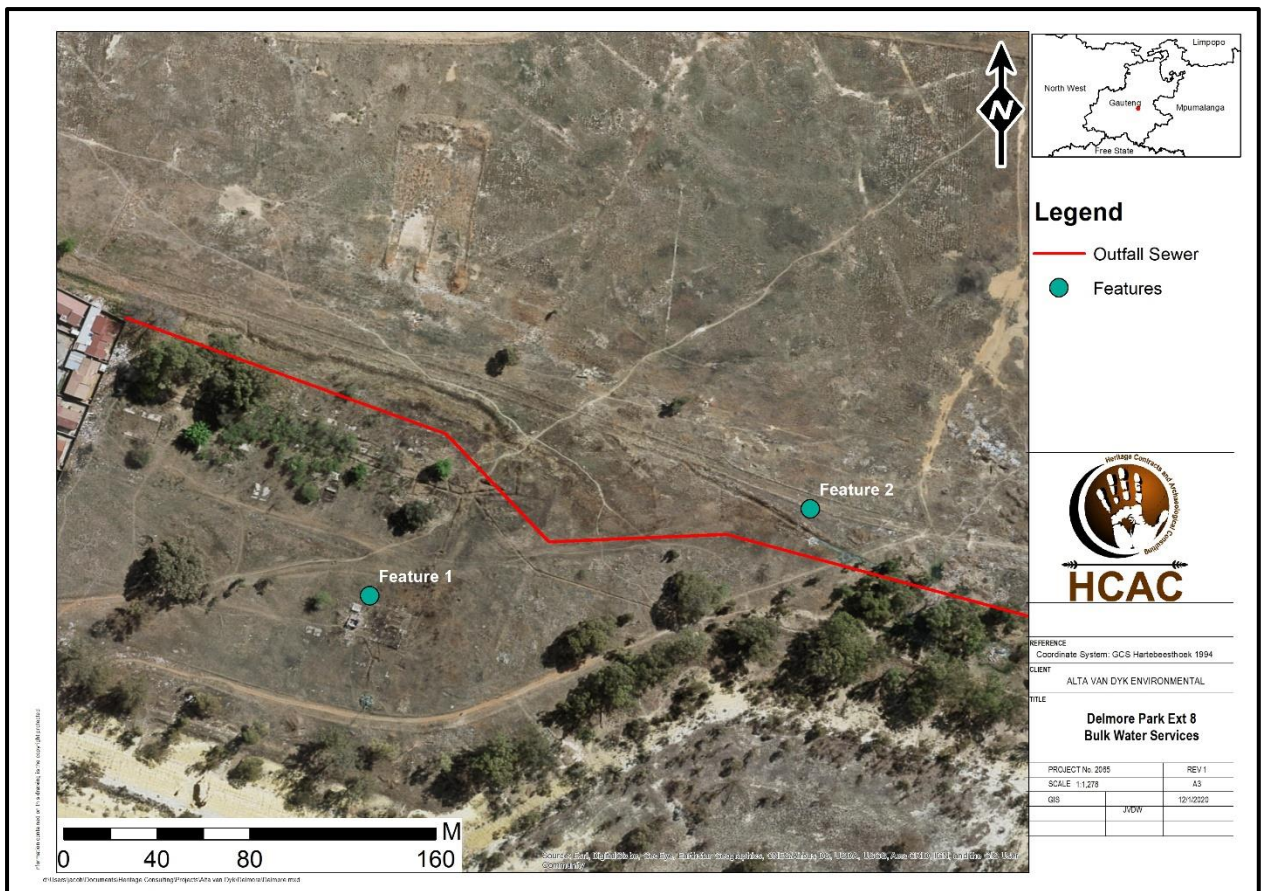


Figure 9-1: Recorded features in relation to the outfall sewer.

Table 6. Impact Assessment table.

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								Cumulative	Status	RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		M	D	S	I	R	P	TOTAL	SP				M	D	S	I	R	P	TOTAL	SP
<b>Cultural Heritage Impact Assessment</b>																				
Disturbance or destruction of identified structure and stone cairn.	Construction of the Delmore Ext 8 bulk services pipelines		5	1	1	5	1	12	L	Very Low		<ul style="list-style-type: none"> <li>The recorded features should be indicated on design plans and should be avoided.</li> <li>Implementation of a chance find procedure.</li> </ul>		4	1	1	5	1	11	L

## 10 Conclusion and recommendations

The study area is divided into two separate pipelines (Bulkwater and sewerage outfall) traversing through various township and informal settlement areas. The bulk water route is the most northerly pipeline located mostly within an existing township. This area is highly degraded, and no heritage resources was located along this line.

The southern section (bulk sewer pipeline) is designated as the Delmore Park Main Branch and replacement of a section of the Lilianton Main Outfall Sewer. This line is located along a small section of open field next to a historical mine dump and further along an existing township development still under construction. The line follows the outer wall of the development area and end near the southern edge of the study area near a small stream that seems to be highly disturbed and polluted.

The section of the Bulk Water Sewer Pipeline upgrade traversing through the open field yielded remains of older infrastructure possibly relating to the extensive mining developments in the surrounding area. Two features were recorded here as Feature 1 and Feature 2. Feature 1 is partially demolished rectangular structure built from red bricks and cement and seems to have been part of older mining infrastructure. Various other broken-down structures and dumped material litters the area, that is highly overgrown. The structure could be part of the mining history of the area and older than 60 years.

Feature 2 marks a small stone cairn right next to an informal road towards the mine dump. Due to the high level of disturbance within the area it is unlikely that this cairn marks an unmarked grave and is therefore of low heritage significance. Both these features are located well away from the pipeline (Feature 1 - approximately 76 m south of the line, Feature 2 - approximately 23 meters north from the line) and no direct impact is expected on these features

The area is indicated as of very high palaeontological sensitivity on SAHRIS and an independent study was conducted by Prof Marion Bamford. The study concluded that the routes for the Bulk Sewer Pipeline and realignment are on non-fossiliferous rocks of the Johannesburg Subgroup so that section may proceed, as far as the palaeontology is concerned. The route for the Bulk Water Pipeline along Station road: This route is mostly on Vryheid Formation shales and a short section on Dwyka Group tillites and diamictites. Based on the observations made during the site visit, there are no fossils in the highly disturbed surface soils and sands. It is unlikely that any fossils would be preserved in the top few metres of soil that will be excavated for the trench in which to lay the outfall sewer pipes.

The proposed development will have a low impact on the surrounding cultural landscape and is in line with surrounding land use. Visual impacts to scenic routes and sense of place are also considered to be low. The impact of the project on heritage resources is considered to be low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA:

### **Recommendations:**

- Implementation of a chance find procedure for both the archaeological and paleontological components as outlined below.
- Feature 1 and 2 should be indicated on development plans and avoided during construction.



### 10.1. Chance Find Procedures

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefore chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

#### **Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.**

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (stromatolites, plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

### **10.2. Reasoned Opinion**

The impact of the proposed project on heritage resources is low and any impact to accidental finds can be mitigated to an acceptable level and no further pre-construction mitigation is required based on approval from SAHRA. Furthermore, the socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures (i.e. chance find procedure) are implemented for the project.

### **10.3. Potential risk**

Potential risks to the proposed project are the occurrence of unrecorded graves. These risks can be managed by monitoring the area during construction by the ECO and the implementation of a chance find procedure as outlined in Section 10.1. The presence of graves should also be confirmed during social consultation for the project.

## 11 References

- Bamford, M. 2020. Palaeontological Impact Assessment for the proposed UMK Mine Amendment, Northern Cape Province. Unpublished report.
- Beaumont, P. 2008. Phase 1 Archaeological Impact Assessment Report On Areas At Hotazel Mine On The Farm Hotazel 280, Kgalagadi District Municipality, Northern Cape Province.
- Beaumont, P.B. & Morris, D. 1990. Guide to archaeological sites in the Northern Cape. Kimberley: McGregor Museum.
- Beaumont, P.B., Smith, A.B. & Vogel, J.C. 1995. Before the Einiqua: the archaeology of the frontier zone. In: Smith, A.B. (ed.) Einiqualand: studies of the Orange River frontier: 236-264. Cape Town: University of Cape Town Press.
- Coetzee, T. & George, L. 2013. Archaeological Impact Assessment For Assmang Limited – Black Rock Mine Operations On Erf 5529, A Portion Of Erf 01 Kuruman
- Dreyer, C. 2005. Archaeological And Historical Investigation Of The Proposed New Sport Stadium At Geelboom, Kuruman District, Northern Cape
- De Jong, R.C. 2010. Heritage Impact Assessment report: Proposed Manganese and Iron Ore Mining Right Application in respect of the Remainder of the farm Paling 434, Hay Registration Division, Northern Cape Province. Unpublished Report Cultmatrix Heritage Consultants Project 2010/23 May 2010 for Kai Batla
- Kusel, U., M.van der Ryst and S.Kusel. 2009. Cultural Heritage Impact Assessment of Manganese Mining Areas on the farms Belgravia 264, Santoy 230, Gloria 226 and Nchwaning 267, at Black Rock, North of Kuruman, Kgalagadi District Municipality Northern Cape Province. Unpublished Report African Heritage Consultants September 2009. For Assmang Limited.
- Morris, D. 2005. Report on a Phase 1 Archaeological Impact Assessment of proposed mining areas the farms Ploegfontein, Klipbankfontein, Welgevonden, Leeuwfontein, Wolhaarkop and Kapstevell, west of Postmasburg, Northern Cape. Kimberley: McGregor Museum.
- Morris, D. 2010. Heritage Impact Assessment of an area of proposed housing development and associated infrastructure in Kuruman, Northern Cape.
- Morris, D. & Beaumont, P. 2004. Archaeology in the Northern Cape: some key sites. Kimberley: McGregor Museum.
- Mucina, L. & Rutherford, M.C. 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute. Pretoria.
- National Heritage Resources Act NHRA of 1999 (Act 25 of 1999)
- Pelser, A. 2012 (a). A Report On Archaeological Impact Assessments (AIA's) For Proposed Housing Developments On Erven 83 And 2467, Kuruman, In The Northern Cape. Unpublished report.
- Pelser, A. 2012 (b). Archaeological Impact Assessment for the proposed Housing Development on Erf 675, Kuruman, in the Northern Cape. Unpublished Report.
- Pelser, A.J. & A.C.van Vollenhoven. A Report on a Heritage Impact Assessment (HIA) for a proposed new rail crossing over the Gamagara River for the Gloria Mine Operations, Assmang Black Rock, on Gloria 266, north of Hotazel, Northern Cape. Unpublished Report Archaetnos cc AE1151. May 2011. For EScience Associates (Pty) Ltd.

- Pistorius, JCC. 2006 A Phase I Heritage Impact Assessment (HIA) Study For The Proposed New United Manganese Of Kalahari (UMK) Mine On The Farms Botha 313, Smartt 314 And Rissik 330 Near Hotazel In The Northern Cape Province Of South Africa
- SAHRIS (referenced 2018)
- SAHRA Report Mapping Project Version 1.0, 2009
- Van der Walt, J. 2012. Archaeological Impact Assessment Report for the Proposed extension of an abandoned Gravel Pit on the Farm Harvard 171, in the Kudumane Magisterial District 13km East of Kuruman. Unpublished report for Site Plan.
- Van der Walt, J & Fourie, W. 2006 Kalahari Manganese Mines Heritage Assessment On Umtu 281 Olive Pan 282 Gama 283
- Webley, L. & Halkett, D 2008 Phase 1 Heritage Impact Assessment: Proposed Prospecting On The Farms Adams 328 And Erin 316, Kuruman, Ga-Segonyana Municipality In The Northern Cape.

## 12 Appendices:

### Appendix A Curriculum Vitae of Specialist

Jaco van der Walt  
Archaeologist

jaco.heritage@gmail.com  
+27 82 373 8491  
+27 86 691 6461

---

#### Education:

---

##### Particulars of degrees/diplomas and/or other qualifications:

**Name of University or Institution:** University of Pretoria  
**Degree obtained** : BA Heritage Tourism & Archaeology  
**Year of graduation** : 2001

**Name of University or Institution:** University of the Witwatersrand  
**Degree obtained** : BA Hons Archaeology  
**Year of graduation** : 2002

**Name of University or Institution** : University of the Witwatersrand  
**Degree Obtained** : MA (Archaeology)  
**Year of Graduation** : 2012

**Name of University or Institution** : University of Johannesburg  
**Degree** : PhD  
**Year** : Currently Enrolled

---

#### EMPLOYMENT HISTORY:

---

2011 – Present: **Owner – HCAC (Heritage Contracts and Archaeological Consulting CC).**  
 2007 – 2010 : **CRM Archaeologist**, Managed the Heritage Contracts Unit at the University of the Witwatersrand.

- 2005 - 2007: **CRM Archaeologist**, Director of Matakoma Heritage Consultants  
2004: **Technical Assistant**, Department of Anatomy University of Pretoria  
2003: **Archaeologist**, Mapungubwe World Heritage Site  
2001 - 2002: **CRM Archaeologists**, For R & R Cultural Resource Consultants,  
Polokwane  
2000: **Museum Assistant**, Fort Klapperkop.

**Countries of work experience include:**

Republic of South Africa, Botswana, Zimbabwe, Mozambique, Tanzania, The Democratic Republic of the Congo, Lesotho and Zambia.

**SELECTED PROJECTS INCLUDE:****Archaeological Impact Assessments (Phase 1)**

Heritage Impact Assessment Proposed Discharge Of Treated Mine Water Via The Wonderfontein Spruit Receiving Water Body Specialist as part of team conducting an Archaeological Assessment for the Mmamabula mining project and power supply, Botswana

Archaeological Impact Assessment Mmamethlake Landfill

Archaeological Impact Assessment Libangeni Landfill

**Linear Developments**

Archaeological Impact Assessment Link Northern Waterline Project At The Suikerbosrand Nature Reserve

Archaeological Impact Assessment Medupi – Spitskop Power Line,

Archaeological Impact Assessment Nelspruit Road Development

**Renewable Energy developments**

Archaeological Impact Assessment Karoshoek Solar Project

**Grave Relocation Projects**

Relocation of graves and site monitoring at Chlookop as well as permit application and liaison with local authorities and social processes with local stakeholders, Gauteng Province.

Relocation of the grave of Rifle Man Maritz as well as permit application and liaison with local authorities and social processes with local stakeholders, Ndumo, Kwa Zulu Natal.

Relocation of the Magolwane graves for the office of the premier, Kwa Zulu Natal

Relocation of the OSuthu Royal Graves office of the premier, Kwa Zulu Natal

**Phase 2 Mitigation Projects**

Field Director for the Archaeological Mitigation For Booyendal Platinum Mine, Steelpoort, Limpopo Province. Principle investigator Prof. T. Huffman

Monitoring of heritage sites affected by the ARUP Transnet Multipurpose Pipeline under directorship of Gavin Anderson.

Field Director for the Phase 2 mapping of a late Iron Age site located on the farm Kameelbult, Zeerust, North West Province. Under directorship of Prof T. Huffman.

Field Director for the Phase 2 surface sampling of Stone Age sites effected by the Medupi – Spitskop Power Line, Limpopo Province

**Heritage management projects**

Platreef Mitigation project – mitigation of heritage sites and compilation of conservation management plan.

---

**MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS:**


---

- Association of Southern African Professional Archaeologists. Member number 159  
Accreditation:
  - Field Director                      Iron Age Archaeology
  - Field Supervisor                  Colonial Period Archaeology, Stone Age  
   Archaeology and Grave Relocation
- Accredited CRM Archaeologist with SAHRA
- Accredited CRM Archaeologist with AMAFA
- Co-opted council member for the CRM Section of the Association of Southern African Association Professional Archaeologists (2011 – 2012)

---

**PUBLICATIONS AND PRESENTATIONS**


---

- A Culture Historical Interpretation, Aimed at Site Visitors, of the Exposed Eastern Profile of K8 on the Southern terrace at Mapungubwe.
  - J van der Walt, A Meyer, WC Nienaber
  - Poster presented at Faculty day, Faculty of Medicine University of Pretoria 2003
- 'n Reddingsondersoek na Anglo-Boereoorlog-ammunisie, gevind by Ifafi, Noordwes-Provinsie. South-African Journal for Cultural History 16(1) June 2002, with A. van Vollenhoven as co-writer.
- Fieldwork Report: Mapungubwe Stabilization Project.
  - WC Nienaber, M Hutten, S Gaigher, J van der Walt
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2004
- A War Uncovered: Human Remains from Thabantšho Hill (South Africa), 10 May 1864.
  - M. Steyn, WS Boshoff, WC Nienaber, J van der Walt
  - Paper read at the 12<sup>th</sup> Congress of the Pan-African Archaeological Association for Prehistory and Related Studies 2005
- Field Report on the mitigation measures conducted on the farm Bokfontein, Brits, North West Province .
  - J van der Walt, P Birkholtz, W. Fourie
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2007
- Field report on the mitigation measures employed at Early Farmer sites threatened by development in the Greater Sekhukhune area, Limpopo Province. J van der Walt
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2008
- Ceramic
- J]nalysis of an Early Iron Age Site with vitrified dung, Limpopo Province South Africa.

- 
- J van der Walt. Poster presented at SAFA, Frankfurt Germany 2008
- Bantu Speaker Rock Engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga (*In Prep*)
    - J van der Walt and J.P Celliers
  - Sterkspruit: Micro-layout of late Iron Age stone walling, Lydenburg, Mpumalanga. W. Fourie and J van der Walt. A Poster presented at the Southern African Association of Archaeologists Biennial Conference 2011
  - Detailed mapping of LIA stone-walled settlements' in Lydenburg, Mpumalanga. J van der Walt and J.P Celliers
    - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
  - Bantu-Speaker Rock engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga. J.P Celliers and J van der Walt
    - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
  - Pleistocene hominin land use on the western trans-Vaal Highveld ecoregion, South Africa, Jaco van der Walt.
    - J van der Walt. Poster presented at SAFA, Toulouse, France. Biennial Conference 2016

---

**REFERENCES:**


---

1. Prof Marlize Lombard      Senior Lecturer, University of Johannesburg, South Africa  
E-mail: mlombard@uj.ac.za
2. Prof TN Huffman      Department of Archaeology Tel: (011) 717 6040  
University of the Witwatersrand
3. Alex Schoeman      University of the Witwatersrand  
E-mail: Alex.Schoeman@wits.ac.za