A HERITAGE IMPACT ASSESSMENT STUDY FOR THE PROPOSED CAMDEN WASTE DISPOSAL SITES, CAMDEN POWER STATION, MSUKALINGWA LOCAL MUNICIPALITY, GERT SIBANDE DISTRICT, MPUMALANGA PROVINCE, SOUTH AFRICA.

PROJECTS & HERITAGE CONSULTANTS (PTY)LTD

Version.01

29 May 2013

ACKNOWLEDGEMENT OF RECEIPT

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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 was been appointed by Baagi Environmental Consultancy as an independent and lead CRM firm to conduct an HIA (exclusive of Palaeontological desktop study) for the proposed development (of Camden Waste Disposal Sites) as part of specialists (inputs) impact assessment studies required to fulfil the EMP 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), as well as other applicable legislations such as the MPRDA No. 28 of 2002. Nkosinathi Tomose, the lead archaeologist & heritage consultant of NGT Projects & Heritage Consultants, conducted the HIA study for the proposed Camden Waste Disposal Sites in Camden Power Station, Msukalingwa Local Municipality, Gert Sibande District, Mpumalanga Province, South Africa.

The following conclusions and recommendations are made about the 3 proposed Camden Waste Disposal Sites 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 EMP requirement as proposed by the client (Baagi Environmental Consultancy):

- The physical survey of the proposed project area, which took place on the 9th of May 2013, did not yield any archaeological or heritage resources sites or artefacts.
- Based on the results of the survey and literature review is concluded that, from a cultural resources management point of view, the project may proceed as planned.

TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF TABLES

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
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
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 Eskom Power Generation projects and it involves construction of waste disposal site at Camden Power Station, Msukalingwa Local Municipality, Gert Sibande District, Mpumalanga Province, South Africa. The current study form part of specialists studies aimed at giving inputs in the BAR process and advising the best suitable waste disposal site out of the 3 sites currently be investigated for a suitable Camden Waste Disposal Site. It is also aimed at advising on best heritage mitigation measures for heritage resources in terms known heritage resources management measures (Figure 1).

1.1.2. Proposed Project Aims

The aim of Camden Waste Disposal site is to help manage waste produced as a by-product during power generation activities in Camden Power Station, Msukalingwa Local Municipality, Gert Sibande District, Mpumalanga Province, South Africa. Therefore, the aim of the current study is to advise Eskom on the suitable and best site to construct the proposed Camden Waste Disposal Site and on measures to use during the construction and operational phase of the project for the management of the environmental fabric of Camden Power Station landscape. It does this through a compilation of various impact assessment studies that feed into the BAR document. This HIA study aims to contribute to the development of such a BAR document through the assessing and evaluation impacts that affect or have the potential to impact on the cultural environment. The proposed project consists of the following:

- The selection of the best suitable sites in terms of environmental management parameters for the construction of the Camden Waste Disposal Site , Msukalingwa Local Municipality, Gert Sibande District, Mpumalanga Province, South Africa.
- Following the selection process of the suitable site - the construction of a Waste Disposal Site

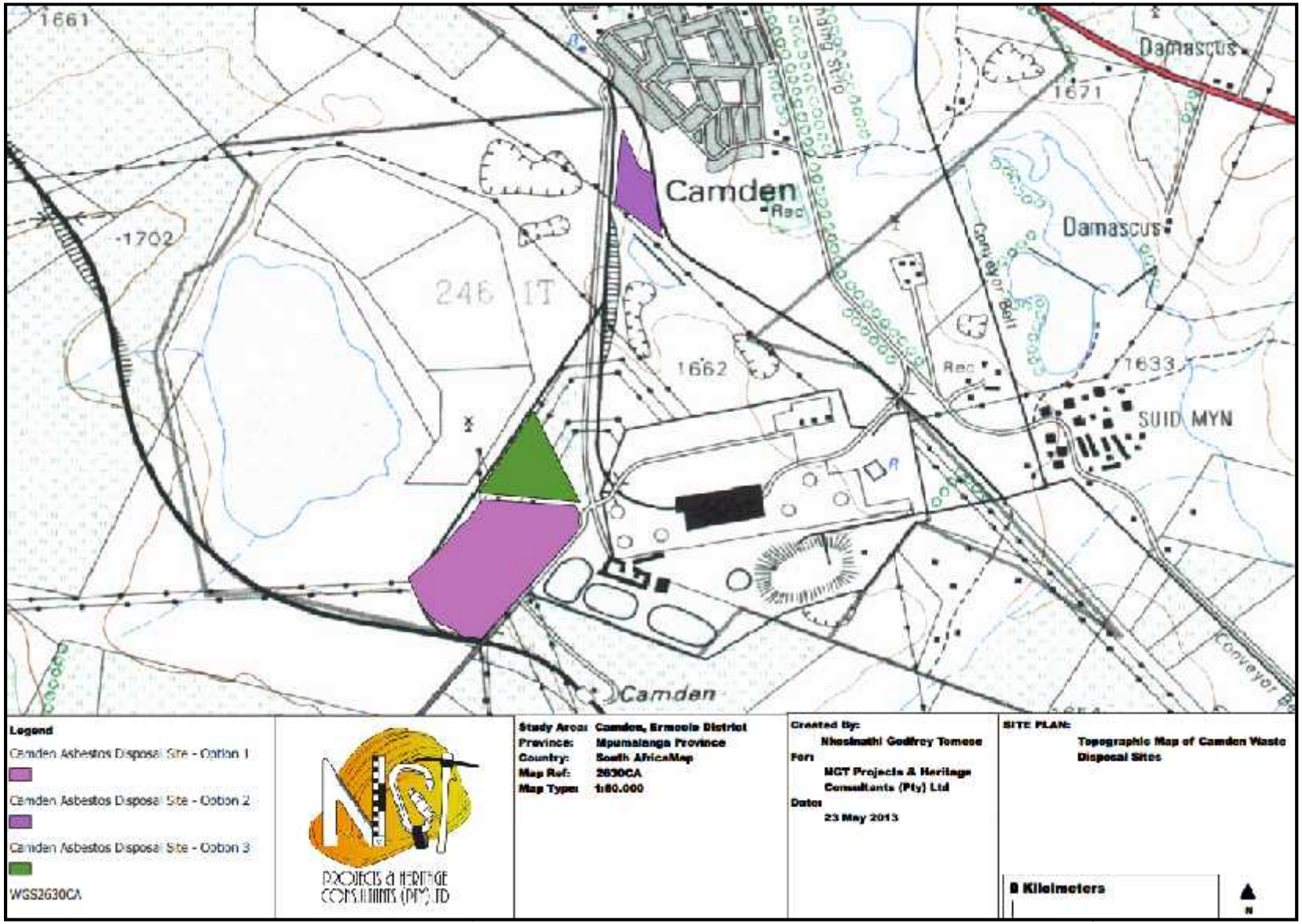
1.1.3. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist

Because of the nature and size of the proposed development - proposed Camden Waste Disposal Site and associated infrastructure exceeding a total area of 5000m^2, a BAR 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 facilities is listed as an activity that requires environmental authorisation. Undertaking of the BAR process is therefore a requirement instead of the full EIA process. The current BAR process involves the identification and assessment of environmental impacts through specialist studies.

NGT Projects & Heritage Consultants (Pty) Ltd has been appointed by Baagi Environmental Consultancy as an independent and lead CRM firm to conduct an HIA (exclusive of Palaeontological desktop study) for the proposed development as part of specialists (inputs) impact assessment studies required to fulfil the BAR process and its requirements. Nkosinathi Tomose, the lead archaeologist & heritage consultant of NGT Projects & Heritage Consultants,

conducted the HIA study for the proposed Camden Waste Disposal Site in Camden Eskom PowerStation, , Msukalingwa Local Municipality, Gert Sibande District, Mpumalanga Province, South Africa (Figure 1).

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), as well as other applicable legislations such as the MPRDA No. 28 of 2002.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Country: South AfricaMap
Map Ref: 2630CA
Map Type: 1:80.000
Created By:
Nhosinathi Godfrey Tomose
For:
MCT Projects & Heritage Consultants (Pty) Ltd
Date:
23 May 2013
SITE PLAN:
Topographic Map of Camden Waste Disposal Sites
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Figure 1- Location of the proposed Camden Waste Disposal Sites in Camden Power Station, Mpumalanga Province, South Africa. Note the various options of the proposed waste disposal sites.

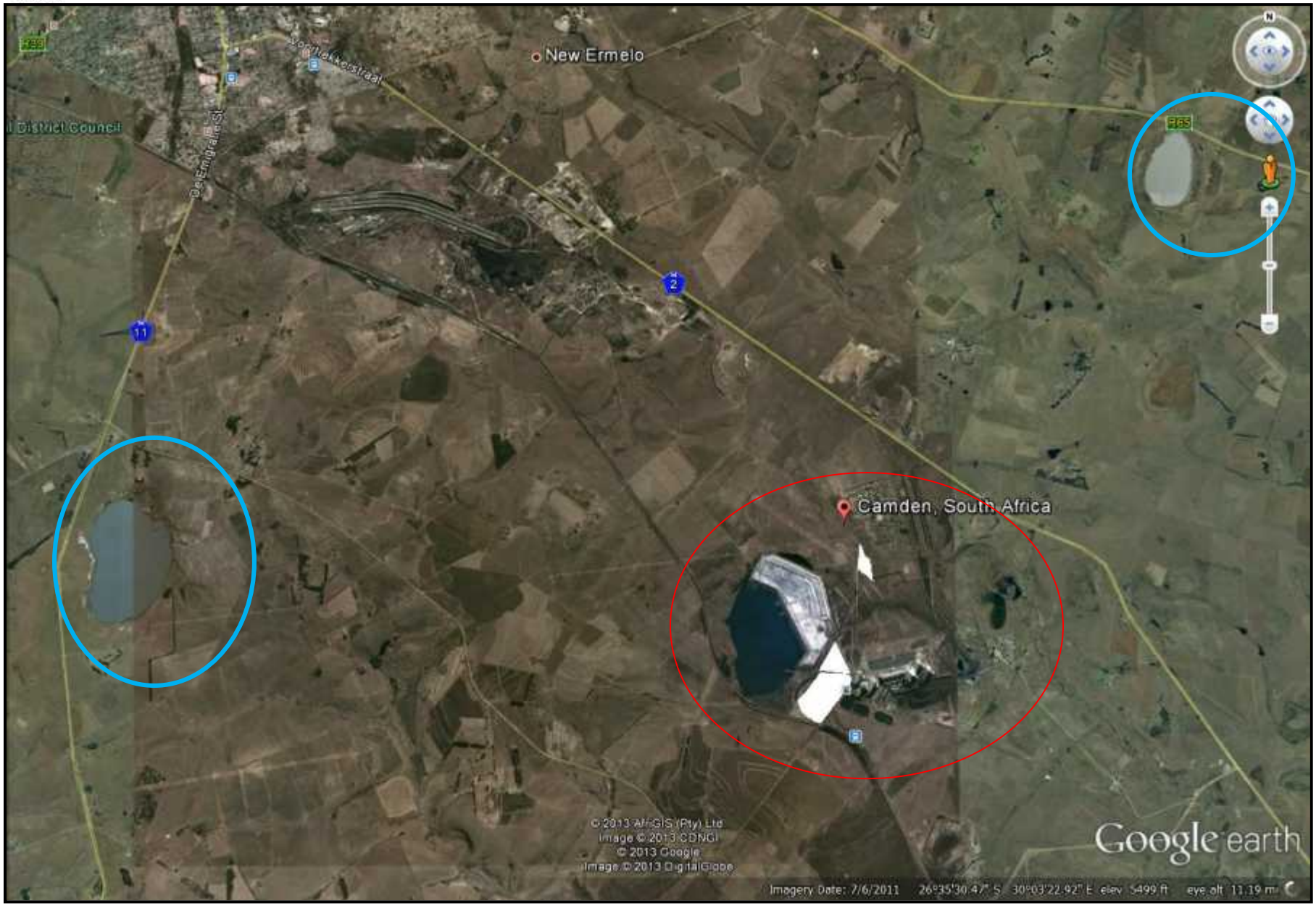
2. BACKGROUND OF THE STUDY AREA

2.1. Description of the affected environment

Table 1 -Camden, Gert Sibande District Municipality, Mpumalanga Province, South Africa

Location	• The project area is located in the Camden PowerStation, , Msukalingwa Local Municipality, Gert Sibande District, Mpumalanga Province, South Africa. It is located within the Highveld (Figure 22)
Study Site Land Uses	• Government Parastatal: Eskom station and offices (Figure 3), Eskom Camden Village (Figure 4), transmission lines (Figure 5), Transnet railways lines (Figure 6), existing Camden waste disposal sites (Figure 1 and Figure 7), multi-purpose pipeline (Figure 8), and storage tanks and cylinders (Figure 9). • As result of the above land use activities all the proposed 3 Camden Waste Disposal Sites options are highly disturbed (e.g. Figure 10).
Land Owner(s)	• Government Parastatal - Eskom
Applicant	• Baagi Environmental on behalf of Eskom
Proposed Development	• Development of a new Camden Waste Disposal Site to be selected out of 3 proposed Camden Waste Disposal Sites options, Mpumalanga, South Africa
Access	• Existing national, provincial and local roads, routes and human foot paths. • The study area is ensconced between the following major roads: west of the N2 from Ermelo to Piet Retief, east of the N11 from Ermelo to Amersfoort, north of the R543 road linking Piet Retief, Wakkerstroom and Volksrust (e.g. Figure 2)
Defining natural features	• A number of fresh water pans and dams are found in areas located in and around Camden Power Station (e.g. Figure 2 - blue circles) • The area is also generally flat in areas defined by operational

	and now operation plough-fields (Figure 2).


New Ermelo
Camden, South Africa
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Google earth
Imagery Date: 7/6/2011

Figure 2- Location of Camden Power Station in between some of the known national roads in Gert Sibande District, Mpumalanga Province, South Africa

Figure 3 - Camden Power Station - note the flatness of the landscape

Figure 4- Camden Village

Figure 5 - Eskom transmission powerlines

Figure 6 - Transnet railway line passing south of Camden Power Station

Figure 7- Existing waste disposal site, Camden Power Station

Figure 8- Multi-purpose pipelines

Figure 9 - Storage tanks or cylinders

2.1.1. Camden Waste Disposal Site - Option 1

This option is highly disturbed like the other 2 options. Various activities have been noted in the options such as concrete storage for road maintenance and construction activities (Figure 10). Old roads, bridges and a railway line are found on the southern edges of the site (Figure 11). The eastern ages of the site are defined by ground water seepage (Figure 12). The rest

of the site has long to low grass cover - low grass under power line servitude as a result of servitude maintenance (e.g. Figure 13)

Figure 10- Levels of disturbance

Figure 11- Old road and railway line

Figure 12- Ground water seepage

Figure 13- Grass cover under powerlines

2.1.2. Camden Waste Disposal Site - Option 2

Option 2 is located some distance from Option 1 and 3 which are both located in the same area (Figure 1). In a trapezium to diamond shape - this option is highly disturbed. Evidence of previous waste storage (presumable temporary) is seen through leaching, ash and ash dump burnt material (Figure 14). There is also evidence of concrete road which use to support the railway tracks (Figure 15). Unlike Options 1 and 3, Option 2 is not characterised by Powerline pylons and servitudes - these occur some distance from the actual site.

Figure 14- Ground leaching, showing evidence of ash and burnt material - typical waste dump site material.

Figure 15- Position of old railway tracks.

2.1.3. Camden Waste Disposal Site - Option 3

Option 3 is located just above Option 1 and form a little triangle shape (Figure 1). This Option is probable the most highly disturbed option out of the 3 proposed Camden Waste Dump Options. Disturbance are a result of Eskom transmission lines and servitudes (Figure 16),

multi-purpose pipelines (Figure 17) and rubble storage (Figure 18). There is also an area that has ground water seepage as evident in the type of grass (reed type grass) (Figure 19)

Figure 16- Eskom power lines. Note levels of grass cover as a result of servitude maintenance

Figure 17- Multipurpose pipelines

Figure 18- Rubble storage

Figure 19- Area with ground water seepage

2.2. Description of proposed activities: Infrastructure Proposed

Table 2 - List of Activities

Activity 1	Construction of a Waste Disposal Site, and associated infrastructure
Activity 2	Clearing of access roads and stabilizing the land to support the proposed Waste Disposal Site

2.3. Needs & Desirability

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

Activity 1	• Desktop study of the heritage value and integrity of the area under consideration and its surrounding with a particular focus on resources within the proposed alignment (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 3 proposed Camden Waste Disposal Site, Mpumalanga Province as part the BAR process
Activity 2	• 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	• Proposing heritage management measures for inclusion in the BAR document • Making recommendations to SAHRA and provincial heritage resources authority - MPHRA

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 Olduwan 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 Olduwan 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.

One of the site in close proximity to the study area with known ESA stone artefacts, material culture and fossilized remains of Australopithecus is the Makapansgat World Heritage Site. The site is located off the N1 some 23km north-east of the Town of Mokopane. Fossil evidence of such occupation date between 1,5m.y.a and 100 k.y.a (MSA).

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 Qriqualand 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 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 counter-parts - 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. Owning 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 and 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

groves on rock surfaces, grinding stones etc (e.g. Huffman, 2007). In the vicinity of the study area iron or miners and traders, who frequented the region have left evidence of ore slug and smelters - the ore deposit in Thabazimbi would have attracted many LIA miners and traders.

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 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 ruminants 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.

2.4.4. History of Camden Power Station

Camden Power Station is located some 14.4km from Ermelo City Centre. The station was commissioned in 1967 by the Eskom. The station operated for approximately 21 years and it was mothballed between the year 1990 and 2004. However, as a result of South Africa energy crisis which became eminent when electricity distribution become spread across all sectors of South African society to include areas that previously had no electricity power - Eskom was prompted to re-commission the station. The process began in year 2005 and between 2005 and 2008 8 units of the sites had been operational. The station is a fossil fuel power generating station using coal. Its power is generated by eight 200MW units with a total installed capacity of 1.600MW. The station and its infrastructure are today 46 years old and not buildings or other industrial structures associated with this station meet the 60 year old heritage site proclamation period.

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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 need to 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 Camden Waste Disposal Sites (3 options) it forms part of specialists studies aimed at giving inputs into the BAR for Camden PowerStation, Gert Sibande District Municipality, Mpumalanga Province, South Africa. It does this in order to adhere to the Terms of Reference provided by the client for the completion of this report. However, 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.
    - Ermelo 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 3 proposed Camden Power Station Waste Disposal Sites";

2. To "identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located in and around the proposed Camden Waste Disposal Sites . Use will be made of annotated maps where appropriate"

In order to address these concerns by the client:-

- The physical survey of the proposed Camden Waste Disposal Sites was conducted by a qualified archaeologist and general heritage specialist from NGT Projects & Heritage Consultants on the 9th May 2013.
- The survey covered all 3 proposed options of the proposed Camden Waste Disposal Site 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 Camden Waste Disposal Sites. 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 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 barrow pits and human excavated grounds. The edges/sides of dirty 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
    - Lenovo ThinkPad aided with Garmin Basecamp Software, Google Earth – to plot the propose the 3 proposed Camden Waste Disposal Site options.

- Quantum GIS was used to plot all the identified heritage resources and to develop heritage maps in order to inform the heritage analysis of the 3 proposed Camden Waste Disposal Sites.
- Maps provided by the client before the survey also proved invaluable
- Shapefiles (KMZ files) provided by the client were used to map the site
- Samsung camera – was 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 Quantum GIS
- 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 - <10/50m^2
    - Medium - 10-50/50m^2
    - High - >50/50m^2
- 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 uncertain 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 line corridor represent the total amount of physical or tangible resources distributed in and around/along the propose line corridor servitude.

4.2. Exclusions -

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

- The survey was conducted in May 2013, early Winter period - as such there are still 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 line corridor 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 Borutho-Witkop Transmission Line. Because there was no deeds search of the various properties and farms that the proposed Transmission Line 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 Medupi-Borutho Transmission Line, Limpopo Province–

Based on the known archaeological and historical events that took place within this region - Mpumalanga Province. The following archaeological and heritage resources sites are would occur in areas that have less disturbance:

- Iron Age implements
- Iron ceramics
- Iron Age graves and burials
- Iron Age stone settlements and kraals
- Ash middens
- Historic monuments – some associated with the South African Wars (commonly known as the Anglo-Boer Wars)
- 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 Camden Power Station it is very unlikely that any archaeological and historical resources will be located within and immediately outside of each of the 3 proposed Camden Waste Disposal Sites.

5.3. Cadastral Search:

The following maps of the study area were used to assess the evolutions of the landscape in and around the area in which the proposed corridor will traverse:

- The fist map is a general tour guide map of the region in which Camden is located. On this map Camden Power Station is shown located south of the N2 linking Ermelo and Piet Retief and south-east of the town of Ermelo. The area in which the study is based seem an interesting landscape in terms of biodiversity - for example, the location of Jericho Dam Nature Reserve as well as the Mpumalanga Wetlands Regions (Figure 20).

- The second maps is the 1942 (1:250.000) Topo-cadastral - it shows Camden Power Station south of the N2 linking Ermelo and Piet Retief. Also shown on the map is the railway line which still exist south of Option 1 of Camden Waste Site (1). Using this map to relative date this railway line - it would be over 70 years today. Also important about this map is the depiction of New Ermelo (Native Quarters) - one passes these townships from Ermelo City Centre to site.

- 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 Highveld. It terms of biodiversity and environment this is important as it would give information on the various natural environmental features.

Figure 20- Tourism Map showing the location of Camden Power Station in relation to the N2 and Ermelo.

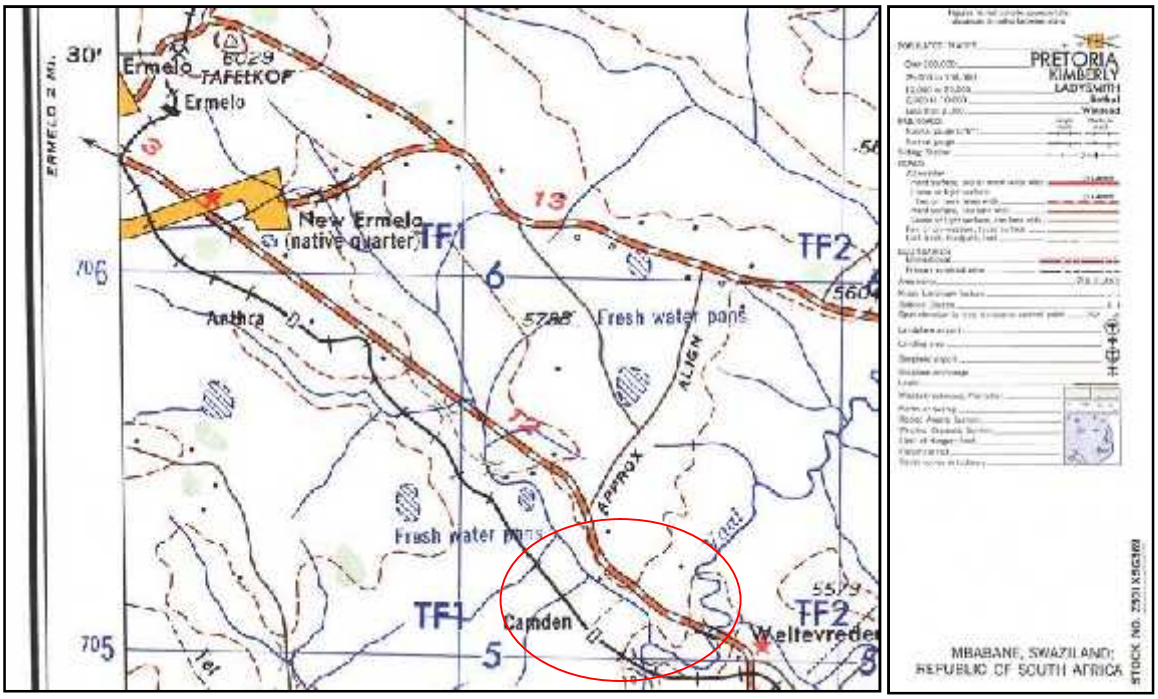

Figure 21. 1942 1:250.00 Topo-cadastral Map Location of Camden Power Station in relation to the N2 and Ermelo.

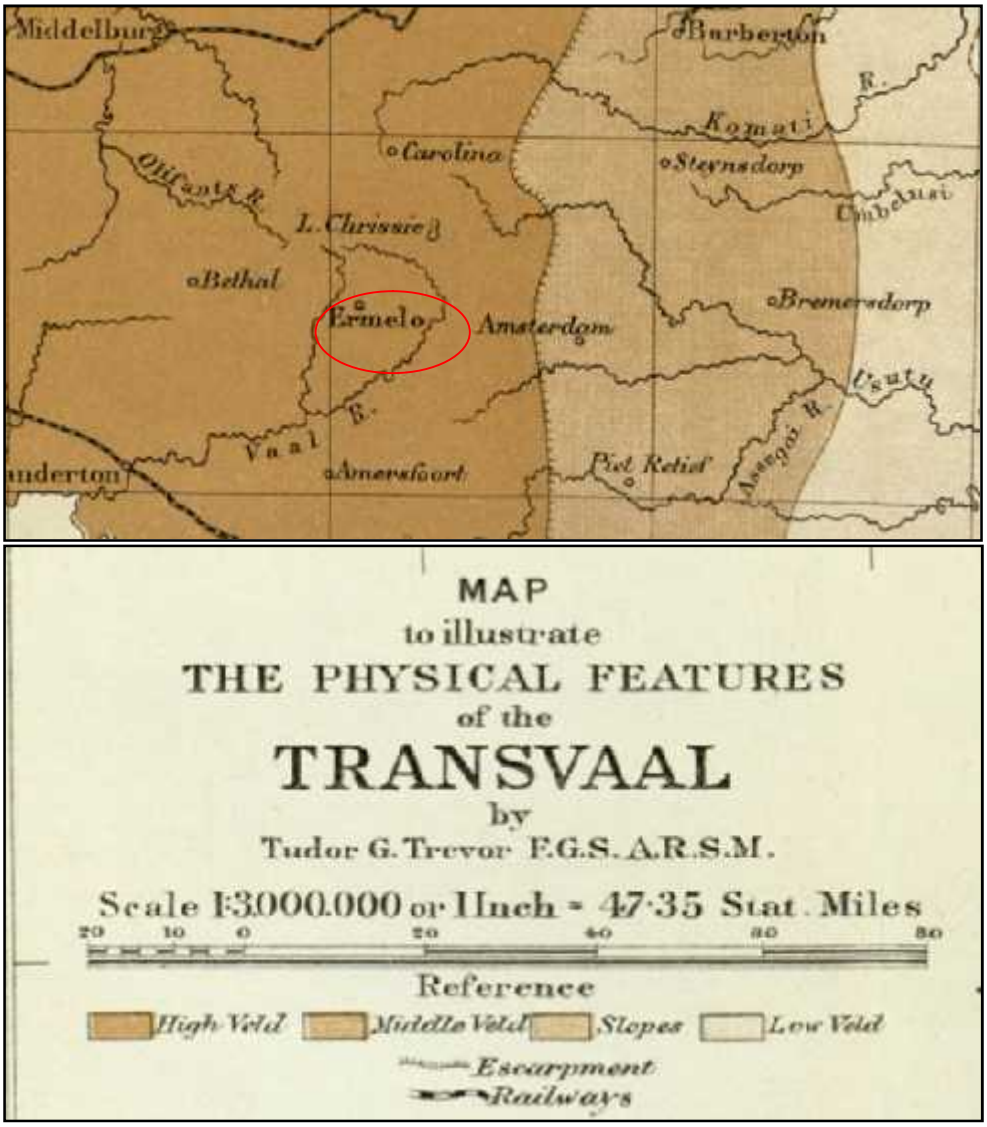

Figure 22-1905 Map illustrating the physical features of the Transvaal by Tudor G. Trevor, - F.G.S.A.R.S.M @ Trevor, 1906.

5.4. Deeds Search:

No deeds search was conducted as part of the study.

5.5. Field Survey and Identified Archaeological/Heritage Resources:

The physical survey of Camden PowerStation for the proposed 3 Waste Disposal Sites did not yield any archaeological or heritage resources and sites. All three study options are highly disturbed through various industrial actions and activities that have taken place in Camden.

6. DISCUSSION AND CONCLUSIONS:

Both the desktop phase and the physical survey of the project area did not yield any archaeological and heritage resources about the 3 proposed Camden Waste Disposal Sites. Based on the study findings it is concluded that the proposed development can go ahead as planned. Out of the 3 options surveyed and assessed, Option 2 is the most preferred site. This is partly based on the layering of the landscape of this site which is devoid of any ground seepages and Eskom Power Line which characterise the other 2 Options. Both Option 1 and 3 did not yield any resources but they are located in an areas with existing Power Line and lots of ground seepage.

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 processes for land stabilization process for the placement of selected Waste Disposal Site. These resources should be treated as chance finds. Refer to Appendix 2 "Heritage Management Plan Camden Waste Disposal Sites" for the management of chance finds.

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10.2. APPENDIX 2: HERITAGE MANAGEMENT PLAN INPUT INTO THE BORUTHO-WITKOP TRANSMISSION LINE CORRODR EMP, LIMPOPO PROVINCE, SOUTH AFRICA

Chart Title:	Heritage Management Inputs for the Camden Waste Disposal Site , BAR, Mpumalanga Province , South Africa								© NGT
Project Title:									
Objectives of the inputs	• 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	Ensure that all the identified and mapped archaeological resources, both within and immediately around the project footprint, are	Ensure that the demarcated archaeological resources, both with and immediately around the project	Construction needs to stop immediately and a professional and accredited archaeologist or palaeontologist need to be	The identified mapped and demarcated archaeological resources need to be included in the rehabilitation	During this phase all the resources that were identified and demarcated for conservati	Environmental Control Officer (ECO)	Throughout the project – reporting to environmental manager on weekly basis and	Contact a professional and accredited archaeologist in terms of Section 35 of the NHRA, No.25 of 1999. "Preferable the one involved in	Include all significant archaeological/palaeontological/meteorite resources in the Integrated Environmen

]; Palaeontological; & Meteorite.	demarcated in preparation for construction activities and associated infrastructure. (These Sections are also worthy to note 7, 27, 31 of the NHRA, N0.25 of 1999). A 5m buffer is recommended	footprint, are not disturbed at all times. Ensure that no machinery or other construction related infrastructure compromises the nature of any of these resources	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)	plan of the project	on purposes need to be monitored on 6 months to annual basis		urgently in cases of chance finds.	the project scoping and/or EIA phases"	tal 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 development
Historical, Built Environment & Landscape (incl. Industrial)	Ensure that all historical, built environment & landscape features including industrial structures/feat	Ensure that all the demarcated historical & built environment and landscape	Should any unplanned disturbance to such resources occur as a result of unforeseen events such as	The identified mapped and demarcated resources or resources included in the current	During this phase all the resources that were identified and demarcate	ECO	Throughout the project – reporting to environmental manager/p	Contact a professional and accredited heritage consultant in terms of Section 34 of the NHRA,	Include all significant heritage resources in the Integrated Environmental

	ures 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 & 27 of the NHRA, N0.25 of 1999). A 5 to	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.	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 will be called	project construction activities either through additions and/or alterations need to be included in the overall project area rehabilitation	d for conservation purposes need to be monitored on 6 months to annual basis – this includes structures/ features added on/altered		roject manager on weekly basis and urgently in cases of unforeseen disturbances as a result of accidents.	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.	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

	2m buffer is recommended for structures/features not forming part of the current construction.		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	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	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	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	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

© NGT	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 of Section 36 of the NHRA, N0.25 of 1999). In a case where they will not be direct impacted it is recommended that a 5m buffer need to be made available	the nature of any of these resources	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)		by the responsible archaeologist in consultation with the EM or client & ECO				on the nature and size of development.