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EP3 ENVIRONMENTAL PTY (LTD): PROPOSED CONSTRUCTION OF 4 WEIRS AND A CULVERT ON THE FARM ROODEKRANS 133 JT, EMAKHAZENI LOCAL MUNICIPALITY, DULLSTROOM, MPUMALANGA PROVINCE

Archaeological Impact Assessment

Prepared for: **EP3 Environmental Pty (Ltd)**

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ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF AREAS DEMARACTED FOR THE PROPOSED CONSTRUCTION OF 4 WEIRS AND A CULVERT ON PORTION 3 OF THE FARM ROODEKRANS 133 JT, DULLSTROOM AREA, MPUMALANGA PROVINCE

February 2016

Conducted on behalf of:

EP3 Environmental Pty (Ltd)
Exigo Sustainability

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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 Roodekrans weirs and culvert development 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: 15 February 2016

EXECUTIVE SUMMARY

This report details the results of an Archaeological Impact Assessment (AIA) study on the farm Roodekrans 133 JT in the Dullstroom area of the Mpumalanga Province, subject to an Environmental Impact Assessment (EIA) process for the proposed Roodekrans weirs and culvert development project. The proposed project entails the construction of 4 small weirs and a road culvert within a drainage channel that feeds the Crocodile River on Roodekrans. 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 relevant heritage resources agency (SAHRA) and recommendations contained in this document will be reviewed.

A large number of archaeological and historical studies have been conducted in this section of the Mpumalanga Province, most of which infer a varied and rich heritage landscape. The cultural historical landscape of Mpumalanga area spans million years with evidence of hominin occupation, Stone Age traditions, Iron Age farmers and historical events. Mpumalanga was populated by multiple and ethnically diverse but interrelated communities. The closest known Stone Age sites are found near Carolina, Badplaas and Lydenburg, and include San rock art sites, with the closest at Machadodorp and Lydenburg. The Highveld, particularly around Lydenburg, Badfontein, Sekhukhuneland, Roossenekal, and Steelpoort, became active again from the 15th century onwards. In an area around Belfast, including Lydenburg, Nelspruit, Machadodorp and Badplaas a number of 1 792 Iron Age sites have been identified and the sites are associated with the BaKoni. This archaeological horizon demarcates one of the most significant complex societies in Southern African during the Later Iron Age farmer period. The Colonial history of Mpumalanga is associated with early trade, major conflicts such as the Anglo-Boer Wars as well as the establishment of towns and farms. The study area is generally pristine but disturbances do occur in places as a result of forestation and livestock grazing. At least 5 areas of heritage concern were identified outside of – but in close vicinity of the Roodekrans weirs and culvert development project study area:

- A series of well-preserved stone wall livestock enclosures, foundations structures, the remains of the original Roodekrans farmhouse as well as associated features occur in a Eucalyptus forest east and southeast of the drainage line demarcating the study area (**EXIGO-RK133JT-HP01, EXIGO-RK133JT-HP02, EXIGO-RK133JT-HP03)**. The sites, dating the Colonial Period in Mpumalanga is historically significant but impact as a result of the development is not anticipated to occur here as the study area drainage line is situated some distance from the sites. However, it is recommended that an informed ECO inspect the project area and the heritage resources on regular basis in order to monitor possible impact on heritage sites and features.
- A single grave demarcated by a rectangular stone cairn (**EXIGO-RK133JT-BP01)** as well as an elongated, rectangular stone cairn closely resembling a human grave (**EXIGO-RK133JT-BP02)** occur in the same Eucalyptus forest east and southeast of the drainage line demarcating the study area. Since all human burials are considered sensitive heritage receptors, the features are highly significant but impact as a result of the development is not anticipated to occur since the study area drainage line is situated away from the sites. It is nonetheless recommended that any activities in the vicinity of the cemeteries be executed in a way as to avoid impact on the heritage resources at all times. In addition, a conservation buffer zone of at least 50m around the burials, as well as the fencing off of the graves

is recommended. However, should impact on any of the graves in the cemeteries or the proposed 50m buffer zone prove inevitable, full grave relocations are recommended for these burial sites. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.

- Generally, it is recommended that a careful watching brief monitoring process is recommended whereby an informed ECO inspect the construction site 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.

Roodekrans weirs and culvert development project Heritage Sites Locations

Site Code	Description	Coordinate S	Coordinate E
EXIGO-RK133JT-HP01	Historical stone walled enclosures	S25.49301°	E30.15838°
	Historical building foundations	S25.49329°	E30.15870°
EXIGO-RK133JT-HP02	Historical stone house remains	S25.49253°	E30.15818°
	Stone cairn	S25.49247°	E30.15787°
EXIGO-RK133JT-HP03	Historical stone walled enclosures	S25.49441°	E30.15661°
	Historical livestock dip tank structure	S25.49403°	E30.15666°
EXIGO-RK133JT-BP01	Human burial site	S25.49278°	E30.15796°
EXIGO-RK133JT-BP02	Potential human burial site	S25.49456°	E30.15663°

Colonial Period remains and human burial sites or potential human burial sites all carrying a high heritage significance were identified in the Roodekrans weirs and culvert development project study area. It is the opinion of the author of this Archaeological Impact Assessment Report that the proposed Roodekrans weirs and culvert development project on the farm Roodekrans 133 JT will have no impact on archaeological heritage resources. The project should be allowed to proceed from a culture resources management perspective, provided that mitigation measures provided in this assessment (avoidance, monitoring), endorsed by the relevant Heritage Resources authority, 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 Mpumalanga Province and the Dullstroom 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 relevant heritage authorities (SAHRA). 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 (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
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
PHRA	Provincial Heritage Resources Authorities
SAFA	Society for Africanist Archaeologists
SAHRA	South African Heritage Resources Association
YCE	Years before Common Era (Present)

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1 BACKGROUND

1.1 Scope and Motivation

Exigo Sustainability was commissioned by EP3 Environmental Pty (Ltd) for an Archaeological Impact Assessment (AIA) study subject to an Environmental Impact Assessment (EIA) process for the proposed Roodekrans weirs and culvert development project near Dullstroom in the Mpumalanga 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 Roodekrans weirs and culvert development project entails the construction of 4 weirs and the construction of a road culvert on the farm Roodekrans. The culvert will be constructed under the existing farm dirt road. The weirs and the culvert will be located along an unnamed tributary of the Crocodile River. The tributary is fed by a spring and is non-perennial. Previously the drainage channel to the east of the property was diverted, at the point where it crosses under the farm access dirt road, towards the existing dam on the property and both channels fed into the existing dam. As a result the eastern channel and surrounding wetland was mostly dewatered and alien vegetation became established along this section. The proposed development will divert the eastern channel back along its original course and it is also along this section of the channel that 3 of the weirs will be constructed. The proposed development will allow natural rehabilitation and recovery of the degraded wetland downstream of the access road. The weirs have been designed in a manner that will improve the current state of the tributary of the Crocodile River and thereby improve the current status of the Ecological Support Area of the Critical Biodiversity Area as identified under the Mpumalanga Biodiversity Sector Plan.

One weir will be located up-stream of the road culvert and the other 3 will be located down-stream of the road culvert (See Figure 2-4):

- **Road Culvert:** An existing farm access road that crosses a drainage line will be upgraded to prevent the road from being washed away during rainfall events and to allow the stream to flow more freely. The upgrade will entail the installation of suitable culverts and an increase in the height of the road. The road will not be widened and will be upgraded within the current footprint. The road crossing the

area below the small dam along the access road has caused dewatering of the channeled valley bottom wetland causing the invasion of the wetland by terrestrial species and weeds. The installation of the culverts under the road will aid in rehabilitating the downstream channel and wetland areas. Three pipe culverts, each with a diameter of 1 meter and approximately 8 meters in length will be installed under the road. Gabions will be placed along the embankments of the road to prevent the road from being eroded by stormwater.

- **Four Weirs:** The weirs will be constructed to retain water and to provide water for cattle on the farm. Weir 1 will be located on the northern side of the road in an area classified as high sensitivity with wetland and drainage features. Weir 1 will be 7.75 meters in length and 6 meters in width. Weirs 2, 3 and 4 will be on the south side of the farm access road in an area classified as medium sensitivity wetlands in a degraded state (according to the ecological report). Weir 2 will be 8.8 meters in length and 7 meters in width. Weir 3 will be 9 meters long and 7 meters in width. Weir 4 will be 8.35 meters in length and 6 meters in width. The total surface areas and exact locations of each weir on the property are indicated in the table below. The weirs will be constructed using gabions and scour pools will be prepared using rock material on the down-stream side of the weirs which will aid in preventing erosion. Furthermore, graded cobbles and gravels will be used to make a smooth transition to the natural channel boundary. The weirs are anticipated to provide drinking water for livestock on the farm, while the larger dams will be utilized for trout fishing. The weirs trigger listed activities under the National Environmental Management Act (Act no 107 of 1998) however the upgrade of the existing road which entails the installation of a culvert does not trigger any listed activities under the NEMA as the upgrade will occur within the footprint of the existing dirt road.

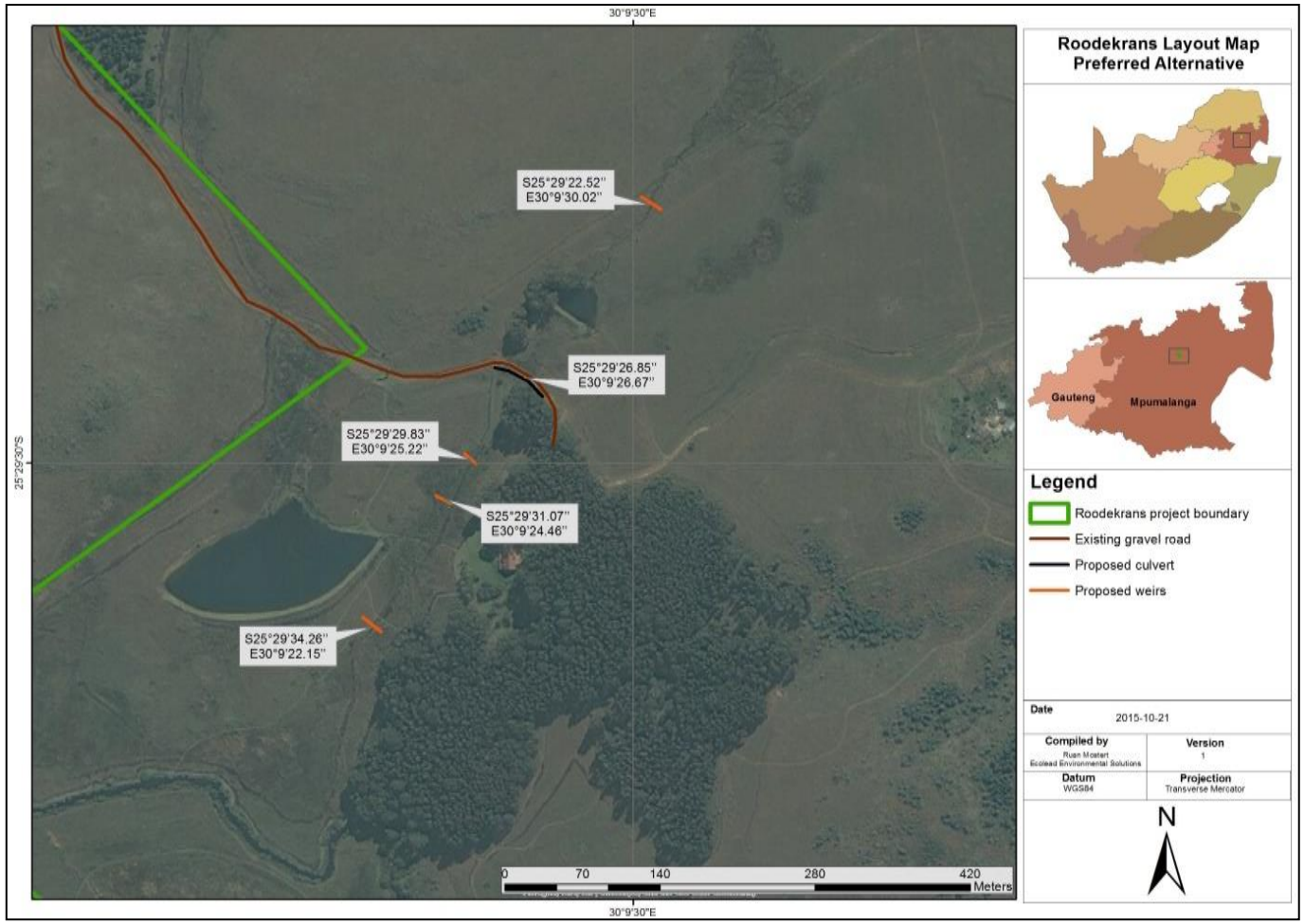

Figure 1-1: Aerial representation of the Roodekrans weirs and culvert development project components.

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 proposed Roodekrans weirs and culvert development project study area is located on the farm Roodekrans 133 JT approximately 10km south-east of the town of Dullstroom in the Emakhazeni District Municipality of the Mpumalanga Province. The farm is situated east of the R540 which connects Dullstroom to Belfast. More specifically, the Roodekrans weirs and culvert development project areas is located at **S25.49322° E30.15664°.** The study areas appear on 1:50000 map sheet 2530AC (see Figure 2-1).

2.2 Area Description: Receiving Environment

The development site lies within the Grassland Biome which is found chiefly on the high central plateau of South Africa. Grasslands are dominated by a single layer of grasses. The most recent classification according to Mucina et al. (2005) classifies the general vegetation of the area as Lydenburg Montane Grassland. Although it is predominantly a grassland area, Acocks classified North-eastern Mountain Sourveld as an Inland Tropical Forest type, due to the patches of forest occurring in the sheltered ravines, gorges and valleys of the escarpment. The rainfall is high, mist plays an important role, while low temperatures, frost, snow and fire are also important determinants of this vegetation type (Bredenkamp, Granger & Van Rooyen, 1996). The project area is characterised by slightly to moderately undulating hills and lowlands with the Crocodile River and two of its tributaries bisecting the site. The topography across the site is slightly to moderately undulating. The most important topographical feature in the Inkomati water management area is the Great Escarpment, which divides the water management area into the Plateau area in the west (elevation of more than 2 000 m above sea level) and the Lowveld in the east.

2.3 Site Description

The proposed development area is located on portions of the farm Roodekrans 133 JT near Dullstroom in Mpumalanga. The topography of the study area is relatively hilly, with a number of outcrops and rocky ridges present. For the most part the area is characterized by rolling grass veld. A further feature is some wetland sections, fed by intermittent streams and drainage lines running towards from the Crocodile River. Although the area has not been extensively disturbed in the past through residential or urban developments, some agricultural activities and forestation did take place here (mainly grazing). This is clear from the 1:50 000 topographic map of the area (2530AC Dullstroom) dating to 1984. This map indicates some ploughed fields, sections of plantation (blue gum) and only a few small (farm related) buildings in the larger area of Roodekrans.

At the farm, two large trout dams occur west of the current Roodekrans farm house. These dams are fed by the drainage line demarcating the study area. A large Eucalyptus forest occurs directly east to the current Roodekrans farmhouse and the drainage line.

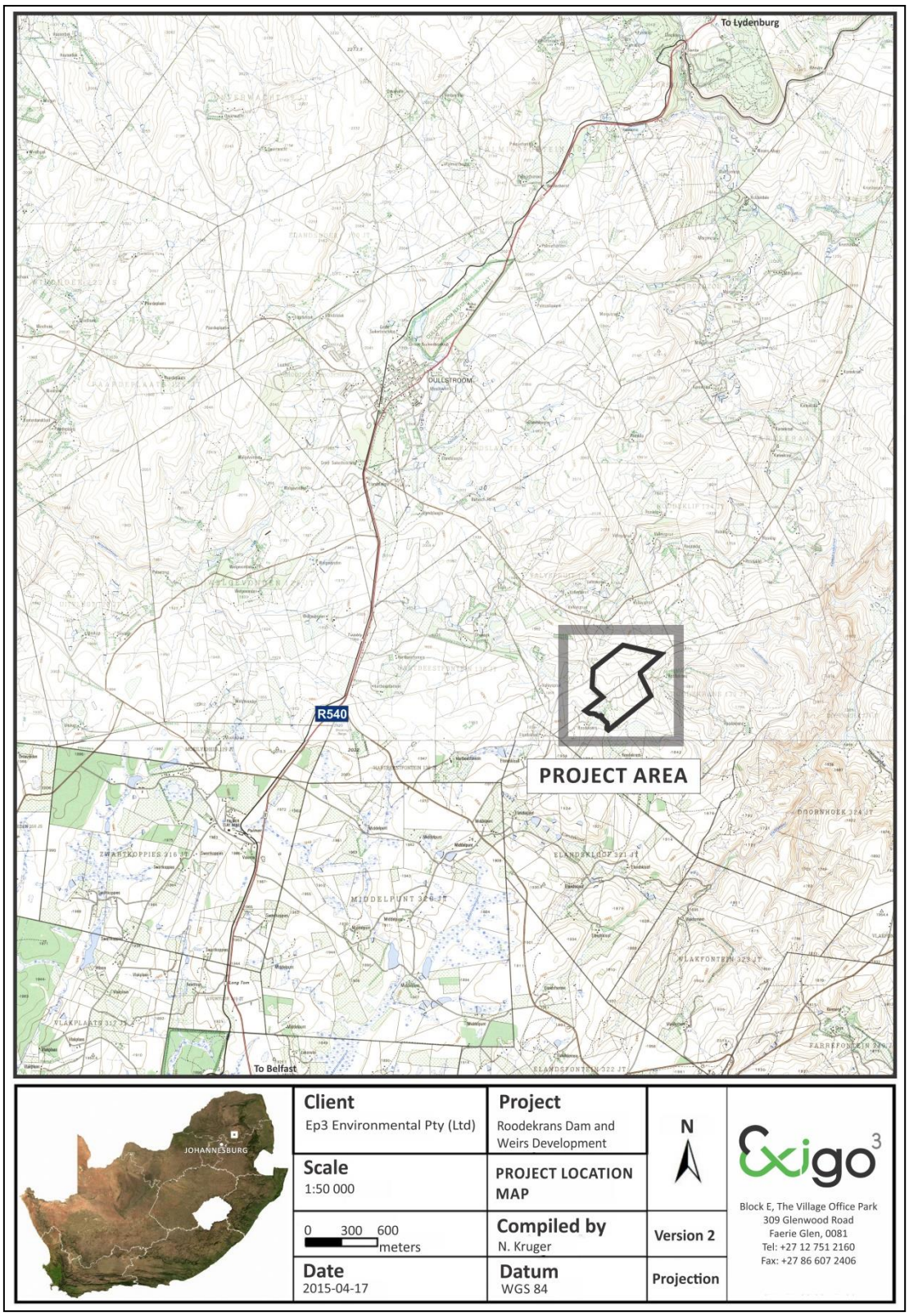

Figure 2-1: 1:50 00 Map representation of the location of the proposed Roodekrans weirs and culvert development project Area (sheet 2530AC).

Figure 2-2: Panorama view of the project area at the time of the field survey (March 2015).

Figure 2-3: Panorama view of the trout dams in the project area at the time of the field survey (March 2015).

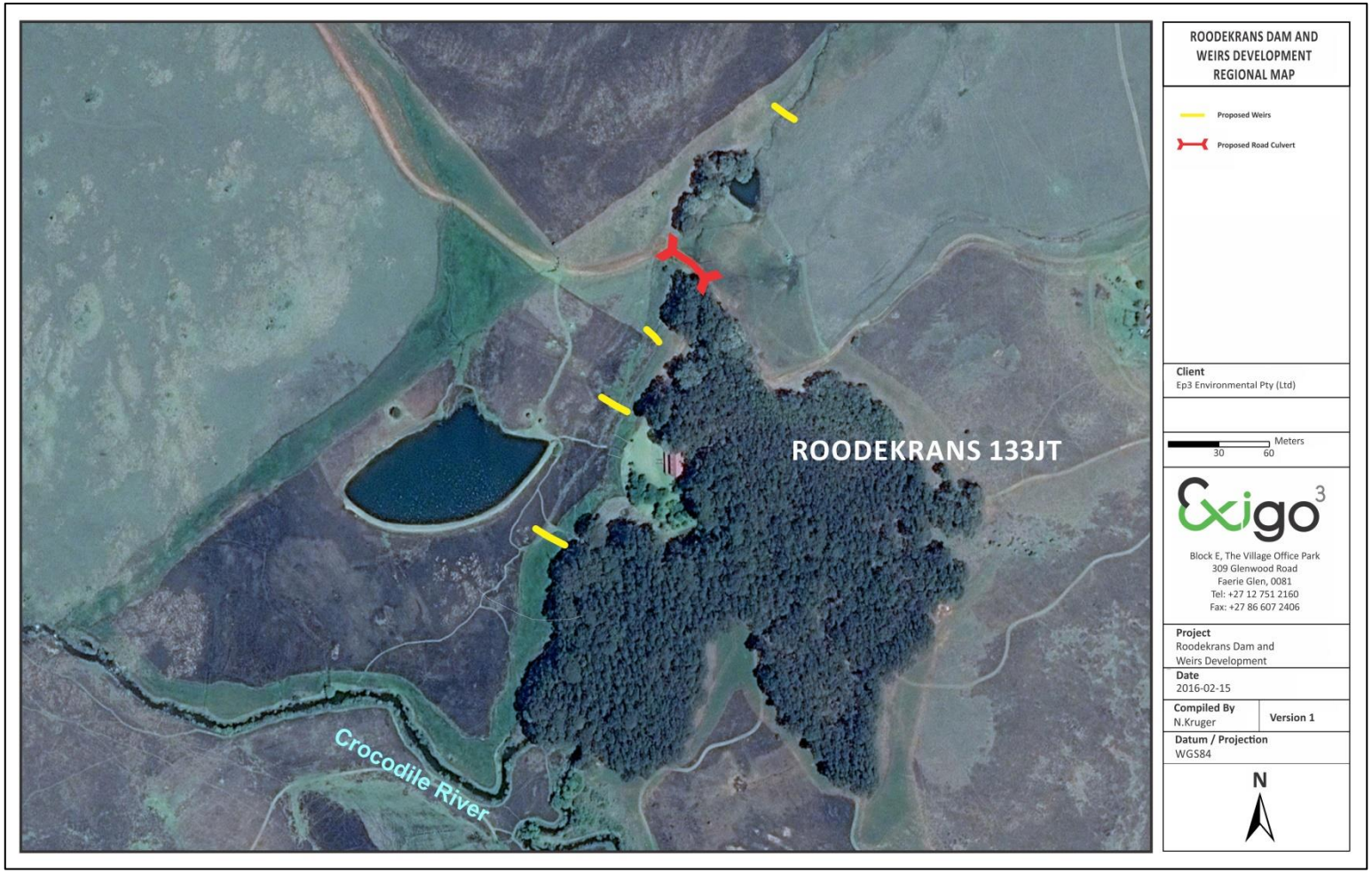

Figure 2-4: Aerial representation of the regional setting for the Roodekrans weirs and culvert development project area.

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 Dullstroom 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 Dullstroom area and the larger landscape of this section of the Mpumalanga Province.

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 Roodekrans weirs and culvert development project have been subjected to vast historical and more recent disturbances and impacts as a result of agriculture and human interference (see Figure 2-3).

3.1.3 Field Survey

Archaeological survey implies the systematic procedure of the identification of archaeological sites. An archaeological survey of development areas on Roodekrans was conducted in March 2015. 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 the affected areas as well as the surrounding landscape was systematically surveyed on foot by means of a transect survey, 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.

3.1.4 General Public Liaison

Correspondence with a farm worker at Roodekrans provided information on the general history of the area, possible locations of heritage resources and brief commentaries on the recent history of the farm. The worker, said to have been living on the farm for many decades pointed to the fact that, according to his knowledge, the Kruger family occupied the farm for the larger part of the 20th century and that they built the elaborate stone structures and features at the farm.

3.2 Limitations

3.2.1 Access

The Roodekrans Farm is accessed directly via a regional tar road connecting to the R540 provincial route to Dullstroom. Internal farm roads provided access to the project area. Access control is applied to the farm relevant to this assessment but since the author of this report was accompanied by project managers, no restrictions were encountered during the site visit.

3.2.2 Visibility

The vegetation in the Dullstroom surroundings is mostly comprised out of dense grasslands. Vegetation within the project area has altered in places as a result of forestation and livestock grazing. However, the drainage line demarcating the areas proposed for development is densely overgrown. Generally, the visibility at the time of the AIA site inspection (March 2015) was moderate to low (see Figures 3-1 to 3-6). In single cases during the survey sub-surface inspection was possible. Where applied, this revealed no archaeological deposits.

Figure 3-1: View of the drainage line demarcating the study area where proposed weirs will be constructed.

Figure 3-2: View of the drainage line towards the crocodile river where a proposed weir will be constructed.

Figure 3-3: The current drainage diversion system in the study area.

Figure 3-4: View of the study area along the access road where a culvert is proposed.

Figure 3-5: View of the project area from the north, looking south towards the Roodekrans farm house.

Figure 3-6: View of the current Roodekrans farm house. Note the Eucalyptus forest east of the house.

3.2.3 Limitations and Constraints

The foot survey for the Roodekrans weirs and culvert development 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. The following constraints were encountered during the site inspection of the Roodekrans weirs and culvert development project area.

- **Visibility:** Visibility proved to be a constraint in areas with denser surface cover, as well as portions where vegetation is pristine.

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 Exigo Specialist are generally done using the Plomp[1] impact assessment matrix scale supplied by Exigo. 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

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)**

[1] Plomp, H.,2004

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 Mpumalanga, 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 Dullstroom Regional History: Specific Themes.

Mpumalanga was populated by multiple and ethnically diverse but interrelated communities. It was inhabited by the San (Hunter-Gatherer, Basarwa or Bathwa) groupings prior to the settlement of various Late Iron Age (LIA) farming communities, the ancestors of modern Sotho-Tswana and Nguni societies. The north-western and southern portions of the region came to be broadly occupied by the Kgatla (Bakgatla), Rolong (Barolong), Ntwane (Bantwane), Koni (Bakone), Kopa (Bakopa) and Southern Ndebele mixed farming communities. According to other recorded oral traditions ancestorrs of Bakone groupings occupied parts of the low country (Phalaborwa and Bokgaga near Leydsdorp) at an uncertain date. The main body of the Bakone appears to have been under the Matlala ruling lineage at the time of their fragmentation into a multiplicity of groups and subsequent chiefdoms aro und the 15th to 16th centuries. While some groups remained in the low country others ventured further west and southwards and Koni groups came to settle in the areas later called Ohrigstad, Lydenburg and Middelburg. Either before or at the start of the 17th century an early Nguni-speaking community entered the orbit of the Sotho-Tswana communities in the Transvaal and in particular the north-eastern Highveld.The Sotho-Tswana people commonly called this early Nguni offshoot Matebele, denoting Pursuers. According to P. Lekgoathi these Nguni groups accepted the appellation Matebele but pronounced it as Amandebele. Anthropologists and historians later rendered both Sotho-Tswana and Nguni terms as Ndebele. In due course relations between other royal contend ers degenerated into open confrontation. The Manala (Mabena) and Mhwaduba sections remained independently in and around Pretoria areas while the Ndzundza and Mthombeni groups moved north-eastward into the environs of the Steelpoort (Tubatse) River valley and the slopes of Bothasberg in Middelburg. There is evidence that Mzilikazi's Ndebele invaded the south-eastern and central Transvaal areas. Accounts of the Southern Ndebele, the Koni, the Kgatla, the Rolong and the Ntwane attest to Mzilikazi's sporadic plunder and their own counter raids of Mzilikazi's frequent raids. The Koni, Kopa and some Eastern Sotho fortified settlements in the Middelburg, Nelspruit (Waterval Boven, Sudwala Caves) and Lydenburg areas were attacked by intruding armies.

4.2.1 Early History

The cultural historical landscape of Mpumalanga area spans million years with evidence of hominin occupation, Stone Age traditions, Iron Age farmers and historical events. Earlier Stone Age (ESA) material is relatively scarce but the Middle Stone Age (MSA) is abundantly represented in the area. Although the MSA has not been extensively studied in Mpumalanga, evidence for this period has been excavated from Bushman Rock Shelter, a well-known site situated on the farm Klipfonteinhoek in the Ohrigstad District. Later Stone Age groups, including the San hunter gatherers and Khoi herders frequented the area in the last few millennia, and numerous LSA sites have been discovered and excavated. Similarly, LSA evidence such as

stone implements, ceramics and a wealth of rock paintings are scattered over the Highveld going into the Lowveld. There appears to be a gap in the Mpumalanga LSA record between 9 000 BP and 5 000 BP. This may have to do with the general dearth of Stone Age research in the province, but it also encompasses a period of rapid warming and major climate fluctuation, which may have forced people to seek out more protected and viable environments in this area. We pick up the Mpumalanga Stone Age record again in the mid-Holocene at the farm Honingklip (HKLP) near Badplaas in the Carolina District. Here two LSA sites were found on opposite sides of a bend in the Nhlazatshe River, about 1km west of its confluence with the Teespruit. The HKLP sites are in the foothills of the Drakensberg, where the climate is warmer than the Highveld but cooler than the Lowveld. The closest known Stone Age sites are found near Carolina, Badplaas and Lydenburg, and include San rock art sites, with the closest at Machadodorp and Lydenburg (Bergh 1999: 4-5).The development area does not contain shelters or any other indication of possible Stone Age living areas. It is possible that Stone Age people could have stayed higher up in the mountain ranges surrounding the area. Stone Age material is frequently found close to rivers and other water sources, although none was found during this survey. The lack of knowledge on the Stone Age archaeology of the area is more than likely just an indication of a lack of detailed research in the past and it does not necessarily mean that none exist.

4.2.2 Later History: Iron Age / Farmer Period

Within the last two thousand years, San and Khoi groups were displaced by Iron Age farming communities moving into the Dullstroom area, possibly prompted by the spread of tsetse fly into the lowveld areas. While there is some evidence that the EIA continued into the 15th century in the lowveld, on the escarpment it had ended by AD1100. The Highveld, particularly around Lydenburg, Badfontein, Sekhukhuneland, Roossenekal, and Steelpoort, became active again from the 15th century onwards. In an area around Belfast, including Lydenburg, Nelspruit, Machadodorp and Badplaas a number of 1 792 Iron Age sites have been identified (Bergh 1999: 7). These all are dated to the Late Iron Age. Sites such as these are known for extensive stone building forming settlement complexes. No indication of metal smelting was identified at any of these sites (Bergh 1999: 8). It is also known that the early trade routes did not run through this area (Bergh 1999: 9). Traditional sources of wealth were easily bolstered as metals were used in place of cattle to encourage key marriage alliances, and at the same time used to purchase livestock and other trade items from outside the country. Local trade consisted of metal, salt, thatch, poles, cattle and grain. Salt was produced from alkaline springs. This valuable commodity could be obtained by paying a tithe to the chief on whose land the salt was located. However, there were examples of mass production where salt was 'balled' for transport and sold for huge profit in salt scarce areas. By the 1700s, with growing trade wealth, economically driven centres of control began to emerge and, following the establishment of Portuguese trade posts, the Mpumalanga landscape became an important thoroughfare for both local and foreign traders. The closest Early and Middle Iron Age sites are those of the famous Lydenburg Heads Site and Klingbeil near Lydenburg (Bergh 1999: 6). Many Late Iron Age sites are known to occur in the larger geographical area, some of the sites associated with the BaKoni (Bergh 1999: 7). Based on the research by Huffman it is possible that pottery related to the so-called Marateng facies of the Urewe Tradition, dating to around AD1650-1840, could possibly be found in the area, although no evidence of this was found in the assessment area (Huffman 2007: 207). No Iron Age material or features were identified during the assessment.

4.2.3 Later History: Colonial Period

At the beginning of the 19th century the Phuthing, a South Sotho group, stayed to the south of Belfast. The Koni of Makopole stayed to the north-east and the Ndzundza Ndebele to the west. During the Difaquane they fled to the south, south-west and north-west as Mzilikazi's impi moved in from the southeast. During this time the Swazi also moved into this area (Bergh 1999: 10-11;109). The area around Belfast, stretching

as far as the Kruger Park, Middelburg and Ohrigstad, was first traded from the Swazi in 1846. White farmers therefore only settled here after this date (Bergh 1999: 16, 133). The town of Belfast was established in 1890 and by the 1890's this area was inhabited by many white farmers (Bergh 1999: 21). Just to the south of the town, on the farm Wemmershuis, the remains of an old coach house were identified. This is on the old trade route between Middelburg and the far eastern Transvaal (Van Vollenhoven 2008: 14). A map from Bulpin (1974) shows that the eastern railway line went through Belfast and one can assume that this was an important stop for travellers. The reason is that the road forks here to the north in the direction of Ohrigstad and Lydenburg and to the east in the direction of Nelspruit. The first Europeans to trek through the interior of South Africa north of the Vaal River was the expedition party of dr. Andrew Cowan who traveled from the Cape to the border of Botswana and from there eastwards past the Waterberg into Sekhukuneland on the way to Delagoa Bay. The party however disappeared and was never heard of after a final report written by Cowan in 1808. After the foundation of Andries-Ohrigstad in 1845 many farms were proclaimed in the larger Mpumalanga area including the areas surrounding the Olifants River and the Strydpoort Mountains. These farms were awarded to white farmers which lead to increasing tension and hostility between the Pedi's and the whites. The first white traveller to visit these surroundings of Dullstroom was Robert Scoon in 1836 (Bergh 1999: 13). At the same time, two Missionaries from the Berlin Missionary Society. Alexander Merensky and H. Grutzner established Mission Stations at Gerlachshoop near Dullstroom and Botshabelo near Middelburg. As tension mounted and both the Pedi's and the ZAR prepared for a confrontation, the Missionaries penetrated the local groups and built relatively positive relations with them. A war between the Pedi's led by Sekhukhune and the white farmers broke out in 1876. After continued confrontations Sekhukhune approached Merensky to act as mediator between his people and the ZAR Government and in February 1877 a peace treaty was announced. However, this treaty was flawed and further confrontation, also with the British authorities followed. In 1879, after many confrontations and a prolonged time of instability Sekhukune was arrested and incarcerated in the Pretoria Central Prison. During the Anglo-Boer War the area around Belfast saw much action. The last of the conventional military encounters between the British and Boer forces were that of the Battle of Bergendal, sometimes called the Battle of Dalmanutha. The battle took place between 21 and 27 August 1900. On 21-22 August skirmishes started on the farm Van Wyksvlei, to the south of Belfast. This was followed by an attack on 23 August by the British on the Boer forces on the farm Geluk. Later that day the Boersat Dalmanutha were also under attack. The final phase of the battle was at Berg-en-dal on 27 August 1900 (Van der Westhuizen & Van der Westhuizen 2000: 218-220). The Boers retrieved from the scene and the British could continue their advance to the Lowveld. On 24 August 1900 the British occupied Belfast. In the town they had three concentration camps for Boer women and children (Van der Westhuizen & Van der Westhuizen 2000: 211-214). One may therefore expect to find farm buildings, structures and objects in the area. Many graveyards from this period in time have been identified in surrounding areas during past surveys. The village of Dullstroom was granted Town Council status in 1921.

The earliest title deed map of the farm Roodekrans (Chief Surveyor General), dating to July 1886 shows that the whole of the original farm was granted to one Petrus Bezuidenhout. No historical features are shown on this map (see Figure 5-1). A farm worker currently residing on the farm, who is said to have been living on the farm for many decades pointed to the fact that, according to his knowledge, the Kruger family occupied the farm for the larger part of the 20th century and that they built the elaborate stone structures and features at the farm.

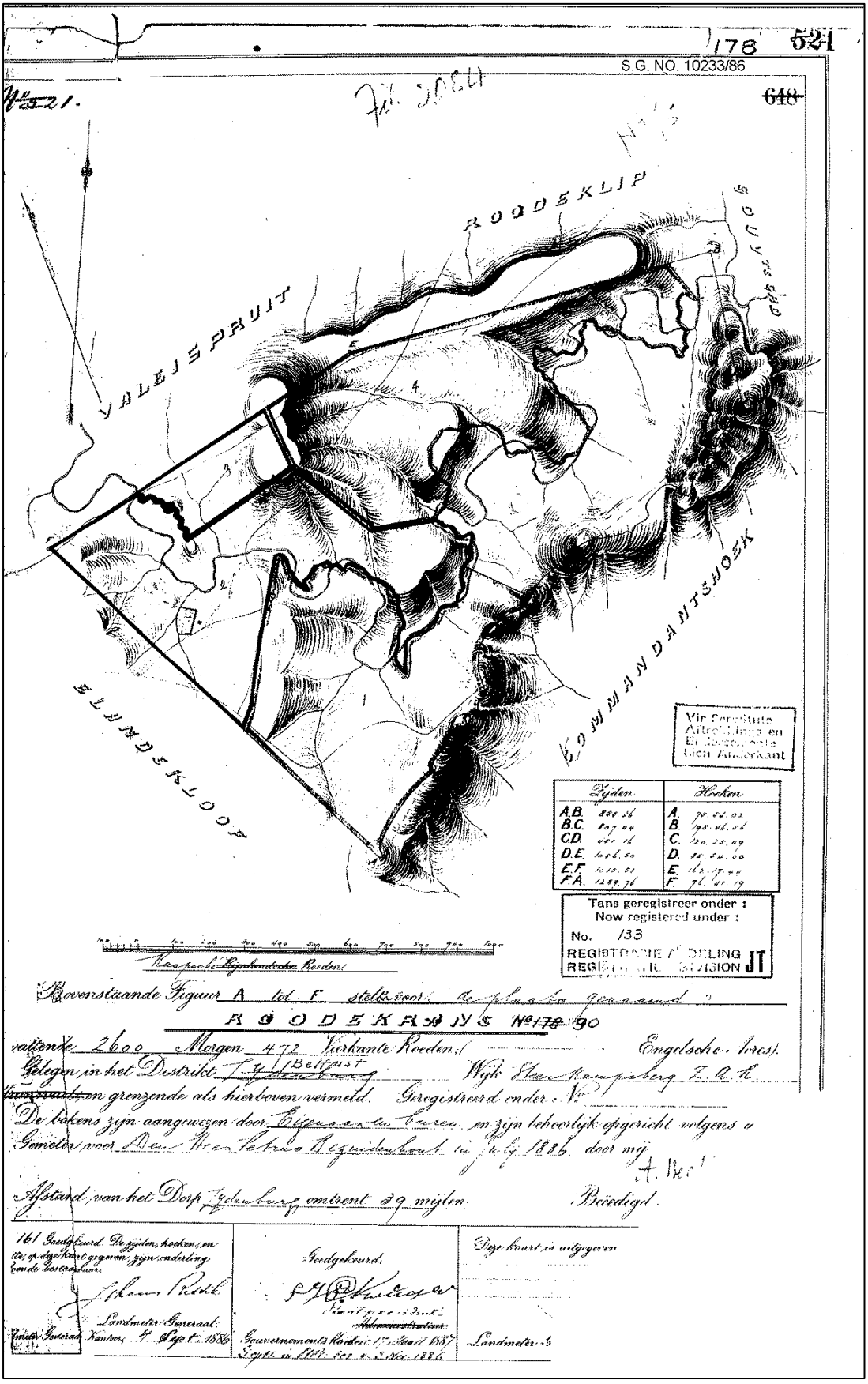

Figure 5-1: Original title deed for the farm Roodekrans dating to 1886.

4.2.4 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 larger landscape around the project area is well known for Stone Age, and particularly Iron Age and Colonial Period heritage remnants. The study area is generally pristine but disturbances do occur in places as a result of forestation and livestock grazing. At least 5 areas of heritage concern were identified outside of – but in close vicinity of the Roodekrans weirs and culvert development project study area. These occurrences were uniquely coded **EXIGO-RK133JT-HPxx** (Exigo Roodekrans 133JT Historical Period) and **EXIGO-RK133JT-BPxx** (Exigo Roodekrans 133JT Burial Place.

5.1 The Stone Age

No Stone Age scatters or occurrences were observed in the project area.

5.2 The Iron Age Farmer Period

No Iron Age (Farmer Period) occurrences were observed in the project area.

5.3 Historical / Colonial Period

Three areas of Historical nature, probably similar in historical context were observed in the landscape around project area.

- **EXIGO-RK133JT-HP01**: Historical stone walled enclosures (S25.49301° E30.15838°), Historical building foundations (S25.49329° E30.15870°)

A series of well-preserved stone wall enclosures occurs in a Eucalyptus forest directly east of the Roodekrans farm house and the drainage line demarcating the study area. The walls, in places reaching a height of approximately 2m in height, and more or less 0.5m deep have been constructed out of round stones of various sizes. The structures cover an area of approximately 0.5 ha forming square and rectangular enclosures and passages. A number of entrances have been built into the walls in various locations. According to an elderly farm worker residing in the area, the walls could be more than 80years old and they were used as cattle kraals by the Kruger family who occupied the farm at the beginning of the 20th century. In addition, a number of poorly preserved smaller rectangular stone foundation structures occur directly south-east of the kraals. The function of the structures is not known but they are probably associated with the adjacent kraal. The site, dating the Colonial Period in Mpumalanga is historically significant but impact as a result of the development is not anticipated to occur here as the study area drainage line is situated some **200m** from the site.

Figure 5-1: Extensive stone walling and enclosures at Site EXIGO-RK133JT-HP01. Note entrance in the structure.

Figure 5-2: Stone walled enclosures and walls at Site EXIGO-RK133JT-HP01.

Figure 5-3: Poorly preserved stone foundations at Site EXIGO-RK133JT-HP01.

- **EXIGO-RK133JT-HP02**: Historical stone house remains (S25.49253° E30.15818°), associated stone cairn (S25.49247° E30.15787°).

The remains of what was said to be the original Roodekrans farmhouse occur in the same Eucalyptus forest between the cattle enclosures and the current farm house. Only a few of the house walls, built from round and square stones remain and as such, preservation of the feature is poor. The house remains measures approximately 4m x 8m. A small stone cairn of unknown function occurs west of the house but it is probably associated with the larger historical site. The house ruins is significant since is associated with the nearby historically significant cattle enclosure but impact as a result of the development is not anticipated to occur here as the study area drainage line is situated some **150m** from the site.

Figure 5-4: The remains of the stone-built walls of the first Roodekrans farmhouse.

Figure 5-5: A stone cairn of unknown function at Site EXIGO-RK133JT-HP02

- **EXIGO-RK133JT-HP03**: Historical stone walled enclosures (S25.49441° E30.15661°), Historical livestock dip tank structure (S25.49403° E30.15666°)

An additional series of smaller stone wall enclosures occurs towards the southern periphery of the Eucalyptus forest south of the current Roodekrans farm house and directly east the drainage line demarcating the study area. Preservation of the walls which, in places reach a height of approximately 1m in height is fair. The walls have been constructed out of round stones of various sizes. The structures cover an area of approximately 100m x 50mha forming rectangular enclosures and long passages. According to the elderly farm worker residing in the area, the walls were used as sheep enclosures by the Kruger family who occupied the farm at the beginning of the 20th century. At the site, a livestock dipping tank as well as a small water tank, constructed in the same fashion as the enclosures occur. The site forms part of the Colonial Period farmstead discussed above, and it is historically significant. Impact as a result of the development is not anticipated to occur here as the study area drainage line is situated some **100m** from the site.

Figure 5-6: Densely overgrown stone walled enclosures at Site EXIGO-RK133JT-HP03.

Figure 5-7: A stone-built livestock dipping tanks visible in the middle of the enclosure at Site EXIGO-RK133JT-HP03.

Figure 5-8: A small water tank associated with the livestock dipping tank at Site EXIGO-RK133JT-HP03.

5.4 Graves / Human Burials

Two burial sites or potential burials were noted in the landscape around project area

- **EXIGO-RK133JT-BP01**: Human burial site (S25.49278° E30.15796°)

A single grave demarcated by a rectangular stone cairn as grave dressing occurs in the same Eucalyptus forest south of the farm house ruins. The grave bears a rough elongated headstone. It is said that the grave belongs to a British individual who resided at Roodekrans and later unexpectedly died there. The site probably dates to the Colonial Period and, since all human burials are considered sensitive heritage receptors, the feature is highly significant. Impact as a result of the development is not anticipated to occur here as the study area drainage line is situated some **150m** from the site.

Figure 5-9: A grave at Site EXIGO-RK133JT-BP01. Note the upright headstone to the left.

- **EXIGO-RK133JT-BP02**: Potential human burial site (S25.49456° E30.15663°)

An elongated, rectangular stone cairn was noted on the banks of the Crocodile River along the southern periphery of the eucalyptus forest. The structure closely resembles a human grave and should be treated as such until otherwise proven. Since all human burials are considered sensitive heritage receptors, the

feature is by potentially highly significant. Impact as a result of the development is not anticipated to occur here as the study area drainage line is situated some **300m** from the site but the site is situated in a sensitive buffer around the proposed development area.

Figure 5-10: An elongated stone cairn closely resembling a grave on the banks of the Crocodile River at Site EXIGO-RK133JT-BP02.

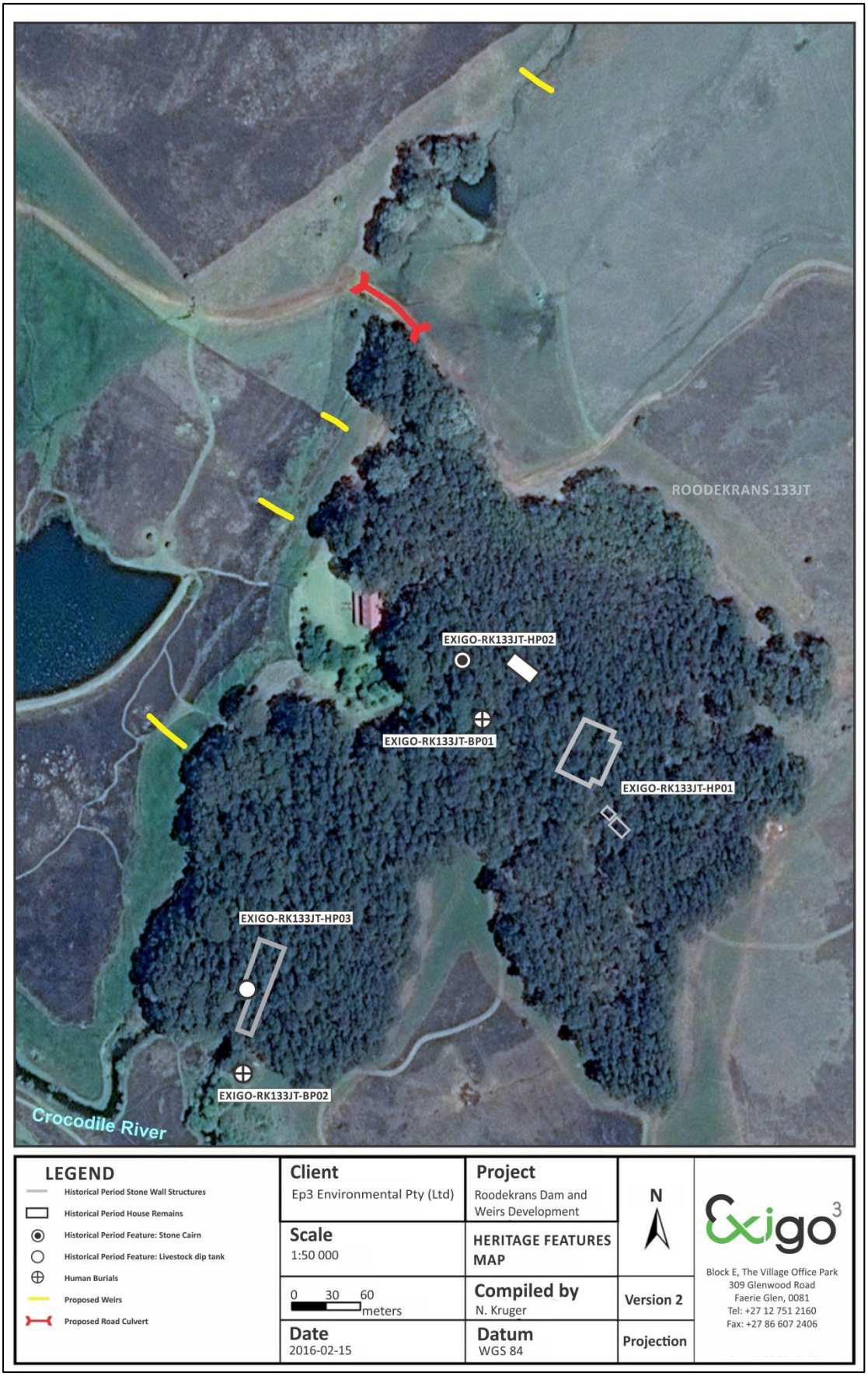

Figure 5-11: Aerial map indicating the locations of all heritage occurrences discussed in the text.

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). Significant heritage receptors were found in the project zones and potential impacts to heritage resources is foreseen. The following table summarizes impacts to archaeological material anticipated for the Roodekrans weirs and culvert development project:

- **EXIGO-RK133JT-HP01, EXIGO-RK133JT-HP02, EXIGO-RK133JT-HP03 (Colonial Period farmstead and associated features)**
- **EXIGO-RK133JT-BP01, EXIGO-RK133JT-BP02 (Human burial site / potential burial site)**

NATURE OF IMPACT: Impacts could involve displacement or destruction of Colonial Period features, sites and human burials in the vicinity of the Roodekrans weirs and culvert development Project.		
	Without mitigation	**With mitigation**
EXTENT	Local	Local
DURATION	Permanent	Permanent
MAGINITUDE	Major	Minor
PROBABILITY	Improbable	Very improbable
SIGNIFICANCE	High	Low
STATUS	Negative	Neutral

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

REVERSIBILITY	Non-reversible	Non-reversible
IRREPLACEABLE LOSS OF RESOURCES?	Yes	No
CAN IMPACTS BE MITIGATED?	Yes	
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 Dullstroom area suggest a rich and diverse archaeological landscape. The study area is generally pristine but disturbances do occur in places as a result of forestation and livestock grazing. At least 5 areas of heritage concern were identified outside of – but in close vicinity of the Roodekrans weirs and culvert development project study area.

Colonial Period remains and human burial sites or potential human burial sites all carrying a high heritage significance were identified in the Roodekrans weirs and culvert development project study area. It is the opinion of the author of this Archaeological Impact Assessment Report that the proposed Roodekrans weirs and culvert development project on the farm Roodekrans 133 JT will have no impact on archaeological heritage resources. The project should be allowed to proceed from a culture resources management perspective, provided that mitigation measures provided in this assessment (avoidance, monitoring), endorsed by the relevant Heritage Resources authority, 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 Roodekrans weirs and culvert development project.

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

- ***For the* Colonial Period farmstead and associated features *in the project area (*EXIGO-RK133JT-HP01, EXIGO-RK133JT-HP02, EXIGO-RK133JT-HP03) *the following are required in terms of heritage management and mitigation:***

PROJECT COMPONENT/S	All phases of construction.
POTENTIAL IMPACT	Damage/disturbance of previously undetected heritage remains.
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.
MITIGATION: TARGET/OBJECTIVE	To adequately document the historic fabric of previously undetected heritage remains as soon as possible after disturbance so as to maximize

	the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL		**RESPONSIBILITY**	**TIMEFRAME**
Preferred Mitigation Procedure			
Avoidance: Implement a heritage conservation buffer of at least 50m around the heritage resource; if necessary realign any applicable infrastructure alignments to avoid the heritage resource and the proposed conservation buffer.		DEVELOPER	Prior to the commencement of construction and earth-moving, during all phases of development.
Fixed Mitigation Procedure (**required**)			
Site Monitoring: Regular examination of trenches and excavations.		ECO	Monitor as frequently as practically possible.
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 human burials / potential human burials in the project area (*EXIGO-RK133JT-BP01, EXIGO-RK133JT-BP02*the following are required in terms of heritage management and mitigation:***

PROJECT COMPONENT/S	All phases of construction and operation.		
POTENTIAL IMPACT	Damage/disturbance to subsurface burials and surface burial features.		
ACTIVITY RISK/SOURCE	Digging foundations and trenches into sensitive deposits that are not visible at the surface.		
MITIGATION: TARGET/OBJECTIVE	To locate human burials as soon as possible after disturbance so as to maximize the chances of successful rescue/mitigation work.		
MITIGATION: ACTION/CONTROL		**RESPONSIBILITY**	**TIMEFRAME**
Preferred Mitigation Procedure			
Avoidance: Implement a heritage conservation buffer of at least 50m around the heritage resource; if necessary realign any applicable infrastructure alignments to avoid the heritage resource and the proposed conservation buffer. Fence burial places and apply access control.		DEVELOPER	Prior to the commencement of construction and earth-moving, during all phases of development.
Alterative Mitigation Procedure (**if preferred mitigation procedure is not feasible**)			
Grave Relocation: Relocation of burials and documentation of site, full social consultation with affected parties, possible conservation management and protection measures. Subject to authorisations and relevant permitting from heritage authorities and affected parties.		QUALIFIED HERITAGE SPECIALIST	Prior to the commencement of construction and earth-moving.
Fixed Mitigation Procedure (**required**)			
Site Monitoring: Regular examination of trenches and excavations.		ECO	Monitor as frequently as practically possible.

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 Dullstroom is rich in pre-historical and historical remnants, significantly so Stone Age, Iron Age Farmer Period and Colonial sites. Previous studies conducted in the larger Dullstroom area suggest a rich and diverse archaeological landscape. The study area is generally pristine but disturbances do occur in places as a result of forestation and livestock grazing. At least 5 areas of heritage concern were identified outside of – but in close vicinity of the Roodekrans weirs and culvert development project study area. The following recommendations are made based on general observations in the proposed Roodekrans weirs and culvert development project Area:

- 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
- Three areas of Historical nature, similar in historical context were observed in the landscape around project area (**EXIGO-RK133JT-HP01, EXIGO-RK133JT-HP02, EXIGO-RK133JT-HP03)**. In these areas livestock enclosures, the ruins of the first Roodekrans farmhouse as well as other associated features are of historic al significance. However the sites are located away from the proposed project area and no impact is foreseen. It is recommended that an informed ECO inspect the project area and the heritage resources on regular basis in order to monitor possible impact on heritage resources
- A human burial site and another potential grave (**EXIGO-RK133JT-BP01, EXIGO-RK133JT-BP02)** occur in the landscape around the study area**.** The sites are situated outside of areas demarcated for infrastructure components proposed for the project. Since human burials are generally of high heritage significance at all levels for their spiritual, social and cultural values, it is primarily recommended that any activities in the vicinity of the cemeteries be executed in a way as to avoid impact on the heritage resources at all times. In addition, a conservation buffer zone of at least 50m around the burials, as well as the fencing off of the graves is recommended. However, should impact on any of the graves in the cemeteries or the proposed 50m buffer zone prove inevitable, full grave relocations are recommended for these burial sites. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation and subject to any local and regional provisions and laws and by-laws pertaining to human remains. A full social consultation process should occur in conjunction with the mitigation of cemeteries and burials.
- 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 Roodekrans weirs and culvert development 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 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 (SAHRA).

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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