



A HERITAGE IMPACT ASSESSMENT STUDY FOR THE PROPOSED PROVISION OF BULK WATER SUPPLY FROM RUST DE WINTER DAM TO MATHANJANA MAGISTERIAL DISTRICT , LIMPOPO/MPUMALANGA PROVINCES, SOUTH AFRICA.



Version.01

21 November 2013



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DECLARATION OF INDEPENDENCE

This report has been compiled by Nkosinathi Tomose, leading archaeologist and heritage consultant for NGT Project & Heritage Consultants. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the project.

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EXECUTIVE SUMMARY

NGT Projects & Heritage Consultants (Pty) Ltd has been appointed by GKB Design Associates (Pty) Ltd on sub-consultancy basis as an independent and lead CRM firm to conduct an HIA (exclusive of Palaeontological desktop study) for the proposed provision of bulk water supply from Rust De Winter Dam to Mathanjana Magisterial District , Limpopo/Mpumalanga Provinces, South Africa. The study forms part of specialists (inputs) impact assessment studies required to fulfil the EIA process and its requirements as well as acquisition of Environmental Permits. The appointment of NGT Projects & Heritage Consultants (as an independent CRM firm) is in terms of the NHRA, No. 25 of 1999 (as amended), the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations). Nkosinathi Tomose, the lead archaeologist & heritage consultant of NGT Projects & Heritage Consultants, conducted the HIA study for the proposed provision of bulk water supply from Rust De Winter Dam to Mathanjana Magisterial District , Limpopo/Mpumalanga Provinces, South Africa. He was assisted in this regard (field logistics) by Ms Thandeka Mngadi from NGT Group of companies.

The study identified 5 sites along the proposed bulk supply water pipeline route/servitude. The sites include 1 burial ground and grave site (MMD-1) and 4 built environment and landscape features (MMD-2, MMD-3, MMD-4 and MMD-5). The following conclusions and recommendations are made about the proposed provision of bulk water supply from Rust De Winter Dam to Mathanjana Magisterial District , Limpopo/Mpumalanga Provinces based on existing literature about the project area, observations made during the physical survey of the proposed development area, assessment and evaluation methods using SAHRA minimum standards for evaluation and grading of archaeological (and other heritage) resources as well as the NHRA, No 25 of 1999 for the protection, conservation and management of the Nation Estate (Section 3 of the NHRA, No 25 of 1999), and assessment of associated impacts in term of the BAR Assessment Standards translated to suite the EIA requirement:

- It is concluded the proposed development will have minimum impact on the cultural environment in MMD. The only impact to the cultural environment that will occur is the potential destruction of a single grave (MMD-1) (Figure 12 & 17).
- This grave will need to be mitigated by fencing it off from the construction activities or relocating it.
- It recommended that a Phase II plan of study should be developed for the single grave located in close proximity to Masobe Village (Figure 17).
- The most viable and suitable mitigation measure for this grave is to fence it off from the construction activities and develop a grave management plan to manage it during the

construction and post construction phase of the project (during pipeline maintenance).
there

- It is further recommended that SAHRA should grant a positive Review Comment for the project, provided that the client agrees to implement the recommendations of this HIA.

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ABBREVIATIONS

Acronyms	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
ARCH	Archaeological
BEL	Built Environment & Landscape
BGG	Burial Grounds & Graves
BGG?	Proven not to be Burial Ground & Grave
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DoE	Department of Energy
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
K.y.a	Thousand years ago
MPHRA	Mpumalanga Province Heritage Resources Authority
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
MMD	Mathanjana Magisterial District
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NEMA	National Environmental Management Act
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
RBIG	Regional Bulk Infrastructure Grant

RBWSIP	Regional Bulk Water Services Infrastructure Programme
PDAFP	Proposed Development Area Footprint
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SPV	Special Purpose Vehicle

TERMS & DEFINITION

Archaeological resources

This includes:

- material remains resulting from human activity which 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;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- Features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Heritage resources

This means any place or object of cultural significance

1. INTRODUCTION

1.1. Project Background

1.1.1. Summary of the Proposed Project

This project is one of Rand Water projects as the Department Water Affairs (DWA) Implementing Agent (IA) for the Regional Bulk Infrastructure Grant (RBIG) under a programme called Regional Bulk Water Services Infrastructure Programme (RBWSIP). In year "2007 the National Treasury (NT) approved funding for a three year programme called Regional Bulk Infrastructure Grant (RBIG). This programme has been subsequently extended and is an on-going programme where the wider scope of all the regional bulk water supply management requirements was consolidated. It has been decided that all the regional bulk infrastructure roles and functions will merge under one programme, named Regional Bulk Water Services Infrastructure Programme (RBWSIP). The aim of the fund is to support Government's development targets where in this project is to supply a regional bulk infrastructure eradication of basic water supply backlogs" (GKB Design Associates, 2013: 9). GKB Consulting Engineering was appointed the Rand Water to undertake an investigation into the provision of bulk water supply to Mathanjana Magisterial District (MMD) (Figure 1). The investigation addressed the bulk infrastructure requirements necessary for sourcing water from the Rust de Winter Dam, its treatment and distribution to the respective villages of the MMD. In summary the current project involves provision of bulk water supply from Rust De Winter Dam to Mathanjana Magisterial District, Limpopo/Mpumalanga Provinces, South Africa (Figure 2). This HIA study form part of specialists studies aimed at giving inputs into the EIA process and advising on the best management measures for heritage resources along the proposed bulk water supply pipeline route in terms known heritage resources management measures.

1.1.2. Proposed Project Aims

The aim of the project is to provide bulk water supply from Rust De Winter Dam to Mathanjana Magisterial District , Limpopo/Mpumalanga Provinces, South Africa. In line with the overall project aims, the objective of the current study (HIA) is to advise the EIA process, GKB Design Associates subsequently Rand Water on how to manage and mitigate heritage resources yielded by the physical survey of the proposed development area from Rust De Winter Dam to

MMD where it ends in Masobe village. It also advises on the measures to use during the construction and operational phase of the project for the management of the cultural environment along the proposed bulk water supply route from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces. In the EIA process, this HIA study aims to contribute to the development of the EIA document through assessing and evaluating impacts that affect or have the potential to impact on the cultural environment.

1.1.3. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist

Because of the nature and size of the proposed development - proposed bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces and associated infrastructure exceeding a total area of 5000m², and a pipeline exceeding 300m an EIA process is being conducted and the current HIA feeds into it. In terms of the EIA Regulations of June 2010 (Government Notice 543-546 published in terms of the NEMA, No 107 of 1998) the construction of the proposed facility is listed as an activity that requires environmental authorisation. Undertaking of the EIA process is therefore a requirement. The current EIA process involves the identification and assessment of environmental impacts through specialist studies.

NGT Projects & Heritage Consultants has been appointed by GKB Design Associates on sub-consultancy basis as an independent and lead CRM firm to conduct an HIA (exclusive of Palaeontological desktop study) for the proposed provision of bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa. The study forms part of specialists (inputs) impact assessment studies required to fulfil the EIA process and its requirements. Nkosinathi Tomose, the lead archaeologist & heritage consultant of NGT Projects & Heritage Consultants, conducted the HIA study for the proposed project and he was assisted in this regard (field logistics and supplies) by Miss Thandeka Mngadi from NGT Group of companies.

The appointment of NGT Projects & Heritage Consultants (as an independent CRM firm) is in terms of the Section 38 of the NHRA, No. 25 of 1999 (as amended) and the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations).

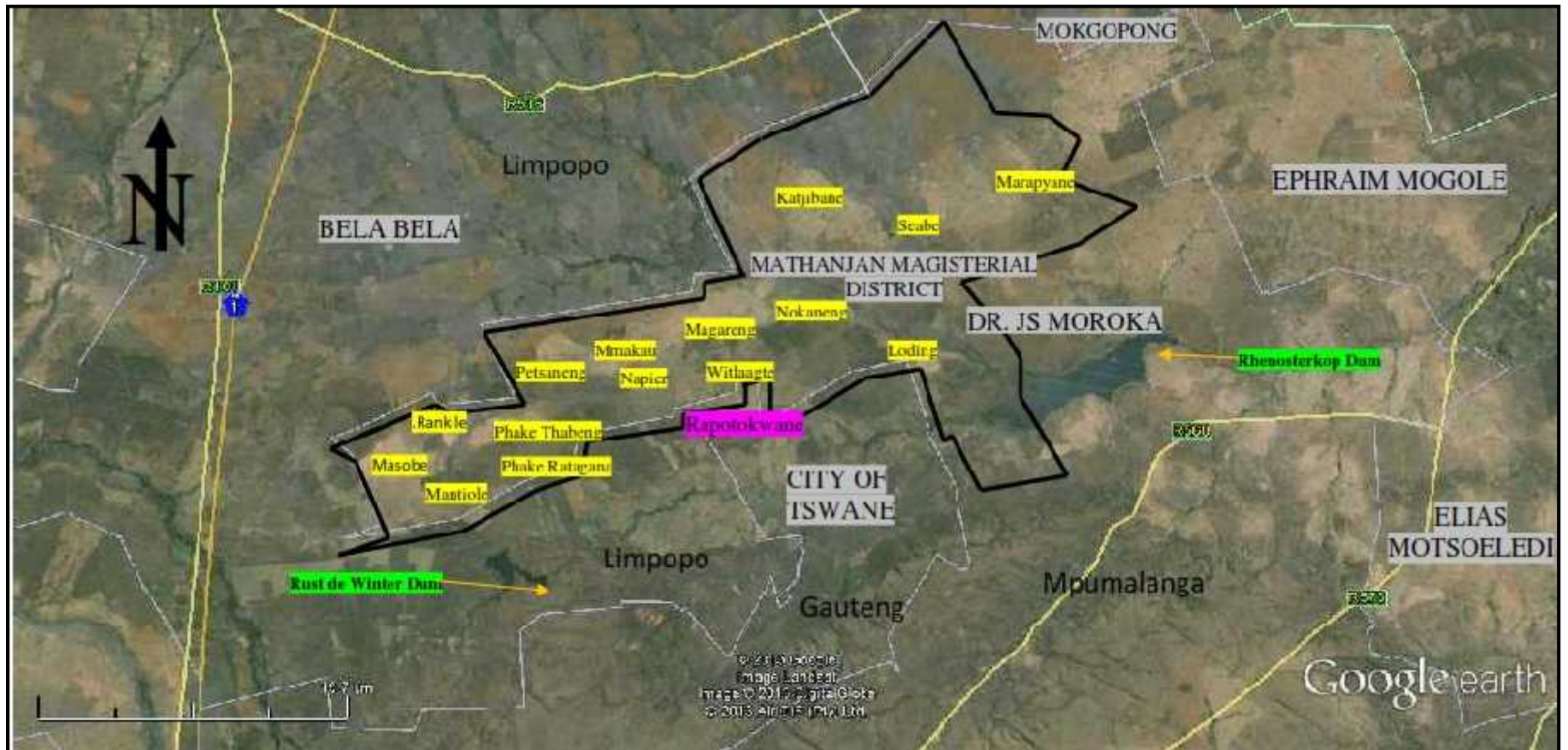


Figure 1-Location of Mathanjana Magisterial District, Limpopo/Mpumalanga Provinces, South Africa.

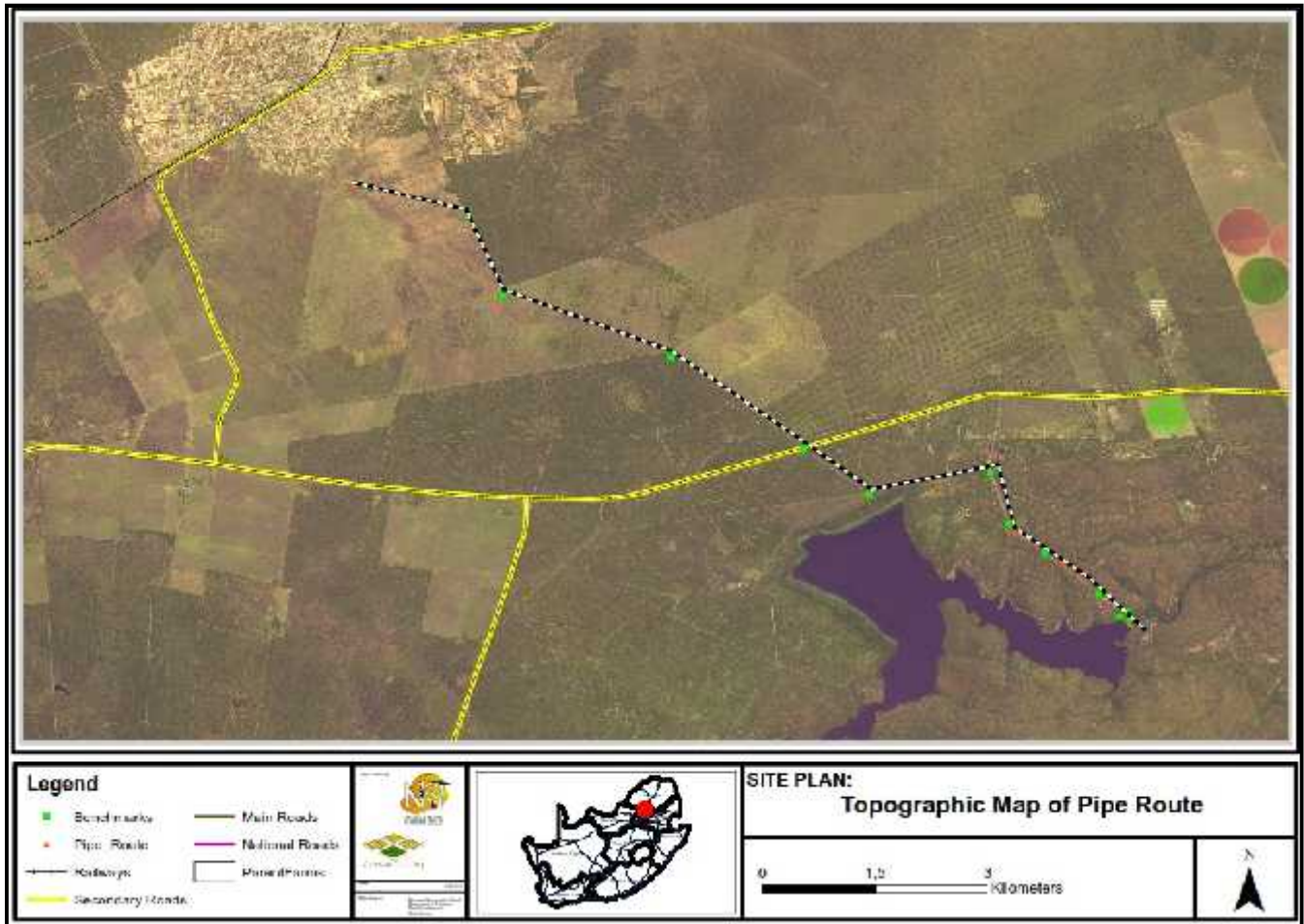


Figure 2- proposed bulk water supply from Rust De Winter Dam to Mathanjana Magisterial District , Limpopo/Mpumalanga Provinces, South Africa.

2. BACKGROUND OF THE STUDY AREA

2.1. Description of the affected environment

Table 1 - Mathanjana Magisterial District , Limpopo/Mpumalanga Provinces, South Africa

Location	<ul style="list-style-type: none"> • Mathanjana Magisterial District , Limpopo/Mpumalanga Provinces, South Africa (Figure 1). • It is located within the Highveld (Figure 10)
Study Site Land Uses	<ul style="list-style-type: none"> • Government: Rust De Winter Dam (Figure 3, 8 & 9) • Government Parastatal: : Eskom power line (Figure 4) • Private: Game farming and cattle ranching (Figure 3). • Communal and tribal: village settlements and subsistence farming (Figure 3) • As result of the above land use activities the route of the proposed bulk water supply from Rust De Winter Dam to Mathanjana Magisterial District, Limpopo/Mpumalanga Provinces run along already disturbed areas or along existing roads.
Land Owner(s)	<ul style="list-style-type: none"> • Government Parastatal - Rand Water • Private - Game Farmers • Tribal- Villages
Applicant	<ul style="list-style-type: none"> • GKB Design Associates (Pty) Ltd on behalf of Rand Water
Proposed Development	<ul style="list-style-type: none"> • Provision of bulk water supply from Rust De Winter Dam to Mathanjana Magisterial District, Limpopo/Mpumalanga Provinces South Africa (e.g. Figure 2 & 17)
Access	<ul style="list-style-type: none"> • Existing national, provincial and local roads, routes and human foot paths. • The study area is ensconced between the following major roads: east of the R101 or the N1 to Polokwane, south of te R516 and north of the R568 (Figure 1)
Defining natural features	<ul style="list-style-type: none"> • A major water dams are found south and east of Mathanjana Magisterial District and they include: Rust Van Winter Dam (south-west) and Rhenosterkop Dam (east) (Figure 1 & 3). • The Eiland River is a major river that runs south of Mathanjana Magisterial District (e.g. Figure 10). • The area is also generally flat and is defined by operational and

	now operation plough-fields, game farms and grazing fields and settlement/residential areas (Figure 3)
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REPUBLIC OF SOUTH AFRICA

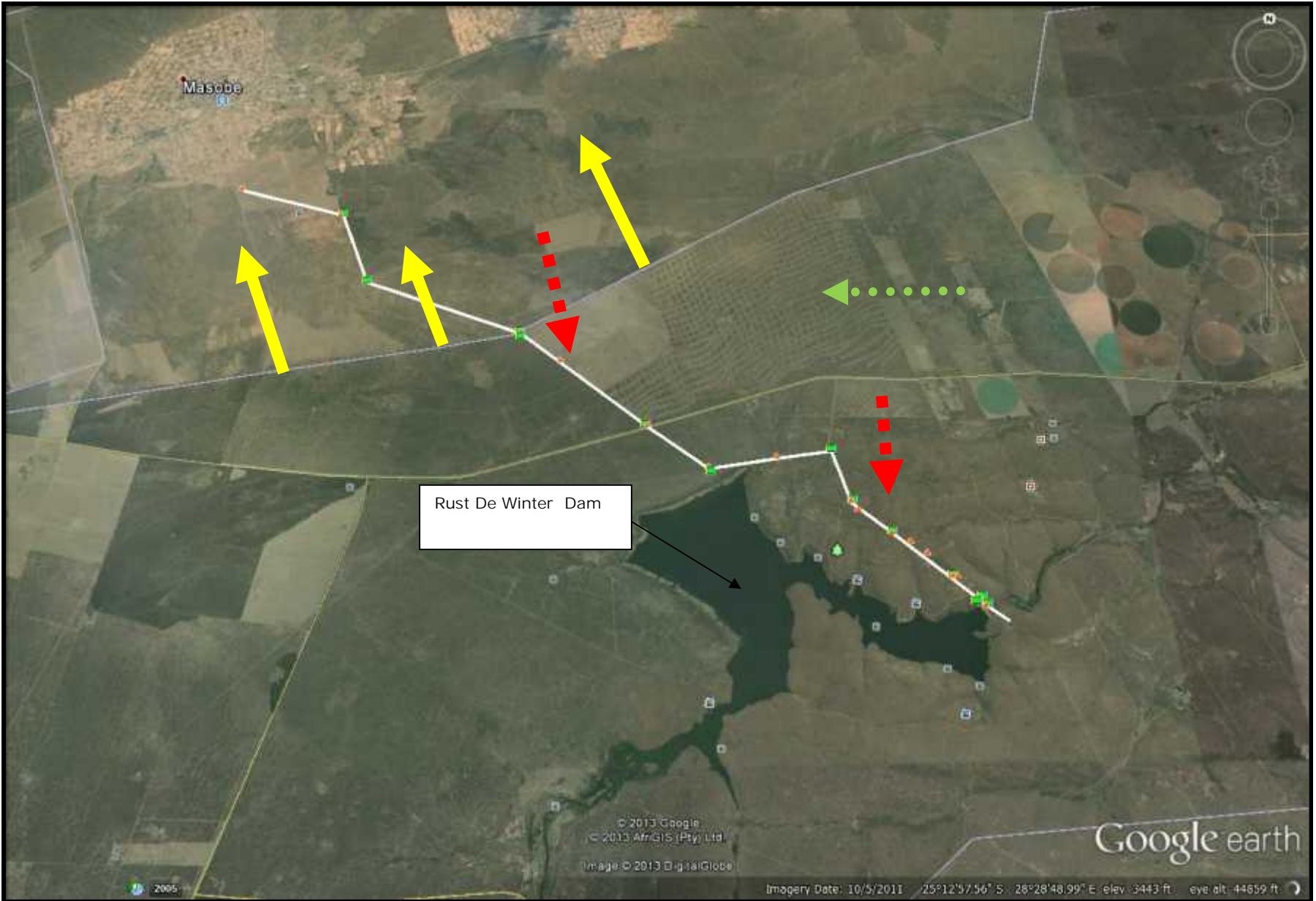




Figure 3- Location of proposed bulk water supply from Rust De Winter Dam to Mathanjana Magisterial District. Red arrows show areas with game farms or private land, yellow arrows areas - communal or tribal land, green arrow plough fields- private land. Rust De Winter is also shown.



Figure 4- Eskom Powerline



Figure 5- Existing water distribution feeder points in Masobe Village



Figure 6- Old water supply infrastructure which include borehole and water reserve tanks



Figure 7- Existing water pump valves at Rust De Winter Dam



Figure 8- General view Rust De Winter Dam



Figure 9- Dam wall and discharge Rust De Winter Dam

2.2. Description of proposed activities: Infrastructure Proposed

Table 2 - List of Activities

Activity 1	<ul style="list-style-type: none"> • Construction of a bulk water supply and associated infrastructure • Construction water distribution pipeline to supply the different villages with the Mathanjana District
Activity 2	<ul style="list-style-type: none"> • Clearing pipeline route, road and stabilizing the land to support the proposed bulk water pipeline • Excavation to installation

2.3. Needs & Desirability

Table 3 –List of activities in-line with the project scope

Activity 1	<ul style="list-style-type: none"> • Desktop study of the heritage value and integrity of the area under consideration and its surrounding with a particular focus on heritage resources within and along the proposed pipeline route (refer to 2.4 below for detailed overview of resources in the region under consideration). • Physical identification, documentation and recording of heritage resources within and immediately outside the proposed pipeline route, Mathanjana District, Limpopo/Mpumalanga Provinces as part the EIA process
Activity 2	<ul style="list-style-type: none"> • The mapping, assessment and evaluation of the heritage value and integrity of the identified heritage resources and assessment of potential impacts as a result of the proposed development on these resources.
Activity 3	<ul style="list-style-type: none"> • Proposing heritage management measures for inclusion in the EIA document • Making recommendations to SAHRA and provincial heritage resources authority - MPHRA and LIHRA

2.4. Desktop Study: Archaeological and Heritage:

South Africa is rich in diverse forms and types of heritage, ranging from natural to cultural heritage. The natural includes among other things: Geological, Palaeontological, and the various plant and animal species that define the country. The cultural heritage, which dates as far back as 2.5 million years ago (m.y.a), includes - the different periods of Stone Age Archaeology, the Iron Age Archaeology, Historical and Industrial Archaeology, as well as the "Political/Historic" geographies of South Africa.

2.4.1. Stone Age Archaeology:

The Stone Age Archaeology of South Africa is divided into three categories, namely: the ESA, MSA and the LSA. These Stone Age industries are well documented throughout southern Africa regions including the Limpopo province where the current study is located. Below are detailed summaries of the traits that characterises each industry artefact and/or material culture as well as the types of industries dominant in the province.

ESA – Early Stone Age:

The ESA is dated between 2.5m.y.a and 250 k.y.a (thousand years ago) – during this period predecessors of Homo Sapien Sapiens started making stone artefacts. The earliest known Stone Age industry is referred to as the Olduvan Industry. It derives its name from the first known Stone Age industry recorded in Olduvia Gorge, Tanzania north-east Africa. Stone artefacts associated with this industry are often described as crude and rudimentary in making – they define the earliest form of Stone Age technological innovation. The Olduvan is replaced, in the archaeological records, by the Acheulian Industry some 1.5 m.y.a. The Acheulian is characterised by large cutting tools (also referred to as bifaces) - hand axes and cleavers are the dominant forms of artefacts found in this industry.

Other ESA tools which form part of what is called the Victoria West Stone Industry in regions such as the Free State and Northern Cape include: hand axes and what Smith refers to as 'Tortoise Cores' (Smith, 1920; R. A., Smith in 1915). This was probably Smith reference to the peculiar feature or morphology of Prepared Cores – where different pieces of where chipped off from a single piece of parent material to make way for the ultimate removal or

shaping of a specific tool and most likely a well defined hand axe. A. H. J., Goodwin (1935) defines the Victoria West Industry with and without cores. Meaning that hand axes and cleavers could have been produced without necessarily having to prepare a parent material to a point to which a single definable tool could be produced. The absence of prepared cores in relation to hand axes and cleaver did not mean the end to this stone tool manufacturing techniques for it become a dominant and defining feature towards the end of the ESA into the MSA. What first became known as 'Tortoise Cores' was later defined as the transition marker between the ESA and the MSA. Therefore, the Prepared Cored of the Victoria West industry can be taken as the markers of transitional period in the Stone Age industry from Acheulian into the MSA, a second clearly defined phase in Stone Age technological innovation. Lycett (2009) sees the Victoria West as an evolutionary step towards the Levallois Prepared Core Technique which signifies the outwards spread of the Stone Age technology. Such technological innovation within the ESA is also endemic in the Limpopo Province and part of the Mpumalanga Province towards the escarpment. There are, however, no known sites of early stone age within the vicinity of the study area.

MSA – Middle Stone Age:

The MSA stone artefact replace the dominant large and often imposing hand axes and cleavers that characterise the ESA. Such a distinction or transition in archaeological records has this far be dated to 250 k.y.a. During this period, smaller artefacts define the archaeological records and the most dominant ones are flake and blade industry. This period has been defined by some in archaeological circles as a period that signifies a secondary step towards the modern human behaviour through technology, physical appearance, art and symbolism (e.g. Binneman et al. 2011). This industry innovation is suggested to have been at its most highest during the last 120 k.y.a. With surface scatters of the flake and blade industries found throughout the southern Africa regions (Thompson & Maream, 2008). They often occur between surface and approximately 50-80cm below ground. Fossil bones may be associated with the MSA in some sites. The flakes and blade industries are often found in secondary context as surface scatters and occurrence like their predecessor industries. Malan (1949) defines the earliest MSA stone industry as the Mangosia and its distribution stretching across the Oriqualand in Northern Cape, Natal, the Cape Point, the Free State. The Prepared Core Technique which had become the defining technological technique of the MSA is in this industry replaced by the Micro Lithics that become a dominant feature or trait in the LSA. They mostly occur as surface scatter.

The MSA tools include flakes, blades and points. Their time sequence is often not known because they mostly occur in surface. Other industries within the MSA include:

- The Howieson's Poort which is known to have wide distribution throughout southern Africa
- The Orangia 128 to 75 k.y.a.
- Florisbad and Zeekoegat industries dated between 64 and 32 k.y.a

In the central provinces such as Mpumalanga, Gauteng and the Free State most of the MSA stone artefacts are made from the following materials: fine grain quartzite, quartz, silcrete, chalcedony and hornfels (Binneman et al. 2011, see also Binneman et al. 2010a). Like the ESA artefacts, the MSA stone artefacts occur in secondary context owing to a variety of reasons. One is due to natural events and/or activities such as erosion and being wash down by water and/or riverine activities, animal and human disturbances etc. It would, therefore, be in the best interest of the author (or archaeologist and/or heritage consultant) to pay special attention to exposed surfaces, disturbed pieces of land and along any gullies and hill foot slopes, drainage lines etc during the survey process.

LSA – Late Stone Age:

The LSA spans a period from 30 k.y.a to the historical time i.e. the last 500 years to 100 years ago. It is associated, in archaeological records, with the San hunter-gathers. This is particular important for the last 10 k.y.a whereby the San material culture dominates the archaeological records -mostly in rock shelters, caves as well as open air sites in both the interior and coastal regions. However, the San open air sites are not always easy to find because they are in most cases covered by the various forms and types of vegetation and the other contributing factor is the mobility nature of these people. They were not sedentary communities like their counterparts - e.g. the Iron Age people/communities who needed to settled the land for ploughing, grazing etc. In the coastal regions, sand dunes sometimes become impediments in locating LSA sites. Owing to all these factors the preservation state of the LSA archaeology is often poor and not easily disenable (e.g. Deacon & Deacon 1999). Caves and rock shelters provide a more substantial preservation record of pre-colonial record of indigenous people's archaeology. This is in a form of stone artefacts, rock art and other material culture such as beads etc. The LSA archaeology was, however, not only dominated by the San hunter-gathers - in about 2 k.y.a the southern Africa landscape is known to have also been penetrated and occupied by the

Khoekhoe pastoralists/herders who introduce sheep and cattle (e.g. Hall & Smith, 2000). Sites that document the existence of Khoekhoe herders in South African landscape Ceramic vessels are some of the material culture that signifies the Khoekhoe material culture in archaeological records – including the depiction of sheep and cattle often found in San hunter-gather rock art (ibid). Smith and Hall (2000) give detailed descriptions of potential relations that could have taken place between the San, the Khoekhoe and later the Iron Age farmers in Little Mock - an archaeological interaction sites located in the Limpopo Province near the Soutpansberg Mountain north east of the current study geography. In their study, Smith and Hall, argue that the material culture of the Khoekhoe herders included among other things the art of making rock art in form of geometrics, concentric circles etc. Binneman (et al. 2011) asserts that the diet of this new group of people would have also included muscle collected along the muddy river banks, coastal line and riverine and terrestrial foods. Other than the material culture such as artefacts found within the LSA industries, burials or human remains become dominant in the landscape. In the coast they are often found buried underneath middens (dumpsites) (e.g. Deacon & Deacon 1999). While in the interior (such as Mpumalanga) and the northern regions such as the Limpopo Province they are sporadic and can occur across various features in the landscape.

The LSA archaeology is therefore rich and varied consisting of stone artefacts, other forms of material cultures such as beads (ostrich egg shell beads are dominant), pottery, rock art in form of paintings and engravings with engraving dominating the central low land and the interior regions. Engravings are also found spread across the Highveld and central regions such as the North West Province, the Free State Province and the Cape provinces such as the Northern Cape - better known to archaeologist as the "Mecca" of engravings sites in South Africa and most probable in southern Africa. Among stone tools found in this period include, continuation of bifaces (e.g. hand axes), but they now become supplemented by tanged barbed arrow heads made from the various materials found with the southern Africa regions.

2.4.2. Iron Age Archaeology:

The Limpopo Province is probably one of the well researched and documented regions of South Africa in term of Iron Age archaeological research. Like the Stone Age archaeology, in the Limpopo Province (and few other South African province) this period in archaeological records is divided into three categories, namely the EIA (Early Iron Age), MIA (Middle Iron Age) and

the LIA (Late Iron Age) (e.g. Huffman, 2005). While in regions such as the Free State Province there is no clearly defined MIA (e.g. Tomose, 2013).

The EIA communities first appear in southern African archaeological records in the 1st Millennium AD (Huffman 2007; van Schalkwyk, 2007). The eastern regions of the country were their preferred regions because of their rainfall patterns – summer rainfall climates conducive for ploughing and growing crops like maize, sorghum and millet. In the interior regions, the former Transvaal areas of Limpopo and Gauteng Province alike were preferred.

Other than rock art, stone walls and pottery – the material culture of the Iron Age communities also includes Iron Implements, traded beads, rainmaking site features, spear sharpening grooves on rock surfaces, grinding stones etc (e.g. Huffman, 2007). Within the Mpumalanga province and along the same belt with the study area such sites are endemic in areas such as Machadodorp, Ladenburg and towards Steelpoort.

2.4.3. Historical Archaeology:

The Historical archaeology is a period in archaeological records that refers to the last 500 years in archaeological records. This period encapsulates the later parts of the Late Stone Age, Late Iron Age, and the period of European settlers and/or "colonist" in southern Africa. The archaeological records that characterises this period includes remnants of Stone Age industries (and material culture), the Late Iron Age material culture (e.g. pottery/ceramics, iron age implements etc) and built environment (e.g. elaborate stone wall settlements etc) and the settlers material culture and built environment. In other regions of the country, settler towns become a dominant form of built environment and landscape features. The colonial, Union and the late political periods such as the Apartheid Era (as proclaimed in 1962) and the democratic South Africa have elements that could be associated with historical archaeology even though they are not necessarily over 60 or 80 years old. For example, requirements of an archaeologist intervention in dealing graves that are not located with municipality demarcated cemetery or in dealing with graves related to conflict such the liberation struggle or the different wars like the World War II.

3. METHODOLOGY

3.1. Legislative Requirements

The NEMA, No. 107 of 1998 stipulated that for any development in South African to be granted permission to go ahead an assessment of the potential impacts of the proposed development on both the natural and cultural environment should be conducted. As such, this HIA fulfils the requirements of NEMA (and the applicable 2010 EIA Regulations) and is conducted in-line with Section 38 (1) of the NHRA, No. 25 of 1999.

3.2. Methodology

This chapter outline the methodologies used in conducting this study. This HIA report was compiled by Nkosinathi Tomose, lead archaeologist and heritage consultant for NGT Projects & Heritage Consultants for the proposed provision of bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa. It does this in order to adhere to the Terms of Reference provided by the client for the completion of this report. Some areas of the report follow minimum standards for completion of professional HIA as stipulated in SAHRA minimum standard (2012) such as detailed account to the archaeological and historical background of the study area or region. This is also

3. 2.1. Step I – Literature Review (Desktop Phase):

- The background information search of the proposed study area included the following sources:
 - Published academic papers and HIA studies conducted in and around the region where the current development will take place.
 - Mpumalanga online
- There was limited use of archival maps - two historical maps and one general travel map showing the proposed area of development and its surround were assessed to aid information about the proposed area of development and its surrounding.
- This also included a review and assessment of relevant environmental and heritage legislations such as the NEMA (together with the 2010 EIA Regulations) and the NHRA.

3.2.2. Step II – Physical Survey:

The physical survey of the study area aimed to address the following main areas of concern raised by the client in the specialist Terms of Reference:

1. To "conduct an onsite verification for the proposed provision of bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa";
2. To "identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located in and around the proposed provision of bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa". Use will be made of annotated maps where appropriate"

In order to address these concerns by the client: -

- The physical survey of the proposed provision of bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa was conducted by a qualified archaeologist and general heritage specialist from NGT Projects & Heritage Consultants between the 15 and 17 November 2013.
- The survey covered the proposed bulk water supply pipeline routes (and the potential water distribution ports with the village) from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa on foot and track logs of the "walk down" were recorded using Garmin GPSmap 62s.
- The objective of the survey was to locate and identify archaeological and heritage resources and/or sites and objects, occurrence within the proposed provision of bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa. To record and map them using necessary and applicable tools and technology.
- The physical survey was deemed necessary based on the known occurrence of archaeological resources within the broader Highveld region.
- The survey also paid special attention to disturbed and exposed layers of soils as such as eroded surfaces because these areas are more likely to be exposed or yield archaeological and other heritage resources that may be buried underneath the soil and be brought to the earth surface by animal and human activities such as animal burrow pits and human excavated grounds. The edges/sides of dirt roads were also inspected for possible Stone Age scatters as well as exposed Iron Age implements and other resources.

- The following technological tools and platforms were deemed important for documenting and recording located and/or identified sites:
 - Garmin GPSmap 62s – to take Lat/Long coordinates
 - DELL Notebook aided with Garmin Basecamp Software, Google Earth – to plot the propose bulk water supply pipeline in MMD.
 - ArcGIS was used to plot all the identified heritage resources and to develop heritage map in order to inform the heritage analysis of the resources found along the bulk water pipeline supply route from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa.
 - Maps provided by the client before the survey also proved invaluable
 - Shapefiles (KMZ files) developed by NGT based pipeline route points provided by client were used
 - A Garmin GPS with camera and Samsung camera – were use to take photos of the affected environment and the identified heritage sites.

3.2.3. Step III – Data Consolidation and Report Writing:

During field work and on the return from the field the following clients concerns were addressed: -

1. To "assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value"
2. To "describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;
3. To "propose suitable mitigation measures to minimize possible negative impacts on the culturalresources;
4. To "prepare an heritage resource management plan"
5. "Review applicable legislative requirements" - Section 3.1. of this Chapter (i.e. Chapter 3) addresses this concern as well as Section 5.5 of Chapter 5 discusses Sections of the NHRA, No. 25 triggered by the current study findings
6. To ".....highlight assumptions, exclusions and key uncertainties". Chapter 4 (below) of this report address this concern.

- The final step involved the consolidation of the data collected using the various sources as described above.
- This involved the manipulation Shapefiles/KML files through ArcGIS
- Assessing the significance and potential impact of the identified sites, discussing the finds, report writing and making recommendation on the management and mitigation measures of the identified sites and resources as well as the impact and influence of these sites and resources on the proposed corridor.

3.3. Assessment of Site Significance in Terms of Heritage Resources Management Methodologies

The significance of heritage sites was based on four main criteria:

- Site integrity (i.e. primary vs. secondary context)
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures)
 - Density of scatter (dispersed scatter)
 - Low - <math><10/50\text{m}^2</math>
 - Medium - 10-50/50m²
 - High - >50/50m²
- Uniqueness and
- Potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

- A - No further action necessary;
- B - Mapping of the site and controlled sampling required;
- C - No-go or relocate pylon position
- D - Preserve site, or extensive data collection and mapping of the site; and
- E - Preserve site
- Impacts on these sites by the development will be evaluated as follows:

Measure of Heritage Sites Significance

The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by the ASAPA for the SADC region were used for the purpose of this report.

Table 4: Site significance classification standards as prescribed by SAHRA

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

3.4. Methodology for Impact Assessment in terms of Environmental Impact Assessment Methodologies including Measures for Environmental Management Plan Consideration:

The Basic Assessment Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effects of environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the Basic Assessment & Environmental Impact Assessment. The impact evaluation of predicted impacts was undertaken through an

assessment of the significance of the impacts. This is in line with specialist requirements as required by the client. For example, the request that:-

"The impact methodology [should] concentrate on addressing key issues. This methodology to be employed in the report thus results in a circular route, which allows for the evaluation of the efficiency of the process itself. The assessment of actions in each phase [that should] be conducted in the following order:

- Assessment of key issues;
- Analysis of the activities relating to the proposed line corridor, pylon locations;
- Assessment of the potential impacts arising from the activities, without mitigation, and
- Investigation of the relevant mitigation measures.

Because, "activities within the framework of the proposed line corridor give rise to certain impacts". The client recommended that, "for the purposes of assessing these impacts, the project has [to be] divided into two phases from which impact activities can be identified, namely:

- the Construction Phase
- and Operational Phase

The following Assessment Criteria is Used for Impact Assessment

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 alternatives under study for meeting a project need.

The significance of the aspects/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 determined through a synthesis of the criteria below:

Probability: This describes the likelihood of the impact actually occurring

Improbable: The possibility of the impact occurring is very low, due to the circumstances, design or experience.

Probable: There is a probability that the impact will occur to the extent that provision must be made therefore.

Highly Probable: It is most likely that the impact will occur at some stage of the development.

Definite: The impact will take place regardless of any prevention plans and there can only be relied on mitigatory measures or contingency plans to contain the effect.

Duration: The lifetime of the impact

Short Term: The impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.

Medium Term: The impact will last up to the end of the phases, where after it will be negated.

Long Term: The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.

Permanent: The impact is non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.

Scale: The physical and spatial size of the impact

Local: The impacted area extends only as far as the activity, e.g. footprint

Site: The impact could affect the whole, or a measurable portion of the above mentioned properties. Regional: The impact could affect the area including the neighbouring residential areas.

Magnitude/ Severity: Does the impact destroy the environment, or alter its function

Low: The impact alters the affected environment in such a way that natural processes are not affected.

Medium: The affected environment is altered, but functions and processes continue in a modified way.

High: Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

Significance: This is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

Negligible: The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.

Low: The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.

Moderate: The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.

High: The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

The significance is calculated by combining the criteria in the following formula:

Sum (Duration, Scale, Magnitude) x Probability (Table -2)

S = Significance weighting; Sc = Scale; D = Duration; M = Magnitude; P = Probability

Table 5 -The significance weightings for each potential impact are as follows:

Aspec	Description	Weight
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Scale	Local	1
	Site	2
	Regional	3
Magnitude/Severit	Low	2
	Medium	6
	High	8
Significance	Sum (Duration, Scale, Magnitude) x Probability	
	Negligible	20
	Low	>20 40
	Moderate	>40 60
	High	>60

The significance of each activity was rated without mitigation measures (WOM) and with mitigation (WM) measures for both construction, operational and closure phases of the proposed development

To address the question of Heritage Management Plan the following table is used for Measures to be included in the EMP. This table is relevant in that it addresses key issues at the various stages of the project by also addresses how some of the key concerns that develop from a heritage point of view can be mitigated.

Table 6 -Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: Description of the objective, which is necessary in order to meet the overall goals; these take into account the findings of the environmental impact assessment specialist studies		
Project component/s	List of project components affecting the objective	
Potential Impact	Brief description of potential environmental impact if objective is not met	
Activity/risk source	Description of activities which could impact on achieving objective	
Mitigation: Target/Objective	Description of the target; include quantitative measures and/or dates of completion	
Mitigation: Action/control	Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above	Who is responsible for the measures	Time periods for implementation of measures
Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.	
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting	

4. ASSUMPTIONS, EXCLUSIONS AND UNCERTAINTIES

The following assumptions, exclusions and uncertainties exist in terms of the present study:

4.1. Assumptions -

- The current study is a Phase 1 Heritage Impact Assessment. As such, a historical and archival desktop study as well as a field survey were undertaken to identify tangible heritage resources located in and around the proposed development area footprint. The assumption is that a heritage social consultative process would have taken place with some of the locals or farm owners to ascertain known archaeological or heritage sites in their properties such as presence or existence of graves and cemeteries etc. However, there was no formal heritage social consultation that took place as part of the study - this is due to the fact that nature of the current.
- The study assumes that the amount of heritage resources located in and around the propose bulk water supply route from Rust De Winter Dam to MMD represent the total amount of physical or tangible resources distributed in and around/along the propose pipeline route/servitude.

4.2. Exclusions -

The following exclusions or limitations have direct consequence to the study and its results-

- The survey was conducted in November 2013, summer period - as such there was high level of vegetation cover for the archaeologist/heritage surveyor to pick up all the different archaeological and heritage features in the landscape such as unmarked graves, the different Stone Age, Iron Age and Historical Archaeology material culture and artefacts. This forms one major limitation in terms of observing and recording all forms of archaeological and heritage sites in and immediately outside or along the proposed development line corridor servitude.

4.3. Uncertainties -

Heritage studies like most other specialist studies often experience many challenges during and after the physical survey of the proposed development area.

- From an archaeological and general heritage perspective - the assumption is often made that, the amount of identified archaeological and heritage resources during physical survey of the proposed development area represent some of the total amount of resources that exist in and around or along the development area.
- This is not often true because the nature of some the archaeological and heritage resources - some of these resources are subterranean in nature and as such, one cannot totally rule out their presence or existence along the propose pipeline route even though they are not recorded and map as part of the current study. These resources may be exposed or brought to the surface of the earth during the construction phase of the project which will involve excavation for land stabilization and clearing of vegetation and top soil.
- This presents one of the major uncertainties regarding the 'holistic' management or archaeological and heritage resources along the proposed line corridor servitude.
- Archaeologists and heritage specialists alike refer to discovery of such resources as chance finds and to mitigate such uncertainty - it is always advised that should such chance finds be made of archaeological and heritage resources or site the ECO should report them to the nearest SAHRA office or museum or call an archaeologist and heritage specialist to investigate the finds make necessary recommendations.

5. FINDINGS

The findings of this study are presented in three ways as per the search and other methodological methods used in conducting it. Such as desktop study, map and physical survey of the proposed pipeline route for the proposed provision of bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa. Because there was no deeds search of the various properties and farms that the proposed bulk water pipeline is going to traverse - no deeds information is provided of the farms that the power line will pass.

5.1. Anticipated Heritage Resources and Sites within the proposed pipeline route for the proposed provision of bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa –

Based on the known archaeological and historical events that took place within these two regions - Limpopo and Mpumalanga Province. The following archaeological and heritage resources sites are anticipated to occur in areas that have less disturbance:

- Iron Age sites
- Burial grounds and graves
- Stone settlements and kraals
- Historical cemeteries and graves
- Historic houses/buildings
- Farming heritage resources

5.2. Results of Desktop Search-

The desktop search of the area revealed a number of things and activities that took place within the region - the literature review section above gives an accounts of this. Resources anticipated to be found mostly emanates from the findings of the Desktop Search. However, based on the age of the villages located in and around Mathanjana Magisterial District and the types of economic activities such as plough fields and game farms it is very unlikely that any archaeological and historical resources will be located in some parts of the pipeline route.

5.3. Historic Cadastral Search:

The following map of the study area was used to assess the evolutions of the landscape in and around the area in which the proposed bulk water supply will traverse:

- The third map is the 1905 Map illustrating the physical features of the Transvaal by Tudor G. Trevor - this map does not give detailed information - but shows that the study area is located in the Middle and High Veld. In terms of biodiversity and environment this is important as it would give information on the various natural environmental features.

- The map also shows that by 1905 there was already a railway line Pretoria and Warmbath (Bela Bela) and the railway system linking Pretoria, Middelburg, Belfast, Machadodorp up to Mozambique was also already developed. This line is associated with the NZASM railways encouraged by the Zuid Afrikaansche Republic government under president Kruger.

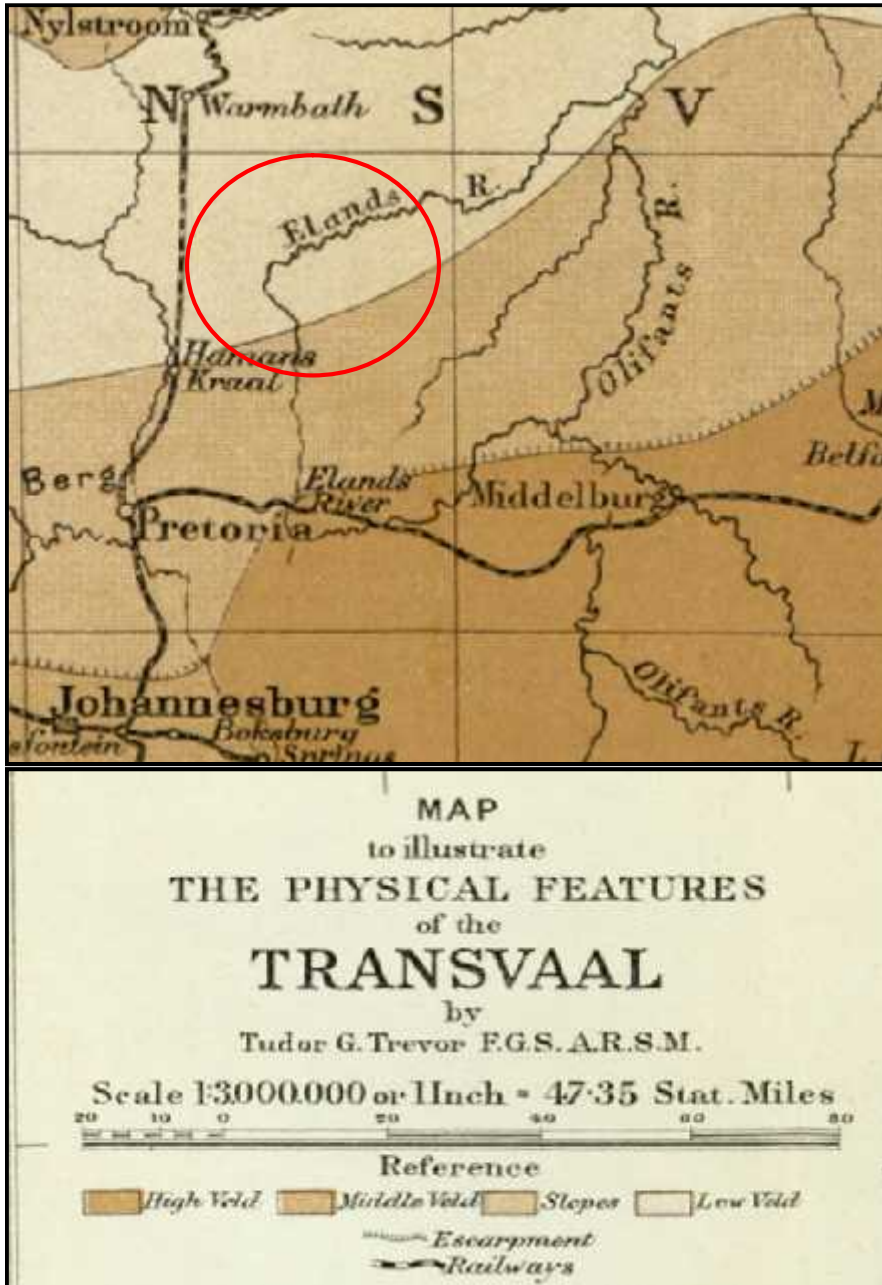


Figure 10-1905 Map illustrating the physical features of the Transvaal by Tudor G. Trevor, - F.G.S.A.R.S.M @ Trevor, 1906. The study is located between the Highveld and the Middle Veld.

5.4. Deeds Search:

No deeds search was conducted as part of the study.

5.5. Field Survey and Identified Archaeological/Heritage Resources:

A total of 5 heritage sites was yielded by the survey of the pipeline route for the propose provision of bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa. The resources/sites included:

- A grave with brick dressing/mound
- Stone house foundations/ruins
- Reservoir (not a heritage site)
- Ruminants of a historic settlement site
- Ruminants of a historic wall

Site	MMD-1
Type	Grave
Density	Single grave
Location/Coordinates	S25 12 04.2 E28 27 45.4
Approximate Age (More than 60 Or Less than 60 years old)	More than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	Section 36
<p>Description:</p> <p>The single grave is located exactly on the bulk pipeline water servitude or route on the border of farms Tamboottenpan 75 JR and Kliprand 76 JR. The grave has red brick dressing and is located within a game farm fence. It is in a typical burial position orientation - east-west (Figure 13). The grave show signs of recent visitation in a form of grave goods or material culture. A white enamel dish or plate was found.</p>	

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.A	-	Localised	High/Medium	High significance	Definite	Long-term : Construction & operational phases	Fence off the grave from the excavation activities and diverted the pipeline. If the pipeline cannot be diverted- relocated the grave to formal cemetery

Nature: Construction activities (& development of associated infrastructure) will impact on the identified grave by destructing the grave markers, exposing the remains and creating access challenges for the relatives of the deceased. These are impact measures based on the worst case scenario where the grave is relocated.

	Without mitigation	With mitigation
Extent	High (5)	Medium (3)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Highly probable (4)
Significance	(64) High	(56) Medium
Status (positive or negative)	Negative	Positive

Reversibility	Low	Medium
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
<p>Mitigation: The grave should be relocated into a municipal declared cemetery within MMD before the commencement of the project. Fencing of the grave can also provide a positive measure provided that the engineers agree to diverting the line. A permit should be applied for with SAHRA BGG Unit to fence off the grave should it be retained and a permit should also be applied for with SAHRA BGG Unit should the grave be proposed to be relocated. A social consultation and public participation to involve family/ies or other Interested and Affected parties should also be undertaken in each of the above processes.</p>		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> Cumulative impacts regarding the grave and its management are predicated to result from the construction activities (& associated infrastructure development) and from the operational phase of the projects. The grave may be impacted by the proposed development activities. 		
<p>Residual Impacts:</p> <ul style="list-style-type: none"> Negative - lasting impact to the grave Positive - the project will bring water to MMD 		

Measures for inclusion in the draft Environmental Management Plan:

<p>OBJECTIVE:</p> <p>The overall goal is to identify, manage and conserve heritage resources within and immediately outside the development area for the proposed provision of bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa. In order to achieve this goal it is recommended that the single grave should be fenced off and the pipeline be diverted. Should this not be applicable the grave should be relocated to a municipal proclaimed cemetery within MMD prior to the commencement of development.</p>	
Project component/s	Construction and operational phases of the project
Potential Impact	In case where the identified grave is not fenced off or not relocated - the grave will be negatively impacted by the development. The construction activities will also cause destruction to the grave - destruction of grave markers/dressers making it difficult for

	the deceased families to recognise their graves resulting to legal disputes between the developer and affected families).		
Activity/risk source	Exclusion of the above objectives from the overall Environmental Management Plan		
Mitigation: Target/Objective	The single grave should be fenced off or be relocated prior to the commencement of development activities. Before these processes a permit that addressed the needs of each mitigation measure should be applied for with the relevant heritage statutory - the SAHRA BGG Unit. The dates (e.g. days/months/years) for the project life span are not yet known.		
Mitigation: Action/control	Responsibility	Timeframe	
With the approval of the project, the Environmental Consultant should consult an archaeologist/heritage consultant to applied for a permit to fence off the grave and develop a grave management plan or a permit to relocate the grave in the case where it is not deemed feasible to divert the pipeline. The permit should be applied for with SAHRA BGG Unit.	Accredited archaeologist and heritage consultant or CRM firm	Prior to the construction and operation phases of the project.	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.		
Monitoring	With the approval of the project the Environmental Consultant and appointed ECO should consult with the appointed archaeologist/heritage consultant to apply for permit to fence off or relocated the affected grave.		



Figure 11- Single grave located within



Figure 12- Material culture associated with the grave

Site	MDD-2
Type	Old house foundations/ruins
Density	1 structures
Location/Coordinates	S25 13 40.8 E28 30 41.7
Approximate Age (More than 60 Or Less than 60 years old)	More than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	Section 34
<p>Description:</p> <p>The site consists of stone house foundation (Figure 13). Next to the foundation is what looks to have be a sewer system manhole (Figure 13 -yellow arrow).</p>	

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.C	-	Local	Negligible	Low	Improbable	Short term	A

Note! – There are no further actions recommended for this site because it is located some 15m away from the bulk pipeline servitude which is along the existing road.



Figure 13- House foundation/ruins

Site	MDD-3
Type	Reservoir
Density	1 structure
Location/Coordinates	S25 13 28.0 E28 30 23.8
Approximate Age (More than 60 Or Less than 60 years old)	Less than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	Section 34
<p>Description:</p> <p>This is not a heritage or historic site, but a reservoir located not very far from the proposed bulk water supply rout (Figure 14).</p>	

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.C	-	Local	Negligible	Low	Improbable	Short term	A

Note! – There are no further actions recommended - not a heritage or historic site.



Figure 14- Reservoir

Site	MDD-4
Type	Historic settlement - Disturbed land with stone walling
Density	High density
Location/Coordinates	S25 13 21.9 E28 30 15.2
Approximate Age (More than 60 Or Less than 60 years old)	More than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	Section 35
<p>Description:</p> <p>The site is a historic settlement located approximately 50 or more meters from the bulk water pipeline supply servitude (Figure 15).</p>	

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.C	-	Local	Negligible	Low	Improbable	Short term	A

Note! – The site is located far from the main pipeline servitude and will not be impacted. It is located some 50 meters from the main pipeline servitude.

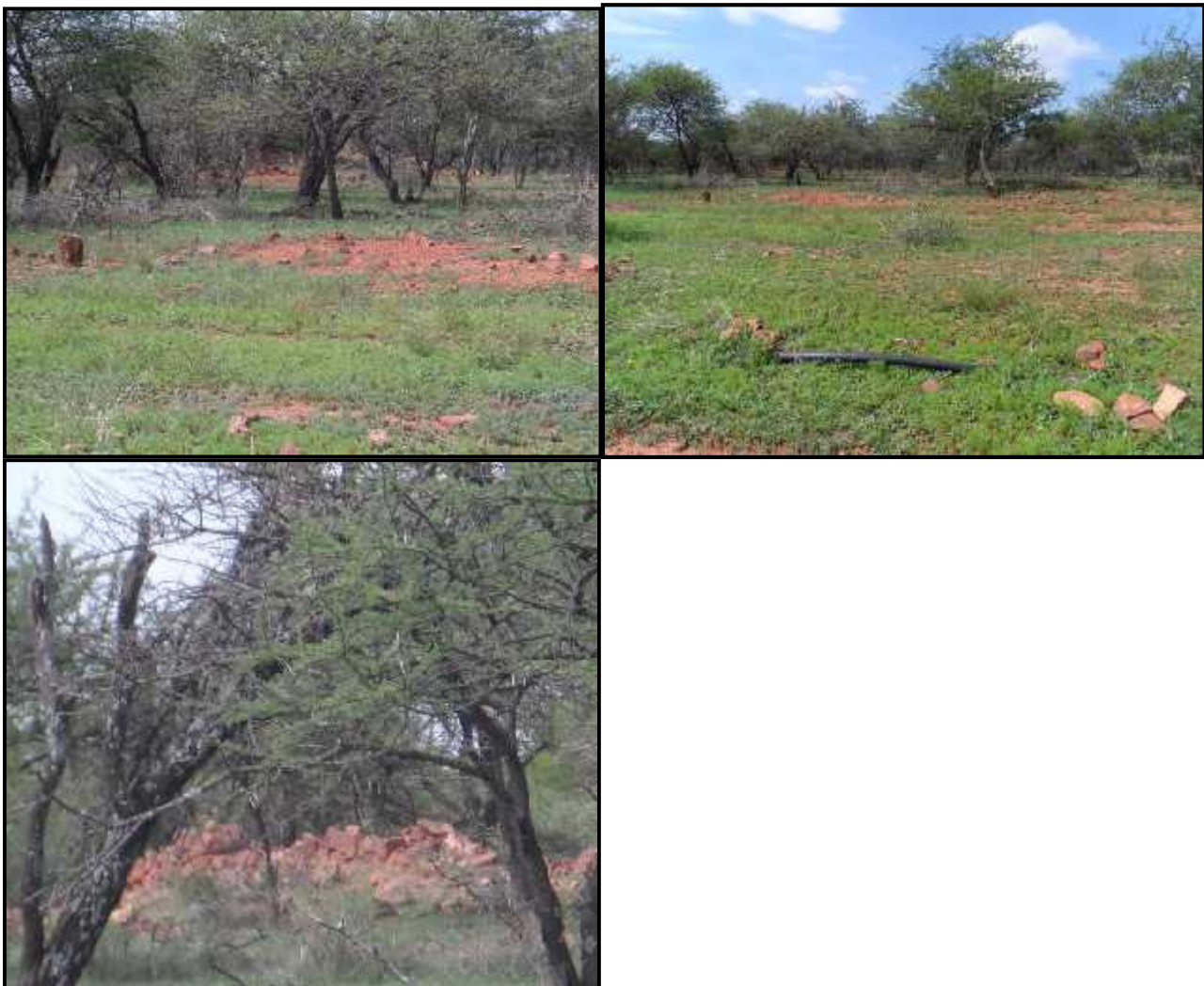


Figure 15- Historic settlement site.

Site	MDD-5
Type	Historic/recent settlement - stone walling
Density	Low density
Location/Coordinates	S25 13 14.4 E28 30 11.2
Approximate Age (More than 60 Or Less than 60 years old)	Less than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	Section 34
<p>Description:</p> <p>The site is recent abandoned settlement site consisting of one stone wall. Like MDD-4 it is located approximately 50 or more meters from the bulk water pipeline supply servitude (Figure 16).</p>	

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GP.C	-	Local	Negligible	Low	Improbable	Short term	A

Note! – The site is located far from the main pipeline servitude and will not be impacted. It is located some 50 meters from the main pipeline servitude. The site is also less than 60 years.



Figure 16- Historic settlement site

6. DISCUSSION AND CONCLUSIONS:

The desktop and cadastral search of the project area did not yield an information about Mathanjana Magisterial District. Information about archaeological and historical resources was yielded about the broader study regions - Mpumalanga and Limpopo Provinces. The physical survey of the project area yielded five sites: a burial ground and grave site in a form of a single grave (MMD-1) and four built environment and landscape features in form of house foundation ruins (MDD-2), two historic/recent settlement sites (MMD-4 & 5) and a recent reservoir (MMD-3) (Figure 14). All the 5 sites are located along the proposed bulk water supply pipeline route/servitude from Rust De Winter Dam to Masobe Village where the bulk water pipeline will end before the water is refined and distributed to various villages in MMD. Four of the five identified sites are located within close proximity to Rust De Winter Dam and the grave site towards Masobe Village (Figure 17). The grave site is located on the border of farms Tamboottenpan 75 JR and Kliprand 76 JR and close to Masobe Village (Figure 17). The potential impact to the grave site is highly probable even though it is visible enough to be

noticed because it falls exactly with the surveyed bulk water supply servitude of 30m (15 meters on either sides). The impact of the proposed development, especially the bulk water supply pipeline excluding distribution once it reaches Masobe Village is very low. Most of these site are located outside the pipeline servitude - for example, MDD-2 (Figure 13), MMD-4 (Figure 15) and MMD-5 (Figure 16).

Based on the findings of the study it is concluded the proposed development will have minimum impact on the cultural environment in MMD. The only impact to the cultural environment that will occur is the potential destruction of a single grave (MMD-1) (Figure 12 & 17). This grave will need to be mitigated and two mitigation measures on how this can be achieved include:

- Fencing off the graves and developing a grave management plan for construction and post construction phase of the project. The pipeline will also need to be divert approximately 15m or more from the grave position.
- To relocate the grave to a municipal formalised cemetery provided that the bulk water pipeline cannot be diverted.

Out of the two mitigation measures the first is the most preferred measure, because relocating the grave is an intense and costly exercise and the development of a pipeline will not have a server negative residual impact of the resource.

7. RECOMMENDATIONS

Based on the discussion and conclusions about the study area the following recommendations are made about the known heritage resources located within the study area, MMD:

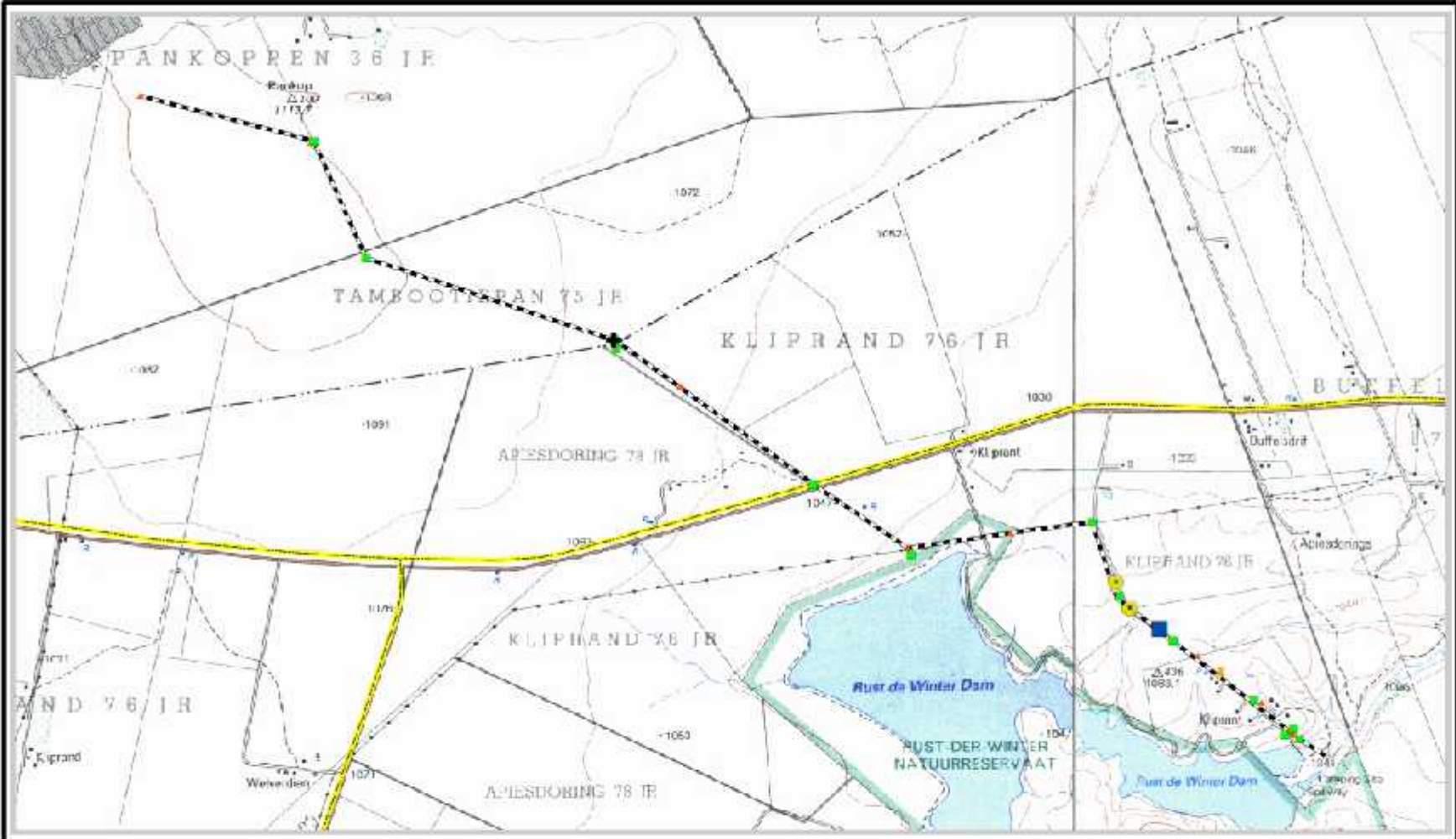
- It is recommended that a Phase II plan of study should be developed for the single grave located in close proximity to Masobe Village (Figure 17).
- The most viable and suitable mitigation measure for this grave is to fence it off from the construction activities and develop a grave management plan to manage it during the construction and post construction phase of the project (during pipeline maintenance). there
- It is further recommended that SAHRA should grant a positive Review Comment for the project, provided that the client agrees to implement the recommendations of this HIA.

Disclaimer

Because of the nature of some archaeological and heritage resources, such as unmarked graves, are subterranean in nature and might have been missed by the current study. The developer should take note of this. In cases such resources are unearthed during the excavation, subsoil and vegetation clearing processes for the placement of for the pipeline - the resources should be treated as chance finds. Refer to Appendix 2 "Heritage Management proposed provision of bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa " for the management of chance finds.



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Legend Mathajane Resources Type_of_Resource + Grave ● Historic settlement site ■ House foundation - walls ■ Floorplans ● Burialmounds				SITE PLAN: HIA MAP Spot image of Pipe line		
● Pipe_kiosk --- Pipe Line --- Railways --- Secondary + Rivers --- Main Roads --- Irrigation canals □ Pasture/Farms						



Figure 17- Map showing the distribution of identified heritage resources along the servitude of the proposed bulk water supply pipeline



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10.2. APPENDIX 2: HERITAGE MANAGEMENT PLAN INPUT INTO THE PROPOSED PROVISION OF BULK WATER SUPPLY FROM RUST DE WINTER DAM TO MMD, LIMPOPO/MPUMALANGA PROVINCES, SOUTH AFRICA

Chart Title:	Heritage Management Inputs for the proposed provision of bulk water supply from Rust De Winter Dam to MMD, Limpopo/Mpumalanga Provinces, South Africa								© NGT
Project Title:									
Objectives of the inputs	<ul style="list-style-type: none"> To avoided disturbance/destruction/damage to the identified and unidentified heritage resources with and immediately around the project area To actively and properly manage all the identified resources with the project area To mitigate any impact or potential impacts to the identified and unidentified heritage resources during the project planning, construction and operational phases 								
Type of Resources	Mitigation of Heritage Resources During Different Project Phases					Responsibility/Implementer/Monitor	Duration	Contact	EMP
	Planning	Construction	Chance Finds/Disturbances During Construction	Rehabilitation	Operational			Client/EM to	
Archaeological [Stone Age (ESA, MSA&LSA); Iron Age (EIA, MIA? LIA); Rock Art; & Historic Archaeology]; Palaeontological; & Meteorite.	Ensure that all the identified and mapped archaeological resources, both within and immediately around the project footprint, are demarcated in preparation for construction activities and associated infrastructure. (These Sections are also worthy to note 7, 27, 31 of the NHRA, NO.25 of 1999). A 5m buffer	Ensure that the demarcated archaeological resources, both with and immediately around the project footprint, are not disturbed at all times. Ensure that no machinery or other construction related infrastructure compromises the nature of any of these resources	Construction needs to stop immediately and a professional and accredited archaeologist or palaeontologist need to be called on sites to investigate and evaluate the finds and make necessary recommendations (e.g. objects in terms of Section 32 of the NHRA, No. 25 of 1999)	The identified mapped and demarcated archaeological resources need to be included in the rehabilitation plan of the project	During this phase all the resources that were identified and demarcated for conservation purposes need to be monitored on 6 months to annual basis	Environmental Control Officer (ECO)	Throughout the project – reporting to environmental manager on weekly basis and urgently in cases of chance finds.	Contact a professional and accredited archaeologist in terms of Section 35 of the NHRA, No.25 of 1999. “Preferable the one involved in the project scoping and/or EIA phases”	Include all significant archaeological/palaeontological/meteorite resources in the Integrated Environmental Management Plan as part of Section 35 of the NHRA, No.25 of 1999 or include them in terms of Section 38 of the NHRA depending on the nature and size of

	is recommended					© NGT			development
Historical, Built Environment & Landscape (incl. Industrial)	Ensure that all historical, built environment & landscape features including industrial structures/features are documented, mapped, demarcated in preparation for construction activities and related infrastructure unless they will form part of the project construction such addition and/or alteration in which case a permit needs to be applied for from relevant responsible authority e.g. SAHRA or PHRA (refer to Section 7	Ensure that all the demarcated historical & built environment and landscape feature including industrial structures/features are not in any way compromised by the construction unless they form an integral part of the construction such as additions and/or alterations.	Should any unplanned disturbance to such resources occur as a result of unforeseen events such as accident the work needs to stop immediately and a qualified heritage consultant needs to be called on site to investigate and evaluate the nature of disturbance and make necessary recommendations. In case of discovery of heritage objects (in terms of Section 32 of the NHRA, No 25 of 1999) through construction/digging an archaeologist	The identified mapped and demarcated resources or resources included in the current project construction activities either through additions and/or alterations need to be included in the overall project area rehabilitation	During this phase all the resources that were identified and demarcated for conservation purposes need to be monitored on 6 months to annual basis – this includes structures/features added on/altere	ECO	Throughout the project – reporting to environmental manager/project manager on weekly basis and urgently in cases of unforeseen disturbances as a result of accidents.	Contact a professional and accredited heritage consultant in terms of Section 34 of the NHRA, No.25 of 1999. “Preferable the one involved in the project scoping and/or EIA phases”. In case of discovery of heritage objects (in terms of Section 32 of the NHRA, No 25 of 1999) through construction/digging, an archaeologist will be called on site.	Include all significant heritage resources in the Integrated Environmental Management Plan as part of Section 34 of the NHRA, No.25 of 1999 or include them in terms of Section 38 of the NHRA depending on the nature and size of development

	& 27 of the NHRA, NO.25 of 1999). A 5 to 2m buffer is recommended for structures/features not forming part of the current construction.		will be called on site.						
Burial Grounds & Grave	Ensure that all the identified and mapped burial grounds and graves sites (e.g. isolate graves or cemeteries – both municipal formalised and those not formalised as such), both within and immediately around the project footprint, are demarcated in preparation for construction activities and associated infrastructure. Should it be deemed that they will inevitably be disturbed a permit needs to be applied for with SAHRA BGG Unit in terms	Ensure that the demarcated burial grounds and grave sites, both with and immediately around the project footprint, are not disturbed at all times. Ensure that no machinery or other construction related infrastructure compromises the nature of any of these resources	Should any an previously un identified burials and graves, as a result of them being unmarked to make them visible, be accidentally discovered/uncover -construction needs to stop immediately and a professional and accredited archaeologist dealings with burials and graves need to be called on sites to investigate and evaluate the finds and make necessary recommendations (e.g. in terms of Section 36 of the NHRA, No. 25 of 1999)	The identified, mapped and demarcated burial grounds and graves sites need to be included in the rehabilitation plan of the project	During this phase all the resources that were identified and demarcated for conservation purposes need to be monitored on monthly, 6 months to annual basis as deemed necessary by the responsible archaeologist in consultation with the EM or client & ECO	Environmental Control Officer (ECO)	Throughout the project – reporting to environmental manager on weekly basis and urgently in cases of accidentally discovered/uncovered burials and graves.	Contact a professional and accredited archaeologist in terms of Section 35 of the NHRA, No.25 of 1999. “Preferable the one involved in the project scoping and/or EIA phases”	Include all burials and graves Integrated Environmental Management Plan as part of Section 36 of the NHRA, No.25 of 1999 or include them in terms of Section 38 of the NHRA depending on the nature and size of development.

© NGT	of Section 36 of the NHRA, NO.25 of 1999). In a case where they will not be direct impacted it is recommended that a 5m buffer need to be made available								
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