AGES OMEGA: PROPOSED BARKLEY EAST BULK WATER SUPPLY UPGRADE DEVELOPMENT, BARKLY EAST, EASTERN CAPE PROVINCE

Archaeological Impact Assessment

An EOH Company

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Innovation in Sustainability

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ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF AREAS DEMARACTED FOR THE BARKLEY EAST BULK WATER SUPPLY UPGRADE PROJECT, BARKLY EAST, JOE GQABI DISTRICT MUNICIPALITY, EASTERN CAPE PROVINCE

May 2016

Conducted on behalf of:

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Exigo Sustainability promotes the conservation of sensitive archaeological and heritage resources and therefore uncompromisingly adheres to relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980). In order to ensure best practices and ethics in the examination, conservation and mitigation of archaeological and heritage resources, Exigo Sustainability follows the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment as set out by the South African Heritage Resources Agency (SAHRA) and the CRM section of the Association for South African Professional Archaeologists (ASAPA).

DECLARATION

I, Nelius Le Roux Kruger, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Barkley East Bulk Water Supply Upgrade Project in an objective manner, even if this results in views and findings that are not favourable to the client;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have the required expertise in conducting the specialist report and I will comply with legislation, including the relevant Heritage Legislation (National Heritage Resources Act no. 25 of 1999, Human Tissue Act 65 of 1983 as amended, Removal of Graves and Dead Bodies Ordinance no. 7 of 1925, Excavations Ordinance no. 12 of 1980), the Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment (SAHRA, AMAFA and the CRM section of ASAPA), regulations and any guidelines that have relevance to the proposed activity;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this declaration are true and correct.

_____

Signature of specialist
Company: Exigo Sustainability
Date: 22 May 2014

EXECUTIVE SUMMARY

This report details the results of an Archaeological Impact Assessment (AIA) study in Barkly East area, subject to an Environmental Impact Assessment (EIA) process for the proposed upgrade of bulk water supply infrastructure. The applicant, Joe Gqabi District Municipality, proposes the upgrade of approximately 3.11km of water supply pipeline and 2.40km of sewage line upgrade in and around Barkly East. The AIA was conducted subject to requirements as set out by the National Environmental Management Act (Act 107 of 1998), the National Heritage Resources Act (NHRA - Act 25 of 1999). The report includes background information on the area's archaeology, its representation in southern Africa, and the history of the larger area under investigation, survey methodology and results as well as heritage legislation and conservation policies. A copy of the report will be supplied to the provincial heritage agency (EC-PHRA) and recommendations contained in this document will be reviewed.

A number of archaeological and historical studies have been conducted in this section of the Eastern Cape Province and around the town of Barkly East, most of which infer a varied and rich heritage landscape. Surface scatters of Early Stone Age handaxes and Middle Stone Age stone artefacts occur near Indwe approximately 45km west of Barkly East. Middle Stone Age rock shelter sites containing blade stone artefacts and wooden artefacts as well as preserved bedding have also been recorded near to Maclear approximately 60km from the study area. Several Later Stone Age sites have been excavated and researched within the surrounding area and wider region, the closest site situated 3km west of the Polar Park study area. Several rock art sites occur within the surrounding regions with rock panels containing Hunter Gatherer art occurring on many farms around the town of Barkly East. However, the study area has been altered extensively by recent and historical activities largely sterilising the area of heritage remains. As such, only two sensitive heritage receptors were identified in the Barkley East Bulk Water Supply Upgrade Project study areas.

- The remains of a railway warehouse and a number of ruined multi-room buildings possibly dating to the Colonial Period in the study area (**Site EXIGO-BWS-HP01 & Site EXIGO-BWS-HP02)** are of medium-low significance due to their poor preservation. However, it is recommended that the sites and any activities in its surrounds be monitored in order to avoid the destruction of previously undetected heritage remains. The necessary destruction permits should be obtained from the relevant Heritage Resources Authorities prior to the probable destruction of the features.
- A number of Colonial Period heritage structures features occur in Barkley East in close proximity of the project area (**Site EXIGO-BWS-HP03**) and the sites are generally of medium significance. It is recommended that the sites be avoided and that a 50m conservation buffer around the structures be implemented. The sites and any activities in its surrounds should be carefully monitored in order to avoid the destruction of previously undetected heritage remains.
- A careful watching brief monitoring process is recommended whereby an informed ECO inspect the construction sites on regular basis in order to monitor possible impact on heritage resources. Should any subsurface paleontological, archaeological or historical material or heritage resources be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately

A Palaeontological Impact Assessment and / or Desktop Study is recommended for the study area and, should fossil remains such as fossil fish, reptiles or petrified wood be exposed during construction, these objects should carefully safeguarded and the relevant heritage resources authority (EC-PHRA) should be notified

immediately so that the appropriate action can be taken by a professional palaeontologist.

Barkley East Bulk Water Supply Upgrade Project Heritage Sites Locations

Site Code	Short Description	Coordinate S E	Mitigation Action
EXIGO-BWS-HP01	Colonial Period Ruin	**S30.963848° E27.582191°**	General site monitoring by informed ECO. Destruction permitting if impacted on.
EXIGO-BWS-HP02	Colonial Period Ruins	**S30.961018° E27.583705°**	
EXIGO-BWS-HP03	Colonial Period Buildings	**S30.971656° E27.597871°**	Avoidance, conservation buffer, site monitoring.

Heritage resources occur inside and in close proximity of alignments proposed for sewer and water pipelines areas proposed for the Barkley East Bulk Water Supply Upgrade Project and potential peripheral impact on these heritage receptors is foreseen. However, this impact can be mitigated by means of avoidance and site monitoring during development. In the opinion of the author of this Archaeological Impact Assessment Report, the proposed Barkley East Bulk Water Supply Upgrade Project may proceed from a culture resources management perspective, provided that mitigation measures are implemented where applicable, and provided that no subsurface heritage remains are encountered during construction.

It is essential that cognisance be taken of the larger archaeological landscape of the Eastern Cape Province and the Barkly East region in order to avoid the destruction of previously undetected heritage sites. Should any previously undetected heritage resources be exposed or uncovered during construction phases of the proposed project, these should immediately be reported to the EC-PHRA. Since the intrinsic heritage and social value of graves and cemeteries are highly significant, these resources require special management measures. Should human remains be discovered at any stage, these should be reported to the Heritage Specialist and relevant authorities (EC-PHRA, SAHRA) and development activities should be suspended until the site has been inspected by the Specialist. The Specialist will advise on further management actions and possible relocation of human remains in accordance with the Human Tissue Act (Act 65 of 1983 as amended), the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), the National Heritage Resources Act (Act no. 25 of 1999) and any local and regional provisions, laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.

This report details the methodology, limitations and recommendations relevant to these heritage areas, as well as areas of proposed development. It should be noted that recommendations and possible mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

NOTATIONS AND TERMS/TERMINOLOGY

Absolute dating:

Absolute dating provides specific dates or range of dates expressed in years.

Archaeology:

The study of the human past through its material remains.

Archaeological record:

The archaeological record minimally includes all the material remains documented by archaeologists. More comprehensive definitions also include the record of culture history and everything written about the past by archaeologists.

Artefact:

Entities whose characteristics result or partially result from human activity. The shape and other characteristics of the artefact are not altered by removal of the surroundings in which they are discovered. In the southern African context examples of artefacts include potsherds, iron objects, stone tools, beads and hut remains.

Assemblage:

A group of artefacts recurring together at a particular time and place, and representing the sum of human activities.

^{14}C or radiocarbon dating:

The ^{14}C method determines the absolute age of organic material by studying the radioactivity of carbon. It is reliable for objects not older 70 000 years by means of isotopic enrichment. The method becomes increasingly inaccurate for samples younger than ±250 years.

Ceramic Facies:

In terms of the cultural representation of ceramics, a facies is denoted by a specific branch of a larger ceramic tradition. A number of ceramic facies thus constitute a ceramic tradition.

Ceramic Tradition:

In terms of the cultural representation of ceramics, a series of ceramic units constitutes as ceramic tradition.

Context:

An artefact's context usually consists of its immediate *matrix*, its *provenience* and its *association* with other artefacts. When found in *primary context*, the original artefact or structure was undisturbed by natural or human factors until excavation and if in *secondary context,* disturbance or displacement by later ecological action or human activities occurred.

Culture:

A contested term, "culture" could minimally be defined as the learned and shared things that people have, do and think.

Cultural Heritage Resource:

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

Cultural landscape:

A cultural landscape refers to a distinctive geographic area with cultural significance.

Cultural Resource Management (CRM):

A system of measures for safeguarding the archaeological heritage of a given area, generally applied within the framework of legislation designed to safeguard the past.

Ecofact:

Non artefactual material remains that has cultural relevance which provides information about past human activities. Examples would include remains or evidence of domesticated animals or plant species.

Excavation:
The principal method of data acquisition in archaeology, involving the systematic uncovering of archaeological remains through the removal of the deposits of soil and the other material covering and accompanying it.

Feature:
Non-portable artefacts, in other words artefacts that cannot be removed from their surroundings without destroying or altering their original form. Hearths, roads, and storage pits are examples of archaeological features

GIS:
Geographic Information Systems are computer software that allows layering of various types of data to produce complex maps; useful for predicting site location and for representing the analysis of collected data within sites and across regions.

Historical archaeology:
Primarily that aspect of archaeology which is complementary to history based on the study of written sources. In the South African context it concerns the recovery and interpretation of relics left in the ground in the course of Europe's discovery of South Africa, as well as the movements of the indigenous groups during, and after the "Great Scattering" of Bantu-speaking groups – known as the *mfecane* or *difaqane*.

Impact: A description of the effect of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

Iron Age:
Also known as "Farmer Period", the "Iron Age" is an archaeological term used to define a period associated with domesticated livestock and grains, metal working and ceramic manufacture.

Lithic:
Stone tools or waste from stone tool manufacturing found on archaeological sites.

Management / Management Actions:
Actions – including planning and design changes - that enhance benefits associated with a proposed development, or that avoid, mitigate, restore, rehabilitate or compensate for the negative impacts.

Matrix:
The material in which an artefact is situated (sediments such as sand, ashy soil, mud, water, etcetera). The matrix may be of natural origin or human-made.

Megalith:
A large stone, often found in association with others and forming an alignment or monument, such as large stone statues.

Midden:
Refuse that accumulates in a concentrated heap.

Microlith:
A small stone tool, typically knapped of flint or chert, usually about three centimetres long or less.

Monolith:
A geological feature such as a large rock, consisting of a single massive stone or rock, or a single piece of rock placed as, or within, a monument or site.

Oral Histories:
The historical narratives, stories and traditions passed from generation to generation by word of mouth.

Phase 1 CRM Assessment:
An Impact Assessment which identifies archaeological and heritage sites, assesses their significance and comments on the impact of a given development on the sites. Recommendations for site mitigation or conservation are also made during this phase.

Phase 2 CRM Study:
In-depth studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including

historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required. Mitigation / Rescue involves planning the protection of significant sites or sampling through excavation or collection (in terms of a permit) at sites that may be lost as a result of a given development.

Phase 3 CRM Measure:

A Heritage Site Management Plan (for heritage conservation), is required in rare cases where the site is so important that development will not be allowed and sometimes developers are encouraged to enhance the value of the sites retained on their properties with appropriate interpretive material or displays.

Prehistoric archaeology:

That aspect of archaeology which concerns itself with the development of humans and their culture before the invention of writing. In South Africa, prehistoric archaeology comprises the study of the Early Stone Age, the Middle Stone Age and the greater part of the Later Stone Age and the Iron Age.

Probabilistic Sampling:

A sampling strategy that is not biased by any person's judgment or opinion. Also known as statistical sampling, it includes systematic, random and stratified sampling strategies.

Provenience

Provenience is the three-dimensional (horizontal and vertical) position in which artefacts are found. Fundamental to ascertaining the provenience of an artefact is *association,* the co-occurrence of an artefact with other archaeological remains; and *superposition,* the principle whereby artefacts in lower levels of a matrix were deposited before the artefacts found in the layers above them, and are therefore older.

Random Sampling:

A probabilistic sampling strategy whereby randomly selected sample blocks in an area are surveyed. These are fixed by drawing coordinates of the sample blocks from a table of random numbers.

Relative dating:

The process whereby the relative antiquity of sites and objects are determined by putting them in sequential order but not assigning specific dates.

Remote Sensing:

The small or large-scale acquisition of information of an object or phenomenon, by the use of either recording or real-time sensing device(s) that is not in physical or intimate contact with the object (such as by way of aircraft, spacecraft or satellite). Here, ground-based geophysical methods such as Ground Penetrating Radar and Magnetometry are often used for archaeological imaging.

Rock Art Research:

Rock art can be "decoded" in order to inform about cultural attributes of prehistoric societies, such as dress-code, hunting and food gathering, social behaviour, religious practice, gender issues and political issues.

Scoping Assessment:

The process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an impact assessment. The main purpose is to focus the impact assessment on a manageable number of important questions on which decision making is expected to focus and to ensure that only key issues and reasonable alternatives are examined. The outcome of the scoping process is a Scoping Report that includes issues raised during the scoping process, appropriate responses and, where required, terms of reference for specialist involvement.

Sensitive:

Often refers to graves and burial sites although not necessarily a heritage place, as well as ideologically significant sites such as ritual / religious places. *Sensitive* may also refer to an entire landscape / area known for its significant heritage remains.

Site (Archaeological):

A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity. These include surface sites, caves and rock shelters, larger open-air sites, sealed sites (deposits) and river deposits. Common functions of archaeological sites include living or habitation sites, kill sites, ceremonial sites, burial sites, trading, quarry, and art sites,

Slag:
The material residue of smelting processes from metalworking.

Stone Age:
An archaeological term used to define a period of stone tool use and manufacture.

Stratigraphy:
This principle examines and describes the observable layers of sediments and the arrangement of strata in deposits

Stratified Sampling:
A probabilistic sampling strategy whereby a study area is divided into appropriate zones – often based on the probable location of archaeological areas, after which each zone is sampled at random.

Systematic Sampling:
A probabilistic sampling strategy whereby a grid of sample blocks is set up over the survey area and each of these blocks is equally spaced and searched.

Tradition:
Artefact types, assemblages of tools, architectural styles, economic practices or art styles that last longer than a phase and even a horizon are describe by the term *tradition*. A common example of this is the early Iron Age tradition of Southern Africa that originated ± 200 AD and came to an end at about 900 AD.

Trigger: A particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an *issue* and/or potentially significant *impact* associated with that proposed development that may require specialist input. Legal requirements of existing and future legislation may also trigger the need for specialist involvement.

Tuyère:
A ceramic blow-tube used in the process of iron smelting / reduction.

LIST OF ABBREVIATIONS

Abbreviation	Description
ASAPA	Association for South African Professional Archaeologists
AIA	Archaeological Impact Assessment
BP	Before Present
BCE	Before Common Era
CRM	Culture Resources Management
EC-PHRA	Eastern Cape Provincial Heritage Resources Agency
EIA	Early Iron Age (also Early Farmer Period)
EIA	Environmental Impact Assessment
EFP	Early Farmer Period (also Early Iron Age)
ESA	Earlier Stone Age
GIS	Geographic Information Systems
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
K2/Map	K2/Mapungubwe Period
KZNHA	KwaZulu-Natal Heritage Act of 2008
LFP	Later Farmer Period (also Later Iron Age)
LIA	Later Iron Age (also Later Farmer Period)
LSA	Later Stone Age
MIA	Middle Iron Age (also Early later Farmer Period)
MRA	Mining Right Area
MSA	Middle Stone Age
NHRA	National Heritage Resources Act No.25 of 1999, Section 35
PFS	Pre-Feasibility Study
EC - PHRA	Eastern Cape Provincial Heritage Resources Authorities
SAFA	Society for Africanist Archaeologists
SAHRA	South African Heritage Resources Association
YCE	Years before Common Era (Present)

TABLE OF CONTENTS

LIST OF FIGURES

1 BACKGROUND

1.1 Scope and Motivation

Exigo Sustainability was commissioned by AGES Omega for an Archaeological Impact Assessment (AIA) study subject to an Environmental Impact Assessment (EIA) process for the proposed Barkley East Bulk Water Supply Upgrade Project near Barkly East in the Eastern Cape Province. The rationale of this AIA is to determine the presence of heritage resources such as archaeological and historical sites and features, graves and places of religious and cultural significance in previously unstudied areas; to consider the impact of the proposed project on such heritage resources, and to submit appropriate recommendations with regard to the cultural resources management measures that may be required at affected sites / features.

1.2 Project Direction

Exigo Sustainability's expertise ensures that all projects be conducted to the highest international ethical and professional standards. As archaeological specialist for Exigo Sustainability, Mr Neels Kruger acted as field director for the project; responsible for the assimilation of all information, the compilation of the final consolidated AIA report and recommendations in terms of heritage resources on the demarcated project areas. Mr Kruger is an accredited archaeologist and Culture Resources Management (CRM) practitioner with the Association of South African Professional Archaeologists (ASAPA), a member of the Society for Africanist Archaeologists (SAFA) and the Pan African Archaeological Association (PAA) as well as a Master's Degree candidate in archaeology at the University of Pretoria.

1.3 Project Brief

The Barkley East Bulk Water Supply Upgrade Project entails the following infrastructure activities around the town of Barley east (see Figure 1-1):

- The upgrade of approximately 3.11km of water supply pipeline, from an extraction in the Langkloof River east of the town routing west to the site of existing and new reservoirs.
- The upgrade of approximately 2.40km of sewage pipeline along the western periphery of the town to a large sewage plant north-west of Barkley East.
- The possible construction of a reservoir adjacent to existing reservoirs on a hill south-west of Barkley East.

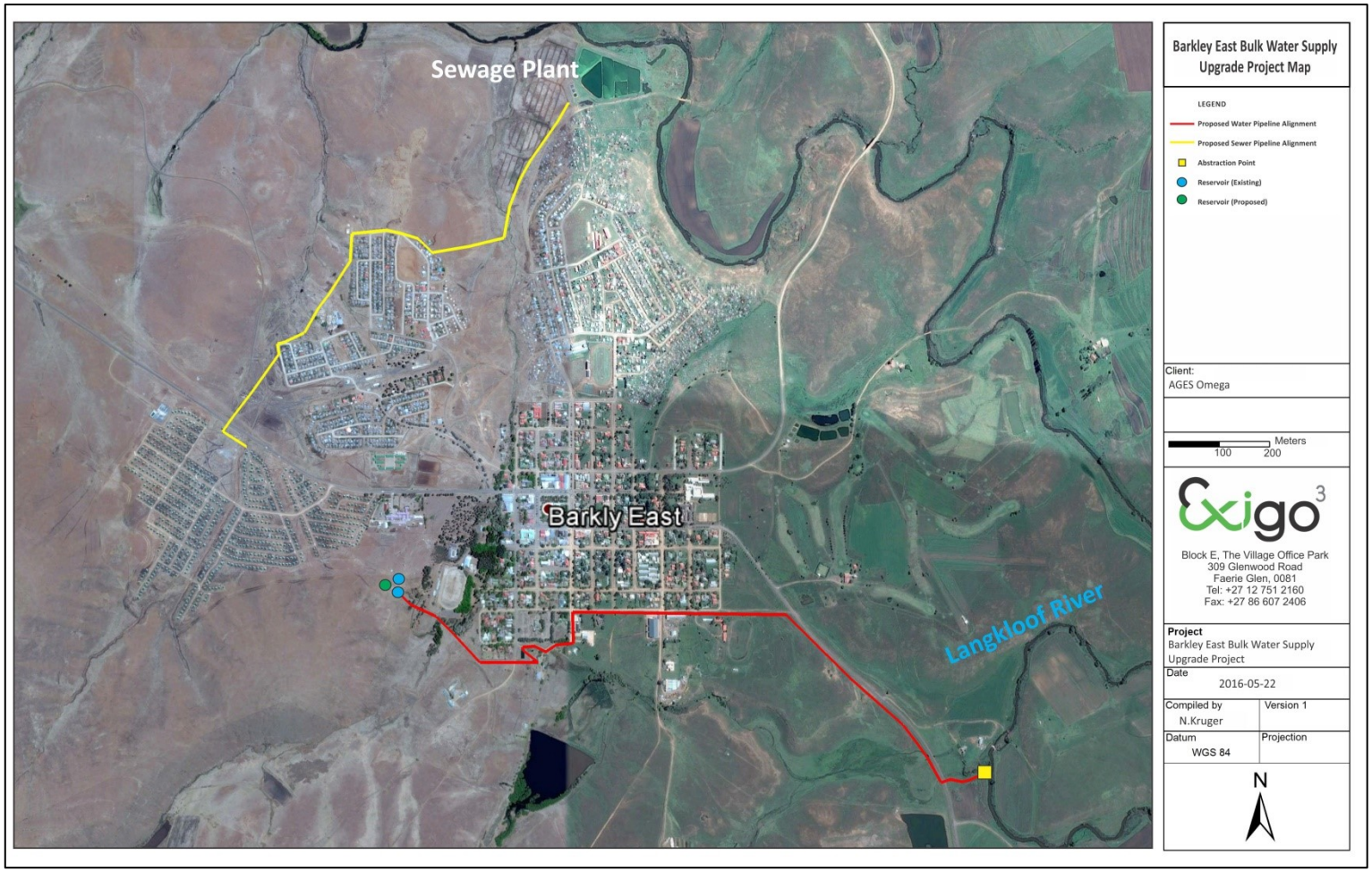

Figure 1-1: Aerial image indicating infrastructure components subject to the Barkley East Bulk Water Supply Upgrade Project.

1.4 Terms of Reference

Heritage specialist input into the Environmental Impact Assessment (EIA) process is essential to ensure that through the management of change, developments still conserve our heritage resources. Heritage specialist input in EIA processes can play a positive role in the development process by enriching an understanding of the past and its contribution to the present. It is also a legal requirement for certain development categories which may have an impact on heritage resources (Refer to Section 2.5.2).

Thus, EIAs should always include an assessment of Heritage Resources. The heritage component of the EIA is provided for in the **National Environmental Management Act, (Act 107 of 1998)** and endorsed by section 38 of the **National Heritage Resources Act (NHRA - Act 25 of 1999)** and the **KwaZulu-Natal Heritage Act (KZNHRA - Act of 2008)**. In addition, the NHRA and the KZNHRA protects all structures and features older than 60 years, archaeological sites and material and graves as well as burial sites. The objective of this legislation is to ensure that developers implement measures to limit the potentially negative effects that the development could have on heritage resources.

Based hereon, this project functioned according to the following **terms of reference for** heritage specialist input**:**

- *Provide detailed updated description of all additional archaeological artefacts, structures (including graves) and settlements which may be affected, if any.*
- *Assess the nature and degree of significance of such resources within the area.*
- *Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance.*
- *Assess any possible impact on the archaeological and historical remains within the area emanating from the proposed development activities.*
- *Propose possible heritage management measures provided that such action is necessitated by the development.*
- *Obtain a comment from the EC-PHRA.*

1.5 CRM: Legislation, Conservation and Heritage Management

The broad generic term *Cultural Heritage Resources* refers to any physical and spiritual property associated with past and present human use or occupation of the environment, cultural activities and history. The term includes sites, structures, places, natural features and material of palaeontological, archaeological, historical, aesthetic, scientific, architectural, religious, symbolic or traditional importance to specific individuals or groups, traditional systems of cultural practice, belief or social interaction.

1.5.1 Legislation regarding archaeology and heritage sites

The South African Heritage Resources Agency (SAHRA) and their provincial offices aim to conserve and control the management, research, alteration and destruction of cultural resources of South Africa. It is therefore vitally important to adhere to heritage resource legislation at all times.

a. National Heritage Resources Act No 25 of 1999, section 35

According to the National Heritage Resources Act of 1999 a historical site is any identifiable building or part thereof, marker, milestone, gravestone, landmark or tell older than 60 years. This clause is commonly known as the "60-years clause". Buildings are amongst the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Iron Age settlements. "Tell" refers to the evidence of human existence which is no longer above ground level, such as building foundations and buried remains of settlements (including artefacts).

The Act identifies heritage objects as:

- objects recovered from the soil or waters of South Africa including archaeological and palaeontological objects, meteorites and rare geological specimens
- visual art objects
- military objects
- numismatic objects
- objects of cultural and historical significance
- objects to which oral traditions are attached and which are associated with living heritage
- objects of scientific or technological interest
- any other prescribed category

With regards to activities and work on archaeological and heritage sites this Act states that:

"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit by the relevant provincial heritage resources authority." (34. [1] 1999:58)

and

"No person may, without a permit issued by the responsible heritage resources authority-

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or

(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. (35. [4] 1999:58)."

and

"No person may, without a permit issued by SAHRA or a provincial heritage resources agency-

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals (36. [3] 1999:60)."

b. Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925

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

1.5.2 Background to HIA and AIA Studies

South Africa's unique and non-renewable archaeological and palaeontological heritage sites are 'generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. Heritage sites are frequently threatened by development projects and both the environmental and heritage legislation require impact assessments (HIAs & AIAs) that identify all heritage resources in areas to be developed. Particularly, these assessments are required to make recommendations for protection or mitigation of the impact of the sites. HIAs and AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources including archaeological and palaeontological sites that might occur in areas of developed and (b) make recommendations for protection or mitigation of the impact on the sites.

The National Heritage Resources Act (Act No. 25 of 1999, section 38) provides guidelines for Cultural Resources Management and prospective developments:

"38. *(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as:*

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50m in length;

(c) any development or other activity which will change the character of a site:

(i) exceeding 5 000 m^2 in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within

the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development."

And:

"The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;

(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;

(c) an assessment of the impact of the development on such heritage resources;

(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and

(g) plans for mitigation of any adverse effects during and after the completion of the proposed development (38. [3] 1999:64)."

Consequently, section 35 of the Act requires Heritage Impact Assessments (HIAs) or Archaeological Impact Assessments (AIAs) to be done for such developments in order for all heritage resources, that is, all places or objects of aesthetics, architectural, historic, scientific, social, spiritual, linguistic or technological value or significance to be protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures older than 60 years, living heritage, historical settlements, landscapes, geological sites, palaeontological sites and objects.Heritage resources management and conservation

1.6 Assessing the Significance of Heritage Resources

Archaeological sites, as previously defined in the National Heritage Resources Act (Act 25 of 1999) are places

in the landscape where people have lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and *non-renewable.* Many such sites are unfortunately lost on a daily basis through development for housing, roads and infrastructure and once archaeological sites are damaged, they cannot be re-created as site integrity and authenticity is permanently lost. Archaeological sites have the potential to contribute to our understanding of the history of the region and of our country and continent. By preserving links with our past, we may not be able to revive lost cultural traditions, but it enables us to appreciate the role they have played in the history of our country.

- Categories of significance

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

- *Aesthetic value:*

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

- *Historic value:*

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

- *Scientific value:*

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

- *Social value:*

Social value includes the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a certain group.

It is important for heritage specialist input in the EIA process to take into account the heritage management structure set up by the NHR Act. It makes provision for a 3-tier system of management including the South Africa Heritage Resources Agency (SAHRA) at a national level, Provincial Heritage Resources Authorities (PHRAs) at a provincial and the local authority. The Act makes provision for two types or forms of protection of

heritage resources; i.e. formally protected and generally protected sites:

Formally protected sites:

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

Generally protected sites:

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

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

Significance	Rating Action
No significance: sites that do not require mitigation.	None
Low significance: sites, which may require mitigation.	2a. Recording and documentation (Phase 1) of site; no further action required 2b. Controlled sampling (shovel test pits, augering), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction
Medium significance: sites, which require mitigation.	3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]
High significance: sites, where disturbance should be avoided.	4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism
High significance: Graves and burial places	4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances and regional by-laws; exhumation and reinterment [including 2a, 2b & 3]

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

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

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

2 REGIONAL CONTEXT

2.1 Area Location

The Barkley East Bulk Water Supply Upgrade Project study area is located in and around the town of Barkly East in the Joe Gqabi District Municipality of the Eastern Cape Province. The R18 route passes through the town and the project area. The area is located below the Southern Drakensberg escarpment in the Drakensberg Foothill Moist Grassland lowlands, comprising mainly of agricultural lands. Within a seventy kilometre radius Barkly East plays neighbour to two small towns namely Elliot and Lady Grey, both, much like Barkly East, is supported mainly by the farms in the outlying sections of the towns. The study areas appear on 1:50000 map sheet 3027DC (see Figure 2-1) and coordinates for the proposed project are as follows :

E30.969138° S27.595346°

2.2 Area Description: Receiving Environment

Barkly East is situated on the hills of the Eastern Cape grasslands south of the Drakensberg. The ecological landscape is defined as a combination of mixed grasslands and forest / scrub forest, typically dominated by mixed grassveld and forests at differing altitudes. The annual rainfall ranges between 1150 to over 1300mm per annum. The geology of the larger region is constituted by mudstones and sandstones of the Beaufort group and towards the coast, shales, mudstones and sandstones of the Ecca group, with exposures of dolerite intrusions mostly in the higher lying areas, are found. Soils in the area are moderate to deep and vary between sandy loams in the upper half to clayey loam in the downstream half. The town is situated within expanding rural residential areas and surface disturbances are prevalent in the study areas. These disturbance agents include agricultural activities such as ploughing and grazing and severe surface erosion and decomposition of low-lying geomorphological deposits.

2.3 Site Description

The Study Area is situated along gradually rolling hills and plains within urban zones of Barkly East. The terrain consists predominantly of flatter parcels of developable land. Villages around Barkley East are situated in areas that have been altered extensively where informal and formal housing, schools, shops, homesteads, crop fields, roads and other infrastructure have been established. Sections of original vegetation remain intact along rivers and water courses. The Langkloof River flows east of the town. Barkly East farmers have been very successful at livestock farming, predominantly sheep and cattle. Today, due to limited government funding and the mediocre price of wool, many farmers have to supplement their livestock farming with crop production such as maize, cabbage and potatoes; there are even those who have started to test the viability of fruit production such as apples and raspberries

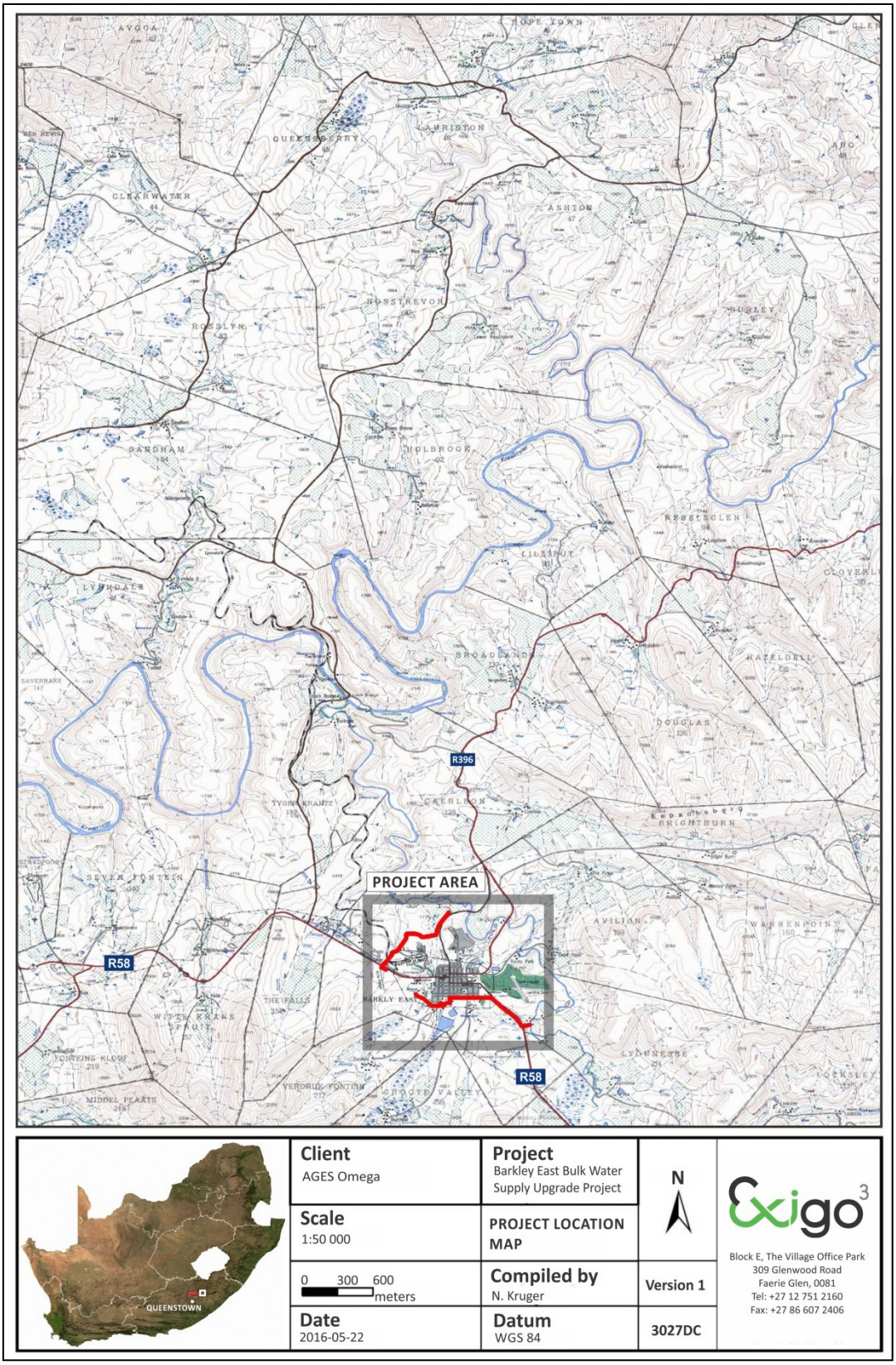

Figure 2-1: 1:50 00 Map representation of the location of the Barkley East Bulk Water Supply Upgrade Project Area (sheet 3027DC).

Figure 2-2: Aerial representation of the regional setting for the Barkley East Bulk Water Supply Upgrade Project area.

Figure 2-3: Panorama view of the larger Barkly East area at the time of the field survey (May 2016). The N18 road and the Lankkloof River are visible in the distance.

Figure 2-4: View of Barkley East and the ssite of the reservoirs south west of the town.

3 METHOD OF ENQUIRY

3.1 Sources of Information

Data from detailed desktop, aerial and field studies were employed in order to sample surface areas systematically and to ensure a high probability of heritage site recording.

3.1.1 Desktop Study

The larger landscape around Barkly East has been relatively well documented in terms of its archaeology and history. A desktop study was prepared in order to contextualize the proposed project within a larger historical milieu. The study focused on relevant previous studies, archaeological and archival sources, aerial photographs, historical maps and local histories, all pertaining to the Barkly East area and the larger landscape of this section of the Eastern Cape Province. A number of Cultural Resources Management (CRM) projects have been conducted in the Barkly East area and these include:

- Booth, C. 2012. An archaeological desktop study foe the proposed Elliot Wind Energy Facility west of Elliot, Eastern Cape Province. Savannah Environmental.
- Fairley, K. & Hemming, M. 2007. Environmental Impact Assessment and Environmental Management Plan for the Exploration for Coal Bed Methane, Elliot Project, Eastern Cape Province.
- Prins, F. 2010. A cultural heritage survey of the proposed SAPPI to Elliot and Ugie substations 132kV powerline in the Eastern Cape Province. Active Heritage
- Van Schalkwyk, L.O. & Wahl, B. 2008a. Heritage Impact Assessment of Qoboshane Road Bridge and Borrow Pits, Indwe, Eastern Cape Province, South Africa. eThembeni
- Anderson, G. 2007. The Archaeological Survey of the Elitheni Mine, Indwe, Eastern Cape. Umlando
- Van Schalkwyk, L.O. & Wahl, B. 2007. Heritage Impact Assessment of Waste Water Treatment Works, Ugie, Eastern Cape Province, South Africa. eThembeni
- Van Schalkwyk, L.O. & Wahl, B. 2008b. Heritage Impact Assessment of Shopping Centre, Ugie, Eastern Cape Province, South Africa. eThembeni
- Van Ryneveld, K. 2011. Phase 1 Archaeological Impact Assessment (AIA) for the expansion of the Cala Landfill Site, Closure of the Elliot Landfill Site and Establishment of a Waste Transfer Station. ArchaeoMaps

3.1.2 Aerial Representations and Survey

Aerial photography is often employed to locate and study archaeological sites, particularly where larger scale area surveys are performed. This method was applied to assist the pedestrian and automotive site surveys where depressions, variation in vegetation, soil marks and landmarks were examined. Specific attention was given to shadow sites (shadows of walls or earthworks which are visible early or late in the day), crop mark sites (crop mark sites are visible because disturbances beneath crops cause variations in their height, vigour and type) and soil marks (e.g. differently coloured or textured soil (soil marks) might indicate ploughed-out burial mounds). Attention was also given to moisture differences, as prolonged dampening of soil as a result of precipitation frequently occurs over walls or embankments. By superimposing high frequency aerial photographs with images generated with Google Earth, potential sensitive areas were subsequently identified, geo-referenced and transferred to a handheld GPS device. These areas served as referenced points from where further vehicular and pedestrian surveys were carried out. From the aerial survey it is evident that surface areas subject to the Barkley East Bulk Water Supply Upgrade Project have been subjected to major historical and more recent disturbances and impacts as a result of natural agents as well as agriculture and urbanisation (see Figure 3-1).

3.1.3 Field Survey

Archaeological survey implies the systematic procedure of the identification of archaeological sites. An archaeological survey of the footprint areas proposed for the Barkley East Bulk Water Supply Upgrade Project was conducted in May 2016. The process encompassed a systematic field survey in accordance with standard archaeological practice by which heritage resources are observed and documented. In order to sample surface areas systematically and to ensure a high probability of site recording alignments identified for water pipes and sewer lines were systematically surveyed on foot and by motor vehicle, GPS reference points were visited and random spot checks were made (see detail in previous section). Using a Garmin E-trex Legend GPS objects and structures of archaeological / heritage value were recorded and photographed with a Canon 450D Digital camera. Real time aerial orientation, by means of a mobile Google Earth application was also employed to investigate possible disturbed areas during the survey. As most archaeological material occur in single or multiple stratified layers beneath the soil surface, special attention was given to disturbances, both man-made such as roads and clearings, as well as those made by natural agents such as burrowing animals and erosion.

3.2 Limitations

3.2.1 Access

The town of Barkley East and all areas subject to this assessment are accessed directly via the N18 and town roads. Access control is not applied to the areas relevant to this assessment and no restrictions were encountered during the site visit.

3.2.2 Visibility

The surrounding vegetation Barkley East mostly comprised out of mixed grasslands and riverine bush. However, vegetation within the town and in surrounding village has been altered as a result of urbanization where small pockets of natural vegetation remain. Generally, the visibility at the time of the AIA site inspection (May 2016) was moderate to high (see Figures 3-2 to 3-11). In single cases during the survey sub-surface inspection was possible. Where applied, this revealed no archaeological deposits.

Figure 3-1: View of the sewage plant and the northern offset of the proposed sewage line.

Figure 3-2: View of the existing sewage pipeline north-east of the town.

Figure 3-4: View of a small village north-east of Barkley East along the sewage line alignment.

Figure 3-5: A small sewage plant along the swage line alignment.

Figure 3-6: View of wetland areas along the sewage line alignment.

Figure 3-7: The N18 low water bridge where the sewage line will cross the road.

Figure 3-8: View of the southern offset of the sewage line, looking east towards Barkley East.

Figure 3-9: The extraction point in the Langkloof River from where water will be pumped along the proposed water pipeline.

Figure 3-10: View of the N18 road indicting the eastern alignment of the proposed water pipeline.

Figure 3-11: An open field east of Barkley East along the water pipeline alignment.

Figure 3-12: View of a dirt road leading intro Barkley East along the water pipeline alignment.

Figure 3-13: A drainage line along the along the water pipeline alignment.

Figure 3-14: General surroundings along the south-west of the proposed water pipeline alignment.

Figure 3-15: View of an existing reservoir and possibly the site of a new reservoir, demarcating the western offset of the proposed water pipeline alignment.

3.2.3 Limitations and Constraints

The foot and vehicular site survey for the Barkley East Bulk Water Supply Upgrade Project AIA primarily focused around areas tentatively identified as sensitive and of high heritage probability (i.e. those noted during the aerial survey) as well as areas of high human settlement catchment. No major constraints were encountered during the site survey. However, even though it might be assumed that survey findings are representative of the heritage landscape of the project area, it should be stated that the possibility exists that individual sites could be missed due to the localised nature of some heritage remains as well as the possible presence of sub-surface archaeology. Therefore, maintaining due cognisance of the integrity and accuracy of the archaeological survey, it should be stated that the heritage resources identified during the study do not necessarily represent all the heritage resources present in the project area. The subterranean nature of some archaeological sites, dense vegetation cover and visibility constraints sometimes distort heritage representations and any additional heritage resources located during consequent development phases must be reported to the Heritage Resources Authority or an archaeological specialist.

3.3 Impact Assessment

For consistency among specialists, impact assessment ratings by AGES Specialist are generally done using the Plomp[1] impact assessment matrix scale supplied by AGES. According to this matrix scale, each heritage receptor in the study area is given an impact assessment. A cumulative assessment for the proposed project is also included.

4 ARCHAEO-HISTORICAL CONTEXT

4.1 The archaeology of Southern Africa

Archaeology in southern Africa is typically divided into two main fields of study, the **Stone Age** and the **Iron Age** or **Farmer Period**. The following table provides a concise outline of the chronological sequence of periods, events, cultural groups and material expressions in Southern African pre-history and history.

Table 1 Chronological Periods across southern Africa

[1] Plomp, H.,2004

Period	Epoch	Associated cultural groups	Typical Material Expressions
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominins: *Australopithecines* *Homo habilis* *Homo erectus*	Typically large stone tools such as hand axes, choppers and cleavers.
Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First *Homo sapiens* species	Typically smaller stone tools such as scrapers, blades and points.
Late Stone Age 20 000 BC – present	Pleistocene / Holocene	*Homo sapiens sapiens* including San people	Typically small to minute stone tools such as arrow heads, points and bladelets.
Early Iron Age / Early Farmer Period 300 – 900 AD	Holocene	First Bantu-speaking groups	Typically distinct ceramics, bead ware, iron objects, grinding stones.
Middle Iron Age (Mapungubwe / K2) / early Later Farmer Period 900 – 1350 AD	Holocene	Bantu-speaking groups, ancestors of present-day groups	Typically distinct ceramics, bead ware and iron / gold / copper objects, trade goods and grinding stones.
Late Iron Age / Later Farmer Period 1400 AD -1850 AD	Holocene	Various Bantu-speaking groups including Venda, Thonga, Sotho-Tswana and Zulu	Distinct ceramics, grinding stones, iron objects, trade objects, remains of iron smelting activities including iron smelting furnace, iron slag and residue as well as iron ore.
Historical / Colonial Period ±1850 AD – present	Holocene	Various Bantu-speaking groups as well as European farmers, settlers and explorers	Remains of historical structures e.g. homesteads, missionary schools etc. as well as, glass, porcelain, metal and ceramics.

4.1.1 The Stone Ages

- **The Earlier Stone Age (ESA)**

The Earlier Stone Age from between 1.5 million and 250 000 years ago refers to the earliest that *Homo sapiens sapiens* predecessors began making stone tools. The earliest stone tool industry was referred to as the Olduwan Industry originating from stone artefacts recorded at Olduvai Gorge, Tanzania. The Acheulian Industry, the predominant southern African Early Stone Age Industry, replaced the Olduwan Industry approximately 1.5 million years ago, is attested to in diverse environments and over wide geographical areas. The hallmark of the Acheulian Industry is its large cutting tools (LCTs or bifaces), primarily handaxes and cleavers. Bifaces emerged in East Africa more than 1.5 million years ago but have been reported from a wide range of areas, from South Africa to northern Europe and from India to the Iberian coast. Earlier Stone Age deposits typically occur on the flood-plains of perennial rivers. These ESA open sites sometimes contain stone tool scatters and manufacturing debris ranging from pebble tool choppers to core tools such as handaxes and cleavers. These groups seldom actively hunted and relied heavily on the opportunistic scavenging of meat from carnivore fill sites. The most well-known Early Stone Age site in southern Africa is Amanzi Springs, situated about 10km north-east of Uitenhage, near Port Elizabeth (Deacon 1970). In a series of spring deposits a large number of stone tools were found in situ to a depth of 3-4m. Wood and seed material preserved remarkably very well within the spring deposits, and possibly date to between 800 000 to 250 000 years old.

- **The Middle Stone Age (MSA)**

The Middle Stone Age (MSA) spans a period from 250 000-30 000 years ago and focuses on the emergence of modern humans through the change in technology, behaviour, physical appearance, art and symbolism.

Various stone artefact industries occur during this time period, although less is known about the time prior to 120 000 years ago, extensive systemic archaeological research is being conducted on sites across southern Africa dating within the last 120 000 years (Thompson & Marean 2008). The large handaxes and cleavers were replaced by smaller stone artefactscalled the MSA flake and blade industries. Surface scatters of these flake and blade industries occur widespread across southern Africa although rarely with any associated botanical and faunal remains. It is also common for these stone artefacts to be found between the surface and approximately 50-80cm below ground. Fossil bone may in rare cases be associated with MSA occurrences (Gess 1969). These stone artefacts, like the Earlier Stone Age handaxes are usually observed in secondary context with no other associated archaeological material. The MSA is distinguished from the ESA by the smaller-sized and distinctly different stone artefacts and chaine operatoire (method) used in manufacture, the introduction of other types of artefacts and evidence of symbolic behaviour. The prepared core technique was used for the manufacture of the stone artefacts which display a characteristic facetted striking platform and includes mainly unifacial and bifacial flake bladesand points. The Howiesons Poort Industry (80 000-55 000 years ago) is distinguished from the other MSA stone artefacts: the size of tools are generally smaller, the range of raw materials include finer-grained rocks such as silcrete, chalcedony, cJartz and hornfels, and include segments, backed blades and trapezoids in thestone toolkit which were sometimes hafted (set or glued) onto handles. In addition to stone artefacts, bone was worked into points, possibly hafted, and used as tools for hunting (Deacon & Deacon 1999). Other types of artefacts that have been encountered in archaeological excavations include tick shell beads, the rim pieces of ostrich eggshell (OES) water flasks, ochre-stained pieces of ostrich eggshell and engraved and scratched ochre pieces, as well as the collection of materials for purely aesthetic reasons. The majority of MSA sites occur on flood plains and sometimes in caves and rock shelters. Sites usually consist of large concentrations of knapped stone flakes such as scrapers, points and blades and associated manufacturing debris. Tools may have been hafted but organic materials, such as those used in hafting, seldom remain preserved in the archaeological record. Limited drive-hunting activities are associated with the MSA.

- **The Later Stone Age (LSA)**

The Later Stone Age (LSA) spans the period from about 20 000 years ago until the colonial era, although some communities continue making stone tools today. The period between 30 000 and 20 000 years ago is referred to as the transition from the MSA to LSA; although there is a lack of crucial sites and evidence that represent this change. By the time of the Later Stone Age the genus Homo, in southern Africa, had developed into *Homo sapiens sapiens*, and in Europe, had already replaced *Homo neanderthalensis*. The LSA is marked by a series of technological innovations, new tools and artefacts, the development of economic, political and social systems, and core symbolic beliefs and rituals. The stone toolkits changed over time according to time-specific needs and raw material availability, from smaller microlithic Robberg, Wilton Industries and in between, the larger Albany/Oakhurst and the Kabeljous Industries. Bored stones used as part of digging sticks, grooved stones for sharpening and grinding and stone tools fixed to handles with mastic also become more common. Fishing equipment such as hooks, gorges and sinkers also appear within archaeological excavations. Polished bone tools such as eyed needles, awls, linkshafts and arrowheads also become a more common occurrence. Most importantly bows and arrows revolutionized the hunting economy. It was only within the last 2000 years that earthenware pottery was introduced, before then tortoiseshell bowls were used for cooking and ostrich eggshell (OES) flasks were used for storing water. Decorative items like ostrich eggshell and marine/fresh water shell beads and pendants were made. Hunting and gathering made up the economic way of life of these communities; therefore, they are normally referred to as hunter-gatherers. Hunter-gatherers hunted both small and large game and gathered edible plant foods from the veld. For those that lived at or close the coast, marine shellfish and seals and other edible marine resources were available for the gathering. The political system was mainly egalitarian, and socially, hunter-gatherers lived in bands of up to twenty people during the scarce resource availability dispersal seasons and aggregated according to kinship relations

during the abundant resource availability seasons. Symbolic beliefs and rituals are evidenced by the deliberate burial of the dead and in the rock art paintings and engravings scattered across the southern African landscape. Sites dating to the LSA are better preserved in rock shelters, although open sites with scatters of mainly stone tools can occur. Well-protected deposits in shelters allow for stable conditions that result in the preservation of organic materials such as wood, bone, hearths, ostrich eggshell beads and even bedding material. By using San (Bushman) ethnographic data a better understanding of this period is possible. South African rock art is also associated with the LSA.

4.1.2 The Iron Age Farmer Period

- **Early Iron Age (Early Farming Communities)**

The Early Iron Age (also Early Farmer Period) marks the movement of Bantu speaking farming communities into South Africa at around 200 A.D. These groups were agro-pastoralists that settled in the vicinity of water in order to provide subsistence for their cattle and crops. Artefact evidence from Early Farmer Period sites is mostly found in the form of ceramic assemblages and the origins and archaeological identities of this period are largely based upon ceramic typologies and sequences, where diagnostic pottery assemblages can be used to infer group identities and to trace movements across the landscape. Early Farmer Period ceramic traditions are classified by some scholars into different “streams” or trends in pot types and decoration that, over time emerged in southern Africa. These “streams” are identified as the Kwale Branch (east), the Nkope Branch (central) and the Kalundu Branch (west). More specifically, in the northern regions of South Africa at least three settlement phases have been distinguished for prehistoric Bantu-speaking agropastoralists. The first phase of the Early Iron Age, known as Happy Rest (named after the site where the ceramics were first identified), is representative of the Western Stream of migrations, and dates to AD 400 - AD 600. The second phase of Diamant is dated to AD 600 - AD 900 and was first recognized at the eponymous site of Diamant in the western Waterberg. The third phase, characterised by herringbone-decorated pottery of the Eiland tradition, is regarded as the final expression of the Early Iron Age (EIA) and occurs over large parts of the North West Province, Northern Province, Gauteng and Mpumalanga. This phase has been dated to about AD 900 - AD 1200. Early Farmer Period ceramics typically display features such as large and prominent inverted rims, large neck areas and fine elaborate decorations. The Early Iron Age continued up to the end of the first millennium AD.

- **Middle Iron Age / K2 Mapungubwe Period (early Later Farming Communities)**

The onset of the middle Iron Age dates back to ±900 AD, a period more commonly known as the Mapungubwe / K2 phase. These names refer to the well known archaeological sites that are today the pinnacle of South Africa’s Iron Age heritage. The inhabitants of K2 and Mapungubwe, situated on the banks of the Limpopo, were agriculturalists and pastoralists and were engaged in extensive trade activities with local and foreign traders. Although the identity of this Bantu-speaking group remains a point of contestation, the Mapungubwe people were the first state-organized society southern Africa has known. A considerable amount of golden objects, ivory, beads (glass and gold), trade goods and clay figurines as well as large amounts of potsherds were found at these sites and also appear in sites dating back to this phase of the Iron Age. Ceramics of this tradition take the form of beakers with upright sides and decorations around the base (K2) and shallow-shouldered bowls with decorations as well as globular pots with long necks. (Mapungubwe). The site of Mapungubwe was deserted at around 1250 AD and this also marks the relative conclusion of this phase of the Iron Age.

- **Later Iron Age (Later Farming Communities)**

The late Iron Age of southern Africa marks the grouping of Bantu speaking groups into different cultural units. It also signals one of the most influential events of the second millennium AD in southern Africa, the difaqane. The difaqane (also known as “the scattering”) brought about a dramatic and sudden ending to centuries of stable society in southern Africa. Reasons for this change was essentially the first penetration

of the southern African interior by Portuguese traders, military conquests by various Bantu speaking groups primarily the ambitious Zulu King Shaka and the beginning of industrial developments in South Africa. Different cultural groups were scattered over large areas of the interior. These groups conveyed with them their customs that in the archaeological record manifest in ceramics, beads and other artefacts. This means that distinct pottery typologies can be found in the different late Iron Age groups of South Africa.

- **Bantu Speaking Groups in the South African interior**

It should be noted that terms such as "Nguni", "Sotho", "Venda" and others refer to broad and comprehensive language groups that demonstrated similarities in their origins and language. It does not imply that these Nguni / Sotho groups were homogeneous and static; they rather moved through the landscape and influenced each other in continuous processes marked by cultural fluidity.

Ethnographers generally divide major Bantu-speaking groups of southern Africa into two broad linguistic groups, the Nguni and the Sotho with smaller subdivisions under these two main groups. Nguni groups were found in the eastern parts of the interior of South Africa and can be divided into the northern Nguni and the southern Nguni. The various Zulu and Swazi groups were generally associated with the northern Nguni whereas the southern Nguni comprised the Xhosa, Mpondo, Thembu and Mpondomise groups. The same geographically based divisions exist among Sotho groups where, under the western Sotho (or Tswana), groups such as the Rolong, Hurutshe, Kwena, Fokeng and Kgatla are found. The northern Sotho included the Pedi and amalgamation of smaller groups united to become the southern Sotho group or the Basutho. Other smaller language groups such as the Venda, Lemba and Tshonga Shangana transpired outside these major entities but as time progressed they were, however to lesser or greater extend influenced and absorbed by neighbouring groups.

4.1.3 Pastoralism and the last 2000 years

Until 2000 years ago, hunter-gatherer communities traded, exchanged goods, encountered and interacted with other hunter-gatherer communities. From about 2000 years ago the social dynamics of the southern African landscape started changing with the immigration of two 'other' groups of people, different in physique, political, economic and social systems, beliefs and rituals. One of these groups, the Khoekhoe pastoralists or herders entered southern Africa with domestic animals, namely fat-tailed sheep and goats, travelling through the south towards the coast. They also introduced thin-walled pottery common in the interior and along the coastal regions of southern Africa. Their economic systems were directed by the accumulation of wealth in domestic stock numbers and their political make-up was more hierarchical than that of the hunter-gatherers.

4.1.4 Historical and Colonial Times and Recent History

The Historical period in southern Africa encompass the course of Europe's discovery of South Africa and the spreading of European settlements along the East Coast and subsequently into the interior. In addition, the formation stages of this period are marked by the large scale movements of various Bantu-speaking groups in the interior of South Africa, which profoundly influenced the course of European settlement. Finally, the final retreat of the San and Khoekhoen groups into their present-day living areas also occurred in the Historical period in southern Africa.

4.2 The Barkly East Area: Specific Themes.

The archaeological history of the Eastern Cape Province dates back to about 2 million years and possibly older. Several archaeological sites have been recorded in the landscape around Barkly East. The Albany Museum database holds limited information of archaeological sites for the north Eastern Cape, however, records are held at several institutions including the University of the Transkei (now Walter Sisulu

University), the University of Fort Hare, and the Rock Art Research Institute at the University of the Witwatersrand. Rock art research, mainly conducted by researchers from the Rock Art Research Institute, University of the Witwatersrand, have been conducted around the Barkly East, Ugie, Maclear, Dordrecht and other areas in the Southern Drakensberg escarpment of the north-eastern Cape. The literature shows evidence of an archaeological heritage that spans from the Early Stone Age, Middle Stone Age to the Later-Stone, as well as evidence of pastoralism and Iron Age farmers. Rock paintings are prolific throughout Southern Drakensberg Mountains. The region is also significant historically as a frontier between hunter-gatherers, pastoralists, Nguni-speaking farming communities and European settlers.

4.2.1 The Early and Middle Stone Ages

A few important Early Stone Age (ESA) sites are known from a number of Ciskei sites including Middledrift commonage and wide flood plain along the Keiskamma River, streams and erosion channels show Early Stone Age material on silcrete sandstone, from within the fluvial deposits (Derricourt 1973). ESA handaxes were documented and recorded on a site near Indwe (Smith 2010). ESA material has been reported in other sites in the Transkei (Derricourt 1977: Feely 1987). Middle Stone Age (MSA) artefacts occur throughout the Eastern Cape and MSA people occupied the Southern Drakensberg area before 29 000 BP (Opperman 1996) until between 22 5000 BP and 20 9000 BP (Opperman & Heydenrych 1990). Strathalan Cave B is situated in the foothills of the Southern Drakensberg range approximately 10 km north-east of Maclear contained a terminal MSA continuous occupation from between 28 000 to about 22 000 years ago. The site deposit revealed a sequence of Middle Stone Age occupation floors characterized by the presence of grass bedding materials. The stone artefact collection included slender blades and wooden tools were also used. The subsistence system was based on the hunting of medium-large antelopes and the gathering of plant foods (Opperman & Heydenrych 1990; Opperman 1992). Surface scatters of MSA stone artefact industries occur widely as in the former homelands of the Ciskei and Transkei (Derricourt 1973). Smith (2010) recorded several isolated surface scatters of MSA stone artefacts including flakes, blades and cores on a site near Indwe. In the Barkly East area, a low density of MSA artefacts was identified at the Elliot Landfill site by Van Ryneveld (2011).

4.2.2 The Later Stone Age (LSA) and Rock Art

Later Stone Age (LSA) sites occur both at the coast and inland as caves deposits, rock shelters, open sites and shell deposits. The majority of LSA archaeological sites in the Eastern Cape area would date from the past 10 000 years where San hunter-gatherers inhabited the landscape living in rock shelters and caves as well as on the open landscape. These latter sites are difficult to find because they are in the open veld and often covered by vegetation and sand. Sometimes these sites are only represented by a few stone tools and fragments of bone. The Southern Drakensberg was occupied by hunter-gatherers before 10 000 BP (Opperman 1987) but was subsequently abandoned in the Holocene after ca. 6 000 BP, only to be re-occupied by 3 000 BP (Tusenius 1989). Ecological evidence suggests that the southern Drakensberg may have been too dry to support the animals and plants needed for the existence of hunter-gatherer people between 6 000 and some time before 3 000 BP (Tusenius 1989). The north-eastern Cape forms a link between the better watered eastern half of South Africa and the drier west. The wettest conditions apparently existed around 2700 BP, probably correlating with an increase in human occupation in the Southern Drakensberg following the possible abandonment of that area during the dry phase(s) of preceding millennia (Rosen et al. 1999). The succession of stone artefact Industries within the LSA of the Drakensberg region of the north-eastern Cape demonstrates that the resources of this area, which is characterized by a steep ecological gradient, were consistently exploited throughout end Pleistocene and Holocene following the amelioration of conditions after the cold maximum of the Late Pleistocene. The culture stratigraphic sequence if very comparable to that recorded in Lesotho, the middle Orange River basin and the southern and Eastern Cape (Opperman 1982).

Bonawe (Opperman 1982) is a rock shelter situated below the escarpment about 7 km west of the town of Elliot. The site has been radiocarbon dated to 8 040 +- 100 B.P. and contained end-Pleistocene and Holocene material. Te Vrede is also a rock shelter situated below the escarpment near Ugie and was dated to 10 000 +- 120 B.P. and 8 100 +-80 Pta-3204, containing end Pleistocene and Holocene material (Opperman 1982). The sites of Colwinton, Ravenscraig, Prospect and Wartrail occur above the escarpment within the Barkly East District north of the proposed area for development. Colwinton Rock Shelter contained end Pleistocene and Holocene material including faunal remains, stone artefacts and pottery (Opperman 1982). The stone tool analysis reveals a sequence of three industries in cultural sequence of the southern and eastern Cape, Lesotho and Middle Orange River.

The renowned San rock paintings of the Drakensberg region also belongs to the LSA period- although the majority were made between 4000 years ago and about 120 years ago. Rock Art can be in the form of rock paintings or rock engravings. Rock paintings occur on the walls of caves and rock shelters across southern Africa and are prolific in the Southern Drakensberg, north-eastern Cape extending the entire Drakensberg range into KwaZulu-Natal and Lesotho. Rock engravings are limited to the Karoo and Northern Cape Regions and do not generally occur within the north Eastern Cape region and former Transkei region. Rock art research within the Southern Drakensberg has been conducted by several researchers and students from the Rock Art Research Institute, University of the Witwatersrand, over a period of 25 years, with a well-established database of site from Maclear, Tsolo, Barkly East, Ugie, Dordrecht and the wider region and extent of the Drakensberg range and Maluti Mountains.

4.2.3 Pastoralism in the Eastern Cape

As noted above, Khoekhoe pastoralists or herders entered southern Africa about 2000 years ago, with domestic animals such as fat-tailed sheep and goats, travelling through the south towards the coast. Their economic systems were directed by the accumulation of wealth in domestic stock numbers and their political make-up was more hierarchical than that of the hunter-gatherers. The most significant Khoekhoe pastoralist sites in the Eastern Cape include Scott'sCave near Patensie (Deacon 1967), Goedgeloof shell midden along the St. Francis coast (Binneman 2007) and Oakleigh rock shelter near Queenstown (Derricourt 1977). Often, these archaeological sites are found close to the banks of large streams and rivers. Little detailed pastoralist research has been conducted within the Elliot area, except for the incidences of ceramics recorded during excavations. Coiwinton Rock Shelter situated north towards Barkly East above the escarpment yielded evidence of pre-agriculturalist ceramics within the excavation as well as at Bonawe Rock Shelter west of the town of Elliot (Opperman 1982; Mazel 1992).

4.2.4 Iron Age / Farmer Period

Even though much research has been conducted on the Iron Age (IA) across southern Africa, only a small portion has focused on the Eastern Cape. A few important Eastern Cape Early Iron Age Sites (EIA) sites include Kulubele situated in the Kei River Valley near Khomga (Binneman 1996), Ntsitsana situated in the interior Transkei, 70 km west of the coast, along the Mzimvubu River (Prins & Granger 1993), and Canasta Place situated on the west bank of the Buffalo River (Nogwaza 1994). Previous investigations into the EIA in the Transkei and Ciskei include work at Buffalo River Mouth (Wells 1934; Laidler 1935), at Chalumna River Mouth (Derricourt 1977) and additional research by Feely (1987) and Prins (1989). The first EIA farming communities during the first millennium AD preferred to occupy river valleys within the eastern half of southern Africa owing to the summer-rainfall climate that was conducive for growing millet and sorghum. The closest documented and well-researched Early Iron Age site, to Elliot is located within the Great Kei River Valley. The site is situated some 200 m below the plateau and 60 km inland from the coast, within the borders of the Transkei, approximately 100 km up the coast towards Durban. There has in the past been some speculation that Early Iron Age populations may have spread well south of the Transkei into the

Ciskei, possibly up to the Great Fish River (Binneman et al. 1992), however, no further research has been undertaken to confirm these statements. A closer Early Iron Age site has been documented to the south of East London (Cronin 1982). Thicker and decorated pottery sherds, kraals, possible remains of domesticated animals, upper and lower grindstones and storage pits are associated for identifying EIA sites. The sites are generally large settlements, but the archaeological visibility may in most cases be difficult owing to the organic nature of the homesteads. Metal and iron implements are also associated with EIA communities.

The Later Iron Age (LIA) is not only distinguished from the EIA by greater regional diversity of pottery styles but is also marked by extensive stone wall settlements. LIA sites in the Eastern Cape Province occur adjacent to the major rivers in low lying river valleys but also along ridge crests above the 800m contour. The LIA in the project area can be ascribed to the Mpondomise, Thembu, and Xhosa tribal clusters or their immediate predecessors (Feely 1987). It is also possible that some stone walled sites, especially those incorporating shelters or caves, were constructed by hybrid San/Nguni groups. Trade played a major role in the economy of LIA societies. Goods were traded locally and over long distances. The main trade goods included metal, salt, grain, cattle and thatch. This led to the establishment of economically driven centres and the growth of trade wealth. Keeping of domestic animals, metal work and the cultivation of crops continued with a change in the organisation of economic activities (Maggs, 1989; Huffman 2007). Hilltop settlements are mainly associated with LIA settlement patterns that occurred during the second millennium AD. Later Iron Age settlements have been formally recorded by the Albany Museum and cover a relatively extended area in comparison with the Early Iron Age settlement patterns. With the exception of the Tembu, stone buildings which characterizes the Iron Age sites of Sotho areas, is absent in the Transkei and Ciskei, and a pattern of some mobility without, it is presumed, a stone working technology of significance, makes the allocation of sites a major problem (Derricourt 1973).

4.2.5 Later History: Colonial Period and the Anglo Boer War

The first official proof of ownership of land in the Barkly East district is during the late 1860's. In 1867 the first two farms in the district were allocated, the first to a Joseph Millard Orpen which he called Avoca, and another to John William Sephton, called Glengyle. Both of these men were descendants of the 1820 British settlers to South Africa and this British heritage is revealed quite clearly in the names given to these farms. Avoca and Glengyle are still farmed by the descendants of Joseph Orpen and John Sephton respectively today. While official proof of ownership of land was only found in 1867, these farmers were definitely not the first people to inhabit the district of Barkly East. Historical accounts written about the area indicates that this area was called a "no-man's land" in the early 1800's. These accounts however generally tend to disregard the presence of people not from white colonial heritage, even though it is clearly evident that the proof of their presence does exist, for example, the various rock art and war memorial sites in the district discussed in previous sections. Toward the end of the 19th century, after the last of the frontier wars were fought, the general sentiment in South Africa was that of colonial expansion. Sir George Cathcart and Sir John Cradock, of the British Empire expressed the view that the settling of numerous European farmers on land in return for military services would be an ideal way to start this process (Giliomee, 2003: 58-87) Land was also made available to those without a military record, under the Perpetual Quitrent system. According to this system land of no more than 3000 morgen could be allocated to a person upon him paying a yearly quitrent stipulated by the government, after which ownership for himself and his descendants could be claimed. It is during this period that the town of Barkly East was established in 1873, named after Sir Henry Barkly, who was the Governor and High Commissioner to the Cape from 1870 – 1877. Legislation on land allocation and ownership, and labour practises in the British colonial states of the Cape and Natal, and the Boer settler states of the Transvaal and Orange Free State made it easier for farming districts and small towns such as Barkly East to flourish and prosper. During the

Anglo-Boer War of 1899 – 1902 the town and district of Barkly East saw many changes not the least the fact that it was used by both sides as a military centre.

Throughout Colonial expansion the little town of Barkly East and its surrounding farming districts were booming. With the support from the government and the extremely suitable farming conditions, Barkly East became one of the foremost sheep farming and wool producing districts in the country. Already by 1910 the district of Barkly East boasted with the highest number of sheep in the Union (Barkly East Reporter, 1973: 26). Apart from the district's success with farming, the town's development also prospered. During the period of the late eighteen nineties and nineteen thirties various new additions to the town were made. In 1893 the Loch Bridge was built over the Kraai River making accessibility to- and communication with the town much easier; in 1906 the official school building was erected, as well as the local general dealer Mukheibir Brothers; 1930 saw the opening of the railway in Barkly East, it is no longer in use however; and in 1932 Buys en Seuns (sons) a ladies' and mens' outfitters was established, it was sold in August 2001 and is no longer in existence. Many residents view the demise of Buys en Seuns as a sign of the times and the ultimate and subsequent demise of the town. By the middle of the seventies the municipality of Barkly East was already advertising itself by highlighting certain qualities of the town, foremost on the list featured sufficient cheap labour and cheap land (Barkly East Reporter, 1973: 32). This fits the historical, political and economic precedence already set by the South African government. Here exemplified through its subsidy for farmers; its legislation prohibiting the sale of land to non-whites; and the influx of cheap labour, be it through the migrant labour system or created by the political subjugation of black people at the time.

The Barkly East sheep farmers have reaped the success of the wool industry throughout both World War I and World War II as part of the post-war wool price booms. This continued right into the nineteen seventies and early eighties as a third wool price boom started as part of the oil boom (Mallett, 1992: 11). During these wool price booms, the district of Barkly East was considered to be a million-rand region because of its high quality wool and suitable conditions for sheep farming. Ironically though, the extended wealth of these farmers contributed largely to the demise of the town. As more and more people were able to send their children away to better and more prestigious schools, the economy of the town dwindled. The local school registered less and less students, and many of the smaller stores could not maintain a profit for an extended period of time.

4.2.6 Burial Sites / Human Remains

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

5 RESULTS: ARCHAEOLOGICAL SURVEY

In terms of heritage resources, the project area is primarily well known for the occurrence of San rock paintings – especially in the foothills of the Drakensberg around Barkly East. The area is also rich in Colonial remnants. However, large sections of the proposed pipeline route align along areas that have been altered extensively by recent ad historical urbanization and development largely sterilising the area of heritage remains. However, a number of heritage receptors were identified in the Barkley East Bulk Water Supply Upgrade Project study areas were uniquely coded **EXIGO-BWS-HP01** (Exigo Barkly East Water Supply Historical Period xx).

5.1 The Stone Age

No Stone Age scatters or occurrences were observed in any of the survey areas.

5.2 The Iron Age Farmer Period

No Iron Age (Farmer Period) occurrences were observed in any of the survey areas.

5.3 Historical / Colonial Period

- **Site EXIGO-BWS-HP01 S25.75963° E28.44458°**

The south-western section of the proposed sewer pipeline runs along the old decommissioned railway line into Barkley East. A dilapidated railway warehouse directly north of the N18 occurs in the general vicinity of the pipeline alignment. The warehouse structure consists out of red brick walls on 3 sides which are reinforced with concrete columns in all sides. The roof of the structure is absent and the floor is littered with building rubble. The building is not maintained and a poor state of preservation. A clear temporal context for the structure is not known but, considering the general age of the railway network around Barkley East and the architectural style of the building it might be older than 60 years and it is thus a protected heritage resource. However, the feature is poorly preserved and its scientific value is limited. As such, the site is rated as of medium-low heritage significance. The building occurs along the within the Barkley East Bulk Water Supply Upgrade Project alignments and unmitigated impact on the site is expected to be direct.

Figure 5-1: A Historical Period warehouse at Site EXIGO-BWS-HP01.

- **Site EXIGO-BWS-HP02 S25.75571° E28.44054°**

As noted above, the south-western section of the proposed sewer pipeline runs along the old railway line into Barkley East. A number of dilapidated multi-room house structures and buildings, presumably part of old railway housing and infrastructure, occurs east of the proposed sewer pipe alignments. The buildings were constructed out of plastered mud brick and window frames have been removed. The roofs of the structures are absent but wooden trusses remain in places. The buildings generally resemble the later Historical Period architecture of Barkley East as they presumably formed part of the town's railway infrastructure during the 20th century. The structures are possibly older than 60 years (considering the architectural style similarities with similar historical buildings in the area) and the site is thus a protected heritage resource. Unfortunately, the structures are in a poor state of preservation and much of the potential historical and architectural attributes of the buildings have been lost. As such the site is rated as of medium-low heritage significance. The buildings occur along the Barkley East Bulk Water Supply Upgrade Project alignments and unmitigated impact on the site is expected to be direct.

Figure 5-2: The remains of a Historical Period building at Site EXIGO-BWS-HP02.

Figure 5-3: The remains of a Historical Period buildings at Site EXIGO-BWS-HP02

- **Site EXIGO-BWS-HP03 S25.75571° E28.44054°**

To the south-east, the Barkley East Bulk Water pipeline alignment follows Copeland Street from east to west towards the reservoir site west of Barkley East. In this street a number of houses, warehouses and buildings of possible Historical origin occur. The buildings range from small single room structures, larger residential houses and industrial buildings. Most of the buildings are occupied and fairly well maintained. A clear temporal context for the structures are not known but, considering the architectural styles the sites most probably date to the Colonial farming period in Barkley East and, as such they are most probably older than 60 years and thus protected heritage resources. The features might add to a better understanding of architectural, settlement and social developments in Barkley East and it is of medium heritage significance. The buildings occur in close proximity of the Barkley East Bulk Water Supply Upgrade Project alignments and unmitigated impact on the sites is expected to be peripheral.

Figure 5-4: An industrial building probably dating to Colonial Times around Site EXIGO-BWS-HP03.

Figure 5-5: A residential house probably dating to Colonial Times around Site EXIGO-BWS-HP03.

Figure 5-6: A residential house probably dating to Colonial Times around Site EXIGO-BWS-HP03.

Figure 5-7: A shed structure probably dating to Colonial Times around Site EXIGO-BWS-HP03.

5.4 Graves / Human Burials

The formal Barkley East cemetery containing a large number of graves occurs along the north-earth periphery of the town. In the rural areas of the Eastern Cape Province graves and cemeteries often occur within settlements or around homesteads but this seem not to be the case in Barkley East owing to the centralization of burials at the dedicated municipal cemetery. However, the probability of additional and informal human burials encountered during development should not be excluded. If any human bones are found during the course of construction work then they should be reported to an archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist.

Figure 5-8: Aerial representation of the locations of heritage occurrences discussed in the text.

6 RESULTS: STATEMENT OF SIGNIFICANCE AND IMPACT RATING

6.1 Potential Impacts and Significance Ratings[2]

The following section provides a background to the identification and assessment of possible impacts and alternatives, as well as a range of risk situations and scenarios commonly associated with heritage resources management. A guideline for the rating of impacts and recommendation of management actions for areas of heritage potential within the study area is supplied in Section 10.2 of the Addendum.

6.1.1 General assessment of impacts on resources

Generally, the value and significance of archaeological and other heritage sites might be impacted on by any activity that would result immediately or in the future in the destruction, damage, excavation, alteration, removal or collection from its original position, any archaeological material or object (as indicated in the National Heritage Resources Act (No 25 of 1999)). Thus, the destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during the initial construction period. However, in the long run, the proximity of operations in any given area could result in secondary indirect impacts. The EIA process therefore specifies impact assessment criteria which can be utilised from the perspective of a heritage specialist study which elucidates the overall extent of impacts.

6.1.2 Direct impact rating

Direct or primary effects on heritage resources occur at the same time and in the same space as the activity, e.g. loss of historical fabric through demolition work. **Indirect effects or secondary effects** on heritage resources occur later in time or at a different place from the causal activity, or as a result of a complex pathway, e.g. restriction of access to a heritage resource resulting in the gradual erosion of its significance, which is dependent on ritual patterns of access (refer to Section 10.3 in the Addendum for an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected). Heritage receptors were found in the project zones and potential impacts to heritage resources is foreseen.

The following table summarizes impacts to heritage resources at **Site EXIGO-BWS-HP01 & Site EXIGO-BWS-HP02** of **medium-low** significance located within the project area.

NATURE OF IMPACT: Impacts could involve displacement or destruction of structures or features in the proposed Project area.		
	Without mitigation	**With mitigation**
EXTENT	Local	Local
DURATION	Permanent	Permanent
MAGINITUDE	Minor	Minor
PROBABILITY	Probable	Negligible
SIGNIFICANCE	Low	Low
STATUS	Negative	Neutral
REVERSIBILITY	Non-reversible	Non-reversible

[2] Based on: W inter, S. & Baumann, N. 2005. *Guideline for involving heritage specialists in EIA processes: Edition 1.*

IRREPLACEABLE LOSS OF RESOURCES?	Yes	No
CAN IMPACTS BE MITIGATED?	N.A	
MITIGATION: Site monitoring by ECO, destruction permitting.		
CUMULATIVE IMPACTS: No cumulative impact is anticipated.		
RESIDUAL IMPACTS: n/a		

The following table summarizes impacts to various heritage structures at **Site EXIGO-BWS-HP03** of **medium** significance located in close proximity of the project area.

NATURE OF IMPACT: Impacts could involve displacement or destruction of heritage structures or features in the project area.		
	Without mitigation	**With mitigation**
EXTENT	Local	Local
DURATION	Permanent	Permanent
MAGINITUDE	Major	Minor
PROBABILITY	Improbable	Negligible
SIGNIFICANCE	Medium	Low
STATUS	Negative	Neutral
REVERSIBILITY	Non-reversible	Non-reversible
IRREPLACEABLE LOSS OF RESOURCES?	Yes	No
CAN IMPACTS BE MITIGATED?	N.A	
MITIGATION: Avoidance, site monitoring by ECO.		
CUMULATIVE IMPACTS: No cumulative impact is anticipated.		
RESIDUAL IMPACTS: n/a		

6.1.3 Discussion: Evaluation of Results and Impacts

Previous studies conducted in the larger Barkly East area suggest a rich and diverse archaeological landscape. However, the proposed Barkley East Bulk Water Supply Upgrade Project areas are situated in expanding urban and peri-urban zones and built-up residential areas. As such, these areas have largely been sterilised of potential heritage resources, especially those dating to pre-Colonial and prehistoric times. Cognisance should nonetheless be taken of archaeological material that might be present in surface and sub-surface deposits.

The remains of a railway warehouse and a number of ruined multi-room buildings possibly dating to the Colonial Period in the study area (**Site EXIGO-BWS-HP01 & Site EXIGO-BWS-HP02)** are of medium-low significance. The potential impact on the resources is considered to be LOW but this impact rating can be limited to a NEGLIBLE impact by the implementation of mitigation measures (site monitoring, destruction permitting) for the sites, if / when required.

A number of Colonial Period heritage structures features occur in Barkley East in the project area (**Site EXIGO-BWS-HP03**) and the sites are generally of medium significance. The potential impact on the resource is considered to be LOW but this impact rating can be limited to a NEGLIBLE impact by the implementation of mitigation measures (Avoidance, site monitoring by ECO) for the sites, if / when required

Heritage resources occur inside and in close proximity of alignments proposed for sewer and water pipelines areas proposed for the Barkley East Bulk Water Supply Upgrade Project and potential peripheral impact on these heritage receptors is foreseen. However, this impact can be mitigated by means of avoidance and site monitoring during development. In the opinion of the author of this Archaeological Impact Assessment Report, the proposed Barkley East Bulk Water Supply Upgrade Project may proceed from a culture resources management perspective, provided that mitigation measures are implemented where applicable, and provided that no subsurface heritage remains are encountered during construction.

6.2 Management actions

Recommendations for relevant heritage resources management actions are vital to the conservation of heritage resources. A general guideline for recommended management actions is included in Section 10.4 of the Addendum. The following management measures would be required during implementation of the proposed Barkley East Bulk Water Supply Upgrade Project.

OBJECTIVE: prevent unnecessary disturbance and/or destruction of previously undetected heritage receptors.

The remains of a railway warehouse and a number of ruined multi-room buildings possibly dating to the Colonial Period in the study area (Site EXIGO-BWS-HP01 & Site EXIGO-BWS-HP02) within the project area the following are required in terms of heritage management and mitigation:

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/destruction of sites.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To locate previously undetected heritage remains / graves as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL		**RESPONSIBILITY**	**TIMEFRAME**
Fixed Mitigation Procedure (**required**)			
Site Monitoring: Regular examination of trenches and excavations in order to detect and preserve previously undocumented heritage receptors. **Permitting:** Destruction permitting if and when required.		ECO, HERITAGE ASSESSMENT PRACTITIONER	Monitor as frequently as practically possible. Prior to the commencement of construction and earth-moving.
PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.		
MONITORING	Successful location of sites by person/s monitoring.		

For the number of Colonial Period heritage structures features occur in Barkley East in close proximity of the project area (Site EXIGO-BWS-HP03) the following are required in terms of heritage management and mitigation:

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/destruction of sites.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To locate previously undetected heritage remains / graves as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL		**RESPONSIBILITY**	**TIMEFRAME**
Fixed Mitigation Procedure (**required**)			
Site Monitoring: Regular examination of trenches and excavations in order to detect and preserve previously undocumented heritage receptors.		ECO, HERITAGE ASSESSMENT PRACTITIONER	Monitor as frequently as practically possible.
Preferred Mitigation Procedure			
Avoidance: Implement a heritage conservation buffer of at least 50m around the heritage resource; avoid the heritage resource and the proposed conservation buffer.		DEVELOPER	Prior to the commencement of construction and earth-moving.
PERFORMANCE INDICATOR	Archaeological sites are discovered and mitigated with the minimum amount of unnecessary disturbance.		
MONITORING	Successful location of sites by person/s monitoring.		

7 RECOMMENDATIONS

The larger landscape around Barkly East and the foothills of the Drakensberg is rich in pre-historical and historical remnants, significantly so San rock paintings and associated sites. However, the study area has been altered extensively by recent ad historical activities largely sterilising the area of heritage remains. As such, only two sensitive heritage receptors were identified in the Barkley East Bulk Water Supply Upgrade Project study areas. The following recommendations are made based on general observations in the proposed Barkley East Bulk Water Supply Upgrade Project Area:

- A Palaeontological Desktop Study should be considered for the development. Should fossil remains such as fossil fish, reptiles or petrified wood be exposed during construction, these objects should carefully safeguarded and the relevant heritage resources authority (SAHRA) should be notified immediately so that the appropriate action can be taken by a professional palaeontologist.
- The remains of a railway warehouse and a number of ruined multi-room buildings possibly dating to the Colonial Period in the study area (**Site EXIGO-BWS-HP01 & Site EXIGO-BWS-HP02)** are of medium-low significance due to their poor preservation. However, it is recommended that the sites and any activities in its surrounds be monitored in order to avoid the destruction of previously undetected heritage remains. The necessary destruction permits should be obtained

from the relevant Heritage Resources Authorities prior to the probable destruction of the features.

- A number of Colonial Period heritage structures features occur in Barkley East in close proximity of the project area (**Site EXIGO-BWS-HP03**) and the sites are generally of medium significance. It is recommended that the sites be avoided and that a 50m conservation buffer around the structures be implemented. The sites and any activities in its surrounds should be carefully monitored in order to avoid the destruction of previously undetected heritage remains.
- A careful watching brief monitoring process is recommended whereby an informed ECO inspect the construction sites on regular basis in order to monitor possible impact on heritage resources. Should any subsurface paleontological, archaeological or historical material or heritage resources be exposed during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately
- It is essential that cognisance be taken of the larger archaeological landscape of the area in order to avoid the destruction of previously undetected heritage sites. Should any subsurface paleontological / archaeological / historical material and /or graves/human remains be uncovered, all activities should be suspended and the archaeological specialist should be alerted immediately.
- It should be noted that mitigation measures are valid for the duration of the development process, and mitigation measures might have to be implemented on additional features of heritage importance not detected during this Phase 1 assessment (e.g. uncovered during the construction process).

In addition to these site-specific recommendations, careful cognizance should be taken of the following:

- As Palaeontological remains occur where bedrock has been exposed, all geological features should be regarded as sensitive.
- Water sources such as drainage lines, fountains and pans would often have attracted human activity in the past. As Stone Age material the larger landscape should be regarded as potentially sensitive in terms of possible subsurface deposits.

8 GENERAL COMMENTS AND CONDITIONS

This AIA report serves to confirm the extent and significance of the heritage landscape of the proposed Barkley East Bulk Water Supply Upgrade Project Development area. The larger heritage horizon encompasses rich and diverse archaeological landscapes and cognisance should be taken of heritage resources and archaeological material that might be present in surface and sub-surface deposits. If, during construction, any possible archaeological material culture discoveries are made, the operations must be stopped and a qualified archaeologist be contacted for an assessment of the find. Such material culture might include:

- Formal Earlier Stone Age stone tools.
- Formal Middle Stone Age stone tools.
- Formal Later Stone Age stone tools.
- Potsherds
- Iron objects.
- Beads made from ostrich eggshell and glass.
- Ash middens and cattle dung deposits and accumulations.
- Faunal remains.
- Human remains/graves.

- Stone walling or any sub-surface structures.
- Historical glass, tin or ceramics.
- Fossils.

If such site were to be encountered or impacted by any proposed developments, recommendations contained in this report, as well as endorsement of mitigation measures as set out by AMAFA, SAHRA, the National Resources Act and the CRM section of ASAPA will be required.

It must be emphasised that the conclusions and recommendations expressed in this archaeological heritage sensitivity investigation are based on the visibility of archaeological sites/features and may not therefore, represent the area's complete archaeological legacy. Many sites/features may be covered by soil and vegetation and might only be located during sub-surface investigations. If subsurface archaeological deposits, artefacts or skeletal material were to be recovered in the area during construction activities, all activities should be suspended and the archaeological specialist should be notified immediately **(*cf*. NHRA (Act No. 25 of 1999)**, Section 36 (6)).

It must also be clear that Archaeological Specialist Reports will be assessed by the relevant heritage resources authority (EC-PHRA).

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10 ADDENDUM 1: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF HERITAGE

10.1 Site Significance Matrix

According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these. The following matrix is used for assessing the significance of each identified site/feature.

2. SITE EVALUATION			
2.1 Heritage Value (NHRA, section 2 [3])	High	Medium	Low
It has importance to the community or pattern of South Africa's history or pre-colonial history.			
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.			
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.			
It is of importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.			
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.			
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.			
It has marked or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).			
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.			
It has significance through contributing towards the promotion of a local sociocultural identity and can be developed as a tourist destination.			
It has significance relating to the history of slavery in South Africa.			
It has importance to the wider understanding of temporal changes within cultural landscapes, settlement patterns and human occupation.			
2.2 Field Register Rating			
National/Grade 1 [should be registered, retained]			

Provincial/Grade 2 [should be registered, retained]	
Local/Grade 3A [should be registered, mitigation not advised]	
Local/Grade 3B [High significance; mitigation, partly retained]	
Generally Protected A [High/Medium significance, mitigation]	
Generally protected B [Medium significance, to be recorded]	
Generally Protected C [Low significance, no further action]	

2.3 Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Local			
Specific community			

10.2 Impact Assessment Criteria

The following table provides a guideline for the rating of impacts and recommendation of management actions for sites of heritage potential.

Significance of the heritage resource

This is a statement of the nature and degree of significance of the heritage resource being affected by the activity. From a heritage management perspective it is useful to distinguish between whether the significance is embedded in the physical fabric or in associations with events or persons or in the experience of a place; i.e. its visual and non-visual qualities. This statement is a primary informant to the nature and degree of significance of an impact and thus needs to be thoroughly considered. Consideration needs to be given to the significance of a heritage resource at different scales (i.e. sitespecific, local, regional, national or international) and the relationship between the heritage resource, its setting and its associations.

Nature of the impact

This is an assessment of the nature of the impact of the activity on a heritage resource, with some indication of its positive and/or negative effect/s. It is strongly informed by the statement of resource significance. In other words, the nature of the impact may be historical, aesthetic, social, scientific, linguistic or architectural, intrinsic, associational or contextual (visual or non-visual). In many cases, the nature of the impact will include more than one value.

Extent

Here it should be indicated whether the impact will be experienced:

- On a site scale, i.e. extend only as far as the activity;
- Within the immediate context of a heritage resource;
- On a local scale, e.g. town or suburb
- On a metropolitan or regional scale; or
- On a national/international scale.

Duration

Here it should be indicated whether the lifespan of the impact will be:

- Short term, (needs to be defined in context)
- Medium term, (needs to be defined in context)
- Long term where the impact will persist indefinitely, possibly beyond the operational life of the activity, either because of natural processes or by human intervention; or
- Permanent where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Of relevance to the duration of an impact are the following considerations:

- Reversibility of the impact; and
- Renewability of the heritage resource.

Intensity

Here it should be established whether the impact should be indicated as:

- Low, where the impact affects the resource in such a way that its heritage value is not affected;
- Medium, where the affected resource is altered but its heritage value continues to exist albeit in a modified way; and
- High, where heritage value is altered to the extent that it will temporarily or permanently be damaged or destroyed.

Probability

This should describe the likelihood of the impact actually occurring indicated as:

- Improbable, where the possibility of the impact to materialize is very low either because of design or historic experience;
- Probable, where there is a distinct possibility that the impact will occur;
- Highly probable, where it is most likely that the impact will occur; or
- Definite, where the impact will definitely occur regardless of any mitigation measures

Confidence

This should relate to the level of confidence that the specialist has in establishing the nature and degree of impacts. It relates to the level and reliability of information, the nature and degree of consultation with I&AP's and the dynamic of the broader socio-political context.

- High, where the information is comprehensive and accurate, where there has been a high degree of consultation and the socio-political context is relatively stable.
- Medium, where the information is sufficient but is based mainly on secondary sources, where there has been a limited targeted consultation and socio-political context is fluid.
- Low, where the information is poor, a high degree of contestation is evident and there is a state of socio-political flux.

Impact Significance

The significance of impacts can be determined through a synthesis of the aspects produced in terms of the nature and degree of heritage significance and the nature, duration, intensity, extent, probability and confidence of impacts and can be described as:

- Low; where it would have a negligible effect on heritage and on the decision
- Medium, where it would have a moderate effect on heritage and should influence the decision.
- High, where it would have, or there would be a high risk of, a big effect on heritage. Impacts of high significance should have a major influence on the decision;
- Very high, where it would have, or there would be high risk of, an irreversible and possibly irreplaceable negative impact on heritage. Impacts of very high significance should be a central factor in decision-making.

10.3 Direct Impact Assessment Criteria

The following table provides an outline of the relationship between the significance of a heritage context, the intensity of development and the significance of heritage impacts to be expected

	TYPE OF DEVELOPMENT			
HERITAGE CONTEXT	**CATEGORY A**	**CATEGORY B**	**CATEGORY C**	**CATEGORY D**
CONTEXT 1 High heritage Value	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected	Very high heritage impact expected
CONTEXT 2 Medium to high heritage value	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected	Very high heritage impact expected
CONTEXT 3 Medium to low heritage value	Little or no heritage impact expected	Minimal heritage impact expected	Moderate heritage impact expected	High heritage impact expected
CONTEXT 4 Low to no heritage value	Little or no heritage impact expected	Little or no heritage impact expected	Minimal heritage value expected	Moderate heritage impact expected
NOTE: A DEFAULT "LITTLE OR NO HERITAGE IMPACT EXPECTED" VALUE APPLIES WHERE A HERITAGE RESOURCE OCCURS OUTSIDE				

THE IMPACT ZONE OF THE DEVELOPMENT.	
HERITAGE CONTEXTS	**CATEGORIES OF DEVELOPMENT**
Context 1: Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources **Context 2:** Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources. **Context 3:** Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources **Context 4:** Of little or no intrinsic, associational or contextual heritage value due to disturbed, degraded conditions or extent of irreversible damage.	**Category A: Minimal intensity development** - No rezoning involved; within existing use rights. - No subdivision involved. - Upgrading of existing infrastructure within existing envelopes - Minor internal changes to existing structures - New building footprints limited to less than 1000m2. **Category B: Low-key intensity development** - Spot rezoning with no change to overall zoning of a site. - Linear development less than 100m - Building footprints between 1000m2-2000m2 - Minor changes to external envelop of existing structures (less than 25%) - Minor changes in relation to bulk and height of immediately adjacent structures (less than 25%). **Category C: Moderate intensity development** - Rezoning of a site between 5000m2-10 000m2. - Linear development between 100m and 300m. - Building footprints between 2000m2 and 5000m2 - Substantial changes to external envelop of existing structures (more than 50%) - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 50%) **Category D: High intensity development** - Rezoning of a site in excess of 10 000m2 - Linear development in excess of 300m. - Any development changing the character of a site exceeding 5000m2 or involving the subdivision of a site into three or more erven. - Substantial increase in bulk and height in relation to immediately adjacent buildings (more than 100%)

10.4 Management and Mitigation Actions

The following table provides a guideline of relevant heritage resources management actions is vital to the conservation of heritage resources.

No further action / Monitoring

Where no heritage resources have been documented, heritage resources occur well outside the impact zone of any development or the primary context of the surroundings at a development footprint has been largely destroyed or altered, no further immediate action is required. Site monitoring during development, by an ECO or the heritage specialist are often added to this recommendation in order to ensure that no undetected heritage\ remains are destroyed.

Avoidance

This is appropriate where any type of development occurs within a formally protected or significant or sensitive heritage context and is likely to have a high negative impact. Mitigation is not acceptable or not possible. This measure often includes the change / alteration of development planning and therefore impact zones in order not to impact on resources.

Mitigation

This is appropriate where development occurs in a context of heritage significance and where the impact is such that it can be mitigated to a degree of medium to low significance, e.g. the high to medium impact of a development on an archaeological site could be mitigated through sampling/excavation of the remains. Not all negative impacts can be mitigated.

Compensation

Compensation is generally not an appropriate heritage management action. The main function of management actions should be to conserve the resource for the benefit of future generations. Once lost it cannot be renewed. The circumstances around the potential public or heritage benefits would need to be exceptional to warrant this type of action, especially in the case of where the impact was high.

Rehabilitation

Rehabilitation is considered in heritage management terms as a intervention typically involving the adding of a new heritage layer to enable a new sustainable use. It is not appropriate when the process necessitates the removal of previous historical layers, i.e. restoration of a building or place to the previous state/period. It is an appropriate heritage management action in the following cases:

- The heritage resource is degraded or in the process of degradation and would benefit from rehabilitation.
- Where rehabilitation implies appropriate conservation interventions, i.e. adaptive reuse, repair and maintenance, consolidation and minimal loss of historical fabric.
- Where the rehabilitation process will not result in a negative impact on the intrinsic value of the resource.

Enhancement

Enhancement is appropriate where the overall heritage significance and its public appreciation value are improved. It does not imply creation of a condition that might never have occurred during the evolution of a place, e.g. the tendency to sanitize the past. This management action might result from the removal of previous layers where these layers are culturally of low significance and detract from the significance of the resource. It would be appropriate in a range of heritage contexts and applicable to a range of resources. In the case of formally protected or significant resources, appropriate enhancement action should be encouraged. Care should, however, be taken to ensure that the process does not have a negative impact on the character and context of the resource. It would thus have to be carefully monitored