A Phase 1 Heritage Impact Assessment for the proposed upgrading of bulk sewer lines in Tembisa, Ivory Park and and Clayville, Gauteng Province.

HIA

INTEGRATED SPECIALIST SERVICES (PTY) LTD

November 23, 2018

Authored by: Trust Mlilo (Professional Archaeologist and Heritage Management Specialist (ASAPA member) for Citofield Consulting (Pty) Ltd

DOCUMENT SYNOPSIS (EXECUTIVE SUMMARY)

Item	Description
Proposed development and location	A Phase 1 Heritage Impact Assessment for the proposed upgrading of bulk sewer lines in Tembisa, Ivory Park and and Clayville, Gauteng Province..
Purpose of the study	Phase 1 Archaeological Impact Assessment to determine the presence of cultural heritage sites and the impact of the proposed project on these resources within the area demarcated for the proposed sewer pipeline.
1:50 000 Topographic Map	2528CC
Coordinates	See Figure 1
Municipalities	City of Johannesburg and Ekurhuleni Metropolitan Municipalities
Predominant land use of surrounding area	Agriculture, industrial, residential, power lines, road and transport.
Applicant	City of Ekurhuleni Metropolitan Municipality
Environmental Practitioner	Citofield Consulting (Pty) Ltd Cell: +27 71 910 3636 , +27 72 603 3475 Fax; 086 460 9035 Email: Judith@citofield.co.za/Stanford@citofield.co.za/ info@citofield.co.za
Ref No.	**002/18-19/E0146**
Archaeologists/Heritage Practitioners	Integrated Specialist Services (Pty) Ltd 65 Naaldehout Avenue, Heuweloord, Centurion, 0157. Tel:+27 11 037 1565, Cell:+27 71 685 9247
Contact Person	Trust Mlilo
Date of Report	23 November 2018

This document serves to inform and guide the developer (City of Ekurhuleni Metropolitan Municipality) and contractors about the possible impacts that the proposed sewer pipeline development may have on heritage resources (if any) located in the study area. In the same light, the document must also inform South African heritage authorities (SAHRA/PHRA-G) about the presence, absence and significance of heritage resources located in the study area. As required by South African heritage legislation, linear developments exceeding 300m in length require pre-development assessment by a competent heritage practitioner in order to identify, record and if necessary salvage the irreplaceable heritage resources that may be impacted upon by the development. In compliance with these laws Citofield Consulting (Pty) Ltd retained Integrated Specialist Services (ISS) on behalf of City of Ekurhuleni Metropolitan Municipality to conduct a Phase 1 Archaeological and Heritage Impact Assessment (A/HIA) of the proposed sewer pipeline development in Gauteng. Desktop studies, drive-throughs and fieldwalking were conducted in order to identity heritage landmarks on and around the proposed development area. The study area is not on pristine ground, having seen significant transformations owing to industrial developments, agriculture, power lines, road networks and residential developments. Although the area is known for historical and LIA occurrences, no archaeological resources were identifiable on the surface, even though this may be due to stockpiled litter and grass cover that inhibits ground surface visibility. In terms of the built environment of the project area, structures less than 60 years of age occur within and in the surrounding areas. Nonetheless, sub-surface archaeological material and unmarked graves may still exist and when encountered during construction, work must be stopped forth-with and the finds must be reported to the South African Heritage Resource Agency (SAHRA) or the heritage practitioner. This report must also be submitted to the SAHRA or PHRA-G for review.

NATIONAL LEGISLATION AND REGULATIONS GOVERNING THIS REPORT

This is a specialist report' and is compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014.

DECLARATION OF INDEPENDENCE

In terms of Chapter 5 of the National Environmental Management Act of 1998 specialists involved in Impact Assessment processes must declare their independence.

I, **Trust Mlilo**, do hereby declare that I am financially and otherwise independent of the client and their consultants, and that all opinions expressed in this document are substantially my own, notwithstanding the fact that I have received fair remuneration from the client for preparation of this report.

Expertise:

Trust Mlilo, MA. (Archaeology), BA Hons, PDGE and BA & (Univ. of Pretoria) ASAPA (affiliation member) and more than 15 years of experience in archaeological and heritage impact assessment and management. Mlilo is an accredited member of the Association for Southern African Professional Archaeologists (ASAPA), Amafa akwaZulu Natali and Eastern Cape Heritage Resources Agency (ECPHRA). He has conducted more than hundred AIA/HIA Studies, heritage mitigation work and heritage development projects over the past 15 years of service. The completed projects vary from Phase 1 and Phase 2 as well as heritage management work for government, parastatals (Eskom) and several private companies such as BHP Billiton, Rhino Minerals.

Independence

The views expressed in this document are the objective, independent views of Mr Trust Mlilo and the survey was carried out under Citofield Consulting (Pty) Ltd. Integrated Specialist Services (Pty) Ltd has no any business, personal, financial or other interest in the proposed development apart from fair remuneration for the work performed.

Conditions relating to this report

The content of this report is based on the author's best scientific and professional knowledge as well as available information. Integrated Specialist Services (Pty) Ltd reserves the right to modify the report in any

way deemed fit should new, relevant or previously unavailable or undisclosed information become known to the author from on-going research or further work in this field, or pertaining to this investigation.

This report must not be altered or added to without the prior written consent of the author and Citofield Consulting (Pty) Ltd. This also refers to electronic copies of the 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.

Authorship: This AIA/HIA Report has been prepared by Mr Trust Mlilo (Professional Archaeologist). The report is for the review of the Heritage Resources Agency (PHRA).

Copyright: This report and the information it contains is subject to copyright and may not be copied in whole or part without written consent of Citofield Consulting (Pty) Ltd. and Integrated Specialist Services (Pty) Ltd (Pty) Ltd. This report can however be reproduced by City of Ekurhuleni Metropolitan Municipality. and The South African and Southern African Heritage Resources Agency (SAHRA) for the purposes of the Archaeological and Heritage Management in accordance with the National Heritage Resources Act, Act 25 of 1999

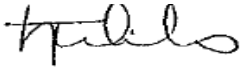
Geographic Co-ordinate Information: Geographic co-ordinates in this report were obtained using a hand-held Garmin Global Positioning System device. The manufacturer states that these devices are accurate to within +/- 5 m.

Maps: Maps included in this report use data extracted from the NTS Map and Google Earth Pro.

Disclaimer: The Authors are not responsible for omissions and inconsistencies that may result from information not available at the time this report was prepared.

The Archaeological and Heritage Impact Assessment Study was carried out within the context of tangible and intangible cultural heritage resources as defined by the SAHRA Regulations and Guidelines as to the authorisation of proposed bulk sewer pipeline development being proposed by City of Ekurhuleni Meteropolitan Municipality.

Signed by



23/ 11/ 2018

Acknowledgements

The authors acknowledge Citofield Consulting (Pty) Ltd. and City of Ekurhuleni Metropolitan Municipality for their assistance with project information, and the associated project BID as well as responding to technical queries related to the project being proposed by City of Ekurhuleni Metropolitan Municipality

1. TABLE OF CONTENTS

TABLE OF PLATES [PHOTOGRAPHS]

TABLE OF FIGURES

LIST OF TABLES

1. ABBREVIATIONS

AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
EIA	Environmental Impact Assessment
EIA	Early Iron Age *(EIA refers to both Environmental Impact Assessment and the Early Iron Age but in both cases the acronym is internationally accepted. This means that it must be read and interpreted within the context in which it is used.)*
EIAR	Environmental Impact Assessment Report
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
ICOMOS	International Council of Monuments and Sites
ISS	Integrated Specialist Services (Pty) Ltd
LIA	Late Iron Age
LFC	Late Farming Community
LSA	Late Stone Age
MIA	Middle Iron Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act 107 of 1998
NHRA	National Heritage Resources Act 25 of 1999
PHRA	Provincial Heritage Resource Agency
SAHRA	South African Heritage Resources Agency
ToR	Terms of Reference

2. KEY CONCEPTS AND TERMS

Periodization

Periodization Archaeologists divide the different cultural epochs according to the dominant material finds for the different time periods. This periodization is usually region-specific, such that the same label can have different dates for different areas. This makes it important to clarify and declare the periodization of the area one is studying. These periods are nothing a little more than convenient time brackets because their terminal and commencement are not absolute and there are several instances of overlap. In the present study, relevant archaeological periods are given below;

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)

Early Iron Age (~ AD 200 to 1000)

Late Iron Age (~ AD1100-1840)

Historic (~ AD 1840 to 1950, but a Historic building is classified as over 60 years old)

Definitions

Definitions Just like periodization, it is also critical to define key terms employed in this study. Most of these terms derive from South African heritage legislation and its ancillary laws, as well as international regulations and norms of best-practice. The following aspects have a direct bearing on the investigation and the resulting report:

Cultural (heritage) resources are all non-physical and physical human-made occurrences, and natural features that are associated with human activity. These can be singular or in groups and include significant sites, structures, features, ecofacts and artefacts of importance associated with the history, architecture or archaeology of human development.

Cultural significance is determined by means of aesthetic, historic, scientific, social or spiritual values for past, present or future generations.

Value is related to concepts such as worth, merit, attraction or appeal, concepts that are associated with the (current) usefulness and condition of a place or an object. Although significance and value are not mutually exclusive, in some cases the place may have a high level of significance but a lower level of value. Often, the evaluation of any feature is based on a combination or balance between the two.

Isolated finds are occurrences of artefacts or other remains that are not in-situ or are located apart from archaeological sites. Although these are noted and recorded, but do not usually constitute the core of an impact assessment, unless if they have intrinsic cultural significance and value.

In-situ refers to material culture and surrounding deposits in their original location and context, for example an archaeological site that has not been disturbed by farming.

Archaeological site/materials are remains or traces of human activity that are in a state of disuse and are in, or on, land and which are older than 100 years, including artefacts, human and hominid remains, and artificial features and structures. According to the National Heritage Resources Act (NHRA) (Act No. 25 of 1999), no archaeological artefact, assemblage or settlement (site) and no historical building or structure older than 60 years may be altered, moved or destroyed without the necessary authorisation from the South African Heritage Resources Agency (SAHRA) or a provincial heritage resources authority.

Historic material are remains resulting from human activities, which are younger than 100 years, but no longer in use, including artefacts, human remains and artificial features and structures.

Chance finds means archaeological artefacts, features, structures or historical remains accidentally found during development.

A grave is a place of interment (variably referred to as burial) and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place. A grave may occur in isolation or in association with others where upon it is referred to as being situated in a cemetery (contemporary) or burial ground (historic).

A site is a distinct spatial cluster of artefacts, structures, organic and environmental remains, as residues of past human activity.

Heritage Impact Assessment (HIA) refers to the process of identifying, predicting and assessing the potential positive and negative cultural, social, economic and biophysical impacts of any proposed project

which requires authorisation of permission by law and which may significantly affect the cultural and natural heritage resources. Accordingly, an HIA must include recommendations for appropriate mitigation measures for minimising or circumventing negative impacts, measures enhancing the positive aspects of the proposal and heritage management and monitoring measures.

Impact is the positive or negative effects on human well-being and / or on the environment.

Mitigation is the implementation of practical measures to reduce and circumvent adverse impacts or enhance beneficial impacts of an action.

Mining heritage sites refer to old, abandoned mining activities, underground or on the surface, which may date from the prehistorical, historical or the relatively recent past.

Study area or '**project area'** refers to the area where the developer wants to focus its development activities (refer to plan).

Phase I studies refer to surveys using various sources of data and limited field walking in order to establish the presence of all possible types of heritage resources in any given area.

Assumptions and disclaimer

The investigation has been influenced by the unpredictability of buried archaeological remains (absence of evidence does not mean evidence of absence) and the difficulty in establishing intangible heritage values. It should be remembered that archaeological deposits (including graves and traces of mining heritage) usually occur below the ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted immediately, and a competent heritage practitioner, SAHRA or PHRA-G must be notified in order for an investigation and evaluation of the find(s) to take place (see NHRA (Act No. 25 of 1999), Section 36 (6). Recommendations contained in this document do not exempt the developer from complying with any national, provincial and municipal legislation or other regulatory requirements, including any protection or management or general provision in terms of the NHRA. ISS assumes no responsibility for compliance with conditions that may be required by SAHRA in terms of this report.

3. TERMS OF REFERENCE (TOR)

The author was requested by Citofield Consulting (Pty) Ltd on behalf of City of Ekurhuleni Metropolitan Municipality to conduct an AIA/HIA study addressing the following issues:

- Archaeological and heritage potential of the proposed development site including any known data on affected areas;
- Provide details on methods of study; potential and recommendations to guide the PHRA/ SAHRA to make an informed decision in respect of authorisation of the proposed pipeline development.
- Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located in and around the proposed development site;
- Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;
- Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;
- Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources;
- Review applicable legislation requirements.

3.1 Introduction

Integrated Specialist Services (Pty) Ltd was retained by Citofield Consulting (Pty) Ltd. on behalf of City of Ekurhuleni Metropolitan Municipality to carry out a Phase 1 AIA/ HIA of the proposed sewer pipeline upgrading in Gauteng. The study area is located in Olifantsfontein, Clayville, Ivory Park and Tembisa area of Gauteng Province. As prescribed by SAHRA and stipulated by heritage legislation, an A/HIA is a pre-requisite for a lenear development exceeding 300m in length. The overall purpose of this heritage report is to identify, assess any heritage resources that may be located in the study area and evaluate the positive and negative impacts of the proposed development on these resources in order to make recommendations for their appropriate management. To achieve this, we conducted background research of published literature, maps and databases (desktop studies) which was then followed by ground-truthing by means of drive-through surveys and field walking. Desktop studies had shown that Iron Age and historical sites were a possibility in the study area but no archaeological sites were recorded during ground-truthing. While heritage resources may have been located in the study area, subsequent developments such as residential and infrastructure development work have either obliterated these materials or reduced them to isolated finds that can only be identifiable as chance finds during construction. If the recommendations of this report are adopted, there is

no archaeological reason why construction cannot proceed, taking full cognizance of clear procedures to follow in the event of chance findings.

4. PROJECT LOCATION AND DESCRIPTION

The City of Ekurhuleni Metropolitan Municipality intends to upgrade the existing bulk sewer pipelines. The project falls within the Tembisa, Ivory Park and Clayville area, Gauteng Province. The project study area is in and around Tembisa. The downstream of the sewer pipelines pass through Ivory Park, Clayville and terminate at the Olifantsfontein Waste Water Treatment Works (WWTW). The downstream of Tembisa bulk sewer passes through the jurisdiction of City of Johannesburg (Ivory Park) (see Figure 1)

The project will be undertaken using a phased approach as described below:

Phase 1: Part 1 A

Upgraded of sewer bulk line from 400mm and 900mm to 1400mm Dia HDPE (2200mm Long) (From Olifantsfontein WWTW in Clayville to near Southward Road in Ivory Park boundary with Clayville).

Phase 1: Part 1 B

Upgraded of existing sewer bulk line to 1400mm Dia HDPE (4250mm Long) (From along Southward Road in Ivory Park Boundary in Clayville to near Madologwe and Ndlovi Streets in Ivory Park boundary with Tembisa).

Phase 2: Part 2 A

Upgraded of existing sewer bulk line to 600mm Dia HDPE (1490mm Long) (From near Madologwe and Ndlovi Streets in Ivory Park to near D Masuku Street in Ivory Park boundary with Tembisa).

Phase 2: Part 2 B

Upgraded of existing sewer bulk line to 800mm Dia HDPE (2118mm Long) (From near Benji Streets in Tembisa:Eyandini to near Mohlala Street in Tembisa:Umfayaneni).

Phase 2: Part 2 C

Upgraded of existing sewer bulk line to 800mm Dia HDPE (2728mm Long) (From near Benji Streets in Tembisa:Eyandini to near Seychelles Street in Tembisa:Vusimuzi). (See figure 1, 2 &3).

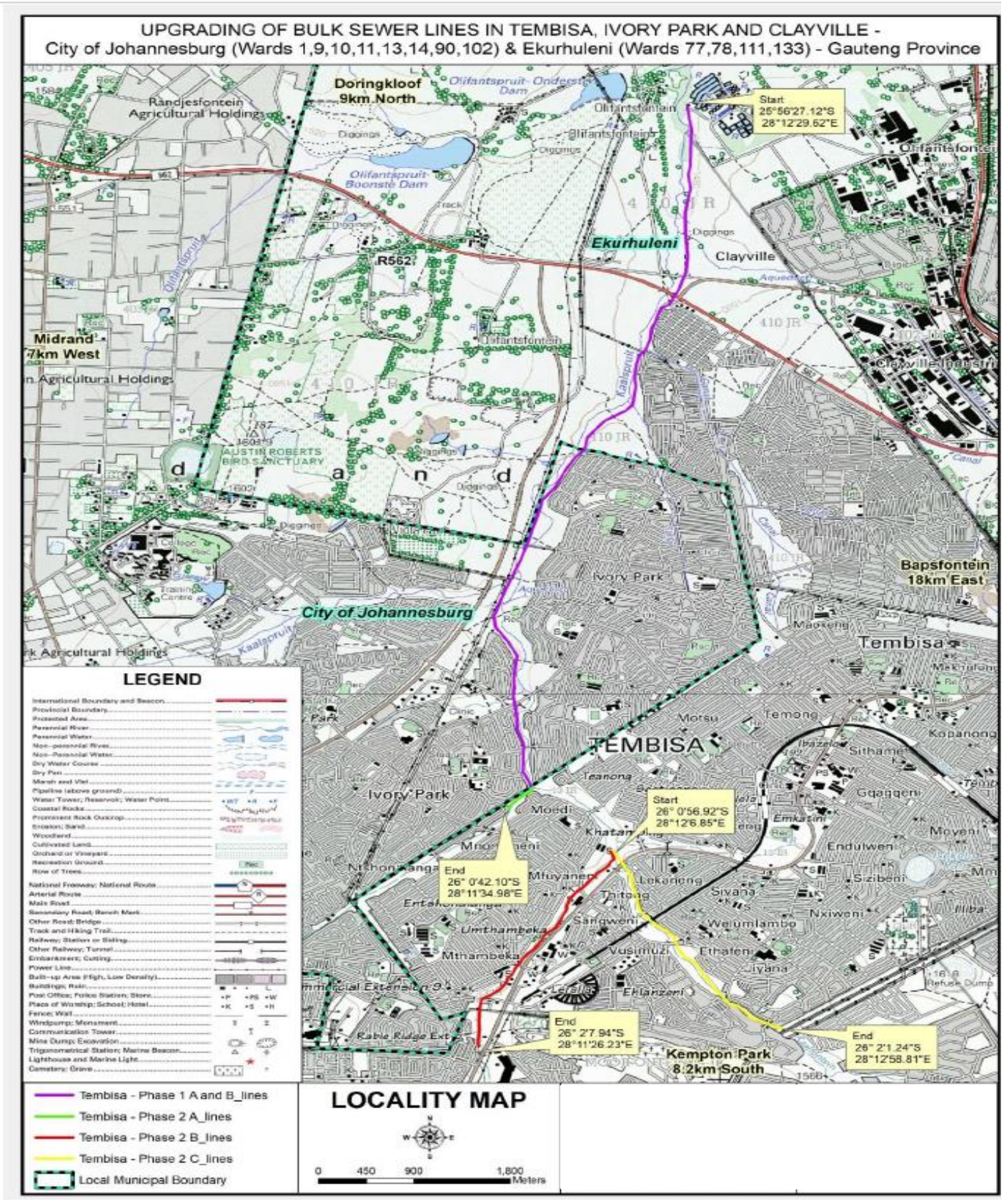


Figure 1: Location of proposed bulk sewer pipeline route (Citofield Consulting 2018)

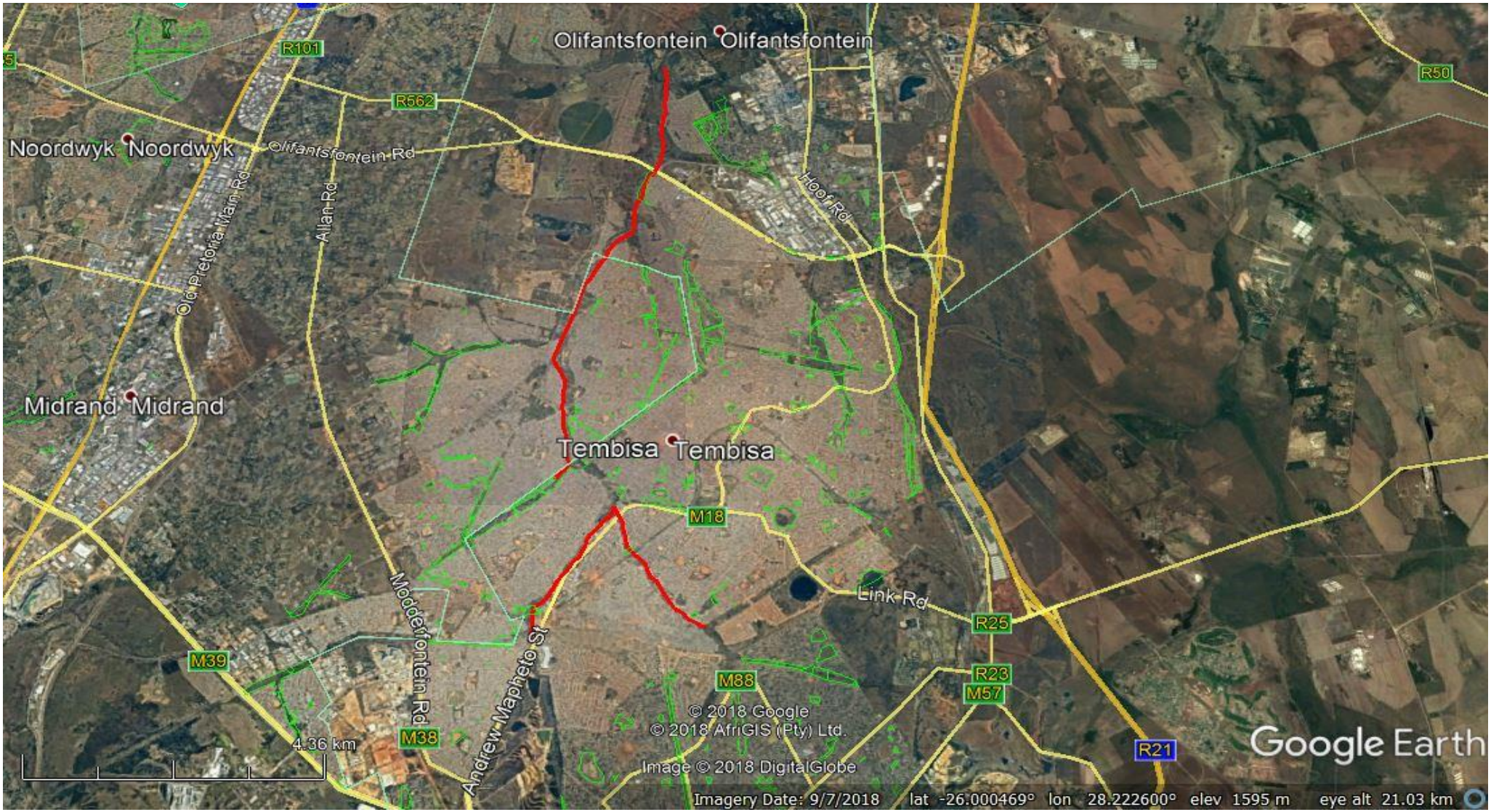


Figure 2: Location of proposed sewer pipeline route earmarked for upgrading (Citofield Consulting 2018)

5. LEGISLATIVE CONTEXT

Relevant pieces of legislations are to the present study are presented here. Under the National Heritage Resources Act (Act 25 of 1999) (NHRA), Mineral and Petroleum Resources Development Act 28 of 2002, and the National Environmental Management Act 107 of 1998 (NEMA) and 2014 Regulations, an AIA or HIA is required as a specialist sub-section of the EIA.

Heritage management and conservation in South Africa is governed by the NHRA and falls under the overall jurisdiction of the SAHRA and its PHRAs. There are different sections of the NHRA that are relevant to this study. The proposed development is a listed activity in terms of Section 38 of the NHRA which stipulates that the following development categories require a HIA to be conducted by an independent heritage management consultant:

- Construction of a road, wall, **powerline**, pipeline, canal or other linear form of development or barrier exceeding 300m in length
- Construction of bridge or similar structure exceeding 50m in length
- Development or other activity that will change the character of a site -
    - Exceeding 5000 sq. m
    - Involving three or more existing erven or subdivisions
    - Involving three or more erven or divisions that have been consolidated within past five years
    - Rezoning of site exceeding 10 000 sq. m
    - The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority
- Any other development category, public open space, squares, parks, recreation grounds

Thus, any person undertaking any development in the above categories, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. Section 38 (2) (a) of the NHRA also requires the submission of a heritage impact assessment report for authorization purposes to the responsible heritage resources agencies (SAHRA/PHRAs).

Related to Section 38 of the NHRA are Sections 34, 35, 36 and 37. Section 34 stipulates that no person may alter, damage, destroy, relocate etc any building or structure older than 60 years, without a permit issued by

SAHRA or a provincial heritage resources authority. Section 35 (4) of the NHRA stipulates that no person may, without a permit issued by SAHRA, destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object. This section may apply to any significant archaeological sites that may be discovered before or during construction. This means that any chance find must be reported to SAHRA or PHRA (the relevant PHRA), who will assist in investigating the extent and significance of the finds and inform about further actions. Such actions may entail the removal of material after documenting the find site or mapping of larger sections before destruction. Section 36 (3) of the NHRA also stipulates that no person may, without a permit issued by the SAHRA, destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority. This section may apply in case of the discovery of chance burials, which is unlikely. The procedure for reporting chance finds also applies to the likely discovery of burials or graves by the developer or his contractors. Section 37 of the NHRA deals with public monuments and memorials which exist in the proposed project area.

In addition, the new EIA Regulations (4 December 2014) promulgated in terms of NEMA (Act 107 of 1998) determine that any environmental reports will include cultural (heritage) issues. The new regulations in terms of Chapter 5 of the NEMA provide for an assessment of development impacts on the cultural (heritage) and social environment and for Specialist Studies in this regard. The end purpose of such a report is to alert the developer, the environmental consultant, SAHRA or PHRA and interested and affected parties about existing heritage resources that may be affected by the proposed bulk sewer pipeline development, and to recommend mitigatory measures aimed at reducing the risks of any adverse impacts on these heritage resources.

Assessing the Significance of Heritage Resources

The appropriate management of cultural heritage resources is usually determined on the basis of their assessed significance as well as the likely impacts of any proposed developments. Cultural significance is defined in the Burra Charter as meaning aesthetic, historic, scientific, or social value for past, present, or future generations (Article 1.2). Social, religious, cultural, and public significance are currently identified as baseline elements of this assessment, and it is through the combination of these elements that the overall cultural heritage values of the site of interest, associated place or area are resolved.

Not all sites are equally significant and not all are worthy of equal consideration and management. The significance of a place is not fixed for all time, and what is considered of significance at the time of assessment

may change as similar items are located, more research is undertaken and community values change. This does not lessen the value of the heritage approach, but enriches both the process and the long-term outcomes for future generations as the nature of what is conserved and why, also changes over time (Pearson and Sullivan 1995:7). This assessment of the Indigenous cultural heritage significance of the Site of Interest as its environments of the study area will be based on the views expressed by the traditional authority and community representatives, consulted documentary review and physical integrity.

African indigenous cultural heritage significance is not limited to items, places or landscapes associated with pre-European contact. Indigenous cultural heritage significance is understood to encompass more than ancient archaeological sites and deposits, broad landscapes, and environments. It also refers to sacred places and story sites, as well as historic sites, including mission sites, memorials, and contact sites. This can also refer to modern sites with particular resonance to the indigenous community. The site of interest considered in this project falls within this realm of broad significance.

Archaeological sites, as defined by the National Heritage Resources Act (Act 25 of 1999) are places in the landscape where people once lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and non-renewable. Many such sites are unfortunately lost on a daily basis through infrastructure developments such as powerlines, roads and other destructive economic activities such as mining and agriculture. This true for the Gauteng Province (proposed project area) whose main economic activities are mining, commercial, industrial and agriculture. It should be noted that once archaeological sites are destroyed, they cannot be replaced as site integrity and authenticity is permanently lost. Archaeological heritage contributes to our understanding of the history of the region and of our country and continent at large. By preserving links with our past, we may be able to appreciate the role past generations have played in the history of our country and the continent at large.

Categories of Significance

Rating the significance of archaeological sites, and consequently grading the potential impact on the resources is linked to the significance of the site itself. The significance of an archaeological site is based on

the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences. The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3 are used when determining the cultural significance or other special value of archaeological or historical sites. In addition, ICOMOS (the Australian Committee of the International Council on Monuments and Sites) highlights four cultural attributes, which are valuable to any given culture:

Aesthetic Value:

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria include consideration of the form, scale, colour, texture and material of the fabric, the general atmosphere associated with the place and its uses and also the aesthetic values commonly assessed in the analysis of landscapes and townscape.

Historical Value:

Historic value encompasses the history of aesthetics, science and society and therefore to a large extent underlies all of the attributes discussed here. Usually a place has historical value because of some kind of influence by an event, person, phase or activity.

Scientific Value:

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality and on the degree to which the place may contribute further substantial information.

Social Value:

Social value includes the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a certain group. It is important for heritage specialist input in the EIA process to take into account the heritage management structure set up by the NHR Act. It makes provision for a 3-tier system of management including the South Africa Heritage Resources Agency (SAHRA) at a national level, Provincial Heritage Resources Authorities (PHRAs) at a provincial and the local authority. The Act makes provision for two types or forms of protection of heritage resources; i.e. formally protected and generally protected sites:

Formally Protected Sites

- Grade 1 or national heritage sites, which are managed by SAHRA
- Grade 2 or provincial heritage sites, which are managed by the PHRA.
- Grade 3 or local heritage sites.

General Protection

- Human burials older than 60 years.
- Archaeological and palaeontological sites.
- Shipwrecks and associated remains older than 70 years.
- Structures older than 60 years.

The certainty of prediction is definite, unless stated otherwise and if the significance of the site is rated high, the significance of the impact will also result in a high rating. The same rule applies if the significance rating of the site is low. The significance of archaeological sites is generally ranked into the following categories:

Significance Rating Action

No significance: sites that do not require mitigation.

Low significance: sites, which may require mitigation.

2a. Recording and documentation (Phase 1) of site; no further action required

2b. Controlled sampling (shovel test pits, auguring), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction

Medium significance: sites, which require mitigation.

3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]

High significance: sites, where disturbance should be avoided.

4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism

High significance: Graves and burial places

4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinternment [including 2a, 2b & 3]

Furthermore, the significance of archaeological sites was based on six main criteria:

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter),
- Social value,
- Uniqueness, and
- Potential to answer current and future research questions.

An important aspect in assessing the significance and protection status of a heritage resource is often whether or not the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and mitigated in order to gain data /information, which would otherwise be lost.

Table 1: Evaluation of the proposed development as guided by the criteria in NHRA, MPRDA and NEMA

ACT	Stipulation for developments	Requirement details
NHRA Section 38	Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length	Yes
	Construction of bridge or similar structure exceeding 50m in length	No
	Development exceeding 5000 sq. m	No
	Development involving three or more existing erven or subdivisions	No
	Development involving three or more erven or divisions that have been consolidated within past five years	No
	Rezoning of site exceeding 10 000 sq. m	No
	Any other development category, public open space, squares, parks, recreation grounds	No
NHRA Section 34	Impacts on buildings and structures older than 60 years	No
NHRA Section 35	Impacts on archaeological and paleontological heritage resources	Subject to identification during Phase 1 walk down survey
NHRA Section 36	Impacts on graves	Subject to identification during Phase 1
NHRA Section 37	Impacts on public monuments	No
Chapter 5 (21/04/2006) NEMA	HIA is required as part of an EIA	Yes
Section 39(3)(b) (iii) of the MPRDA	AIA/HIA is required as part of an EIA	Not a mining development

Other relevant legislations

The Human Tissue Act

Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925 Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and the Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial Member of the Executive Committee as well as the relevant Local Authorities.

6. METHODOLOGY

Relevant published and unpublished sources were consulted in generating desktop information for this report. This included online databases such as the UNESCO website, Google Earth, Google Scholar and SAHRIS. Previous HIA in the project area were also consulted. A number of published works on the archaeology, history and palaeontology were also consulted. This included dedicated archaeological, paleontological and geological works by (Breutz 1956; 1968; 1987; Button 1971; Clarck 1971; Eriksson *et al*. 1975; Bertrand and Eriksson 1977; Humphreys 1978; Humphreys and Thackeray 1983; Beaumont and Vogel 1984; Beaumont and Morris 1990; Beaumont 1999; Holmgren et al. 1999; Johnson et al. 1997; Peabody 1954; Shillington 1985; Wills 1992; Young 1934; 1940, Huffman 2007, Mason 1962). Thus, the proposed pipeline route was considered in relation to the broader landscape, which is a key requirement of the ICOMOS Guidelines.

The proposed bulk sewer pipeline development requires clearance and authorisation from government compliance agencies including the heritage authority of SAHRA. The objectives of this report are to:

- Fulfil the legislative requirements of the National Heritage Resources Act, Act 25 of 1999.
- Identify and describe, (in terms of their conservation and / or preservation importance) sites of cultural and archaeological importance that may be affected by the proposed bulk sewer pipeline development. This study searched for sites and features of traditional historical, social, scientific, cultural, and aesthetic significance within the affected study area; the identification of gravesites.
- Assess the significance of the resources where they are identified.

- Evaluate the impact thereon with respect to the socio-economic opportunities and benefits that would be derived from the proposed development.
- Provide guidelines for protection and management of identified heritage sites and places (including associated intangible heritage resources management that may apply).
- Consult with the affected and other interested parties, where applicable, in regard to the impact on the heritage resources in the project's receiving environment.
- Make recommendations on mitigation measures with the view to reduce specific adverse impacts and enhance specific positive impacts on the heritage resources.
- Take responsibility for communicating with the SAHRA and other authorities in order to obtain the relevant permits and authorization with reference to heritage aspects.

The following tasks were undertaken:

- Preparation of a predictive model for archaeological heritage resources in the study area.
- A review and gap analysis of archaeological, historical, and cultural background information, including possible previous heritage consultant reports specific to the affected project area, the context of the study area and previous land use history as well as a site search;
- Field survey of the proposed sewer pipeline route in order to test the predictive model regarding that heritage sites in the area;
- Physical cultural property recording of any identified sites or cultural heritage places;
- Identification of heritage significance; and
- Preparation of AIA/HIA report with recommendation, planning constraints and opportunities associated with the proposed development.

The fieldwork survey was undertaken on the 19th November 2018. The main focus of the survey involved a pedestrian survey which was conducted across the project site and pipeline route. The pedestrian surveys focussed on parts of the project area where it seemed as if disturbances may have occurred in the past, for example bald spots in the grass veld; stands of grass which are taller that the surrounding grass veld; the presence of exotic trees; evidence for building rubble, and ecological indicators such as invader weeds.

The literature survey suggests that prior to the 20th century modern residential and on-going industrial developments; the general area where the proposed development is located would have been a rewarding region to locate heritage resources related to Stone Age and particularly Iron Age and historical sites (Bergh

1999: 4). However, the situation today is completely different. The study area now lies on a clearly modified landscape that has previously been cleared of vegetation but is now dominated by a continuous sweep of tall grass and shrubs that limit ground visibility. Several agricultural, industrial and illegal dumping are also on-going on and around the development footprint (Plates 2A-O).

6.2 Consultation

The EIA Public Participation process will be conducted by an independent specialist in collaboration with the EAP and specialists. The EIA Public Participation Process invited and addressed comments from affected communities and any registered heritage bodies on any matter related to the proposed project including heritage concerns that may arise as a result of the project. The issues raised by the public with respect to the proposed development will also be included in the HIA report.

7. ASSUMPTIONS AND LIMITATIONS

The investigation has been influenced by the unpredictability of buried archaeological remains (absence of evidence does not mean evidence of absence) and the difficulty in establishing intangible heritage values. It should be noted that archaeological deposits (including graves and traces of archaeological heritage) usually occur below the ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted immediately, and a competent heritage practitioner, SAHRA must be notified in order for an investigation and evaluation of the find(s) to take place (see NHRA (Act No. 25 of 1999), Section 36 (6). Recommendations contained in this document do not exempt the applicant from complying with any national, provincial and municipal legislation or other regulatory requirements, including any protection or management or general provision in terms of the NHRA. The author assumes no responsibility for compliance with conditions that may be required by SAHRA in terms of this report

The field survey did not include any form of subsurface inspection beyond the inspection of burrows, road cut sections, and the sections exposed by erosion or field ploughing. Some assumptions were made as part of the study and therefore some limitations, uncertainties and gaps in information would apply. It should however, be noted that these do not invalidate the findings of this study in any significant way:

- The proposed development activities will be limited to specific right of site as detailed in the development layout (Figure 1& 2).

- The construction team to provide link and access to the proposed site by using the existing access roads and there will be no construction beyond the demarcated site.
- No excavations or sampling were undertaken, since a permit from heritage authorities is required to disturb a heritage resource. As such the results herein discussed are based on surficially observed indicators. However, these surface observations concentrated on exposed sections such as road cuts and clear farmland.
- This study did not include any ethnographic and oral historical studies nor did it investigate the settlement history of the area.

The following photographs illuminate the nature and character of the Project Area.

A

Plate 1: Photo **A**. view of pipeline route in Olifantsfontein (Author 2018)

B

Plate 2: Photo **B**. view of bulk sewer pipeline route (Author 2018)

C

Plate 3: Photo **C**. view of Olifantsfontein Waste Water Treatment Works in the background (Author 2018)

D

Plate 4: Photo **D**. showing pipeline bulk sewer pipeline route.

Plate 5: Photo **E**. showing bulk sewer pipeline infrastructure earmarked for upgrading (Author 2018).

Plate 6: Photo **F** showing bulk sewer pipeline route (Author 2018).

Plate 7: Photo **G**. showing illigal dumping along the proposed pipeline route (Author 2018). Not that this hindered the visibility of any archaeological remains that could be salvaged.

Plate 8: Photo **H** showing urban agriculture activities along the proposed pipeline route.

Plate 9: Photo **I**, showing built up area near pipeline route

Plate 10: Photo **J**, showing pipeline route

K

Plate 11: Photo **K,** showing the proposed pipeline route.

L

Plate 12: Photo **L**,showing the proposed pipeline route

Plate 13: Photo **M**, showing proposed pipeline route

Plate 14: Photo **N** showing proposed pipeline route

Archaeological Context

Gauteng region has yielded evidence of human settlement extending into hundreds of thousands of years of prehistory that include the Stone Age, Iron Age, Historical period and contemporary communities. The palaeontological human-evolution record is reach in palaeoanthropological relics that were found in Stekfontein and Maropeng areas that are popularly known as the Cradle of Mankind that is also a World Heritage Site. Although there are no well-known Stone Age sites located in the Gauteng's Oliphantsfontein and Midrand 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 where 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). MSA sites were recorded on the farm Waterval and LSA sites were located in small rock shelters near Jukskei River for example Glenferness shelter (Mason 1969)

Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Broederstroom south of Hartebeespoort Dam dating to AD 470. Having only had cereals (sorghum, millet) that need summer rainfall, Early Iron Age (EIA) people did not move outside this rainfall zone, and neither did they occupy the central interior highveld area. The occupation of the larger geographical area (including the study area) did not start much before the 1500s. By the 16th century things changed, with the climate becoming warmer and wetter, creating condition that allowed Late Iron Age (LIA) farmers to occupy areas previously unsuitable, for example the Witwatersrand in the region of Klipriviersberg and the Magaliesberg to the north (Horn 1996).

A distinction between the Iron Age and the LSA is drawn on the basis and on the fact that the Iron Age communities occupied the foot-hills and valley lands introducing sedentary life, domesticated livestock, crop production and the use of iron (Maggs 1984a; 1984b; Huffman 2007, van Schalkwyk, 2007). Stonewalls are one of the major characteristic of the Iron Age people. Cattle dung, both vetrified and unvetrified, is also one of the Iron Age traits and also include pits and burials, with some located inside the cattle kraals (see Huffman (1982). This would have varied from cultures to cultures and traditions to traditions. For example, alongside the Urewe Tradition is the second group called the Kalundu Tradition whose EIA archaeological sites have been recorded in most of South Africa's northern and central regions. These are therefore some of the important Iron Age traditions in the EIA. Iron Age sites associated with the ancestors of the modern Sotho-Tswana and Ndebele speaking communities are wide spread in the region.

Archaeologically, the Gauteng is associated with Late Iron Age Sotho Tswana communities and has yielded four ceramic sequences of the Urehwe tradition: Ntsuanatsatsi (1450-1650), Olifantspoort (AD 1500 -1700) and Uitkomst (AD 1700-1850) and Buispoort (1700-1840) [Huffman 2007: 443). Melville Koppies is most well documented site in the project area. The site was excavated by Professor Mason from the Department of Archaeology of WITS in the 1980"s. Extensive Stone walled sites are also 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.

In this area the Klipriviersberg walling probably ended around 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. In Midrand, LIA sites also occur for example Lone Hill and the Boulders Shopping Centre approximately 10km from the proposed project area (Mason 2012).

Historic Period

This area was historically occupied by predominantly Sotho Tswana -speaking groups before Mzilikazi's Ndebele briefly dominated it during the Mfecane. The KwaZulu Natal coastal region has a special place in the history of the region and country at large. This relates to the most referenced Mfecane (wandering hordes) period of tremendous insecurity and military stress which eventually affected the entire Southern Africa including the modern day Gauteng area. Around the 1830s, the region also witnessed the massive movements associated with the Mfecane. The causes and consequences of the Mfecane are well documented elsewhere (e.g. Hamilton 1995; Cobbing 1988). In this context new African kingdoms emerged such as the Zulu Kingdom under Shaka in the second quarter of the 1800s AD. Military pressure from Zululand spilled onto the highveld by at least 1821. Various marauding groups of displaced Sotho-Tswana moved across the plateau in the 1820s. Mzilikazi raided the plateau extensively between 1825 and 1837. And throughout this time settled communities of Tswana people also attacked each other. As a result of this troubled period, Sotho-Tswana people concentrated into large towns for defensive purposes. Their settlements were built of stone because of the lack of trees in the project area. These stone-walled villages were almost always located near cultivatable soil and a source of water.

Prior to the Gauteng region being incorporated into the colonial administration of the Transvaal, the region experienced several episodes of white settler migration and settler settlements as well as the associated colonial wars such as the Anglo-Boer War, which ended in 1902. Palestrant (1986) places the date for the Voortrekker's in the Witwatersrand to 1830 and a date of 1842 for one of the earliest established farms which later became Johannesburg. European settlers of Dutch descent – the Afrikaans communities established earliest colonial settlements after they Trekked from the then Cape Colony to avoid British Administration in the 1930s and 19840s. During the Great Trek these Afrikaans communities, commonly referred to as the Boers (farmers), who left the British Administration of the Cape Colony (i.e. a former Dutch colony in 1795 and again in 1806) established several republics north and north-west of the British Colonies - these republics included the Boer Republics of the Orange Free State (1845) and the Transvaal across the Vaal River were the study area is located. The Transvaal which had different autonomous and separate states which were later united to form what became known as the Zuid Afrikaanse Republiek (South African Republic) the ZAR (Celliers, 2010).

The first settlers in the Midrand area moved in the 1820s. Olfantsfontein and Randjesfontein farms were established in the 1840s by Erasmus and Strydoms families respectively (Palestrant, 1986: 8). White settlers moved into the area during the first half of the 19th century. They were largely self-sufficient, basing their survival on cattle/sheep farming and hunting. The land was previously used for agriculture but now subdivided into small holdings and high density housing stands (Va Schalkwyk 2013). Fully fledged municipality was established in 1881 combining Clayville and Olifantsfontein. As a result of rapid urbanisation influenced by gold discovery, most archaeological remains and historic farmsteads older than 60 years that may have existed have either disappeared or have been altered. Van Schakwyk (1998) posits that these early white settlers and their descendants were often buried in their farms which means formal and informal graves may occur in the project area.

Halfway House became a town in 1920 (Van Schalkwyk 2008). Massive developments started in the 1930s and 40s which saw the establishment of the Grand Central Airport and surrounding large agriculture holdings for example Crowrhorne and Beauliew. At the same time Olifantsfontein located to the east of the proposed development site developed rapidly following the discovery limestone and fire clay deposits by John Richard Holmes in 1895. The discovery saw the development of brick and pottery industries as well as housing for workers such as Clayville established in 1940. However most of the original buildings such as the Halfway House Post Office and Van's café were destroyed. A black township was obliterated during the apartheid

era. The result was that any historic farmsteads older than 60 years that may have existed have either disappeared or have been 'upgraded'. The oldest physical remains in these areas usually are planted vegetation such as lanes and tall trees in nature gardens, cemeteries, the remains of portions of farm and farmstead walling (dry stacked stone walls erected to demarcate the boundaries of a farmstead, an orchard or cattle kraal) farm roads, weirs (in the river) and water furrows.

The Anglo –Boer wars of 1899-1902 had their footprint in the Gauteng area. For example the Jameson Raid Site is located less than 40km from Midrand (Van der Walt 2015). No major battles were fought in Midrand during the Anglo Boer War. However the British passed through Midrand on their way to Pretoria and at some point British forces were stationed at the Eskom Training Centre in President Park and Bibury Grange (Van der Walt 2015, Van Schalkwyk 2008). The later effectively led to complete subjugation of African communities to settler administration starting as part of the ZAR of Transvaal. There after the region was subsequently annexed by the British and effectively placed the majority of African communities under the Union of South Africa in 1910, which eventually ended with the establishment of the new South Africa in 1994.

Intangible Heritage

As defined in terms of the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003) intangible heritage includes oral traditions, knowledge and practices concerning nature, traditional craftsmanship and rituals and festive events, as well as the instruments, objects, artefacts and cultural spaces associated with group(s) of people. Thus intangible heritage is better defined and understood by the particular group of people that uphold it. In the present study area, very little intangible heritage remains because no historically known groups occupied the study area and most of the original settler descendants moved away from the area.

8. SAHRIS DATA BASE AND IMPACT ASSESSMENT REPORTS IN THE PROJECT AREA

Several archaeological and heritage studies were conducted within the project area and its vicinity since 2005 and these presents the nature and heritage character of the area. The HIAs conducted in the area also provide some predictive evidence regarding the types and ranges of heritage resources to be expected in the proposed project area: (see reference list for HIA reports). Five previously recorded sites are on record in the general project area topographic map (2528CC) at the Wits database. However only one site is of relevance to the proposed development ie the Boulders located approximately 10km from the proposed project area (Van der Walt 2015). Previous studies such as Mason (1997), Huffman (1999), Maraise Botes

and Van Schalkwyk recorded a number of sites located out of the project area, for example the Boulders Shopping centre yielded Stone and Iron Age as well as colonial heritage remains (Mason 1997). Some of the relevant studies include housing, infrastructure developments, water pipeline and power line projects completed by Van Schalkwyk (2005, 2007, 2008, 2009, 2010, 2011, 2013, 2014), Kusel 2009, 2010, 2011, 2013, 2014), Tomose 2013, Jaco Van der Walt 2013, Van Der Ryst MM and Mlilo 2016, 2017, 2018a, 201b, 2018c Van Schalkwyk and Udo Kusel did extensive work in the project area mostly for infrastructure developments. The authors note that the entire region was subjected to urbanization and industrial activities, which would have destroyed any pre-colonial or early colonial heritage features that might have occurred in the past, and that the only heritage sites known from the region are a number of historical buildings older than 60 years, municipal cemeteries, which are all located well outside the area of the proposed development. The following table presents projects conducted in the Midrand area and its vicinity from 2005. A survey of the palaeontological sensitivity on SAHRIS revealed that the project area is located in an area of low palaeontological sensitivity.

Table 1: Geographical co-ordinates and findings

Site	Coordinates	Brief Description	Comment relating to proposed development and Mitigation Measures
Starting Point	25°56 27.12"S 28°12'29.62"E	Olifantsfontein Waste Water Treatment Works (WWTW).	No heritage significant, mitigation not required
End 1	26°04'2.10"S 28°11'34.98"E	Within built up area	No heritage significant, mitigation not required
Start	026°0'50.92"S 28°12'6.85"E	Within road servitude	No heritage significant, mitigation not required
End 2	26°27'94.00"S 28°11'26.23"E	Within built up area	No heritage significance, mitigation not required
End 3	26°27'94.00"S 28°11'26.23"E	Within built up area	No heritage significance, mitigation not required

9. Results of the field survey

Archaeological and Heritage Site

The proposed bulk sewer pipeline route did not yield any verifiable archaeological sites or material. The affected landscape is heavily degraded from previous and current land use such as existing bulk sewer pipelines, power lines, infrastructure and from residential property developments. This limited the chances of encountering significant in *situ* archaeological sites. As such the proposed bulk sewer pipeline development will be additional development on the project area (Figure 2, also (see Plates A to L). It is the considered opinion of the author that the chances of recovering significant archaeological materials were seriously compromised and limited due to infrastructure developments and other destructive land use patterns such as deep ploughing, bulk water pipeline, road works and residential areas that already exist on the project area.

Based on the field study results and field observations, the author concluded that the receiving environment for the proposed development is low to medium potential to yield previously unidentified archaeological sites during subsurface excavations and construction work associated with the proposed pipeline development. This observation is supported by the fact that no Iron Age sites are indicated in a historical atlas around the Clayville, Tembisa area; however, this may be an indication of a lack of research. Literature review also revealed that no Stone Age sites are shown on a map contained in a historical atlas of this area. This however should rather be seen as a lack of research in the area and not as an indication that such features do not occur.

Burial grounds and graves

Human remains and burials are commonly found close to archaeological sites; they may be found in abandoned and neglected burial sites, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface. Archaeological and historical burials are usually identified when they are exposed through erosion and earth moving activities for infrastructure developments such as powerlines and roads. In some instances, packed stones or stones may indicate the presence of informal pre-colonial burials. The field survey did not record any burial site along the proposed bulk sewer pipeline route. It should be noted that burial grounds and gravesites are accorded the highest social significance threshold (see Appendix 3). They have both historical and social significance and are

considered sacred. Wherever they exist or not, they may not be tempered with or interfered with during any proposed development. The possibility of encountering human remains during subsurface earth moving works anywhere on the landscape is ever present. Although the possibility of encountering previously unidentified burial sites is low at the project site, should such sites be identified during subsurface construction work, they are still protected by applicable legislations and they should be protected.

Historical Buildings and Structures

The study did not record any buildings and structures older than 60 years along the proposed bulk sewer pipeline.

Monuments and Memorial plaques

The study did not record any memorial plaques and monuments along the proposed bulk sewer pipeline route.

Table 2: Summary of findings

Heritage resource	Status/Findings
Buildings, structures, places and equipment of cultural significance	None exist
Areas to which oral traditions are attached or which are associated with intangible heritage	None exists
Historical settlements and townscapes	None exist on the footprint of the proposed development
Landscapes and natural features of cultural significance	None
Archaeological and palaeontological sites	None
Graves and burial grounds	None were recorded within the proposed development footprint
Movable objects	None
Overall comment	The study did not record any significant heritage resources within the proposed development site and routes.

10. Recommendations

1. From a heritage perspective supported by the findings of this study, the proposed bulk sewer pipeline upgrading is feasible. However, the proposed development should be approved to proceed as planned under observation that the development dimensions do not extend beyond the proposed route. The foot print impact of the proposed development and associated infrastructure should be kept to minimal to limit the possibility of encountering chance finds.
2. Should chance archaeological materials or human remains be exposed during subsurface construction work on any section of the proposed development laydown sites, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimize disruption in construction scheduling while recovering archaeological and any affected cultural heritage data as stipulated by the PHRA and NHRA regulations.
3. Subject to the recommendations herein made and the implementation of the mitigation measures and adoption of the project EMP, there are no significant cultural heritage resources barriers to the proposed development. The Heritage authority may approve the proposed development to proceed as planned with special commendations to implement the recommendations here in made

11. Chance finds procedures

It has already been highlighted that sub-surface materials may still be lying hidden from surface surveys. Therefore, absence (during surface survey) is not evidence of absence all together. The following monitoring and reporting procedures must be followed in the event of a chance find, in order to ensure compliance with heritage laws and policies for best-practice. This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. Accordingly, all construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds.

- If during the 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, work must cease at the site of the find and this person must report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- The site Manager must then make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area before informing ISS.
- The developer will then contact a professional archaeologist for an assessment of the finds who will in turn inform SAHRA/PHRA-G.

12. Conclusions

Integrated Specialist Services (Pty) Ltd was retained by Citofield Consulting (Pty) Ltd to carry out HIA for the proposed bulk sewer pipeline upgrading, as required by Environmental and Heritage legislation. The proposed developments lie on disturbed ground that is within an industrialised, residential landscape and commercial zone. Desktop research intimated that the rich history and archaeology of the general area prior to several infrastructure, industrial and residential developments after the mid-20th century but field surveys on and around the proposed area did not yield any heritage material. In terms of the archaeology and heritage in respect of the proposed bulk sewer pipeline route, there are no obvious 'Fatal Flaws' or 'No-Go' areas. However, the potential for chance finds, still remains and the developer and contractors are advised to be diligent and observant during construction of the land site. The procedure for reporting chance finds has clearly been laid out and if this report is adopted by SAHRA, then there are no archaeological reasons why construction cannot proceed.

13. References

Barham, L. and Mitchell, P.2008. *The first Africans: African archaeology from the earliest toolmakers to most recent foragers*. Cambridge: Cambridge university press

Behrens, J. 2008. Archaeological investigation of a number of structures on Waterval 5IR. Unpublished report. Pretoria: Unisa.

Bergh, J.S. (ed.) 1998. *Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies.* Pretoria: J.L. van Schaik.

Birkholtz, P.D. 2009. *Phase 1 Heritage Impact Assessment for proposed Eskom College Randjesfontein 88kv overhead Distribution lines located on Portions of the farm Olifantsfontein 410JR, Ekurhuleni Metropolitan Municipality, Gauteng Province*

Cloete, P.G. 2000. *The Anglo-Boer War: a Chronology*. Pretoria: JP van der Walt

Deacon, H. J. and Deacon, J.1999. *Human beginnings in South Africa: Uncovering the secrets of the Stone Age.* Cape Town: David Philip

Evers, T.M. 1981. The Iron Age in the Eastern Transvaal, South Africa. In Voight, E.A. (ed). *Guide to archaeological sites in Northern and Eastern Transvaal.* Pretoria: South African Association of Archaeologists, 64-109.

Inskeep, R.R. 1978. *The peopling of Southern Africa*. David Philip: Cape Town.

Hartdegen, P. (ed.) 1988. *Our building heritage*. Halfway House: Ryll's Publishing Co.

Holm, S.E. 1966. *Bibliography of South African Pre- and Protohistoric archaeology*. Pretoria: J.L. van Schaik.

Huffman, T.N. 199 Archaeological survey of Blue Hills farm.Unpublished report by ARM

Huffman, T.N. 2007 Handbook to the Iron Age: The archaeology of pre-colonial farming societies in southern Africa. Scottville: University of KwaZulu Natal Press

Knudson, S. I 1978. Culture in retrospect. Chicago: Rand McNally College Publishing Company.

Küsel, U.S. 2009. *Cultural heritage resources impact assessment of the proposed extension of Midrand Estate Portion 35, 39, a Portion of Portion 48and 148 remainder of Portion 34 and the remainder of the Farm Olifantsfontein 410 JR Ekuruleni Gauteng*

Küsel, U.S.2013. *Heritage impact assessment for proposed construction of a pedestrian pathway and cycle path at Hammanskraal, Gauteng Province*.

Küsel, U.S.2013. *Heritage impact assessment for proposed construction of a pedestrian pathway and side walk cycle path in the Olievenhotbos Area of Gauteng Province*.

Küsel, U.S.2013. *Heritage impact assessment for proposed construction of a pedestrian pathway and cycle path in the Mabopane Area of Gauteng Province*.

Maggs T.M. 2008. The Mpumalanga Escarpment settlements. In (Swanepoel, N., Esterhuisen, A. & Bonner, P. eds.) *Five hundred years rediscovered. South African precedents and prospects*. 169-182.

Marais Botes, L. 2014. Phase 1 Heritage Impact Assessment for the proposed New Road K56 study area:Erling Road between the K46 and K56 between K46 and Main Road, Midrand, Gauteng Province

Mason, R. 1962. Prehistory of the Transvaal. Johannesburg: Witwatersrand University Press.

Mason, R.J. 1968. Transvaal and Natal Iron Age settlement revealed by aerial photography and excavation. *African Studies*. 27:167-180.

Mason, R.J. 1997*. Recording Midrand Heritage from the earliest occupation.The Boulders shopping centre project.*

Mason, R.J. 2012*. A built stone alignment associated with an LSA artefact assemblage on Mia Farm, Midrand, South Africa. South African Archaeological Bulletin 67(196):214-230.*

National Environmental Management Act 107 of 1998

National Heritage Resources Act NHRA of 1999 (Act 25 of 1999)

Praagh, L.V. (ed.) 1906. *The Transvaal and its mines*. London: Praagh & Lloyd

Raper, P.E. 2004. *South African place names. Johannesburg: Jonathan Ball Publishers*

Republic of South Africa. 1980. Ordinance on Excavations (Ordinance no. 12 of 1980). The Government Printer: Pretoria.

Republic of South Africa. 1983. Human Tissue Act (Act 65 of 1983). The Government Printer: Pretoria.

Republic of South Africa. 1998. National Environmental Management Act (no 107 of 1998). Pretoria: The Government Printer.

Ross, R. 2002. A concise history of South Africa. Cambridge: Cambridge University Press.

SAHRA, Burial sites, Http://www.sahra.org.za/burial.htm, Accessed, 02 June 2016.

SAHRIS, Palaeontological sensitivity map, Referenced October 2016

Taylor, M.O.V. 1979. Wildebeestfontein: a Late Iron Age site in the southeastern Transvaal. In Van der Merwe, N.J. & Huffman, T.N. (eds.) 1979. *Iron Age studies in Southern Africa*.

Tomose, G.T.2013. *A Heritage Impact Assessment study for the proposed Prasa's mantainance depots upgrade, Braamfontein Prasa Depot, CoJMM, Gauteng Province*

Van der Ryst, M.M. 2009. *Archaeological Impact Assessment of potential heritage resources on Portion 61 of the farm Olievenhoutbosch 389 JR , Centurion Gauteng Province*

Van Der Walt J. 2009*. Phase 1 Archaeological Impact Assessment on the Portion 123 of the farm Klipfontein 12IR, Midrand, Gauteng Province*

Van Der Walt J. 2014. Phase 1 Heritage Impact Assessment on Holdings 117 Princess Agricultural Holdings in Roodepoort, Gauteng Province

Van Schalkwyk, J.A. & De Jong, R. 1997. *A survey of cultural resources in the Midrand municipal area, Gauteng Province. Unpublished report 1997KH021. Pretoria: National Cultural History Museum*

Van Schalkwyk, J.A. 1998. A survey of cultural resources in the Midrand Municipal area, Gauteng Province*.* Unpublished report. Pretoria: National Cultural History Museum.

Van Schalkwyk, J.A. 2002*. A survey of cultural resources on the farm Olifantsfontein, Midrand municipal area, Gauteng Province. Unpublished report 2002KH15. Pretoria: National Cultural History Museum.*

Van Schalkwyk, J.A. 2005a. *Scoping study for the development of a new landfill site for thenorthern areas of the Metropolitan Municipality of Johannesburg*. Unpublished report2005KH09. Pretoria: National Cultural History Museum.

Van Schalkwyk, J.A. 2005b. *Heritage impact assessment: Olifantsfontein 410JR. Unpublished report 2005KH134. Pretoria: National Cultural History Museum.*

Van Schalkwyk, J.A. 2006a. *Heritage scoping assessment: Olifantsfontein phase 1. Unpublished report 2006KH31. Pretoria: National Cultural History Museum.*

Van Schalkwyk, J.A. 2006b. *Heritage scoping assessment: Clayville extension. Unpublished report 2006KH48. Pretoria: National Cultural History Museum.*

Van Schalkwyk, J.A. 2007a. *Heritage Impact Assessment Report for the proposed development on the Zonk'izizwe property, Midrand, Gauteng Province*

Van Schalkwyk, J.A. 2007b. *Scoping report for the proposed expansion to the Northern Waste Water Treatment Works, Diepsloot 338JR, Randburg magisterial district,Gauteng Province*. Unpublished report 2007/JvS/077. Pretoria.

Van Schalkwyk, J.A. 2008. *Heritage survey report for the development of Road K220 in the Clayville Olifantsfontein Area, Gauteng*

Van Schalkwyk, J.A. 2009. *Heritage impact assessment report for the proposed new substation and 132kV distribution line, south of Krugersdorp, Gauteng Province*. Unpublished report 2009/JvS/059.

Van Schalkwyk, J.A. 2010. *Heritage impact assessment for proposed Ingonyama link road extension and the associated 60m Bridge crossing, City of Johannesburg Metropolitan Municipality*. Pretoria: National Cultural History Museum.

Van Schalkwyk, J.A. 2010. *Heritage impact assessment for the proposed Diepsloot pedestrian bridge development, Randburg magisterial district, Gauteng Province*. Unpublished report 2010/JvS/018. Pretoria.

Van Schalkwyk, J.A. 2011. Heritage Impact Assessment Report for proposed Diepsloot Sewer pipeline in Gauteng. Unpublished report 2006KH111. Pretoria: National Cultural History Museum.

Van Schalkwyk, J.A. 2011. *Heritage impact assessment for proposed Diepsloot Waste Buyback Centre, Randburg Magisterial District, Gauteng Province*. Pretoria: National Cultural History Museum.

Van Schalkwyk, J.A. 2011. *Heritage impact assessment report for the proposed new substation and 132kV distribution line, west of Kagiso, Gauteng Province*. Unpublished report 2011/JvS/034. Pretoria.

Van Schalkwyk, J.A. 2012. *Heritage impact assessment for the establishment of a commercial township on Portions 1, 2 & 3, and the Remainder of Holding 16, Marwyn Agricultural Holdings, Ekurhuleni: Clayville Ext 24, Gauteng*. Pretoria: Unpublished report.

Van Schalkwyk, J.A. 2012. *Heritage impact assessment for the Diepsloot Resevoirs in Gauteng Province.* Unpublished report 2004KH34. Pretoria: National Cultural History Museum.

Van Schalkwyk, J.A. 2013. *Heritage Impact Assessment for proposed new Ntshona Substation and 132kV power line, Mogale City, Gauteng Province*.

Van Schalkwyk, J.A. 2013. *Heritage Impact Assessment for proposed Diepsloot east power line and new substation, Gauteng Province*.

Van Schalkwyk, J.A. 2014.Cultural heritage Impact Assessment for proposed residential development on Portion 57, Benon 771R, Ekhuruleni, Gauteng Province

Van Schalkwyk, J.A. 2014. *Heritage impact assessment for the proposed Diepsloot pedestrian Bridge development, Randburg Magesterial District, Gauteng Province*

Van Schalkwyk, J.A. 2015*. Heritage impact assessment for the proposed light industrial development project on the farm Rensburg 623 JR, Clayville,*Gauteng Province

Van Schalkwyk, J.A. *2016. Cultural heritage Ipact Assessment for the proposed Vorna Valley extension 88 housing development, Midrand Region, City of Johannesburg local Municipality; Gauteng Province*

Wadley, L & Turner, G. 1987. *Hope Hill shelter: a Later Stone Age site in southern Transvaal. South African Journal of Science 83(3):98-105.*

14. APPENDIX 1: HERITAGE MANAGEMENT PLAN INPUT INTO THE PROPOSED BULK SEWER PIPELINE DEVELOPMENT PROJECT EMP

Objective	• Protection of archaeological sites and land considered to be of cultural value; • Protection of known physical cultural property sites against vandalism, destruction and theft; and • The preservation and appropriate management of new archaeological finds should these be discovered during construction.							
No.	Activity	Mitigation Measures	Duration	Frequency	Responsibility	Accountable	Contacted	Informed
Pre-Construction Phase								
1	Planning	Ensure all known sites of cultural, archaeological, and historical significance are demarcated on the site layout plan, and marked as no-go areas.	Throughout Project	Weekly Inspection	Contractor [C] CECO	SM	ECO	EA EM PM
Construction Phase								
1	Emergency Response	Should any archaeological or physical cultural property heritage resources be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped until heritage authority has cleared the development to continue.	N/A	Throughout	C CECO	SM	ECO	EA EM PM
		Should any archaeological, cultural property heritage resources be exposed during excavation or be found on development site, a registered heritage specialist or PHRA official must be called to site for inspection.		Throughout	C CECO	SM	ECO	EA EM PM
		Under no circumstances may any archaeological, historical or any physical cultural property heritage material be destroyed or removed form site;		Throughout	C CECO	SM	ECO	EA EM PM
		Should remains and/or artefacts be discovered on the development site during earthworks, all work will cease in the area affected and the Contractor will immediately inform the Construction Manager who in turn will inform PHRA-G.		When necessary	C CECO	SM	ECO	EA EM PM
		Should any remains be found on site that is potentially human remains, the PHRA-G and South African Police Service should be contacted.		When necessary	C CECO	SM	ECO	EA EM PM
Rehabilitation Phase								
		Same as construction phase.						
Operational Phase								
		Same as construction phase.						

15. APPENDIX 2: HERITAGE MITIGATION MEASURE TABLE

SITE REF	HERITAGE ASPECT	POTENTIAL IMPACT	MITIGATION MEASURES	RESPONSIBLE PARTY	PENALTY	METHOD STATEMENT REQUIRED
Chance Archaeological and Burial Sites	General area where the proposed project is situated is a historic landscape, which may yield archaeological, cultural property, remains. There are possibilities of encountering unknown archaeological sites during subsurface construction work which may disturb previously unidentified chance finds.	Possible damage to previously unidentified archaeological and burial sites during construction phase. • Unanticipated impacts on archaeological sites where project actions inadvertently uncovered significant archaeological sites. • Loss of historic cultural landscape; • Destruction of burial sites and associated graves • Loss of aesthetic value due to construction work • Loss of sense of place Loss of intangible heritage value due to change in land use	In situations where unpredicted impacts occur construction activities must be stopped and the heritage authority should be notified immediately. Where remedial action is warranted, minimize disruption in construction scheduling while recovering archaeological data. Where necessary, implement emergency measures to mitigate. • Where burial sites are accidentally disturbed during construction, the affected area should be demarcated as no-go zone by use of fencing during construction, and access thereto by the construction team must be denied. • Accidentally discovered burials in development context should be salvaged and rescued to safe sites as may be directed by relevant heritage authority. The heritage officer responsible should secure relevant heritage and health authorities permits for possible relocation of affected graves accidentally encountered during construction work.	• Contractor / • Project Manager • Archaeologist • Project EO	Fine and or imprisonment under the PHRA-G Act & NHRA	Monitoring measures should be issued as instruction within the project EMP. PM/EO/Archaeologists Monitor construction work on sites where such development projects commences within the farm.

16 APPENDIX 3: LEGAL PRINCIPLES OF HERITAGE RESOURCES MANAGEMENT IN SOUTH AFRICA

Extracts relevant to this report from the National Heritage Resources Act No. 25 of 1999, (Sections 5, 36 and 47):

General principles for heritage resources management

5. (1) All authorities, bodies and persons performing functions and exercising powers in terms of this Act for the management of heritage resources must recognise the following principles:

(a) Heritage resources have lasting value in their own right and provide evidence of the origins of South African society and as they are valuable, finite, non-renewable and irreplaceable they must be carefully managed to ensure their survival;

(b) every generation has a moral responsibility to act as trustee of the national heritage for succeeding generations and the State has an obligation to manage heritage resources in the interests of all South Africans;

(c) heritage resources have the capacity to promote reconciliation, understanding and respect, and contribute to the development of a unifying South African identity; and

(d) heritage resources management must guard against the use of heritage for sectarian purposes or political gain.

(2) To ensure that heritage resources are effectively managed

(a) the skills and capacities of persons and communities involved in heritage resources management must be developed; and

(b) provision must be made for the ongoing education and training of existing and new heritage resources management workers.

(3) Laws, procedures and administrative practices must

(a) be clear and generally available to those affected thereby;

(b) in addition to serving as regulatory measures, also provide guidance and information to those affected thereby; and

(c) give further content to the fundamental rights set out in the Constitution.

(4) Heritage resources form an important part of the history and beliefs of communities and must be managed in a way that acknowledges the right of affected communities to be consulted and to participate in their management.

(5) Heritage resources contribute significantly to research, education and tourism and they must be developed and presented for these purposes in a way that ensures dignity and respect for cultural values.
(6) Policy, administrative practice and legislation must promote the integration of heritage resources conservation in urban and rural planning and social and economic development.
(7) The identification, assessment and management of the heritage resources of South Africa must
(a) take account of all relevant cultural values and indigenous knowledge systems;
(b) take account of material or cultural heritage value and involve the least possible alteration or loss of it;
(c) promote the use and enjoyment of and access to heritage resources, in a way consistent with their cultural significance and conservation needs;
(d) contribute to social and economic development;
(e) safeguard the options of present and future generations; and
(f) be fully researched, documented and recorded.

Burial grounds and graves

36. (1) Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit.
(2) SAHRA must identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with the grave referred to in subsection (1), and must maintain such memorials.
(3) (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority
(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.
(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.

(5) SAHRA or a provincial heritage resources authority may not issue a permit for any activity under subsection (3)(b) unless it is satisfied that the applicant has, in accordance with regulations made by the responsible heritage resources authority

(a) made a concerted effort to contact and consult communities and individuals who by tradition have an interest in such grave or burial ground; and

(b) reached agreements with such communities and individuals regarding the future of such grave or burial ground.

(6) Subject to the provision of any other law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority

(a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and

(b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangements as it deems fit.

(7) (a) SAHRA must, over a period of five years from the commencement of this Act, submit to the Minister for his or her approval lists of graves and burial grounds of persons connected with the liberation struggle and who died in exile or as a result of the action of State security forces or agents provocateur and which, after a process of public consultation, it believes should be included among those protected under this section.

(b) The Minister must publish such lists as he or she approves in the Gazette.

(8) Subject to section 56 (2), SAHRA has the power, with respect to the graves of victims of conflict outside the Republic, to perform any function of a provincial heritage resources authority in terms of this section.

(9) SAHRA must assist other State Departments in identifying graves in a foreign country of victims of conflict connected with the liberation struggle and, following negotiations with the next of kin, or relevant authorities, it may re-inter the remains of that person in a prominent place in the capital of the Republic.

General policy

47. (1) SAHRA and a provincial heritage resources authority

(a) must, within three years after the commencement of this Act, adopt statements of general policy for the

management of all heritage resources owned or controlled by it or vested in it; and

(b) may from time to time amend such statements so that they are adapted to changing circumstances or in accordance with increased knowledge; and

(c) must review any such statement within 10 years after its adoption.

(2) Each heritage resources authority must adopt for any place which is protected in terms of this Act and is owned or controlled by it or vested in it, a plan for the management of such place in accordance with the best environmental, heritage conservation, scientific and educational principles that can reasonably be applied taking into account the location, size and nature of the place and the resources of the authority concerned, and may from time to time review any such plan.

(3) A conservation management plan may at the discretion of the heritage resources authority concerned and for a period not exceeding 10 years, be operated either solely by the heritage resources authority or in conjunction with an environmental or tourism authority or under contractual arrangements, on such terms and conditions as the heritage resources authority may determine.

(4) Regulations by the heritage resources authority concerned must provide for a process whereby, prior to the adoption or amendment of any statement of general policy or any conservation management plan, the public and interested organisations are notified of the availability of a draft statement or plan for inspection, and comment is invited and considered by the heritage resources authority concerned.

(5) A heritage resources authority may not act in any manner inconsistent with any statement of general policy or conservation management plan.

(6) All current statements of general policy and conservation management plans adopted by a heritage resources authority must be available for public inspection on request.