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**A PHASE I HERITAGE BASE LINE STUDY FOR THE UPGRADING OF
BASE LINE INFORMATION AND FOR THE AMENDMENT OF THE
ENVIRONMENTAL MANAGEMENT PROGRAM REPORT FOR
XSTRATA ALLOYS' BOSHOEK OPERATIONS (XABO) IN BOSCHOEK
NEAR RUSTENBURG IN THE NORTH-WEST PROVINCE**

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EXECUTIVE SUMMARY

This Phase I Base Line Heritage study for the proposed Xstrata Alloys Boshhoek Operations (XABO) near Boschoek in the North-West Province of South Africa was done according to Section 38 of the National Heritage Resources Act (No 25 of 1999).

The aims with the Phase I HIA study were the following, namely:

- To establish whether any of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) (Box 1) do occur in the Project Area and, if so, to determine the nature and the extent of these remains.

The Phase I Base Line Heritage study for XABO revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in the Project Area, namely:

- Two graveyard and three single graves.

(No archaeological [pre-historical] remains were recorded. This study also did not provide for a paleontological study of the Project Area).

The graveyards and grave were geo-referenced and mapped (Figure 2, Table 1).

General remarks (disclaimer)

It is possible that this Phase I HIA study may have missed heritage resources in the Project Area as heritage sites may occur in clumps of vegetation or tall grass while others may lie below the surface of the earth and may only be exposed once development commences.

If any heritage resources of significance is exposed during XABO's operations the South African Heritage Resources Authority (SAHRA) should be notified immediately, all development activities must be stopped and an archaeologist accredited with the Association for Southern African Professional Archaeologist (ASAPA) should be notify in order to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorisation (permits) from SAHRA to conduct the mitigation measures.

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1 INTRODUCTION

1.1 Project Background

This Phase I Heritage Impact Assessment (HIA) study is one of a series of specialist study reports which are compiled in support of the terms of reference for the compilation of an Environmental Management Plan for Xstrata South Africa (Pty) Ltd. – Xstrata Alloys, Chrome Division, Boshhoek Works (Xstrata Alloys Boshhoek Operations – “XABO”).

Previous heritage surveys that were conducted for developers in the Rustenburg District in the North-West Province indicated that the most common types and ranges of heritage resources which exist in this part of the province consists of stone walled sites which date from the Late Iron Age. However, various types and ranges of heritage resources that qualify as part of South Africa’s ‘national estate’ as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) do occur across the North-West Province (see Box 1, next page).

Box 1: Types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999).

The National Heritage Resources Act (Act 25 of 1999, Section 3) outlines the following types and ranges of heritage resources that qualify as part of the national estate:

- a. Places, buildings structures and equipment of cultural significance;
- b. Places to which oral traditions are attached or which are associated with living heritage;
- c. Historical settlements and townscapes;
- d. Landscapes and natural features of cultural significance;
- e. Geological sites of scientific or cultural importance;
- f. Archaeological and palaeontological sites;
- g. Graves and burial grounds including-
 - i. Ancestral graves;
 - ii. Royal graves and graves of traditional leaders;
 - iii. Graves of victims of conflict;
 - iv. Graves of individuals designated by the Minister by notice in the Gazette;
 - v. Historical graves and cemeteries; and
 - vi. Other human remains which are not covered in terms of the Human Tissue Act (Act 65 of 1983);
- h. Sites of significance relating to the history of slavery in South Africa;
- i. Moveable objects, including -
 - i. Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects, material, meteorites and rare geological specimens;
 - ii. Objects to which oral traditions are attached or which are associated with living heritage;
 - iii. Ethnographic art and objects;
 - iv. Military objects;
 - v. Objects of decorative or fine art;
 - vi. Objects of scientific or technological interest; and
 - vii. Books, records, documents, photographs, positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act (Act 43 of 1996).

The National Heritage Resources Act (Act 25 of 1999, Sec 3) also distinguishes nine criteria for a place and/or object to qualify as 'part of the national estate if they have cultural significance or other special value ...'. These criteria are the following:

- a. Its importance in the community, or pattern of South Africa's history;
- b. Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- c. Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- d. Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- e. Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- f. Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- g. Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- h. Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and/or
- i. Its significance relating to the history of slavery in South Africa.

1.2 Definitions

Terms that may be used in this report are briefly outlined below:

- Conservation: The act of maintaining all or part of a resource (whether renewable or non-renewable) in its present condition in order to provide for its continued or future use. Conservation includes sustainable use, protection, maintenance, rehabilitation, restoration and enhancement of the natural and cultural environment.
- Conservation (*in-situ*): The conservation and maintenance of ecosystems, natural habitats and cultural resources in their natural and original surroundings.
- Cultural (heritage) resources: A broad, generic term covering any physical, natural and spiritual properties and features adapted, used and created by humans in the past and present. Cultural resources are the result of continuing human cultural activity and embody a range of community values and meanings. These resources are non-renewable and finite. Cultural resources include traditional systems of cultural practice, belief or social interaction. They can be, but are not necessarily identified with defined locations.
- Cultural (heritage) resource management: A process that consists of a range of interventions and provides a framework for informed and value-based decision-making. It integrates professional, technical and administrative functions and interventions that impact on cultural resources. Activities include planning, policy development, monitoring and assessment, auditing, implementation, maintenance, communication, and many others. All these activities are (or will be) based on sound research.
- Heritage resources: The various natural and cultural assets that collectively form the heritage. These assets are also known as cultural and natural resources. Heritage (cultural) resources include all human-made phenomena and intangible products that are the result of the human mind. Natural, technological or industrial features may also be part of heritage resources, as places that have made an outstanding contribution to the cultures, traditions and lifestyles of the people or groups of people of South Africa.

- Stone Age: Refers to the prehistoric past, although Late Stone Age peoples lived in South Africa well into the Historical Period. The Stone Age is divided into an Earlier Stone Age (3 million years to 150 000 thousand years ago) the Middle Stone Age (150 000 years to 40 000 years ago) and the Late Stone Age (40 000 years to 300 years ago).
- Iron Age: Refers to the last two millennia and 'Early Iron Age' to the first thousand years AD. 'Late Iron Age' refers to the period between the 16th century and the 19th century and can therefore include the Historical Period.
- Historical period: Refers to the first appearance or use of 'modern' Western writing in a particular area or region of the world.
- Pre-historical: Refers to the time before any historical documents were written or any written language developed in a particular area or region of the world.
- Recent past: Refers to the 20th century. Remains from this period are not necessarily older than sixty years and therefore may not qualify as archaeological or historical remains. Some of these remains, however, may be close to sixty years of age and may, in the near future, qualify as heritage resources.
- Maintenance: Keeping something in good health or repair.
- Preservation: Conservation activities that consolidate and maintain the existing form, material and integrity of a cultural resource.
- Protected area: A geographically defined area designated and managed to achieve specific conservation objectives. Protected areas are dedicated primarily to the protection and enjoyment of natural or cultural heritage, to the maintenance of biodiversity, and to the maintenance of life-support systems.
- Reconstruction: Re-erecting a structure on its original site using original components.
- Replication: The act or process of reproducing by new construction the exact form and detail of a vanished building, structure, object, or a part thereof, as it appeared at a specific period.
- Restoration: Returning the existing fabric of a place to a known earlier state by removing additions or by reassembling existing components.

- Sustainability: The ability of an activity to continue indefinitely, at current and projected levels, without depleting social, financial, physical and other resources required to produce the expected benefits.
- Translocation: Dismantling a structure and re-erecting it on a new site using original components.
- Project Area: refers to the area (footprint) where the developer wants to focus its development activities (refer to plan).
- Phase I studies refer to surveys using various sources of data in order to establish the presence of all possible types and ranges of heritage resources in any given Project Area.
- Phase II studies include in-depth cultural heritage studies such as archaeological mapping, excavating and sometimes laboratory work. Phase II work may include the documenting of rock art, engraving or historical sites and dwellings; the sampling of archaeological sites or shipwrecks; extended excavations of archaeological sites; the exhumation of human remains and the relocation of graveyards, etc. Phase II work involve permitting processes, require the input of different specialists and the co-operation and approval of SAHRA.

2 DETAILS OF THE SPECIALIST

Profession: Archaeologist, Museologist (Museum Scientists), Lecturer, Heritage Guide Trainer and Heritage Consultant

Qualifications:

BA (Archaeology, Anthropology and Psychology) (UP, 1976)

BA (Hons) Archaeology (distinction) (UP, 1979)

MA Archaeology (distinction) (UP, 1985)

D Phil Archaeology (UP, 1989)

Post Graduate Diploma in Museology (Museum Sciences) (UP, 1981)

Work experience:

Museum curator and archaeologist for the Rustenburg and Phalaborwa Town Councils (1980-1984)

Head of the Department of Archaeology, National Cultural History Museum in Pretoria (1988-1989)

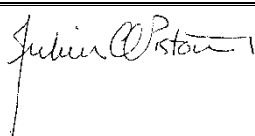
Lecturer and Senior lecturer Department of Anthropology and Archaeology, University of Pretoria (1990-2003)

Independent Archaeologist and Heritage Consultant (2003-Present)

Accreditation: Member of the Association for Southern African Professional Archaeologists. (ASAPA)

Summary: Julius Pistorius is a qualified archaeologist and heritage specialist with extensive experience as a university lecturer, museum scientist, researcher and heritage consultant. His research focussed on the Late Iron Age Tswana and Lowveld-Sotho (particularly the Bamalatji of Phalaborwa). He has published a book on early Tswana settlement in the North-West Province and has completed an unpublished manuscript on the rise of Bamalatji metal workings spheres in Phalaborwa during the last 1 200 years. He has excavated more than twenty LIA settlements in North-West and twelve IA settlements in the Lowveld and has mapped hundreds of stone walled sites in the North-West. He has written a guide for Eskom's field personnel on heritage management. He has published twenty scientific papers in academic journals and several popular articles on archaeology and heritage matters. He collaborated with environmental companies in compiling State of the Environmental Reports for Ekurhuleni, Hartebeespoort and heritage management plans for the Magaliesberg and Waterberg. Since acting as an independent consultant he has done approximately 800 large to small heritage impact assessment reports. He has a longstanding working relationship with Eskom, Rio Tinto (PMC), Rio Tinto (EXP), Impala Platinum, Angloplats (Rustenburg), Lonmin, Sasol, PMC, Foskor, Kudu and Kelgran Granite, Bafokeng Royal Resources etc. as well as with several environmental companies.

3 DECLARATION OF INDEPENDENCE

<p>I, Julius CC Pistorius, declare that:</p>
<ul style="list-style-type: none"> • I act as the independent environmental practitioner in this application • I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant • I declare that there are no circumstances that may compromise my objectivity in performing such work; • I have expertise in conducting environmental impact assessments, including knowledge of the National Heritage Resources Act (No 25 of 1999) and any guidelines that have relevance to the proposed activity; • I will comply with the Act, regulations and all other applicable legislation; • I will take into account, to the extent possible, the matters listed in regulation 8 of the regulations when preparing the application and any report relating to the application; • I have no, 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; • I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application; • I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report; • I will keep a register of all interested and affected parties that participated in a public participation process; and • I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not • all the particulars furnished by me in this form are true and correct; • will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and • I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act. <p>Disclosure of Vested Interest</p> <p>I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2010.</p>
<div style="margin-bottom: 10px;">  </div> <p>_____ Signature of the environmental practitioner: Private Consultant</p> <p>_____ Name of company: 5 January 2012</p> <p>_____ Date:</p>
<p>_____ Signature of the Commissioner of Oaths:</p> <p>_____ Date:</p> <p>_____ Designation:</p>

4 SCOPE OF WORK

Xstrata Alloys Boshoek Operations (XABO) near Boschoek in the North-West Province intends to upgrade the baseline information for its beneficiating plant and mining area and to amend its Environmental Management Program (EMP) report. JMA Consulting (Pty) Ltd who is responsible for compiling the Environmental Management Program (EMP) report commissioned the author to undertake a Phase I HIA study for XABO's operations.

The aims with the Phase I HIA study were the following, namely:

- To establish whether any of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) (Box 1) do occur in the Project Area and, if so, to determine the nature and the extent of these remains.

5 LEGAL FRAMEWORK

South Africa's heritage resources ('national estate') are protected by international, national and regional legislation which provides regulations, policies and guidelines for the protection, management, promotion and utilization of heritage resources. South Africa's 'national estate' includes a wide range of various types of heritage resources as outlined in Section 3 of the National Heritage Resources Act (NHRA, Act No 25 of 1999) (see Table 1).

According to the NHRA (Act No 25 of 1999) heritage resources are categorised using a three-tier system, namely Grade I (national), Grade II (provincial) and Grade III (local) heritage resources.

At the provincial level, heritage legislation is implemented by Provincial Heritage Resources Agencies (PHRAs) which apply the National Heritage Resources Act (Act 25 of 1999) together with provincial government guidelines and strategic frameworks. Metropolitan or Municipal (local) policy regarding the protection of cultural heritage resources is also linked to national acts and is implemented by the South African Heritage Resources Agency (SAHRA) and the Provincial Heritage Resources Agencies.

At a national level heritage resources are dealt with by the National Heritage Council Act (Act No 11 of 1999) and the National Heritage Resources Act (Act No 25 of 1999).

5.1 Legislation relevant to heritage resources

The identification, evaluation and assessment of heritage resources in South Africa are regulated by the following legislation:

- National Environmental Management Act (NEMA) Act 107 of 1998
- National Heritage Resources Act (NHRA) Act 25 of 1999
- Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002

- Development Facilitation Act (DFA) Act 67 of 1995

5.2 The National Heritage Resources Act (NHRA)

According to the NHRA (Act No 25 of 1999) the 'national estate' comprises the following (see Table 1):

- Archaeological artefacts, structures and sites older than 100 years
- Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- Objects of decorative and visual arts
- Military objects, structures and sites older than 75 years
- Historical objects, structures and sites older than 60 years
- Proclaimed heritage sites
- Graveyards, burial grounds and graves older than 60 years
- Meteorites and fossils
- Objects, structures and sites of scientific or technological value.

Elaborating on the above the 'national estate' also includes (Table 1):

- Places, buildings, structures and equipment of cultural significance
- Places to which oral traditions are attached or which are associated with living heritage
- Historical settlements and townscapes
- Landscapes and features of cultural significance
- Geological sites of scientific or cultural importance
- Archaeological and paleontological sites of importance
- Sites of significance relating to the history of slavery
- Movable objects (e.g. archaeological, paleontological, meteorites, geological specimens, military and ethnographic objects, books etc.)

5.3 Heritage Impact Assessment studies

According to Section 38 of the National Heritage Resources Act (Act No 25 of 1999) a Heritage Impact Assessment (HIA) process must be followed under the following circumstances:

- The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length
- The construction of a bridge or similar structure exceeding 50m in length
- Any development or activity that will change the character of a site and which exceeds 5 000m² or which involve three or more existing erven or subdivisions thereof
- Re-zoning of a site exceeding 10 000 m²
- Any other category provided for in the regulations of SAHRA or a provincial heritage authority

5.4 Regulations with regard to heritage resources

The regulations outlined below are applicable to the types and ranges of heritage resources which are the most common in the region where the heritage study was conducted, namely:

5.4.1 Buildings and structures

According to Section 34(1) of the NHRA (Act No 25 of 1999) no person may alter (demolish) any structure or part thereof which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

A structure means any building, works, device or any other facility made by people and which is fixed to land and which includes fixtures, fittings and equipment associated with such structures.

Alter means any action which affects the structure, appearance or physical properties of a place or object, whether by way of structural or any other works such as painting, plastering, decorating, etc..

5.4.2 Graves and burial grounds

Graves and burial grounds are divided into the following:

- a. ancestral graves
- b. royal graves and graves of traditional leaders
- c. graves of victims of conflict
- d. graves designated by the Minister
- e. historical graves and cemeteries
- f. human remains

In terms of Section 36(3) of the NHRA (Act No 25 of 1999) no person, without a permit issued by the relevant heritage resources authority, may:

- 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 or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

Unidentified graves are handled as if they are older than 60 years until proven otherwise.

Human remains that are less than 60 years old are subject to provisions of the Human Tissue Act (Act 65 of 1983) and to local regulations. Exhumation of graves must conform to the standards set out in the Ordinance on Excavations (Ordinance no. 12 of 1980) (replacing the old Transvaal Ordinance no. 7 of 1925).

Permission must also be gained from the descendants (where known), the National Department of Health, Provincial Department of Health, Premier of the Province and local police. Furthermore, permission must also be gained from the various landowners (i.e. where the graves are located and where they are to be relocated) before exhumation can take place. Human remains can only be handled by a registered undertaker or an institution declared under the Human Tissues Act (Act 65 of 1983 as amended).

5.4.3 Archaeology, palaeontology and meteorites

Section 35(4) of the NHRA (Act No 25 of 1999) deals with archaeology, palaeontology and meteorites and states that no person without a permit issued by the responsible heritage resources authority (national or provincial) may:

- destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite;
- destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite;
- trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or paleontological material or object, or any meteorite; or bring onto or use at an archaeological or paleontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and paleontological material or objects, or use such equipment for the recovery of meteorites.
- alter or demolish any structure or part of a structure which is older than 60 years.

Heritage resources may only be disturbed or moved by an archaeologist after being issued with a permit received from the South African Heritage Resources Agency (SAHRA). In order to demolish heritage resources the developer has to acquire a destruction permit by from SAHRA.

6 METHODOLOGY

The Phase I HIA study was conducted by means of the following:

6.1 Desktop study

Literature relating to the pre-historical and the historical unfolding of the Rustenburg District was reviewed. This review provides a broad chronological overview of the region ranging from pre-historical times to the historical period including the development of platinum and chrome mining in the region. It also refers to the Bafokeng and other Tswana clans who, together with the colonial Voortrekkers, were the most influential pre-historic and historical groups in the region. This contextual evidence contributes to a better understanding of the identity and meaning of heritage sites which may occur in and near XABO.

A number of heritage studies which were done for developers near the Project Area also provided information regarding the general heritage characteristics of the larger Project Area (see 'Select Bibliography', Part 12).

The desktop study also involved consulting heritage data banks maintained at institutions such as the North-West Provincial Heritage Resources Agency in Mafikeng, the Archaeological Data Recording Centre at the National Flagship Institute (Museum Africa) in Pretoria and the national heritage resources register at the South African Heritage Resources Agency (SAHRIS) in Cape Town.

The Project Area was also studied by means of maps on which it appears (Sun City 2527AC & Rustenburg East 2527CB 1: 50 000 topographical maps; 2527 Pretoria 1:250 000 map and Google imagery).

6.2 Fieldwork and research

The Project Area was surveyed with a vehicle and by means of pedestrian surveys. A track log which was registered with a mounted GPS instrument outlines the main route for the field survey from where pedestrian surveys were conducted. A number

of photographs also outline the characteristics of the Project Area (see Part 9.1 'Fieldwork survey', Figures A –D).

The Project Area was also surveyed during at least three occasions in the past, namely:

- Pistorius, J.C.C. 2000. An Archaeological scoping report on possible cultural resources on a part of the farm Boschoek 103JQ in the Rustenburg District of the North West: Proposed development of a new town by Amplats. Unpublished report prepared for Landscape Dynamics and Amplats.



Figure 00- Track pathway registered with a mounted GPS outlines the main routes that were followed during the field survey from where pedestrian surveys were undertaken (above).

- Pistorius, J.C.C. 2000 An Archaeological scoping report supplemented with a Phase I Archaeological survey for SA Chrome’s proposed new Ferrochrome Smelter on the farm Boschhoek 103JQ in the Rustenburg District of the Central Bankeveld in the North West Province. Unpublished report prepared for Metago Environmental Engineers.

- Pistorius, J.C.C. 2003. A Heritage Impact Assessment (HIA) for SA Ferrochrome's new proposed expansion operations in Boschoek north of Rustenburg in in the North West Province. Unpublished report prepared for Metago Environmental Engineers.

6.3 Baseline description

The baseline heritage study was compiled by means of a synthesis of the evidence derived from the desktop study (heritage data bases and literature research for contextual evidence) with the fieldwork evidence (GPS recording, describing, photographing and evaluating heritage resources encountered in the veld). This evidence was used to provide a qualitative description and explanation of the various types and ranges of heritage resources that were encountered in the larger Project Area.

6.4 Proposed activity description

It is assumed that certain project activities will have a bearing (impact) on heritage resources. These activities will be described and assessment in terms of their possible influence on any heritage resources that occur in the Project Area.

6.5 The heritage impact assessment

The significance of heritage resources in the Project Area is indicated by means of stipulations derived from the NHRA (Act No 25 of 1999) as well as criteria derived from the historical and cultural context of the heritage resources that may be impacted by the chrome industry's operations.

The significance of potential heritage impacts was determined using a generic ranking scale which is used in most environmental impact assessment studies and which is based on the following:

- Occurrence
 - Probability of occurrence (how likely is it that the impact may/will occur?), and

- Duration of occurrence (how long may/will it last?)
- Severity
 - Magnitude (severity) of impact (will the impact be of high, moderate or low severity?), and
 - Scale/extent of impact (will the impact affect the national, regional or local environment, or only that of the site?)

Each of these factors has been assessed for each potential impact using the following ranking scales:

Probability: 5 – Definite/don't know 4 – Highly probable 3 – Medium probability 2 – Low probability 1 – Improbable 0 – None	Duration: 5 – Permanent 4 - Long-term (ceases with the operational life) 3 - Medium-term (5-15 years) 2 - Short-term (0-5 years) 1 – Immediate
Scale: 5 – International 4 – National 3 – Regional 2 – Local 1 – Site only 0 – None	Magnitude: 10 - Very high/don't know 8 – High 6 – Moderate 4 – Low 2 – Minor

The environmental significance of each potential impact was assessed using the following formula:

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

The maximum value is 100 Significance Points (SP). Potential environmental impacts are rated as very high, high, moderate, low or very low significance on the following basis:

- More than 80 significance points indicates VERY HIGH environmental significance.
- Between 60 and 80 significance points indicates HIGH environmental significance.
- Between 40 and 60 significance points indicates MODERATE environmental significance.
- Between 20 and 40 significance points indicates LOW environmental significance.
- Less than 20 significance points indicates VERY LOW environmental significance.

6.6 Heritage management measures

Heritage management measures are based on guidelines derived from the National Heritage Resources Act (Act No 25 of 1999) and from guidelines provided by the South African Heritage Resources Authority SAHRA).

Recommendations for the handling of graves and human remains older than sixty years are based on terms derived from Section 36(3) of the National Heritage Resources Act (No 25 of 1999). Graves and human remains which are less than sixty years old are subject to provisions of the Human Tissue Act (Act 65 of 1983) and to local regulations. Exhumation of graves must also conform to the standards set out in the Ordinance on Excavations (Ordinance no. 12 of 1980) (replacing the old Transvaal Ordinance no. 7 of 1925).and

6.7 Heritage monitoring plan

Heritage monitoring measures are based on principles associated with best practise and guidelines are derived from practical experiences with regard to the monitoring of heritage resources. Guidelines for best practise are formulated by SAHRA and ASAPA and are recommended to and applied by heritage researchers and consultants.

7 ASSUMPTIONS AND LIMITATIONS

7.1 Adequacy of predictive methods

No predictive evidence (such as models) is used in this study.

7.2 Adequacy of under laying assumptions

This study was not primarily based on assumptions (or hypothetical evidence) but was mainly based on empirical evidence derived from fieldwork observations.

7.3 Uncertainty of information provided

It is possible that this Base Line Heritage study may have missed heritage resources in the Project Area as heritage sites may occur in clumps of vegetation or tall grass while others may lie below the surface of the earth and may only be exposed once development commences.

If any heritage resources of significance is exposed during the chrome industry's operations the South African Heritage Resources Authority (SAHRA) should be notified immediately, all development activities must be stopped and an archaeologist accredited with the Association for Southern African Professional Archaeologist (ASAPA) should be notify in order to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorisation (permits) from SAHRA to conduct the mitigation measures.

8 THE PHASE I HERITAGE SURVEY

8.1 The Project Area

8.1.1 Location

The Xstrata Alloys Boshhoek Operations (XABO) is located on the farms Boschoek 103JQ, Bultfontein 259JQ and Boekenhoutfontein 260JQ, approximately 30km to the north of Rustenburg in the North West Province. The site falls within the Rustenburg Local Municipality within the Bojanala Platinum District Municipality. XABO is located in the great divide between the Magaliesberg mountain range (west) and the Thaba-ea-Maralla range of mountains (east). The Project Area is situated near the eastern foothills of the Magaliesberg and the Pilanesberg further to the north and as such falls within the sphere of influence of the pre-historical and historical Fokeng people (Figure 1).

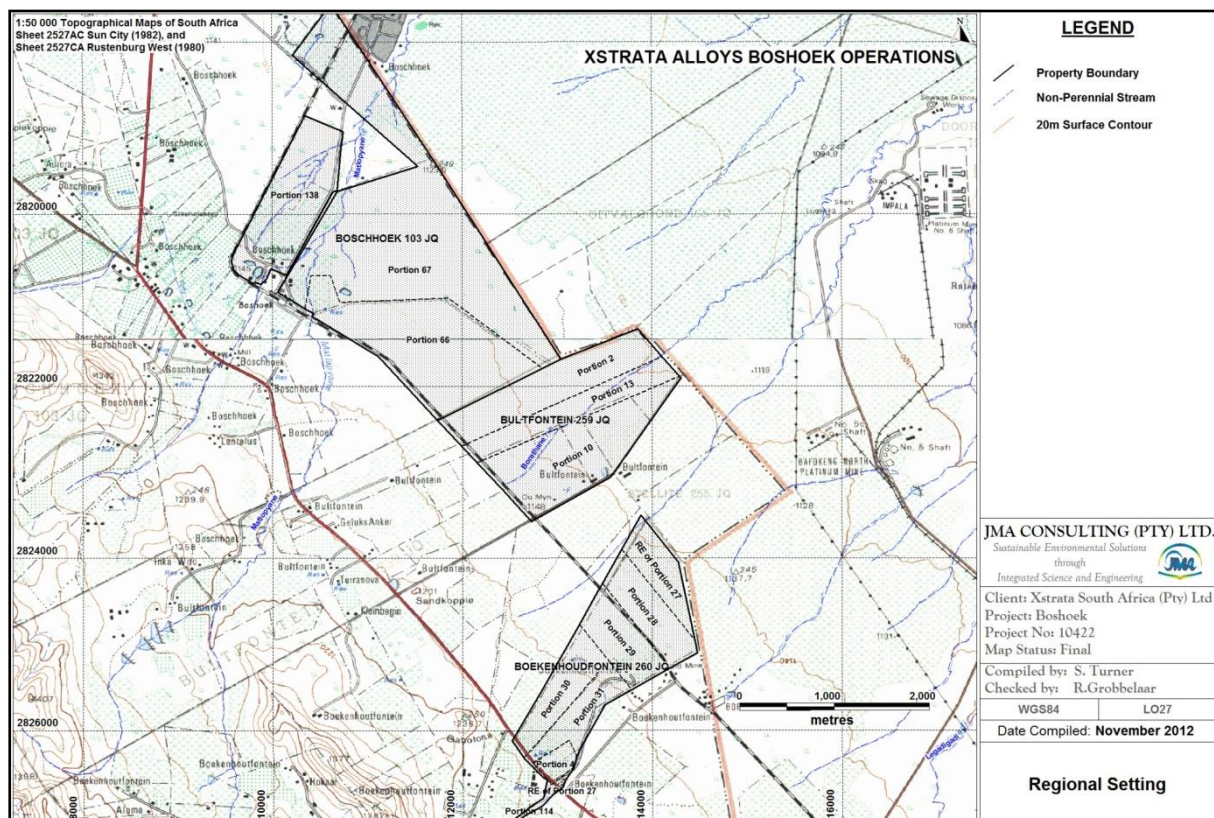


Figure 1- Regional setting for Xstrata Alloys Boshhoek Operations near the village of Boshhoek north of Rustenburg in the North-West Province (above).

The towns closest to the Project Area are Rasimone, Frischgewaagd and Chaneng which are situated to the north, Mogono and Ga-Luka to the east of XABO and Pudunong, Phokeng and Masobobane to the south-east of XABO. The town of Boshoek is situated directly to the west of XABO and the towns of Bala and Chaneng further to the north-east (Sun City 2527AC & Rustenburg East 2527CB 1: 50 000 topographical maps; 2527 Pretoria 1:250 000 map) (Figure 1).

8.1.2 The nature of the Project Area

The Boshoek area has been subjected to development for longer than a century. The most pronounced development consists of the cultivation of land for citrus and tobacco farming. Both farming practices are historical and the extent of these agricultural pursuits can be witnessed on the 1:50 000 map of Sun City [2527CA] which was printed and published in 1964 (by the Government Printer). The agricultural industry led to the establishment of a railway siding at Boshoek in order to transport agricultural produce to markets and cities such as Pretoria and the Witwatersrand.

Platinum mining commenced in the early 1920's and 1930's and was soon followed by chrome mining. Both platinum and chrome mining activities currently surround XABO and have contributed to the transformation of the larger Project Area which cannot be described as an unaffected piece of land any longer.

XABO currently consists of opencast mining operations as well as a ferrochrome beneficiation plant that includes a pelletizing plant, two closed-arc furnaces, a metal extraction/ beneficiation plant, as well as the associated water containment and waste disposal/management facilities. The Project Area therefore can be divided into a totally transformed western part where the beneficiation plant and associated infrastructure and mining activities are located and an eastern part where relatively undisturbed patches of veld can be found. The western part of the Project Area therefore represents an industrial and mining zone with the only infrastructure with heritage significance to occur some of the houses and shops which were built when the town of Boshoek was established in the nineteenth century. These heritage resources, however, occur outside the Project Area.

The eastern flat part of the Project Area includes agricultural fields as well as some patches with undisturbed bush. Several heritage surveys which have been done for power lines which run across this flat piece of veldt which extends as far as the Thaba- ea- Maralla norite hills in the east have not revealed the presence of any heritage resources of significance in this area.

The discontinuous nature of the northern tip of the Magaliesberg was important for the movement of people (such as traders) between the Western Bankeveld and the Central Bankeveld. During the first half of the 19th century and decades thereafter, this part of the mountain served as a trail through which wagons passed on their way to Rustenburg and further to the east and north. Traders such as Schoon and McLuckie (1829), who were the first white people to visit the area north of the Magaliesberg, missionaries such as Robert Moffat (1829), scientists such as Andrew Smith (1835) and the adventurer Cornwallis Harris (1836) trekked through the Magaliesberg (and west of Boschkoppe) on their way to the east where the first Colonists established settlements at places such as Schaapkraal, Tierpoort, Garsfontein and Pretoria.

8.1.3 The nature of the Xstrata Alloys' Boshhoek Operations

The Boshhoek Ferrochrome Smelter Complex was constructed by Merafe Resources Limited (Merafe) in March 2001 and was successfully commissioned in 2002. The first batch of ferrochrome was tapped from the Boshhoek Ferrochrome Smelter Complex on 13 June 2002 and aims to produce 240 000 tonnes of Ferrochrome per Annum. The Boshhoek Smelter Complex was ISO 9000 certified in May 2004. The ferrochrome smelter complex now forms part of the Xstrata-Merafe Chrome Venture which was established on 01 July 2004

XABO currently consists of Opencast Mining Operations as well as a Ferrochrome Beneficiation Plant. The Mining Management Area is further subdivided according to the opencast mining operations into the Northern Opencast Mining Operations and a Southern Opencast Mining Operations. These two open cast mining operational areas are separated by the Farm Stellite 255. The Ferrochrome Beneficiation Plant includes a pelletizing plant, two closed-arc furnaces, a metal extraction/ beneficiation

plant as well as the associated water containment and waste disposal/management facilities.

Project activities relating to the development of open cast mines may have a bearing (impact) on heritage resources in the Project Area (see Part 10.1, 'Project activities relevant to heritage resources').

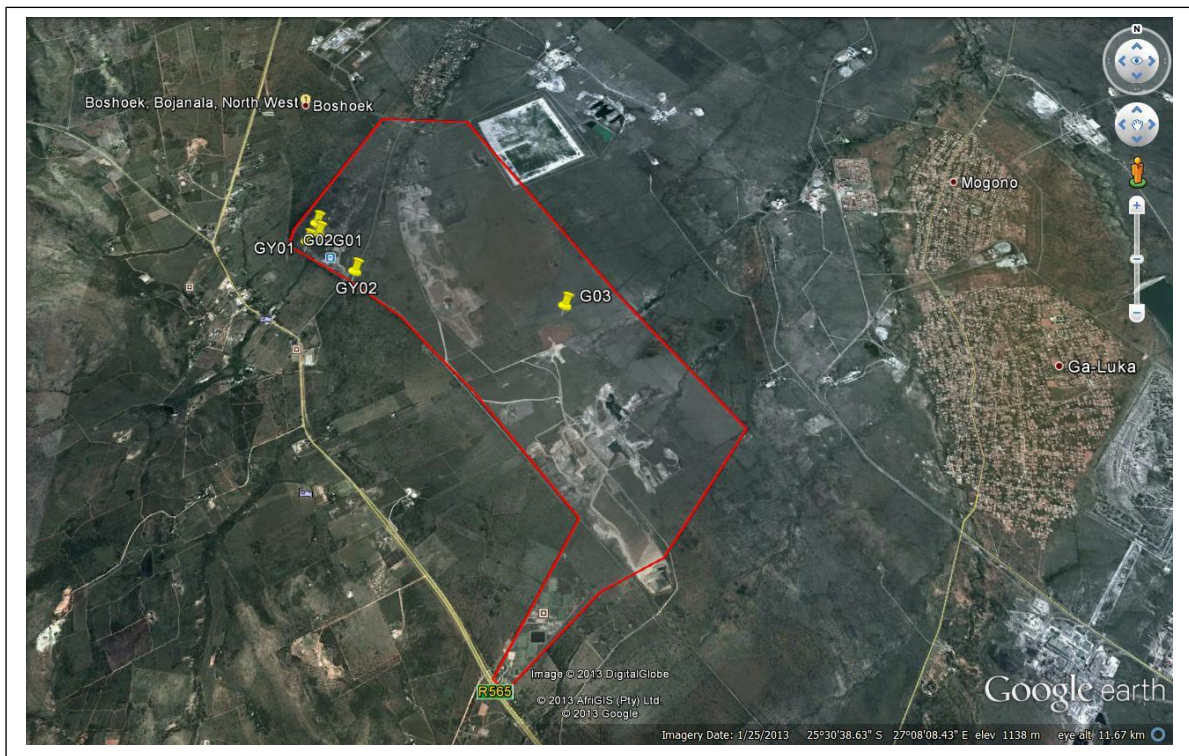


Figure 2- Xstrata Alloys' Boshhoek Operations near Boschoek north of Rustenburg in the North-West Province. Note the presence of two graveyards and three single graves in the Project Area (above).

8.2 Contextualising the Project Area

Several studies for developers have been conducted in the larger Project Area (see Part 13 'Select Bibliography'). These studies have indicated that the most common heritage resources which occur in the region are the following:

- Stone walled sites which date from the Late Iron Age are relatively common in the region and can be associated with various pre-historical and historical Tswana spheres of influence.

- Farmstead complexes which can be associated with colonial farmers.

Heritage resources which are scarce in the larger Project Area include the following:

- Stone Age sites with dense concentrations of stone tools on the surface of the land.
- Historical platinum and chrome mining activities which sometimes are associated with limited infrastructure.

The following overview of pre-historical, historical and cultural evidence outlines the types and range of heritage resources which do occur across the larger Project Area.

8.2.1 Stone Age and rock art sites

Stone Age sites are marked by stone artefacts that are found scattered on the surface of the earth or as parts of deposits in caves and rock shelters. The Stone Age is divided into the Early Stone Age (ESA) (covers the period from 2.5 million years ago to 250 000 years ago), the Middle Stone Age (MSA) (refers to the period from 250 000 years ago to 22 000 years ago) and the Late Stone Age (LSA) (the period from 22 000 years ago to 200 years ago).

The Project Area is not known to contain significant numbers of Stone Age sites from any of the different periods identified for the Stone Age. The insignificant amount of information about Stone Age sites can partly be attributed to the fact that the divide between the Magaliesberg and the Thaba-ee-Maralla range of mountains comprises outstretched grass veld with limited volcanic rock to manufacture stone tools. Stone Age hunters probably utilized the grass veldt to hunt antelope and other small game but settled in the surrounding mountainous areas where there are adequate rock shelters and caves for semi-permanent settlements.

8.2.2 Iron Age sites

The Iron Age is associated with the first agro-pastoralists or farming communities who lived in semi-permanent villages and who practised metal working during the

last two millennia. The Iron Age is usually divided into the Early Iron Age (EIA) (covers the 1st millennium AD) and the Later Iron Age (LIA) (covers the first 880 years of the 2nd millennium AD). It seems as if no Early Iron Age sites occur in the Rustenburg area. However, this region is known for its former and current occupation by clans of the Tswana people.

The oldest legends state that the Fokeng entered the Transvaal through Tweedepoort, under the leadership of Nape, the earliest known Fokeng chief. This was before c. 1700 AD. The group moved south-eastwards and settled on the banks of the Elands River (Kgetleng). Fokeng groups detached them from the main branch and moved southwards on different occasions settling along the Thaba-ea-Maralla mountain range at various places such as Serutube, Marakana, Tsitsing (Kanana), Thekwane and Photsaneng (or Bleskop) when they arrived in the Rustenburg district, from as early as the 17th century. Simultaneously, other clans occupied Phôkeng, the original town lands of what later became Rustenburg and the foothills of the Magaliesberg. The Fokeng then gradually expanded their influence and presence over the great divide between the Magaliesberg in the west and the Thaba-ea-Maralla mountain range in the east (Môkgatle 1971, Coertze 1987).

Sotho-Tswana clans such as the Tlôkwa and Kgatla occupied the Pilanesberg further to the north whilst the Kwena Modimosana chiefdoms of Mmatau and Ramanamela occupied the mega stone walled complexes known as Molokwane and Bôitsemagano to the west of the Magaliesberg (Schapera 1942, Breutz 1954, 1986; Pistorius 1994, 1996). The Batlowa occupied the area directly to the north of the Project Area as they established their capitals at Marothodi and Pilwe (north-west) on the farm Vlakfontein 207JP (Breutz 1954, 1986). The Project Area therefore corresponds and coincides with the former spheres of influence of the Bafokeng who lived further to the south and the Batlowa who lived further to the north. This occupation occurred at mountains and kopjes in the region from as early as the Late Iron Age (17th century to the 19th century), during the Historical Period (second half of the 19th century to the 20th century) and in the more recent past (the last sixty years).

Numerous pre-*difaqane* and *difaqane* wars took place in the Central Bankeveld during the last quarter of the 18th century and the first three decades of the 19th century. These

wars led to the displacement of large numbers of Tswana clans in the Bankeveld. Refugee sites occupied by dislodged Tswana became a common sight (Lye 1975). The Matabele of Mzilikazi caused chaos and havoc in the Bankeveld. The Matabele established several settlement complexes in this region from whence they maintained a grip on the indigenous population (Rasmussen 1978). One of these Zulu/Nguni residences (*imisi*) and military kraals (*amakhanda*) was discovered during an archaeological survey in the newly developed Thlabane-West suburb, north of Rustenburg (Pistorius 1996). The Matabele intermarried with the Fokeng. One of Mzilikazi's sons, Nkulumane, was buried in Phôkeng. His grave is today wrongly indicated as 'Mzilikazi's grave' in the main street in Phôkeng (Pistorius 1997a, 1997b & 1998).

8.2.3 Remains relating to mining heritage

The earliest mining activities in South Africa which were done by Colonists were confined to the mining for salt, lead and limestone. Gold mining followed in the second half of the 19th century whilst the mining for other minerals followed after the discovery of the platinum bearing deposits in the Merensky Reef in the late 19th century (Wagner 1973).

Andries Lombaard's discovery of platinum nuggets in the Moopetsi River on the farm Maandagshoek in the Steelpoort area in 1924 can be considered the initial discovery of the Merensky Reef.

The Merensky Reef occurs, geographically, in the westerly and the easterly parts of the Bushveld Complex. These two limbs of the Complex are confined to the North-West Province and to the Northern and the Mpumalanga Provinces of South Africa. The Merensky Reef has been traced for a total distance strike extent of 283km, 138 kilometres of which is in the eastern limb and 145 kilometres in the western limb of the Bushveld Complex. Vertical depths of 1 900m have been registered along the Reef, which also indicates its continuity.

The eastern limb of the Reef is geologically less well known than the western limb because mining activities in this part of the Reef have been limited.

During the great platinum boom of 1925 over fifty companies were started in the Union of South Africa to exploit the mineral resources of the Bushveld Complex and the Waterberg district. Oxidized ores were initially taken from the Merensky Reef. When these ores had been exhausted, they were replaced by sulphide ores (Wagner 1973). Chrome deposits also proved to be an important resource in the geology of Rustenburg and chrome mining activities accelerated during the last decades with the opening of several chrome mines in this area (Viljoen & Reimold 1999).

Remains associated with old platinum, chrome and other mining activities still exist in the Rustenburg District. These include shafts, headgear, infrastructure and even underground workings. Access to underground mines could be gained through incline shafts or adits dug into kopjes or into the level ground, at a slight angle.

The infrastructure of early 20th century platinum mines consisted mainly of cement and brick buildings covered with corrugated iron. Important plants included treatment plants, power plants as well as mills. Other conspicuous structures were the towering headgear of vertical shafts and incline shafts, a limited number of which may still be found in the Rustenburg, Potgietersrust and Lydenburg areas.

8.2.4 Remains from the historical period and from the recent past

The discontinuous nature of the northern tip of the Magaliesberg mountain range, near the Project Area, was important for the movement of people such as traders between the Western Bankeveld and the Central Bankeveld. During the 19th century this part of the mountain served as a trail through which wagons passed on their way to Rustenburg and further to the east.

Traders such as Schoon and McLuckie (1829), who were the first white people to visit the area north of the Magaliesberg, missionaries such as Robert Moffat (1829), scientists such as Andrew Smith (1835) and the adventurer Cornwallis Harris (1836)

trekked through the Magaliesberg (and over the farm Boschoek) on their way to the eastern part of the Central Bankeveld, where some of them visited Mzilikazi of the Matabele (Ndebele) who occupied at least three villages complexes in the region (Horn 1996, Harris 1963, Lye 1975).

Rustenburg is the third oldest town established by Colonials (Voortrekkers) in the former Transvaal area during the first half of the 19th century. The governor of the Zuid-Afrikaanse Republiek proclaimed the town in September 1851. The Transvaal Volksraad met in the town in 1852.

Other important decisions relating to the church and the state were also taken in this town. Rustenburg also served as the seat for the Zuid-Afrikaanse Republiek before Pretoria became the capitol (Bergh 1992, Pretorius 1967).

Paul Kruger, who served as President of the Zuid-Afrikaanse Reubliek, owned the farm Boekenhoutfontein, south of Boschoek. His family occupied the farm during the second half of the 19th century. The buildings on the farm were destroyed during the Anglo-Boer War. The farm was declared a national heritage site in 1936 and has been preserved by the Simon van der Stel Foundation until recently.

The town of Boshhoek's name is derived from that of the farm Boschhoek. The town is located along the railway line from Pretoria and was formerly a terminus. The town was known for its citrus and for the cultivation of Virginia tobacco (Erasmus 1995).

Several old houses and shops still stand along the sides of the town's main street. The character of the town has gradually changed due to the expansion of platinum and chrome mining industries

8.3 Fieldwork survey

The Project Area was subjected to a survey with a vehicle and a pedestrian survey. The western part of the Project Area was totally transformed as a result of industrialisation and mining activities. These modern development activities were

superimposed on older agricultural activities although dense patches with pristine bush still exist.



Figures A & B- The western part of the Project Area was transformed into an industrial and mining landscape (above and below).





Figures C & D- The eastern part of the Project Area incorporates older abandoned agricultural fields as well as infrastructure related to mining activities (above).



8.4 Types and ranges of heritage resources

The Phase I HIA for XABO revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in the Project Area, namely:

- Two graveyard and three single graves.

(No archaeological [pre-historical] remains were recorded. This study also did not provide for a paleontological study of the Project Area).

The graveyards and graves were geo-referenced and mapped (Figure 2, Table 1).

8.4.1 Graveyards and graves

Two graveyards and three single graves were recorded in the Project Area, namely:

8.4.1.1 Graveyard 01

This graveyard (GY01) is located next to the Boschoek railway line in the western part of The Project Area and in close proximity to the Beneficiation Plant.

GY01 comprises nine graves which are edged with upright stones. None of the graves are fitted with headstones. However, it is highly likely that some of the graves are older than sixty years.

GY01 is demarcated with a fence, holds a signpost ('Graveyard 01') and is neatly maintained.



Figure 3- GY01 is located near a railway line and holds nine graves all of which are edged with upright stones (above).

8.4.1.2 Graveyard 02

This graveyard (GY02) is located next to the Boschoek railway line (further south of GY01) in the western part of The Project Area. GY02 comprises the decorated grave of Danie Joubert and a heap of stones which possibly represents the grave of a child.

The inscription on Danie Joubert's tombstone reads as follow:

- 'Hier rus in vrede ons geliefde seun en ons broer Jacobus Daniel Francois Joubert Geb 23 Sep 1915 Oorlede 22 April 1940 Rus sag liefste Danie tot Jezus u wek Ps 116:11 Ik sal met vreugde in ... huis des Heeren gaan'

Both graves in GY02 are probably older than sixty years.



Figure 4– The grave of Danie Joubert in GY02 which is located near the junction of Road D1813 and the railway line (above).

8.4.1.3 Grave 01

This single grave (G01) is located in dense bush near a stream. It is edged with stones and is not fitted with a headstone. It is located near the Beneficiation Plant.

G01 is demarcated with a fence, holds a signpost ('Graveyard 02') and is neatly maintained.

G01 may be older than sixty years.

8.4.1.4 Grave 02

G02 is located near the Beneficiation Plant. It is fitted with a granite-cross, edged with cement strips and covered with rubble. G02 is demarcated with an iron palisade fence, holds a signpost ('Graveyard 03') and is neatly maintained.

This grave may also be older than sixty years.



Figures 5 & 6- G01 is located in dense bush near a stream. It is edged with stones and holds no headstone with inscriptions (above). GY02 is demarcated with an iron palisade fence and is neatly maintained (below).



8.4.1.5 Grave 03

This single unmarked grave is located in open veld in the Andru Mining area in the south-east of the Project Area.

It merely covered with a few stones and is possibly older than sixty years.



Figure 7– The single, abandoned grave (G03) which is marked with a few stones near Eskom’s power lines in the Andru Mining Area (above).

Graveyards and graves	Coordinates	Significance
GY01. Nine graves next to railway line edged with upright stones.	X27.09755 -25.49386	HIGH (According to legislation)
GY02. Grave of Danie Joubert and a child. Decorated with granite headstone.	X27.10421 Y-25.49800	HIGH (According to legislation)
G01. Single grave in dense bush near a stream edged with upright stones.	X27.09879 Y-25.49272	HIGH (According to legislation)
G02. Single grave in Benefaction Plant. Fitted with granite cross. Cement edged and covered with rubble	X-25.49118 Y27.09831	HIGH (According to legislation)
G03. Single grave covered with stones near Eskom's power lines	X27.13084 Y-25.50252	HIGH (According to legislation)

Table 1- Coordinates and significance rating for graveyards and graves in the Project Area (above).

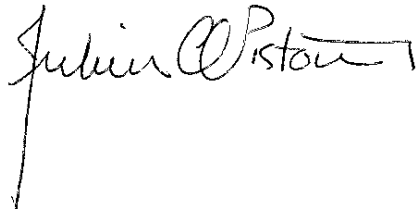
9 CONCLUSION AND RECOMMENDATIONS

The Phase I HIA for XABO revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in the Project Area, namely:

- Two graveyard and three single graves.

(No archaeological [pre-historical] remains were recorded. This study also did not provide for a paleontological study of the Project Area).

The graveyards and grave were geo-referenced and mapped (Figure 2, Table 1).

A handwritten signature in black ink, reading "Julius CC Pistorius". The signature is written in a cursive style with a long vertical line extending downwards from the end of the name.

Dr Julius CC Pistorius

Archaeologist & Heritage Consultant

Member ASAPA

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