

**PHASE 1 HIA/ARCHAEOLOGICAL IMPACT
ASSESSMENT FOR THE PROPOSED
UPGRADING OF TRANSNET SISHEN AND
VLERMUISLAAGTE LOOPS IN THE
NORTHERN CAPE PROVINCE.**

T Mlilo

DOCUMENT SYNOPSIS (EXECUTIVE SUMMARY)

Item	Description
Proposed development and location	Proposed upgrading of the Transnet Sishen and Vlermuislaagte Loops in the Northern Cape Province.
Purpose of the study	The Phase 1 Heritage and Archaeological Impact Assessment for the Proposed upgrading of the Transnet Sishen and Vlermuislaagte Loops in Northern Cape Province
1:50 000 Topographic Map	See Figure 1
Coordinates	See Figure 3
Municipalities	Gamagara Local Municipality, John Taolo Gaetsewe District Municipality
Predominant land use of surrounding area	Railway line, mining, powerlines and associated infrastructure
Applicant	Transnet SOC Ltd Operating Division: TFR 150 Commissioner Street Johannesburg Email : Sibongile.Sibisi@transnet.net Attention : Sibongile Sibisi
EAP	Remofilwe 2010 Trading (Pty) Ltd
Heritage Practitioner	Integrated Specialist Services (Pty) Ltd Cell: 071 685 9247 Email: trust@issolutions.co.za
Authors	Trust Mlilo
Date of Report	10 February 2023

This heritage report serves to inform and guide the applicant (Transnet SOC Limited) and contractors about the possible impacts that the proposed Sishen and Vlermuislaagte Loops may have on heritage resources (if any) located in the study area. In the same light, the report must also inform South African heritage authorities (SAHRA) about the presence, absence and significance of heritage resources located within the proposed project area. This report is submitted in terms of Section 38 (8) of the National Heritage Resources Act 25 of 1999 as part of the proposed project's environmental authorisation process. The purpose of this study is to identify, record and if necessary, salvage the irreplaceable heritage resources that may be impacted upon by the proposed development activities. In compliance with these laws, Integrated Specialist Services (Pty) Ltd was appointed on behalf of Transnet SOC Limited by Remofilwe 2010 Trading (Pty) Ltd, to conduct a Phase 1 Archaeological and Heritage Impact Assessment (AIA/HIA) for the proposed upgrading of the Sishen and Vlermuislaagte Loops in the Northern Cape.

Desktop studies, drive-throughs and fieldwalking were conducted in order to identify heritage landmarks within the proposed project sites. The study site is not on pristine ground, having seen significant transformations owing to previous and current land use activities. The general project area is known for occurrence of archaeological and historical sites. In terms of the built environment the study noted that the buildings and railway infrastructures are younger than 60 years old and do not require Section 34 of the NHRA protection. It should be noted that archaeological material and unmarked graves may exist and when encountered during construction (even though unlikely in this instance), 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 be submitted to the SAHRA for review in terms of Section 38 (4) of the NHRA.

The report makes the following observations:

- The findings of this report have been informed by desktop data review, field survey and impact assessment reporting which include recommendations to guide heritage authorities in making decisions with regards to the proposed project.
- All sections of the proposed project sites are accessible; the field survey was effective enough to cover significant sections of the project receiving environments.
- The immediate project area is predominantly railway infrastructures and livestock farms.
- Some sections of the proposed project sites are severely degraded from previous and current land use activities.

The report sets out the potential impacts of the proposed project on heritage matters and recommends appropriate safeguard and mitigation measures that are designed to reduce the impacts where appropriate. The Report makes the following recommendations:

1. It is recommended that SAHRA endorse the report as having satisfied the requirements of Section 38 (8) of the NHRA requirements.
2. It is recommended that SAHRA make a decision in terms of Section 38 (4) of the NHRA to approve the proposed project on condition that no confirmable archaeological and heritage sites were recorded within the proposed development sites.
3. From a heritage perspective supported by the findings of this study, the proposed development is supported. However, the proposed development should be approved under observation that construction does not extend beyond the area considered in this report (100m corridor).
4. Should chance archaeological materials or human remains be exposed during construction on any section of the site, 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 NHRA regulations.
5. 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 upgrading of Sishen and Vlermuislaagte loops as planned with special commendations to implement the recommendations herein made.

This report concludes that the impacts of the proposed development on the cultural environmental values are not likely to be significant on the entire site if the EMP includes recommended safeguard and mitigation measures identified in this report.

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 as amended.

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, PhD *cand* (Wits), MA. (Archaeology), BA Hons, PDGE and BA & (Univ. of Pretoria) ASAPA (Professional 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 and Rhino Minerals etc.

Independence

The views expressed in this document are the objective, independent views of Mr Trust Mlilo and the survey was carried out under Integrated Specialist Services (Pty) Ltd. The company has no business, personal, financial or other interest in the proposed project 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 Integrated Specialist Services (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).


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 approval of the proposed upgrading of the Sishen and Vlermuislaagte loops proposed by Transnet SOC Limited.

Signed by



10/ 02/ 2023

ACKNOWLEDGEMENTS

The author acknowledges Transnet SOC Limited for their assistance with the project details, fieldwork and responding to technical queries related to the project.

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ABBREVIATIONS

AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
EIA	Environmental Impact Assessment
EIA	Early Iron Age (<i>EIA refers to both Environmental Impact Assessment and the Early Iron Age but in both cases the acronym is internationally accepted.</i>)
EIAR	Environmental Impact Assessment Report
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
ICOMOS	International Council of Monuments and Sites
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

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 exposed during construction activities, such activities should be halted immediately, and a competent heritage practitioner and 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. Integrated Specialist Services (Pty) Ltd assumes no responsibility for compliance with conditions that may be required by SAHRA in terms of this report.

1 INTRODUCTION

Integrated Specialist Services (Pty) Ltd was appointed on behalf of Transnet SOC Limited by Remofilwe 2010 Trading (Pty) Ltd, to carry out a Phase 1 AIA/ HIA for the proposed Upgrading of Sishen and Vlermuislaagte loops in the Northern Cape Province. This study was conducted to fulfil the requirements of Section 38 (8) of the NHRA. The purpose of this heritage study is to identify, assess any heritage resources that may be located within the proposed project sites 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 revealed that the general project area is rich in Late Stone Age (LSA) and historical sites. It should be noted that while heritage resources may have been located in the entire study area, subsequent railway line developments, previous agriculture, settlements, road and boundary fence lines have either obliterated these materials or reduced them to isolated finds that can only be identifiable as chance finds during construction. The proposed development may be approved subject to adopting recommendations and mitigation measures proposed in this report. Based on the findings there is no archaeological and heritage reasons why the proposed development cannot be approved, taking full cognizance of clear procedures to follow in the event of chance findings.

1.1 Terms of Reference (ToR)

The Integrated Specialist Services (Pty) Ltd was requested by Transnet SOC Limited 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 SAHRA to make an informed decision in respect of authorisation of the Upgrading of Sishen and Vlermuislaagte Loops
- Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located within the project 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 construction on these cultural remains, according to a standard set of conventions;
- Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources; and
- Review applicable legislative requirements.

1.2 Project Location

The site is located at Sishen and Vlermuislaagte near Kathu in the Northern Cape Province.

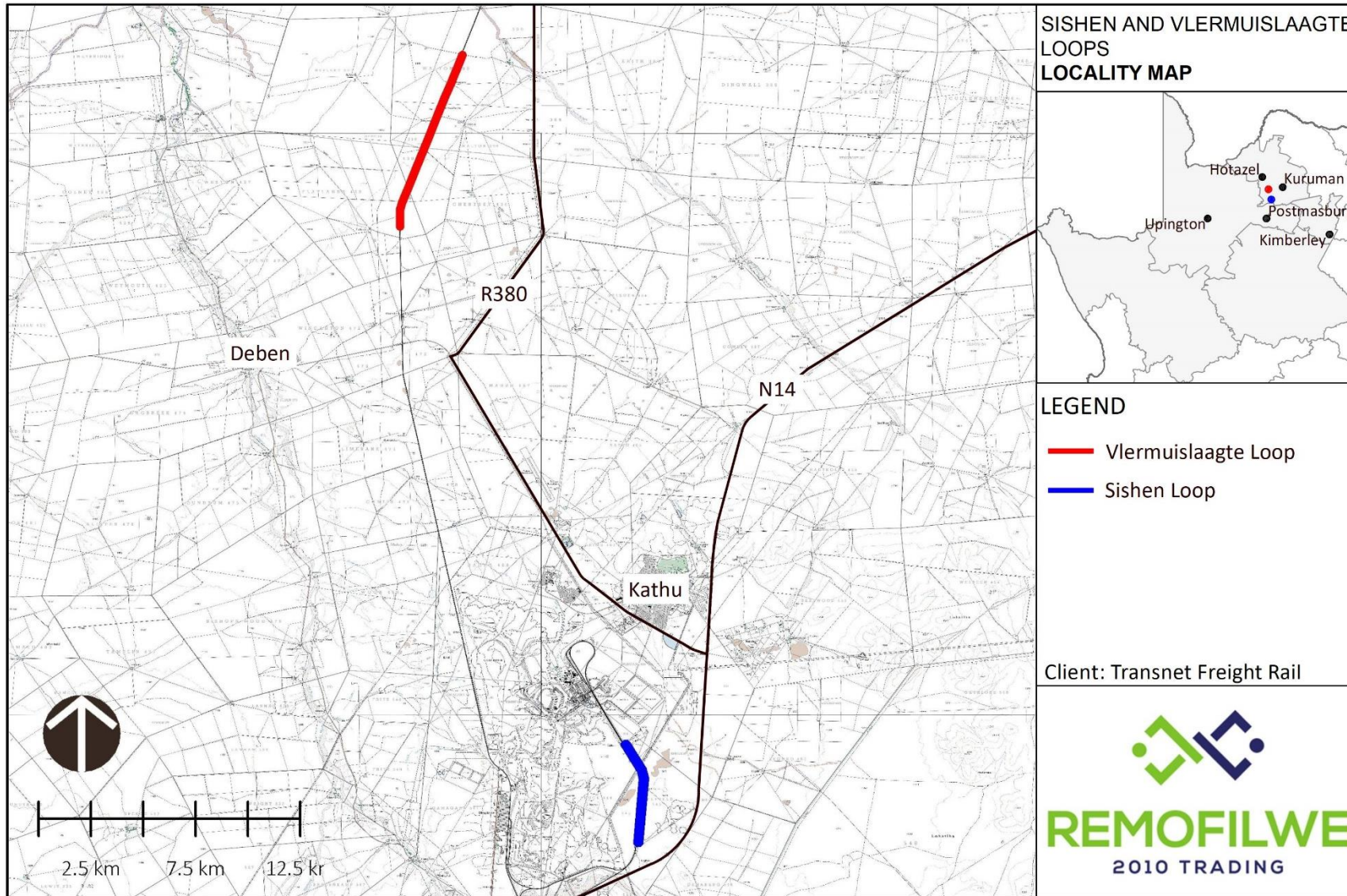


Figure 1: Locality map for the Sishen and Vlermuislaagte Loops

1.3 Project Description

Currently Transnet is implementing solutions for the Manganese expansion program with respect to exporting manganese on the Saldanha corridor. The current scope of the project will present the expansion program with options to optimally utilize the rail capacities en-route to Sishen and to provide appropriate and cost-effective means of expanding those capacities to meet the validated tonnage demand. The proposed solution is to provide additional staging lines in Sishen and provide additional facilities for Vlermuislaagte. The main construction activities will include but not limited to the following:

Sishen Scope:

- Staging line and loop upgrades are approximately 5km in length
- Relocation of Eskom pylons
- Bridge alterations to ensure space/clearances underneath
- Lines to be electrified to 50 kV AC
- Relocation of power lines (132kV)
- Relocation of service roads
- Culverts extensions
- Demolish and relocate retaining wall running parallel to the rail track
- Drainage for additional lines
- Relocation of overhead aerial feeder and return conductors
- Relocation of optic fibre cables if on the impacted structures
- Two (2) lines to be added on the eastern side of the yard as per option 4, which will accommodate three rakes of 116 CR13/14 wagon for iron ore trains and three rakes of 125 CR17 wagon for Manganese trains. These rakes will be pulled by a combination of 15E and 43D locomotives.
- One (1) line to be added on the locomotive staging area.
- 4m wide gravel access road.

Vlermuislaagte Scope:

- The staging line and loops upgrades are approximately 8km in length
- Two (2) arrival lines/Crossing loops for 125 wagon trains (1500m) to accommodate manganese traffic.
- Two (2) additional loops for Staging trains
- Shunting neck to accommodate 125 Wagons
- Track Slab or inspection slab

- Five (5) Not to go shunting spurs – non electrified (each to accommodate Six (6) Wagons) to be used to uncouple Skew/Overloaded wagons and rectified on site.
- Additional inspection road.
- One (1) covered parking with four (4) bays
- Hot box Detector, Vehicle identification system (signaling)
- One (1) level crossing will be relocated and another level crossing will be upgraded at Vlermuislaagte.
- All level crossings will allow for cattle grids as well.
- The site will have a 6m wide surfaced road along its length on the east of the yard and access is proposed from either Mamathwane Yard or from the R380.
- The servitude will be increased by approximately 80m.
- Lines to be electrified to 3 kV DC
- Relay rooms will be provided for signaling works. Color signals to be integrated the CTC's CS90 train authorization system.
- The turnouts shall be 1:20 or 1:12
- Catch points must be added to the first loop to protect the mainline
- 1:12 Runaway sets to be installed to protect loop 1 and 2

Table 1: Coordinates for the staging lines and loops

Staging Line	Start	Middle	End
Sishen	27°48'17.90"S 23° 2'29.03"E	27°46'37.88"S 23° 2'38.55"E	27°45'43.75"S 23° 2'9.62"E
Vlermuislaagte	27°32'22.63"S 22°56'23.11"E	27°30'12.89"S 22°57'3.44"E	27°28'0.63"S 22°57'57.28"E

2 LEGISLATIVE CONTEXT

Three main pieces of legislations are relevant to the present study. The proposed Upgrading of Sishen and Vlermuislaagte Loops is submitted in terms of the National Environmental Management Act, 1998 (NEMA) and the EIA Regulations for activities. Therefore, this is in fulfilment of the assessment of the impact to heritage resources as required by section 24(4)(b)(iii) of NEMA and section 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA). An AIA or HIA is required as a specialist sub-section of the Environmental Authorisation process. This study was conducted in terms of Section 38(8) as part of environmental authorisation process.

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 same act also requires the submission of a heritage impact assessment report for authorization purposes to the responsible heritage resources agencies (SAHRA/PHRAs). Because the proposed development is a linear development longer than 300m, a HIA is required according to this section of the Act.

Related to Section 38 of the NHRA are Sections 34, 35, 36 and 37. Section 34 stipulates that no person may alter damage, destroy and relocate any building or structure older than 60 years, without a permit issued by SAHRA or a provincial heritage resources authority. This section does not apply to present study since none were identified. 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 during construction. This means that any chance find must be reported to the heritage practitioner or SAHRA/PHRA, who will assist in investigating the extent and significance of the finds and inform the applicant 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 South African Heritage Resources Agency (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 unlikely discovery of burials or graves by the applicant or his contractors. Section 37 of the NHRA deals with public monuments and memorials but this may not apply to this study because no protected monument will be physically affected by the proposed development.

In addition, the EIA Regulations of 2014 (as amended) promulgated in terms of NEMA (Act 107 of 1998) stated that environmental assessment 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 applicant Transnet SOC Limited, SAHRA/ PHRA and interested and affected parties about existing heritage resources that may be affected by the proposed project, and to recommend mitigatory measures aimed at reducing the risks of any adverse impacts on these heritage resources.

Table 2: Evaluation of the proposed development as guided by the criteria in NHRA and NEMA

ACT	Stipulation for developments	Requirement details
NHRA Section 38(8)	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 same act also requires the submission of a heritage impact assessment report for authorization purposes to the responsible heritage resources agencies (SAHRA/PHRAs). Because the proposed development is a linear development longer than 300m, a HIA is required according to this section of the Act.	Yes
NHRA Section 34	Impacts on buildings and structures older than 60 years	None
NHRA Section 35	Impacts on archaeological and palaeontological heritage resources	None
NHRA Section 36	Impacts on graves	None
NHRA Section 37	Impacts on public monuments	None
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	No

3 METHODOLOGY

This document aims at providing an informed heritage-related opinion about the proposed Upgrading of Sishen and Vlermuislaagte Loops in Northern Cape Province. This is achieved through a combination of a review of any existing literature and a site inspection. As part of the desktop study, published literature and cartographic data, as well as archival data on heritage legislation, the history and archaeology of the area were studied. The desktop study was followed by field surveys. The field assessment was conducted according to generally accepted AIA/HIA practices and aimed at locating all possible objects, sites, and features of cultural significance on the construction footprint. Initially a drive-through was undertaken around the proposed development site as a way of acquiring the archaeological impression of the general area. This was then followed by a walk down survey in the study area, with a handheld Global Positioning System (GPS) for recording the location/position of each possible site. Detailed photographic recording was also undertaken where relevant. The findings were then analysed in view of the proposed Upgrading of Sishen and Vlermuislaagte Loops in order to make recommendations to the competent authority. The result of this investigation is a report indicating the presence/absence of heritage resources and how to manage them in the context of the proposed Upgrading of Sishen and Vlermuislaagte Loops.

3.1 The Fieldwork survey

The fieldwork survey was undertaken on 30th of November 2022. The focus of the survey involved a pedestrian survey which was conducted within the proposed development site. The pedestrian survey focused 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 than the surrounding grass veld; the presence of exotic trees; evidence for building rubble, existing buildings and ecological indicators such as invader weeds.

3.2 Visibility and Constraints

All sections of the proposed projects sites were accessible. It is conceded that due to the subterranean nature of cultural remains this report should not be construed as a record of all archaeological and historic sites in the area.

3.3 Consultations

The Public Participation process is conducted by the EAP. The BA Public Participation Process will also invite and address comments from the public and any registered heritage bodies on any matter related to the proposed Upgrading of Sishen and Vlermuislaagte Loops including heritage concerns that may arise relating to the construction activities.

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

Photographic presentation of the Sishen Loop



Plate 1: showing some infrastructure within the proposed development site



Plate 2: showing altered nature of the proposed development site

PHASE 1 HIA/ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED UPGRADING OF TRANSNET SISHEN AND VLERMUISLAAGTE LOOPS IN THE NORTHERN CAPE PROVINCE.



Plate 3: showing existing access roads within the proposed development site



Plate 4: showing proposed development site

PHASE 1 HIA/ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED UPGRADING OF TRANSNET SISHEN AND VLERMUISLAAGTE LOOPS IN THE NORTHERN CAPE PROVINCE.



Plate 5: showing proposed development site.



Plate 6: showing the proposed development site.

PHASE 1 HIA/ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED UPGRADING OF TRANSNET SISHEN AND VLERMUISLAAGTE LOOPS IN THE NORTHERN CAPE PROVINCE.



Plate 7: showing degraded sections of the proposed proposed development site.



Plate 8: showing structures dotted within the proposed development site.



Plate 9: showing the proposed development site.



Plate 10: showing the proposed development site

PHOTOGRAPHIC PRESENTATION OF THE VERMUSLAAGTE LOOP



Plate 11: showing the proposed development site



Plate 12: showing the proposed development site



Plate 13: showing degraded sections of the proposed development site.



Plate 14: showing degraded sections of the proposed site.



Plate 15: showing degraded sections of the proposed site.



Plate 16: showing degraded sections of the proposed site.



Plate 17: showing degraded sections of the proposed site.



Plate 18: showing degraded sections of the proposed site.



Plate 19: showing degraded sections of the proposed site.



Plate 20: showing degraded sections of the proposed site.



Plate 21: showing degraded sections of the proposed site.



Plate 22: showing degraded sections of the proposed site.



Plate 23: showing degraded sections of the proposed site.

4 REGIONAL ARCHAEOLOGICAL CONTEXT

The Northern Cape Province is rich in archaeological heritage, mostly dominated by Stone Age occurrences. Numerous sites, bearing Earlier, Middle and Later Stone Age habitation occur across the province, mostly in open air locales or in sediments alongside rivers or pans. In addition, a wealth of Later Stone Age rock art sites, most of which are in the form of rock engravings are found in the region. These LSA sites occur on hilltops, slopes, rock outcrops and occasionally in riverbeds. Sites dating to the Iron Age occur in the northeastern part of the province, but environmental factors delegated that the spread of Iron Age farming westwards. However, evidence of an Iron Age presence as far as the Upington area in the eighteenth century occurs in this area. The Northern Cape also boast of colonial and mining heritage moving into recent times, the archaeological record reflects the development of a rich colonial influence, characterised by mostly isolated farmsteads, missionary establishments (Kuruman Mission) and mining developments and other smaller towns.

The study area was previously used for livestock and game farming as well as manganese and iron ore mining. The previous manganese and iron ore mining left a trail of open trenches, pits, derelict mine houses and access roads. The previous mining activities also left a scatter of mine dumps and abandoned mining equipment. The previous mining of manganese and iron ore destroyed both cultural and natural heritage resources in the area. Although vegetation has recovered in some sections of the mining area, it was established that the entire landscape was severely altered.

Stone Age Archaeology

In the Northern Cape ESA assemblages, including the Fauresmith, tend to occur as lag deposits on the margins of seasonal rivers, semi-permanent water holes or pans. Such assemblages commonly represent the accumulated remains of numerous reoccupations over possibly many thousands of years. In this region stone tools often occur within calcrete zones underlying the modern surface of unstratified red aeolian sands (Deacon 1988:643-647; Mason 1988:626-30). Previous research in the project area confirmed localised occurrences of low-density Stone Age scatters along the exposed calcrete areas in dry riverbeds (PGS Heritage Unit:2009).

Stone Age archaeology is prevalent in the larger geographical area, especially to the northwest of the study area but generally, elsewhere the Hotazel and Santoy area does not seem to have attracted much of habitation, save for the two Late Stone Age rock shelters that occur north and south of GaMohaans hills and sites along the Gamogara ancient riverbed. Perhaps the lack of large rock-shelters, the domination of exposed environments and the lack of preferred stone raw materials for tools, dissuaded early man (ESA ~ 2.6 million to 250 000 years ago) from occupying this part of the area. Further to the southwest and southeast of this area, the ESA is very well represented at sites such as Kathu Pan 1, Kathu Townlands, Bestwood 1 (Wilkins and Chazan 2012; Chazan *et al.* 2012; Walker *et al.* 2014) and Wonderwerk Cave (Thackeray *et al.* 1981). All of the above sites produced well-made Acheulean

hand axes and cleavers, as well as Fauresmith lithic materials that are transitional between the Acheulean (ESA) and the MSA.

The ESA is generally associated with the earlier Oldowan industry (marked by crude choppers and other unifacial core tools), followed by the still large but better fashioned hand axes and cleavers of the Acheulean techno-complex (Deacon and Deacon 1999). The Fauresmith Industry is characterized by a prepared core technology that produced both blades and points, making it transitional between the ESA and the MSA (~ 250 000 to 40-25 000 years ago) (Porat *et al.* 2010; Wilkins and Chazan 2012; Walter *et al.* 2014). Until recently, the Fauresmith Industry was poorly defined, being mostly identified based on the co-occurrence of Levallois points and hand axes (Beaumont and Vogel 2006: 224), and prepared cores, blades, and 'side-scrapers on flakes' (Beaumont 1990:79).

The MSA is better understood as a flake-technological stage characterized by faceted platforms, produced from prepared cores, as distinct from the core tool-based ESA technology (Barham and Mitchell 2008). In the area under study, MSA material mostly occur on the same sites with ESA material, suggesting longer sequences of occupation that have allowed researchers to probe into the behavioural changes that influenced these technological developments (Porat *et al.* 2010; Walker *et al.* 2014). Thus, characteristic MSA have been reported at sites such as Kathu Pan 1 (Wilkins and Chazan 2012), Wonderwerk Cave (Beaumont and Vogel 2006), but they also have been reported in isolated clusters (van Vollenhoven and Pelsler 2012). At Wonderwerk Cave, the MSA component was associated with pieces of haematite and several incised stone slabs, most with curved parallel lines that add to the behavioural shifts that went beyond stone tools and ushered in the appreciation of art (Beaumont and Vogel 2006).

More technological and behavioural changes than those witnessed in the MSA, occurred during the LSA (~ 40-25 000, to recently, 100 years ago), which is also associated with *Homo Sapiens* (Barham and Mitchell 2008). For the first time there is evidence of people's activities derived from material other than stone tools (ostrich eggshell beads, ground bone arrowheads, small, bored stones and wood fragments) (Deacon and Deacon 1999). The LSA people are also credited with the production of rock art (engravings and paintings), which is an expression of their complex social and spiritual beliefs (Parkington *et al.* 2008). In the area north of the study area, the two LSA rock shelters to the south and the north of GaMohaana Hill are the only known archaeological remains that are closer to the study area (van der Walt 2013). Not much is known about these rock shelters, save for the fact that they have LSA material that include rock paintings (Morris 2010; van der Walt 2013: 18).

In terms of characterization, the lithic succession at Wonderwerk Cave serves as a benchmark for the Stone Age sequence of the Northern Cape (Beaumont and Vogel 2006; Kusel *et al.* 2009). The sequence comprises an uppermost LSA sequence that contains Ceramic LSA, Wilton and Oakhurst industries. Some researchers have named the earlier LSA industry of the region as the Oakhurst industry (some have labelled this local variant the

Kuruman), characterized by rare, retouched artefacts, most of which are large scrapers that are oblong with retouch on the side. However, it is not necessary to belabour the descriptions of these industries, especially because no LSA remains were recovered on the proposed development footprint. All the same, variants of the LSA industries were located at other sites such as Kathu Pan 1 (Porat *et al.* 2013) have been reported. At this site, ostrich eggshell fragments, beads and lithic artifacts attributed to Wilton and Albany industries were found.

The most notable site near the study area is the Kathu Pan site (approximately 12 km away from the Sishen loop and 16km away from the Vlermuislage loop). Kathu Pan archaeological site is located about 5km west of the town of Kathu, along the R380 road to Dibeng and Hotazel. The site is located on the boundaries of the farms Marsh 467, Sacha 468, Kathu 465 and Sims 462 come together here. According to Beaumont (1990), the pan covers about 30ha. There is an ancient drainage channel made by the floodwater overflow. Test boreholes reveal a 40m combination of calcrete, sand, clays and gravel layers, below the unstable peaty top sediments.

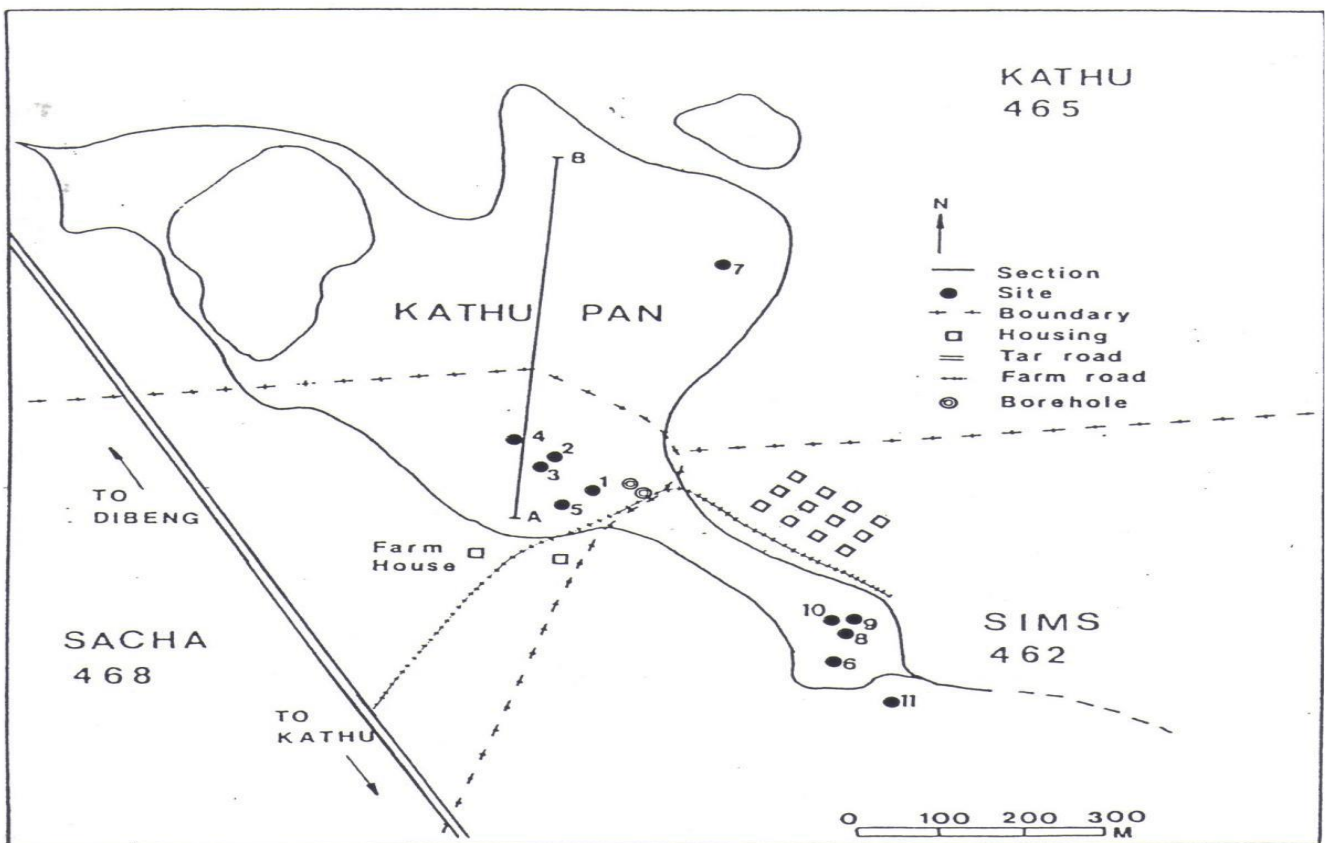


Figure 2: The location of the sites as indicated by Beaumont (1990, 2006).

The first archaeologist to conduct work on the Kathu Pan sites was A.J B. Humphreys on 13 August 1975. Subsequently, P.B. Beaumont conducted extensive studies in the vicinity. During this year several researchers visited the site. Excavations by Peter Beaumont and others produced amongst other finds, portions of clay vessels, ostrich eggshell fragments, Middle Stone Age artefacts, prepared cores, long lithic blades, retouched points and

material classified as Fauresmith artefacts. Further finds include coarse Acheulean hand axes and a variety of scrapers. The flakes represent the banded ironstone material found in the area. Grass pollen, indicating prehistoric vegetation, had been recovered. The investigations at Kathu Pan also produced the remains of large mammals, such as elephant, zebra, rhino, hippo, buffalo, and giraffe, together with a variety of antelope and buck (Beaumont 1990).

Several developments such as the Khai-Appel Recreation Resort, the Sishen Airport, the Kumba Village and the Mitton Transport Yard surround the Kathu Pan archaeological site. From earlier archaeological investigations at Kathu, researchers are aware that stone hand axes and pointed flakes of exceptional technological skills dating from the later phase of the Early Stone Age occur in the red sand deposits of the area. The distribution of these artefacts could be fairly general and widespread in the surroundings of Kathu (Beaumont 1990, 2007; Dreyer 2006, 2008, 2010). While exciting finds were made in the red sand deposits with significant stands of *Erioloba* trees around Kathu, it appears that the geology has changed rapidly in places where the deep red sand deposits transform into hills, which produce rich iron ore accumulations (Dreyer 2010).

The Kathu Pan site has been described by Klein (1984) as the best paleoenvironmental sequence from the Kalahari Basin area. It is a broad surface of organic marshland that is located in the centre of four farms (Marsh 467, Sacha 468, Kathu 465 and Sims 462), 15 km north of Sishen. The scientific value of the Kathu Pan area cannot be underestimated, and the finds also made a significant impact on the popular understanding of the Early Stone Age (Walker, Chazan & Morris 2013). The declaration of Kathu Archaeological Complex as a National Heritage Site, consisting of Kathu Pan, Kathu Cemetery Sites, Kathu Town lands and the Bestwood Site, is pending.



Figure 3: Three hand axes recovered from the Kathu Pan sites (Walker et. Al. 2013:15)

A buffer zone has not yet been established around the Kathu Pan sites. According to Walker *et al* (2013) a considerable amount of fieldwork still needs to be undertaken to clarify the extent of the deposit. They noted that while the sink holes have offered windows into the deposits around the pan, and some excavations around the 1980s have offered clues to the deposits outside the sink holes, the overall extent of what the Kathu Pan sites have to offer is unknown. The Kathu Pan is an exceptionally significant landscape, one of the reasons being that the archaeological deposits contain both ESA artefacts and associated fauna in near primary context (Walker et al 2013). This is unusual as only seven southern African sites contain ESA artefacts and bones in primary context (Cave of Hearths, Wonderwerk, Pomongwe, and the open-air sites of Elandsfontain, Mwanganda, Namib IV and Kathu Pan) (Volman, 1984). The second reason for the high significance of Kathu Pan is that it also includes stratified deposits from the MSA. Walker et al point out that most MSA sites are along the coast and in caves or shelters, whereas there are MSA deposits in an open-air setting in the interior at Kathu.

In conclusion, the Kathu Pan sites are of considerable significance due to the unique geology and formation of the dolines, which could be considered as windows into the past. Kathu Pan Site 1 contains a near perfect stratigraphy

of the ESA, MSA and LSA that provides the best paleo-environmental sequence from this area as well as a useful guide to archaeological events.

Iron Age Archaeology

Agriculturalist communities entered southern Africa from West and East Africa around AD 200 and brought with them settled agriculture, metal working, animal husbandry, pottery making and social stratification (Huffman 2007). The view that all of these activities were introduced to southern Africa by these agriculturalists communities is still contested. The movement and spread of these EIA (~ AD200-1000) people within southern Africa seem to have been restricted to the summer rainfall (because of sorghum and millet farming) and they did not occupy much of the central interior Highveld area in South Africa. This perhaps explains the paucity of EIA sites in the study area. Ecologically, EIA preferred to settle on the alluvial soils near rivers for agricultural purposes and access to water. It was not until the mid-second millennium AD that serious Iron Age occupation began in the larger geographical area (excluding the study area) of this part of the Northern Cape.

The study area falls known within the fringes of the distribution of LIA (~ AD1100-1840) people who made Olifantspoort Facies (ancestral Sotho-Tswana speakers) dated between AD1500 and AD1700 (Huffman 2007: 191). Olifantspoort Facies represents the second phase of the Moloko sequence and settlements with people that made this type of ceramics are distributed in the area to the northeast of the study area, between the Vaal River and Pretoria. The people, just like the markers of Thabeng facies (third phase of the Moloko sequence AD1700-1840), settled in aggregated clusters where space was also demarcated by extensive stone walling. The extensive walled settlements around Kuruman are historically associated with the Tswana people such as the Rolong, Tlharo and Thlaping (De Jong 2010; Pelsler 2012; Fourie 2013). Typologically, this type of walling is called Type Z, which is prevalent in the Free State and mark the most southerly expansion of Sotho-Tswana speakers, up to the edge of a viable farming environment (Nkhasi 2008). Type Z settlement units have large compact central primary enclosures, "usually from three to eight in number and often so close as to be touching" but they also have smaller primary enclosures which may be linked by secondary walling (Maggs, 1976: 40).

The nature of the interaction between the emigrant Tswana groups and Khoesan people who were already in this area is complex but there are indications of acculturation (Breutz 1981) and intensive trading (Goodwin 1956). Some of the activities that formed the locus for trade and interaction between the Tswanas and the Khoesan groups in this area are specularite mining and ivory hunting. For instance, at sites such Blinkklipkop (about 80km to the south of the study area), a Khoesan specularite mine sites dating to as early as AD800, there is evidence of either trade with or occupation of the mine by the Thlaping peoples around 1801 (Thackeray *et al.* 1983). Specularite was used for non-metallurgical purposes such as pottery decoration and bodily adornment (Hall 1985), and was a prized trade commodity, together with ivory and other items during the second millennium trade boom in this part of southern Africa. Thus, by the mid-19th century (and probably earlier), the Thlaping people were purchasing glass

beads, iron, copper, tin and bronze wares from other northern Sotho-Tswana groups such as the Kwena and Hurutse and exchanging these items with the Khoesan groups to the southwest (Goodwin, 1956: 256).

Of the Tswana groups around the present study area, the Thlaping might be of interest because of their connections with the site of Dithakong near Kuruman (De Jong 2010: 35-36; Pelser 2012). This site, which at one point was a Thlaping capital, appears to be the only area in which there is direct archaeological evidence for settlement in the form of stone walling (Maggs 1972; Magoma 2013: 28). Socio-political tensions and permutations necessitated the shifting of most Tswana capital of which Dithakong was no exception. For instance, during the Batlhaping capital was first at Nokaneng around the year 1775, before it was moved to Dithakong on the Mashoweng River, and then at Kuruman in 1801. At around 1806 they returned to Dithakong but settled a short distance from the previous site. In 1812 people were contemplating returning to Nokaneng with an intermediate stop at Kuruman, where they re-established themselves in 1817. Thus in 1820 when Kuruman was the capital and comprised 25 wards, Dithakong was of similar size. Thus, the capital had moved three times in twenty years and suffered one major split which removed about half of its population. The reasons for these movements are not clear. This mobility presents a problem in the interpretation of the archaeological evidence, and it helps to explain why many Iron Age sites have shallow accumulation of waste material (Maggs 1972).

Nonetheless, in the 1920s, the capital of the Batlhaping was permanently moved to Kuruman. All the same, none of these LIA sites were identified in the study area.

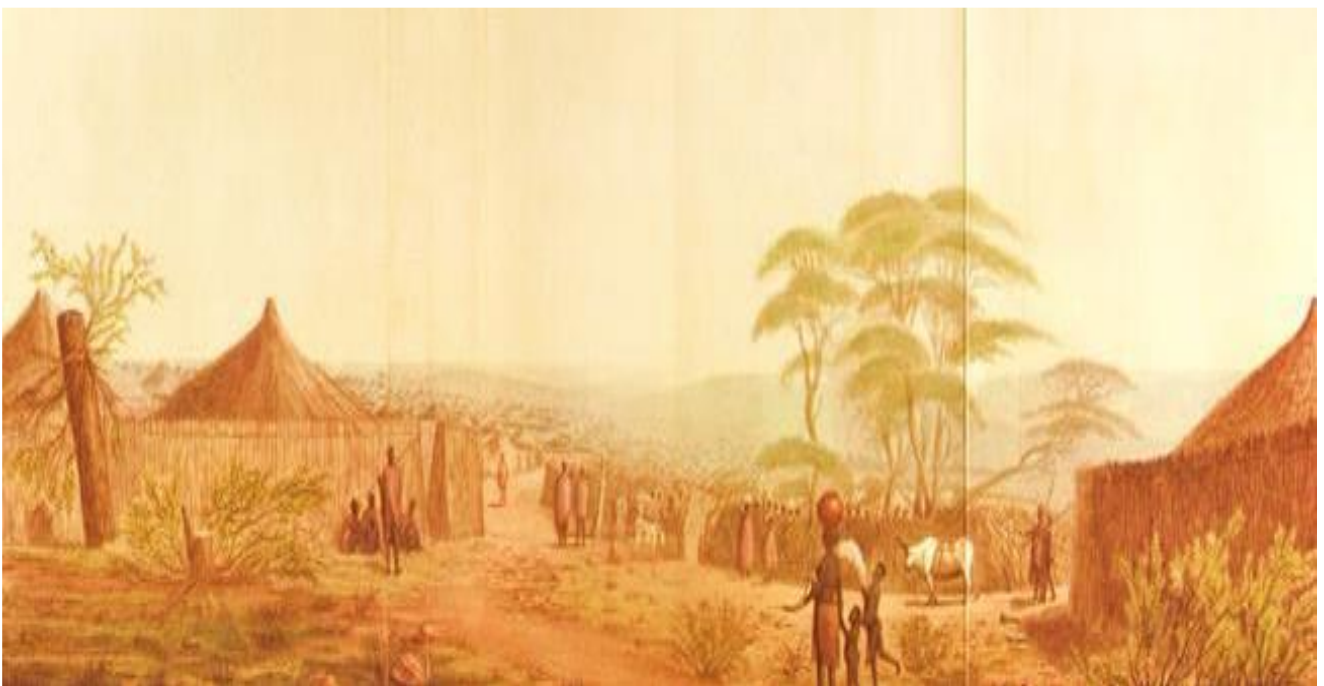


Figure 4: A view in the Town of Litakun' (Dithakong), a southern Tswana town near present-day Kuruman.

An engraved and coloured reproduction of an original drawing made by William Burchell in July 1812 (From Burchell, W.J., 1824, *Travels in the Interior of Southern Africa*. V II, London: Longman, Hurst, Orme, Brown and Green) <http://www.apc.uct.ac.za/news/tuning-obo#sthash.PkrFm3EY.dpuf> (accessed on 30 August 2015).

Contemporary heritage

Southern Africa was networked with the literate world for several centuries, but the period of written history in the study area corresponds to the arrival of white travellers, hunters, missionaries and adventurers from the Cape in the 1800s. Notable amongst them include PJ Truter's, William Somerville, Robert Moffat, Andrew Smith and John Campbell. The first arrivals into the study area may be PJ Truter's and William Somerville who in 1801 reached Dithakong at Kuruman (Pelser 2012). Some of later travellers into this area kept diaries that today form part of invaluable history about indigenous communities whom they travellers interacted with (see Figure 5 and 6). European explorers such as Dr. Hinrich Lichtenstein (in 1805) and Dr. Andrew Smith (in 1835) reached Kuruman and met Tswana-speaking people (Bergh 1999). It should be noted that most of the early African-colonial interaction in this area centred around the nearly two-century old London Mission Society station at Kuruman, established by James Read in 1817 but popularized by Robert Moffat and his wife, three years later. Since the arrival of the Moffats in 1820, the mission has been known as The Moffat Mission Station (Plate 7).

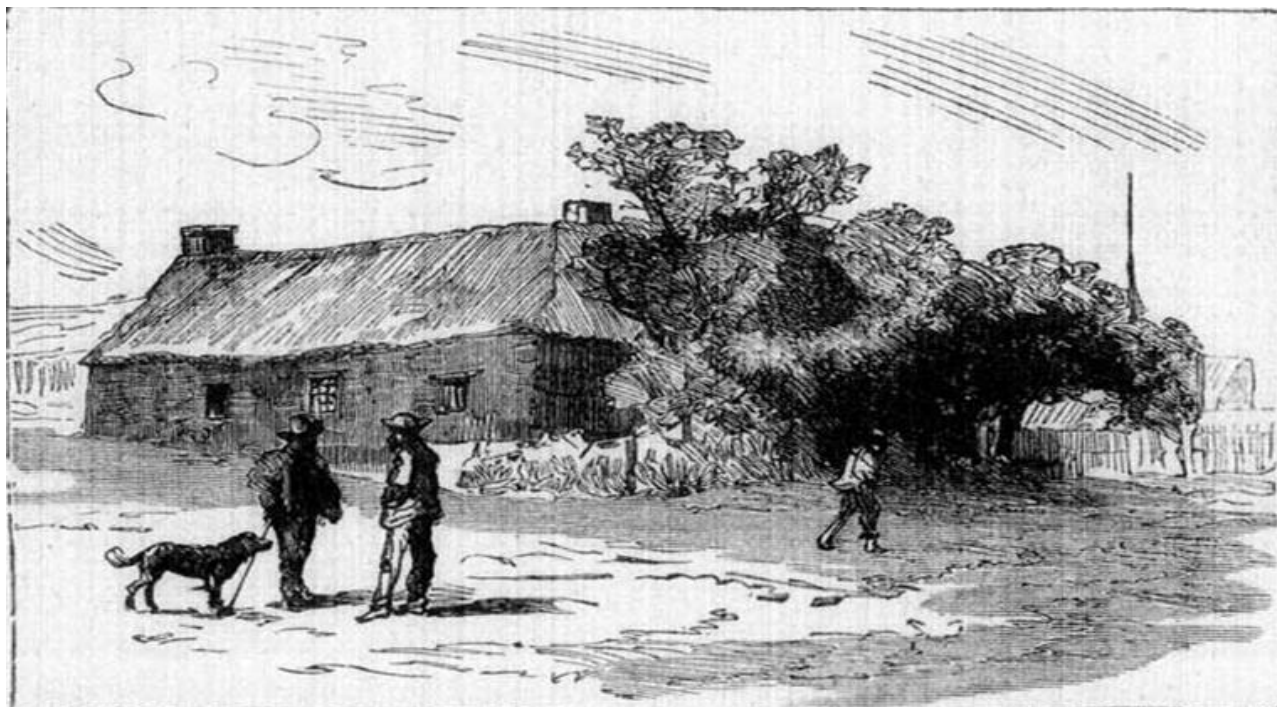


Figure 5::Shows a drawing of the Old Mission House at Lattakoo which is now known as Kuruman (David J. Deane 2005. Robert Moffat: The Missionary Hero of Kuruman. March 16, 2005 [EBook #15379]http://www.gutenberg.org/files/15379/15379-h/15379-h.htm#CHAPTER_IV accessed 30 August 2015.)

Besides the isolated incursions by traders, hunters, and missionaries permanent and mass-movement of white settlers only took root in the late 1800s with the arrival of Dutch speaking farmers (Voortrekkers) who were

protesting and escaping British rule in the Cape Colony (Ross 2002: 39). Yet even this incursion was not permanent as yet because by 1897 most of the white settlers around the Kuruman River had moved away (Fourie 2013). It took the great drought of 1907 and 1908 for many farmers of the then Cape Colony to move into these areas along the edge of the Kalahari Desert in search of better grazing for their cattle (Smit 1966). Nonetheless, significant urban development in this area has been focused around the 'Eye' and the water course springing from it leading to the evolution of the town of Kuruman, from the late nineteenth century (Morris 2010). When in 1885 Britain declared a Protectorate over Bechuanaland and the Kalahari (on 23 March) and then divided the Protectorate was divided into two parts (on 30 September 1885), the area south of the Molopo (including the study area) became the Crown Colony of British Bechuanaland with its capital at Vryburg (Fourie 2013) (Tlou and Campbell 1997). Ten years later this area was included in the Cape Colony accordance to Act 31 of 1895 (Smit 1966) and the Lower Kuruman Native Reserves well as a number of other so-called native reserves were established by virtue of Bechuanaland Proclamation No. 220 of 1895. The study area lies on the fringes of this Lower Kuruman Native Reserve.

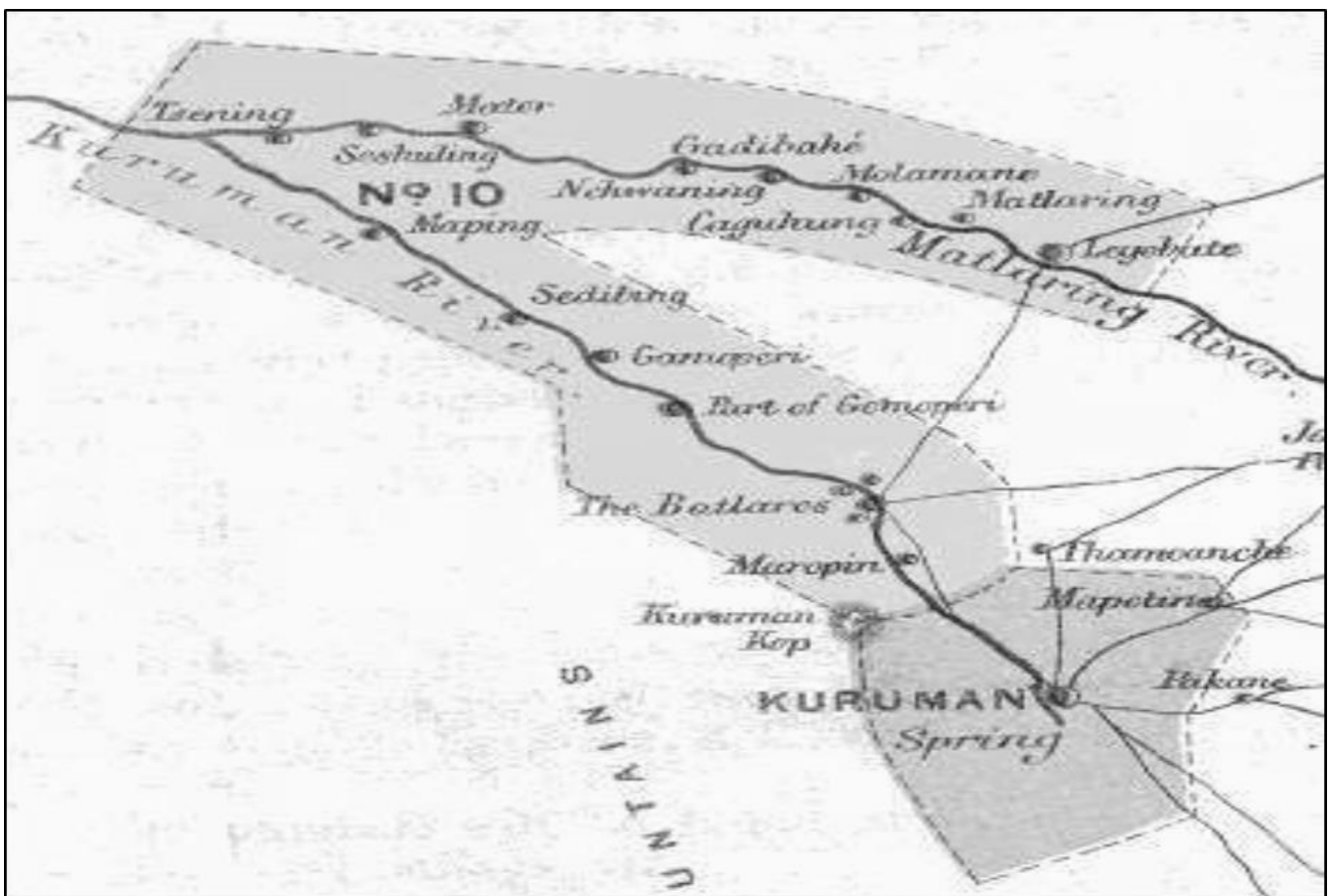


Figure 6: Map showing the original demarcation of the Lower Kuruman Native Reserve (Fourie 2013: 35)

Another impetus for the occupation of the Kuruman area was related to events that were ignited outside the African continent. Thus, when the First World War (1914-1918) broke out, and the South African Union Government joined

the coalition forces and attacked German South West Africa (now Namibia). To sustain the Union troops along the way, a number of boreholes were sunk along the banks of the Kuruman River at places such as Eensaam, Kameelrus, Murray, Springputs and Van Zylsrus (Van der Merwe 1949; Smit 1966;). After the war, even more boreholes were sunk by the Department of Lands as opportunistic white farmers established themselves at these localities as borehole watchmen so that they could be allowed free grazing rights on the surrounding land (Smit 1966). All of this history produced heritage landmarks along the Kuruman River, but it is significant to note that none of these resources are located closer to the area of the proposed development. Parallel to the urban development is the history of manganese mining that the surrounding region is well known for today. Manganese is used in the manufacture of carbon steel and has been mined at such places as Hotazel and Black Rock (Fourie 2013). These mines are however, located out of the current project footprint and **no mining heritage older than 60 years has been located within the proposed development site.**

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 is anticipated on the development footprint because most historical knowledge does not suggest a relationship with the study area per se, even though several other places in the general area such as Old Moffat Mission in Kuruman do have intangible heritage.

SAHRIS Database and Impact assessment reports in the proposed project area

Several archaeological and heritage impact studies were conducted for mining and infrastructure developments in the vicinity of the proposed development site. These studies include studies conducted by Beaumont (2000) and Dreyer (2010) in the broader project area. Therefore, this report must be read together with Beaumont (2000) and Dreyer (2010) reports. Dreyer (2010) noted that evidence of previous mining activities occurs in the entire study area. Dreyer (2010) observed trenches, pits, tracks, mine dumps and infrastructure associated with previous manganese and Iron ore mining in the area. In addition, Dreyer (2010) recorded ruined mine workers houses in the project area. The buildings were made up of concrete brick wall and wooden frames, the current study confirmed that most of the buildings are partially destroyed, some walls have collapsed due to years of neglect and exposure to vibration.

Archaeological research and CRM studies in the general project confirmed that Stone Age tools occur in red sands deposits around the Kathu area (Beaumont 1990, 2000, 2007, Dreyer 2006, 2008, 2010). Although the studies confirmed abundance of ESA remains in Kathu area the Archaeological impact studies conducted by Beaumont (2000) and Dreyer (2010) in the project area did not record any archaeological sites. Desktop studies revealed that

a small Iron Age specularite working on a hill flanking the Gamagara River, on Demaneng 546 was destroyed by previous mining activities. Beaumont (1990, 2007) for Kathu Cemetery, Dreyer (2006) for a development at Bestwood 459 RD yielded hand axes and pointed flakes.

Small McGregor Museum collections from the Farm Lylyveld 545 comprise an Earlier Stone Age sample from along the Gamagara River and Earlier Stone Age plus Iron Age material from around specularite pits on the hills. The sites were destroyed by subsequent Iscor prospecting, as was another small Iron Age specularite working on a hill flanking the Gamagara River, on Demaneng 546. Another small Later Stone Age collection was documented in 1987 on southern Lylyveld 545, from the slopes around a shallow overhang, now mined away, directly south of the N14. Still intact is a low rise with many specularite pits on Mashwening 557, where a test trench in 1989 yielded ceramic Later Stone Age overlying sparse Acheulean, which included a cleaver. These studies also mention pecked engravings on off – white Gamagara Shale located on the Farms Sishen 543 and Bruce 544. In addition, another Acheul quarry of similar extent to the Kathu Towlands Site occurs on the crest of Kathu Hill close to the town of Kathu. However, to extensive mining activities in the area, none of the mentioned sites still survive within the current development site.

Kusel *et al* (2009) Orton (2016 & 2017), Kruger (2015) and Hutten & Hutten (2013) have all identified a mix of ESA and MSA archaeological material along the Ga-Magara River in the Hotazel area west of the current project site. The formal ESA tools include Acheulian hand axes or large cutting tools (LCT's). The MSA flakes and blades are characterised by the faceted striking platforms that indicate the use of prepared cores. Kruger (2015) suggests that the Ga-Magara River would have been an important source of water in this arid environment. The other studies include powerline and substation projects completed by Kaplan, J. (2009), Van der Walt (2013); Fourie, (2013b), Hutten, L. & Hutten, W. (2013) Magoma (2013), Bandama (2015), Mlilo (2016), Kruger (2015a, 2015b), Pelser, A. & van Vollenhoven, A.C. 2011, Pelser (2012), Van Schalkwyk (2010, 2015a, 2015b, 2016), Van Vollenhoven, A.C. (2012) and Webley, L & Halkett (2008). Van Schalkwyk (2010, 2016) examined sites west of Hotazel town and found no cultural resources to be present in either location. Other studies further afield (e.g. Fourie 2013) have found a similar rareness of archaeological material in open, sandy areas. However, along the margins of the Kuruman River and Ga-Mogara River, stone artefacts have been reported (Hutten & Hutten 2013) and (Kusel *et al* 2009). These artefacts are low density and appear to be largely from the Middle Stone Age (MSA), although some may be Later Stone Age (LSA). Nilssen (2018) concludes that several of the heritage studies around Hotazel have commented on the almost total absence of heritage resources. Surveys have revealed that there are large tracts of land where virtually no archaeological material occurs (Orton 2016, 2017; Van Schalkwyk 2010, 2016). Early Stone Age (ESA) material seems to be largely absent, despite how common it is at Kathu, 50 km to the south, where extensive research has been carried out (e.g. Chazan *et al.* 2012; Porat *et al.* 2010).

5 RESULTS OF THE FIELD STUDY

5.1 RESULTS FOR THE SISHEN LOOP

5.1.1 Archaeology

The site was scanned for archaeological remains, but given the previous and current land use activities, **no archaeological remains were identified during the survey** (see Figure 1 & Plates 1-10). Based on the field study results and field observations, the receiving environment for the development site is low to medium potential to yield previously unidentified archaeological sites during construction. Literature review also revealed that no Stone Age sites are not 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.

5.1.2 Burial grounds and Graves

Human remains and burials are commonly found close to archaeological sites and abandoned settlements; they may be found in abandoned and neglected burial sites or occur sporadically anywhere because of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human burials on the landscape as these burials, in most cases, are not marked at the surface and concealed by dense vegetation cover. Human remains are usually identified when they are exposed through erosion, earth moving activities and construction. In some instances, packed stones or bricks may indicate the presence of informal burials. If any human bones are found during the course of construction work, then they should be reported to an archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist. Where human remains are part of a burial, they would need to be exhumed under a permit from either SAHRA (for pre-colonial burials as well as burials later than about AD 1500) or Department of Health for graves younger than 60 years.

The field survey did not identify any burial site within the proposed development site. It should be noted that burial grounds and gravesites are accorded the highest social significance threshold (see Appendix 3). Graves must be protected because they have both historical and social significance and are considered sacred. Wherever they exist or not, they may not be tampered with or interfered with without a permit from SAHRA. It should be borne in mind that the possibility of encountering human remains during subsurface earth moving works anywhere on the landscape is ever present. However, the possibility of encountering previously unidentified burial sites is low, should such sites be identified during construction, they are still protected by applicable legislations, and they should be protected. The identified sites are listed in the Table below.

5.1.3 Public Monuments and Memorials

The study **did not record any public memorials and monuments** within the proposed development site that require protection during construction. As such the proposed Upgrading of Sishen Loops may be approved without any further investigation and mitigation in terms of Section 27 & 9 of the NHRA.

5.1.4 Buildings and Structures

The study **did not record any building or structures that are older than 60 years**. Therefore, in terms of Section 34 of the NHRA, the proposed project may be approved without any further investigation and mitigation.

5.2 RESULTS FOR THE VLEMUSLAAGTE LOOP

5.2.1 Archaeology

The site was scanned for archaeological remains, but given the previous and current land use activities, **no archaeological remains were identified during the survey** (see Figure 1 & Plates 11-23). Based on the field study results and field observations, the receiving environment for the proposed development site is low to medium potential to yield previously unidentified archaeological sites during construction. Literature review also revealed that no Stone Age sites are not 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.

5.2.2 Burial grounds and Graves

The field survey **did not identify any burial site** within the proposed Vlermuislaagte Loop site. It should be noted that burial grounds and gravesites are accorded the highest social significance threshold (see Appendix 3). Graves must be protected because they have both historical and social significance and are considered sacred. Wherever they exist or not, they may not be tampered with or interfered with without a permit from SAHRA. It should be borne in mind that the possibility of encountering human remains during subsurface earth moving works anywhere on the landscape is ever present. However, the possibility of encountering previously unidentified burial sites is low, should such sites be identified during construction, they are still protected by applicable legislations, and they should be protected. The identified sites are listed in the Table below.

5.2.3 Public Monuments and Memorials

The study **did not record any public memorials and monuments** within the proposed development site that require protection during construction. As such the proposed Upgrading of Vlermuislaagte Loops may be approved without any further investigation and mitigation in terms of Section 27 & 9 of the NHRA.

5.2.4 Buildings and Structures

The study **did not record any building or structures that are older than 60 years** on the Vlermuistaagte Loop site. The proposed upgrading of the Vlermuistaagte Loop may be approved without any further investigation in terms of Section 34 of the NHRA.

5.3 Impact Statement

The main cause of impacts to archaeological sites is direct, physical disturbance of the archaeological remains themselves and their contexts. It is important to note that the heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose buried archaeological sites and artefacts, the artefacts are relatively meaningless once removed from their original position. The primary impacts are likely to occur during clearance and earth moving activities, indirect impacts may occur during movement of heavy construction machinery and powerline tower power posts. Any additional excavation for foundations of buildings and structures as well as fence line posts will result in the relocation or destruction of all existing surface heritage material (if any are present).

Similarly, the clearing of access roads will impact material that lies buried in the topsoil. Since heritage sites, including archaeological sites, are non-renewable, it is important that they are identified, and their significance assessed prior to construction. It is important to note that due to the localised nature of archaeological resources, that individual archaeological sites could be missed during the survey, although the probability of this is very low within the proposed development site. Further, archaeological sites and unmarked graves may be buried beneath the surface and may only be exposed during surface clearance. The purpose of the AIA is to assess the sensitivity of the area in terms of archaeology and to avoid or reduce the potential impacts of the proposed development by means of mitigation measures (see appended Chance Find Procedure). There is still a possibility of finding archaeological remains buried beneath the ground. **It is the considered opinion of the author that the chances of recovering significant archaeological materials is low within the proposed construction site.**

Table 3: Summary of Findings

Heritage resource	Status/Findings
Buildings, structures, places and equipment of cultural significance	None recorded within the proposed site
Areas to which oral traditions are attached or which are associated with intangible heritage	None exists
Historical settlements and townscapes	None survives in the proposed area
Landscapes and natural features of cultural significance	None
Archaeological and palaeontological sites	None recorded
Graves and burial grounds	None recorded within the proposed site
Movable objects	None
Overall comment	The proposed Upgrading of Sishen and Vlermuislaagte Loops is supported from a heritage perspective.

5.4 Assessment of development impacts

An impact can be defined as any change in the physical-chemical, biological, cultural, and/or socio-economic environmental system that can be attributed to human activities related to the project site under study for meeting a project need. The significance of the impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The significance of the impacts will be assessed considering the following descriptors:

Table 4: Criteria Used for Rating of Impacts

Nature of the impact (N)		
Positive	+	Impact will be beneficial to the environment (a benefit).
Negative	-	Impact will not be beneficial to the environment (a cost).
Neutral	0	Where a negative impact is offset by a positive impact, or mitigation measures, to have no overall effect.
Magnitude(M)		
Minor	2	Negligible effects on biophysical or social functions / processes. Includes areas / environmental aspects which have already been altered significantly and have little to no conservation importance (negligible sensitivity*).
Low	4	Minimal effects on biophysical or social functions / processes. Includes areas / environmental aspects which have been largely modified, and / or have a low conservation importance (low sensitivity*).
Moderate	6	Notable effects on biophysical or social functions / processes. Includes areas / environmental aspects which have already been moderately modified and have a medium conservation importance (medium sensitivity*).
High	8	Considerable effects on biophysical or social functions / processes. Includes areas / environmental aspects which have been slightly modified and have a high conservation importance (high sensitivity*).
Very high	10	Severe effects on biophysical or social functions / processes. Includes areas / environmental aspects which have not previously been impacted upon and are pristine, thus of very high conservation importance (very high sensitivity*).
Extent (E)		
Site only	1	Effect limited to the site and its immediate surroundings.
Local	2	Effect limited to within 3-5 km of the site.
Regional	3	Activity will have an impact on a regional scale.
National	4	Activity will have an impact on a national scale.
International	5	Activity will have an impact on an international scale.
Duration (D)		
Immediate	1	Effect occurs periodically throughout the life of the activity.
Short term	2	Effect lasts for a period 0 to 5 years.
Medium term	3	Effect continues for a period between 5 and 15 years.

Long term	4	Effect will cease after the operational life of the activity either because of natural process or by human intervention.
Permanent	5	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.
Probability of occurrence (P)		
Improbable	1	Less than 30% chance of occurrence.
Low	2	Between 30 and 50% chance of occurrence.
Medium	3	Between 50 and 70% chance of occurrence.
High	4	Greater than 70% chance of occurrence.
Definite	5	Will occur, or where applicable has occurred, regardless or in spite of any mitigation measures.

Once the impact criteria have been ranked for each impact, the significance of the impacts will be calculated using the following formula:

$$\text{Significance Points (SP)} = (\text{Magnitude} + \text{Duration} + \text{Extent}) \times \text{Probability}$$

The significance of the ecological impact is therefore calculated by multiplying the severity rating with the probability rating. The maximum value that can be reached through this impact evaluation process is 100 SP (points). The significance for each impact is rated as High (SP≥60), Medium (SP = 31-60) and Low (SP<30) significance as shown in the below.

Table 5: Criteria for Rating of Classified Impacts

Significance of predicted NEGATIVE impacts		
Low	0-30	Where the impact will have a relatively small effect on the environment and will require minimum or no mitigation and as such have a limited influence on the decision
Medium	31-60	Where the impact can have an influence on the environment and should be mitigated and as such could have an influence on the decision unless it is mitigated.
High	61-100	Where the impact will definitely have an influence on the environment and must be mitigated, where possible. This impact will influence the decision regardless of any possible mitigation.
Significance of predicted POSITIVE impacts		
Low	0-30	Where the impact will have a relatively small positive effect on the environment.
Medium	31-60	Where the positive impact will counteract an existing negative impact and result in an overall neutral effect on the environment.
High	61-100	Where the positive impact will improve the environment relative to baseline conditions.

Table 6: Construction Phase

Impacts and Mitigation measures relating to the proposed project during Construction Phase														
Activity/Aspect	Impact /	Aspect	Nature	Magnitude	Extent	Duration	Probability	Impact before mitigation	Mitigation measures	Magnitude	Extent	Duration	Probability	Impact after mitigation
Clearing and construction	Destruction of archaeological remains	Cultural heritage	-	2	1	1	2	8	<ul style="list-style-type: none"> Use chance find procedure to cater for accidental finds 	2	1	1	2	8
	Disturbance of graves	Cultural heritage	-	2	2	2	2	12	<ul style="list-style-type: none"> Use appended Chance find procedure to cater for accidental finds. 	2	1	1	1	4

There are no Heritage and Archaeological impacts during the operational phase of an existing railway line.

5.5 Cumulative Impacts

Cumulative impacts as are defined as Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. Therefore, the assessment of cumulative impacts for the proposed development site is considered the total impact associated with the proposed development site when combined with other past, present, and reasonably foreseeable future developments projects. An examination of the potential for other projects to contribute cumulatively to the impacts on heritage resources from this site was undertaken during the preparation of this report. The total impact arising from the proposed development site (under the control of the applicant), other activities (that may be under the control of others, including other developers, local communities, government) and other background pressures and trends which may be unregulated.

The impacts of the proposed construction were assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation, this provides a good method of assessing a project's impact. However, in this case there are several farm infrastructure developments where baselines have already been affected, the proposed development will add to the existing impacts in the project area. As such increased development in the project area will have a number of cumulative impacts on heritage resource whether known or covered in the ground. For example, during construction phase they will be increase in human activity and movement of heavy construction equipment and vehicles that could change, alter or destroy heritage resources within and outside the proposed development sites given that archaeological remains occur on the surface. Cumulative impacts that could result from a combination of the proposed development and other actual or proposed future developments in the broader study area include site clearance and the removal of topsoil could result in damage to or the destruction of heritage resources that have not previously been recorded for example abandoned and unmarked graves.

Heritage resources such as burial grounds and graves, archaeological as well as historical sites are common occurrences within the greater study area. These sites are often not visible and as a result, can be easily affected or lost. Furthermore, many heritage resources in the greater study area are informal, unmarked and may not be visible, particularly during the wet season when grass cover is dense. As such, construction workers may not see these resources, which results in increased risk of resource damage and/or loss. Earth moving and extraction of gravel have the potential to interact with archaeology, architectural and cultural heritage.

No specific paleontological resources were found in the project area during the time of this study (Fourie 2022); however, this does not preclude the fact that paleontological resources may exist within the greater study area. As such, the proposed development has the potential to impact on possible paleontological resources in the area. Sites of archaeological, paleontological, or architectural significance were not specifically identified, and cumulative

effects are not applicable. The nature and severity of the possible cumulative effects may differ from site to site depending on the characteristics of the sites and variables.

Cumulative impacts that need attention are related to the impacts of clearances, access roads and impacts to buried heritage resources. Allowing the impact of the proposed development to go beyond the surveyed area would result in a significant negative cumulative impact on sites outside the surveyed area. A significant cumulative impact that needs attention is related to stamping by especially construction vehicles during at the site. Movement of heavy construction machinery must be monitored to ensure they do not drive beyond the approved sites. No significant cumulative impacts, over and above those already considered in the impact assessment, are foreseen at this stage of the assessment process.

5.6 Mitigation

Mitigation for both sites is not required because the heritage study did not identify any confirmable archaeological and heritage sites within the proposed development sites, however, a copy of the chance finds procedure must be kept at the site office to ensure appropriate management of any accidental finds during construction.

6 ASSESSING SIGNIFICANCE

The Guidelines to the SAHRA Guidelines and the Burra Charter define the following criterion for the assessment of cultural significance:

6.1 Aesthetic Value

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture, and material of the fabric; sense of place, the smells and sounds associated with the place and its use.

6.2 Historic Value

Historic value encompasses the history of aesthetics, science, and society, and therefore to a large extent underlies all the terms set out in this section. A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase, or activity. It may also have historic value as the site of an important event. For any given place, the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.

6.3 Scientific value

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality, or representativeness, and on the degree to which the place may contribute further substantial information. Scientific value is also enshrined in natural resources that have significant social value. For example, pockets of forests and bushvelds have high ethnobotany value.

6.4 Social Value

Social value embraces the qualities for which a place has become a focus of spiritual, religious, political, local, national, or other cultural sentiment to a majority or minority group. Social value also extends to natural resources such as bushes, trees and herbs that are collected and harvested from nature for herbal and medicinal purposes.

7 DISCUSSION

Several Phase 1 Heritage studies for various mining and infrastructure developments were conducted since 2000. The studies noted that significant Stone Age sites occur in and around Kathu and on adjacent farms. However, it is important to note that the general project area was previously surveyed by Beaumont (2000) and Dreyer (2010) who confirmed the scarcity of archaeological remains within the study site. The studies confirmed that the archaeology of the Northern Cape is rich and varied, covering long spans of human history (Morris 2006). In the Northern Cape ESA assemblages, including the Fauresmith, tend to occur on the margins of seasonal rivers, semi-permanent water holes or pans (Beaumont 2000, Dreyer 2010, Pelsler 2010). The significance of ruined farm workers houses recorded in the study area are of lesser importance because they were destroyed by previous mining activities and years of neglect. Similarly, rock engravings previously occurred on the nearby farms, Bruce and Sishen, were also destroyed by mining activities. Although the boundaries of the Kathu Pan site are not clearly defined, the site is located more than 10km from the proposed development sites.

Other than the Kathu Pan and other small finds, the vast areas are devoid of archaeological remains. Archaeological remains that may have occurred in the project area have been affected by extensive iron and manganese mining activities in the area. The region's remoteness of the Northern Cape may be a reason for the lack of archaeological research in the area. Probably because of its dryness, most areas have probably been relatively marginal to human settlement for most of its history (Fourie 2010, Kusel *et al* 2009, Morris 2006, Pelsler 2010). All archaeological studies (Beaumont 2000, Dreyer 2010) in the project area have confirmed the almost total absence of any archaeological material. The lack of confirmable archaeological sites recorded during the current survey is thought to be a result of two primary interrelated factors:

1. That proposed development sites are located within a very dry area which might not have supported prehistoric settlements due lack of water.
2. Previous and current land uses have altered and destroyed any potential archaeological finds.

The absence of confirmable and significant archaeological cultural heritage site is not evidence in itself that such sites did not exist in the proposed development sites (see appended Chance Find Procedure).

8 CONCLUSION

Integrated Specialist Services (Pty) Ltd was tasked by Transnet SOC Limited to carry out a HIA for the proposed upgrading of Sishen and Vlermuislaagte Loops in the Northern Cape Province. Desktop research revealed that the project area is rich in archaeological sites ranging from ESA, MSA to LIA, however, the field study did not identify any sites within the proposed development sites. In terms of the archaeology, there are no obvious 'Fatal Flaws' or 'No-Go' areas.

However, the potential for chance finds, remains and the applicant and contractors are urged to be diligent and observant during construction. 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 the proposed Upgrading of Sishen and Vlermuislaagte Loops cannot be approved.

9 RECOMENDATIONS

Report makes the following recommendations:

1. It is recommended that SAHRA endorse the report as having satisfied the requirements of Section 38 (8) of the NHRA requirements.
2. It is recommended that SAHRA make a decision in terms of Section 38 (4) of the NHRA to approve the proposed project on condition that no confirmable archaeological and heritage sites were recorded within the proposed development sites.
3. From a heritage perspective supported by the findings of this study, the proposed development is supported. However, the proposed development should be approved under observation that construction does not extend beyond the area considered in this report (100m corridor).
4. Should chance archaeological materials or human remains be exposed during construction on any section of the site, 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 NHRA regulations.
5. 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 upgrading of Sishen and Vlermuislaagte loops as planned with special commendations to implement the recommendations herein made.

This report concludes that the impacts of the proposed development on the cultural environmental values are not likely to be significant on the entire site if the EMP includes recommended safeguard and mitigation measures identified in this report.

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SAHRIS case number 1332. Resources Development Act 2002, (Act 28 of 2002) for the approval of an amendment to the Environmental Management Programme for a mining right in respect of iron ore on Portion 2, 6 and the remainder of farm Parson Po. 564, Portions 1,2,3 and the remainder of farm King No. 561, Portion 3,4,5 and the remainder of Bruce No.544, Portion 1,2,3,4,5 remainder of Mokaning No.560 situated in the Magisterial District of Kuruman, Northern Cape.

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2 (Rusoord) and remaining extent of Portion 3 (Portion of Portion 1) of Farm Sacha No.468, remaining extent of Portion 4 of the farm Gamagara No.541, remaining extent of Portion 1 (lot a) of the farm Sishen No. 543, situated in the Magisterial District of Kuruman.

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SAHRIS case number 3698. Proposed relocation of the Vaal Gamagara water pipeline at the Sishen Iron Ore Mine.

SAHRIS case number 3701. Proposed relocation of Rail and Associated Infrastructure at Sishen Iron Ore Mine.

SAHRIS case number 4456. Proposed development of 380ha for residential uses, Kathu, Portion 175/1 and Portion 175/2, Joe Morolong Local Municipality, John Taolo District Municipality, Northern Cape Province.

SAHRIS case number 4785. SAHRA comments for the Heritage Impact Assessment Report for the Kalahari Solar Power Project located on Famr Kathu 465, near Kathu within the Northern Province.

SAHRIS case number 4460. Residential development on Remainder, and Portion 3 of Farm Bestwood 459 near the town of Kathu, Northern Cape.

SAHRIS case number 5323. EIA and EMPr for the Proposed Solar CSP Integration Project: Project 2 - 400kV Power Line from Ferrum to the Solar Substation.

SAHRIS case number 5648. The project will consist of the construction of an approximately 67km Double Circuit 400kV powerline from the Manganore Substation to the Ferrum Substation, including the construction of the new Manganore TX (Transmission) Substation adjacent to the existing Manganore DX (Distribution) Substation. The line runs in a northerly direction through areas of the Tsantsabane, Ga-Segonyana and Gamagara Local Municipalities in the Northern Cape Province.

11 APPENDIX 1: CHANCE FIND PROCEDURE FOR THE PROPOSED UPGRADING OF TRANSNET'S SISHEN AND VLERMUISLAAGTE LOOPS, IN THE NORTHERN CAPE PROVINCE.

FEBRUARY 2023

ACRONYMS

BGG	Burial Grounds and Graves
CFPs	Chance Find Procedures
ECO	Environmental Control Officer
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
SAHRA	South African Heritage Resources Authority
SAPS	South African Police Service
UNESCO	United Nations Educational, Scientific and Cultural Organisation

11.1 CHANCE FIND PROCEDURE

11.1.1 Introduction

An Archaeological Chance Find Procedure (CFP) is a tool for the protection of previously unidentified cultural heritage resources during construction. The main purpose of a CFP is to raise awareness of all construction, workers and management on site regarding the potential for accidental discovery of cultural heritage resources and establish a procedure for the protection of these resources. Chance Finds are defined as potential cultural heritage (or paleontological) objects, features, or sites that are identified outside of or after Heritage Impact studies, normally as a result of construction monitoring. Chance Finds may be made by any member of the project team who may not necessarily be an archaeologist or even visitors. Appropriate application of a CFP on development projects has led to discovery of cultural heritage resources that were not identified during archaeological and heritage impact assessments. As such, it is considered to be a valuable instrument when properly implemented. For the CFP to be effective, the site manager must ensure that all personnel on the proposed development site understand the CFP and the importance of adhering to it if cultural heritage resources are encountered. In addition, training or induction on cultural heritage resources that might potentially be found on site should be provided. In short, the Chance find procedure details the necessary steps to be taken if any culturally significant artefacts are found during construction.

11.1.2 Definitions

In short, the term 'heritage resource' includes structures, archaeology, meteors, and public monuments as defined in the South African National Heritage Resources Act (Act No. 25 of 1999) (NHRA) Sections 34, 35, and 37. Procedures specific to burial grounds and graves (BGG) as defined under NHRA Section 36 will be discussed separately as this require the implementation of separate criteria for CFPs.

11.1.3 Background

The proposed Upgrading of Sishen and Vlermuistlaagte Loops situated close to Kathu in the Northern Cape Province. The proposed development is subject to heritage survey and assessment at planning stage and Upgrading of Sishen and Vlermuistlaagte Loops in accordance with Section 38(8) of NHRA. These surveys are based on surface indications alone and it is therefore possible that sites or significant archaeological remains can be missed during surveys because they occur beneath the surface. These are often accidentally exposed in the course of construction or any associated construction work and hence the need for a Chance Find Procedure to deal with accidental finds. In this case an extensive Archaeological Impact Assessment

was completed by T. Mlilo (2023) on the proposed development sites. The AIA/HIA conducted was very comprehensive covering the entire site. The current study (Mlilo 2023) did not record any archaeological sites within the proposed development sites.

11.1.4 Purpose

The purpose of this Chance Find Procedure is to ensure the protection of previously unrecorded heritage resources within the proposed development sites. This Chance Find Procedure intends to provide the applicant and contractors with appropriate response in accordance with the NHRA and international best practice. The aim of this CFP is to avoid or reduce project risks that may occur as a result of accidental finds whilst considering international best practice. In addition, this document seeks to address the probability of archaeological remains finds and features becoming accidentally exposed during construction and movement of construction equipment. The proposed development activities have the potential to cause severe impacts on significant tangible and intangible cultural heritage resources buried beneath the surface.

Integrated Specialist Services (Pty) Ltd developed this Chance Find Procedure to define the process which govern the management of Chance Finds during construction. This ensures that appropriate treatment of chance finds while also minimizing disruption of the construction schedule. It also enables compliance with the NHRA and all relevant regulations. Archaeological Chance Find Procedures are to promote preservation of archaeological remains while minimizing disruption of construction scheduling. It is recommended that due to the low archaeological potential of the project area, all site personnel and contractors be informed of the Archaeological Chance Find procedure and have access to a copy while on site. This document has been prepared to define the avoidance, minimization and mitigation measures necessary to ensure that negative impacts to known and unknown archaeological remains as a result of project activities and are prevented or where this is not possible, reduced to as low as reasonably practical during construction.

Thus, this Chance Finds Procedure covers the actions to be taken from the discovering of a heritage site or item to its investigation and assessment by a professional archaeologist or other appropriately qualified person to its rescue or salvage.

11.2 GENERAL CHANCE FIND PROCEDURE

11.2.1 General

The following procedure is to be executed in the event that archaeological material is discovered:

- All construction/clearance activities in the vicinity of the accidental find/feature/site must cease immediately to avoid further damage to the find site.
- Briefly note the type of archaeological materials you think you have encountered, and their location, including, if possible, the depth below surface of the find
- Report your discovery to your supervisor or if they are unavailable, report to the project ECO who will provide further instructions.
- If the supervisor is not available, notify the Environmental Control Officer immediately. The Environmental Control Officer will then report the find to the Site Manager who will promptly notify the project archaeologist and SAHRA.
- Delineate the discovered find/ feature/ site and provide 30m buffer zone from all sides of the find.
- Record the find GPS location, if able.
- All remains are to be stabilised *in situ*.
- Secure the area to prevent any damage or loss of removable objects.
- Photograph the exposed materials, preferably with a scale (a yellow plastic field binder will suffice).
- The project archaeologist will undertake the inspection process in accordance with all project health and safety protocols under direction of the Health and Safety Officer.
- **Finds rescue strategy:** All investigation of archaeological soils will be undertaken by hand, all finds, remains and samples will be kept and submitted to a museum as required by the heritage legislation. In the event that any artefacts need to be conserved, the relevant permit will be sought from the SAHRA.
- An on-site office and finds storage area will be provided, allowing storage of any artefacts or other archaeological material recovered during the monitoring process.
- In the case of human remains, in addition, to the above, the SAHRA Burial Ground Unit will be contacted and the guidelines for the treatment of human remains will be adhered to. If skeletal remains are identified, an archaeologist will be available to examine the remains.
- The project archaeologist will complete a report on the findings as part of the Upgrading of Sishen and Vlermuislaagte Loops process.
- Once authorisation has been given by SAHRA, the Applicant will be informed when construction activities can resume.

11.2.2 Management of chance finds

Should the Heritage specialist conclude that the find is a heritage resource protected in terms of the NRHA (1999) Sections 34, 36, 37 and NHRA (1999) Regulations (Regulation 38, 39, 40), Integrated Specialist Services (Pty) Ltd will notify SAHRA and/or PHRA on behalf of the applicant. SAHRA/PHRA may require that a search and rescue exercise be conducted in terms of NHRA Section 38, this may include rescue excavations, for which ISS will submit a rescue permit application having fulfilled all requirements of the permit application process.

In the event that human remains are accidentally exposed, SAHRA Burial Ground Unit or ISS Heritage Specialist must immediately be notified of the discovery in order to take the required further steps:

- a. Heritage Specialist to inspect, evaluate and document the exposed burial or skeletal remains and determine further action in consultation with the SAPS and Traditional authorities:
- b. Heritage specialist will investigate the age of the accidental exposure in order to determine whether the find is a burial older than 60 years under the jurisdiction of SAHRA or that the exposed burial is younger than 60 years under the jurisdiction of the Department of Health in terms of the Human Tissue Act.
- c. The local SAPS will be notified to inspect the accidental exposure in order to determine where the site is a scene of crime or not.
- d. Having inspected and evaluated the accidental exposure of human remains, the project Archaeologist will then track and consult the potential descendants or custodians of the affected burial.
- e. The project archaeologist will consult with the traditional authorities, local municipality, and SAPS to seek endorsement for the rescue of the remains. Consultation must be done in terms of NHRA (1999) Regulations 39, 40, 42.
- f. Having obtained consent from affected families and stakeholders, the project archaeologist will then compile a Rescue Permit application and submit to SAHRA Burial Ground and Graves Unit.

- g. As soon as the project archaeologist receives the rescue permit from SAHRA he will in collaboration with the company/contractor arrange for the relocation in terms of logistics and appointing of an experienced undertaker to conduct the relocation process.
- h. The rescue process will be done under the supervision of the archaeologist, the site representative and affected family members. Retrieval of the remains shall be undertaken in such a manner as to reveal the stratigraphic and spatial relationship of the human skeletal remains with other archaeological features in the excavation (e.g., grave goods, hearths, burial pits, etc.). A catalogue and bagging system shall be utilised that will allow ready reassembly and relational analysis of all elements in a laboratory. The remains will not be touched with the naked hand; all Contractor personnel working on the excavation must wear clean cotton or non-powdered latex gloves when handling remains in order to minimise contamination of the remains with modern human DNA. The project archaeologist will document the process from exhumation to reburial.
- i. Having fulfilled the requirements of the rescue/burial permit, the project archaeologist will compile a mitigation report which details the whole process from discovery to relocation. The report will be submitted to SAHRA and to the client.

Note that the relocation process will be informed by SAHRA Regulations and the wishes of the descendants of the affected burial.

12 APPENDIX 2: HERITAGE MANAGEMENT PLAN INPUT INTO THE PROPOSED UPGRADING OF SISHEN AND VLERMUISLAAGTE LOOPS

Objective								
<ul style="list-style-type: none"> • 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 from 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 Northern Cape PHRA		When necessary	C CECO	SM	ECO	EA EM PM
		Should any remains be found on site that is potentially human remains, the Northern Cape PHRA 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.						

13 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.

13.1 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.

13.2 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.

14 APPENDIX 4: CV OF THE ARCHAEOLOGIST (Trust Mlilo)

PERSONAL INFORMATION

ID NUMBER	690710 6184 187				
TITLE	Mr.	SURNAME	Mlilo	FIRST NAME	Trust
GENDER	Male			DATE OF BIRTH	10 July 1969
CONTACT	Email: trust.mlilo@gmail.com; Tel: +27 (0) 11 037 1565 (Bus) +27 71 685 9247 (Mobile)				
ADDRESSES	Bus. Physical: 65 Naaldehout Avenue, Heuweloord, Centurion, 0157 Cell: Fax: 086 652 9774				
QUALIFICATION: MA (ARCHAEOLOGY), BA Hons (Archaeology), [Univ. of Pretoria, Pretoria], PDGE, BA (Archaeology) UZ					

BRIEF PROFILE

Mr Trust Mlilo

Mr Trust Mlilo is the Archaeology/Heritage specialist. He is professional member of ASAPA and listed as an archaeologist and heritage specialist by Amafa aKwaZulu Natal and Eastern Cape Provincial Heritage Resources Agency (ECPHRA). Prior to joining SATIVATEC (Pty) Ltd, Trust Mlilo served as the Archaeologist and Heritage Manager at Nzumbululo Heritage Solutions (RSA Ltd.) [www.nzumbululo.com]. He has also collaborated in a number of archaeological and Heritage work with Siyathembana 293Trading (Pty) Ltd, Finishing Touch (Pty) Ltd, Vhubvo Archaeo Heritage (Pty) Ltd. And Integrated Specialist Services (Pty) Ltd. He is a professional heritage manager and research consultant with more than 15 years of practice and experience in archaeology, heritage management and education management. He has vast experience in Heritage Impact Assessments, Heritage induction, public consultations, monitoring and pre-construction heritage mitigation. He has worked as a researcher in Heritage development and nomination of heritage sites such as Nelson Mandela Legacy sites, Shembe sites and Delmas Treason Trial just to mention a few. He has attended and participated in several academic and professional symposiums and conferences.

Mr Mlilo has undertaken and assisted research teams in several projects in Sustainability, Energy & Environment (SEE); Environmental Health and Safety Solutions; Cultural Heritage Development (CHD) and

Applied Socio-Economic Research and Enterprise Development [RED]. His willingness to learn has seen him participate as a researcher and coordinator in research teams responsible, for example, in developing a Heritage Management Plans for O.R Tambo and Chris Hani memorial sites (2016) as well as the Nelson Mandela sites (2014 -2015), Integrated Development Planning (IDP) Environmental Toolkit (Mpumalanga Province [2011]), the Tourism Development Toolkit (Department of Environment and Tourism [2009]), etc. He is also effective in public engagements and consultations and has facilitated in massive grave relocation projects for several mining and infrastructure developments companies such as BHP Billiton 2013-2015 and Rhino Minerals 2009-2014 as well as Eskom and Road Agency Limpopo. He has conducted hundreds of Heritage Impact Assessment projects for Eskom minor reticulation projects in North West Province, KwaZulu Natal, Eastern Cape, Limpopo Province, Mpumalanga, Gauteng and the Free State Province as well as HIAs for various public and private developers (See SAHRIS website for HIA reports registered under Nzumbululo Heritage Solutions [Murimbika and Mlilo as the authors], Sativa and Integrated Specialist Services. The major highlight of his work was the Heritage Impact Assessment for the 700km, 765KV Gamma Kappa and Kappa Omega powerline in the Western Cape. Under Sativa Travel and Environmental Consultants, Mlilo served high profile companies such as GIBB, Afrimat, Eskom and Trans Africa Projects. Trust Mlilo has sound knowledge of heritage permit application processes and heritage mitigation processes. He is also effective in resource mobilization, team building and coordination. In addition, he has vast experience in project presentation and consultation.

EDUCATION

Institution [Date from - Date to]	Degree(s) or Diploma(s) obtained:
University of Pretoria 2013 - 2015	MA in Archaeology
University of Pretoria 2009 – 2010	BA Honours in Archaeology
University of Zimbabwe, 2000	Post Graduate Diploma in Education (History)
University of Zimbabwe (1991-1993)	BA Gen. (Archaeology, African Languages & Linguistics)

LANGUAGE PROFICIENCY (Good, Fair, Poor)

Language	Reading	Speaking	Writing
English	Good	Good	Good
Shona	Good	Good	Good
Ndebele	Good	Good	Fair
Zulu	Fair	Good	Fair
Tsonga	Good	Good	Good
Tshivenda	Poor	Fair	Poor
Sesotho	Poor	Fair	Poor
Setswana	Poor	Fair	Poor
Xhosa	Poor	Fair	Poor
Afrikaans	Beginner's stage		

SKILLS MATRIX

Current Skills levels:

1 Had appropriate training only

2 Limited practical experience

3 Solid practical experience

4 Well versed, extensive experience

5 Expert, extensive experience

Type of Experience	Experience In months	Date Last used	Skill level
Communication and Marketing	+120	Current	4
Inter-personal and inter-governmental liaison	+120	Current	4
Organizational skills	+120	Current	4
Coordination	+120	Current	5
Facilitation	+120	Current	5
Planning	+120	Current	4
People Management	+120	Current	4
Time Management	+120	Current	5
Computer literacy (MS Office, Project management software, MAC OS)	+120	Current	3
Project management	+120	Current	4

COMPUTER SKILLS:

- MS Operating System
 - Professional Level Competencies in MS Word, MS Excel, MS Power-point, PMS Publisher, and Internet.
- Mac Operating System
- Photoshop

ACADEMIC WORKS

- The challenges of cultural heritage management in South Africa: A focus on the Klasies River main site (Pending).

Title of Post-Graduate University Theses & Dissertations:

- **Master in Archaeology** (2013-2015), University of Pretoria) Management of the Klasies River main site along the Tsitsikamma Coast in the Eastern Cape Province.
- **BA Hons in Archaeology**. (2010, University of Pretoria): Comparison of conservation of archaeological sites under the jurisdiction of museums and sites in rural locations, the case BaKoni Malapa and Mahumane Late Iron Age sites in Limpopo Province.
- **Post Graduate Diploma in Education**. (2000, University of Zimbabwe): An assessment of attitudes towards use of media in the teaching of History in Secondary schools in Gweru, Zimbabwe

Selected Seminars, Lectures & Conference Papers

July 2014: Pan Africanist Archaeologist Conference. Johannesburg, South Africa Paper to be presented:

- *The challenges of heritage management in South Africa: A focus on the Klasies River main site.*

WORK & PROFESSIONAL EXPERIENCE

PERIOD: 2015 to Present: Archaeologist/Heritage Manager at Integrated Specialist Services (Pty) Ltd an emerging consultancy with highly experienced Heritage, Palaeontology and Ecology/Biodiversity Specialists. ISS main focus is to provide quality specialist services in Environmental and Heritage Management. ISS team has successfully completed a significant number of projects and is looking forward to building its profile in both Environmental and Heritage Management. The major clients are Bigtime Strategic Group Science and Research, Afrimat, Trans Africa Projects, Kimopax, Mawenje Consulting and Road Agency Limpopo. The following is a list of selected projects completed at Sativa (Pty). Ltd

- **ESKOM:** HIA study for the household electrification infrastructure of the proposed 22kv powerline for Norlim-Taung (15km) and Norlim Dikhuting (13km) in the Buxton area (Taung World Heritage Site) Greater Taung Municipality, North West Province.
- **GIBB:** HIA for proposed Assen / Tambotie Mining Right Application for the development of the Assen / Tambotie mine in Madibeng Local Municipality of North West Province
- HIA for proposed Eskom 13,5km, 132kv Randfontein Northern Strategy Power line and associated substations in Mogale City and Rand West City Local Municipalities of Gauteng Province
- HIA for proposed Eskom 132kv Westgate.Tarilton Power line in Mogale City and Rand West City Local Municipalities of Gauteng Province: Archaeological and Heritage Impact Assessment Report
- Phase 1 Heritage Impact Assessment for Eskom's proposed 11.065km 22kV Phase 3 Ngqeleni Electrification in Nyandeni Local Municipality of Eastern Cape Province
- HIA for proposed Eskom Wolvekrans Substation and 132kv Powerline in Mogale City and of Gauteng Province:

- HIA for Proposed Zandrivers Drift Mining Right Application in Madibeng Local Municipality of North West Province
- Phase 1 Heritage Impact Assessment for Eskom's proposed KwaZamoxolo normalization power line development at Noupoot in Umsobomvu Local Municipality, Northern Cape Province.
- Phase 1 Heritage Impact Assessment for Eskom's proposed 0.659km 22kv Murraysburg powerline move in the Pixley Ka Seme District Municipality, Northern Cape Province
- A Phase 1 Heritage Impact Assessment for the proposed, Tubatse Special Economic Zone in Burgersfort, Limpopo, under the jurisdiction of the Greater Tubatse Local Municipality of Limpopo Province.
- A Phase 1 Heritage Impact Assessment for the proposed construction of a new 20ML/D Pump station and bulk water pipeline in Middleburg, Steve Tshwete Local Municipality in Province.
- A Phase 1 Heritage Impact Assessment for the proposed 5.5km 88kV power line and substation in Johannesburg Metropolitan Municipality, Gauteng Province.

PERIOD: 2008 to 2014: Archaeologist and Heritage Manager – Nzumbululo Holdings Limited [www.nzumbululo.com] (dynamic and market-leading consultancy providing innovative solutions in Applied Social-Economic Research and Enterprise Development services, Cultural Heritage Development, Sustainability, and Energy & Environment, Environmental Health and Safety).

Specialist Responsibilities: Assist in Project Management, fieldwork, community consultation and report compilation.

- Researcher for heritage and cultural landscape management projects that involve cultural resources management, heritage conservation management planning, heritage and environmental impact assessment, basic assessment, project management, public participation coordination, predevelopment planning specialists input coordination and liaison with compliant agencies such as government departments.

PROFESSIONAL AFFILIATIONS

- **Member of Association of Southern African Professional Archaeologists (ASAPA) No.396.** Accredited by Amafa akwaZulu Natali and Eastern Cape Provincial Heritage Agency