



**PROJECT NAME: PROPOSED MOTUOANE HENNENMAN EXPLORATION RIGHT**

**HERITAGE STUDY: SCOPING LEVEL REPORT**

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**FOR**

**ENVIRONMENTAL IMPACT MANAGEMENT SERVICES (PTY) LTD**

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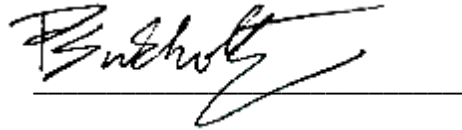
**DECLARATION OF INDEPENDENCE AND SUMMARY OF EXPERTISE**

The report has been compiled by PGS Heritage, an appointed Heritage Specialist for Environmental Impact Management Services. The views stipulated in this report are purely objective and no other interests are displayed during the decision-making processes discussed in this assessment.

HERITAGE CONSULTANT: PGS Heritage

CONTACT PERSON: Polke Birkholtz

SIGNATURE:

A handwritten signature in black ink, appearing to read 'P. Birkholtz', is written over a solid horizontal line.

Polke D. Birkholtz has been actively involved in the heritage industry since 1997 during which time he has completed in excess of 280 heritage and archaeological projects across South Africa. He is well versed in the applicable legislation as it relates to heritage in South Africa.

## EXECUTIVE SUMMARY

PGS Heritage was appointed by Environmental Impact Management Services (EIMS) to undertake a Heritage Scoping Report for the proposed Motuoane Hennenman Exploration Right. The study area is located between Kroonstad and Winburg within the Matjhabeng, Masilonyana and Moqhaka Local Municipalities of the Fezile Dabi and Lejweleputswa District Municipalities and is situated within the Free State Province.

The purpose of the Heritage Scoping report is to identify at a desktop level what the probability is of heritage resources being identified in the study area. This is important because heritage resources are protected in terms of the National Heritage Resources Act, No 25 of 1999, (NHRA) from *inter alia*, destruction or damage, excavation or removal, or other disturbance, without a permit from the responsible heritage resources authority. The National Heritage Resources Act, No 25 of 1999, (NHRA) states that heritage resources are unique and non-renewable and, as such, any impact on such resources must be seen as significant (NHRA, section 5(1)(a)). The NHRA specifically protects certain categories of heritage resources, i.e.: structures, archaeological and paleontological (including meteorological) sites and material and graves and burial grounds (NHRA, sections 34, 35 and 36). Furthermore, Section 38 of the NHRA provides for and regulates the compilation of impact assessment reports of heritage resources that may be affected by construction or development activities.

The desktop research for the Heritage Scoping Report has revealed that the study area and surrounding landscape have a long and diverse historical and archaeological history and that significant potential exists for archaeological and historical sites and material to be located within the study area. The research has also identified specific possible heritage sensitive areas within the study area.

The Scoping Report will be followed by a Heritage Impact Assessment (HIA), which would include the findings of this desktop study report and would provide recommendations for mitigation (destruction, recording and/or avoidance) of the confirmed heritage resources to be impacted upon by the proposed development. The period in-between the existing Heritage Scoping Report and the Final Heritage Impact Assessment Report will be used to finalise any footprints relating to the proposed exploration activities.

The Heritage Scoping Report has highlighted a number of heritage aspects, some of which would require further assessment and mitigation in the subsequent Heritage Impact Assessment report. These aspects include three sensitivities associated with the South African War (1899-1902) namely the Battle of Zand River, the Boer defensive position at Boschrand as well as the three black concentrations camps situated within the study area at Holfontein, Geneva and Boschrand. Other aspects identified include archaeological sites, historic buildings and structures, cemeteries, palaeontology as well as unmarked graves from within the study area.



### **Battle of Zand River (7 – 10 May 1900)**

The South African War (1899-1902) had a significant impact across the country, and within the study area. During the Battle of Zand River (7 – 10 May 1900), the most significant drifts across the river were earmarked for attention by Lord Robers in his attack, including Junction Drift. The farm of this name is located within the present study area, whereas the drift itself was either located within the study area or very close to it. While the drift was taken with relative ease by General Ian Hamilton's men, a range of hills north of the river between Doornkop in the west and Baskop in the east, were strongly occupied by the Boer forces of General Louis Botha. The ensuing battle for control of this ridge, which included an infantry assault and artillery duel, was almost entirely located within the present study area.

An area of expected sensitivity in terms of this battle was highlighted on the sensitivity map. If at all possible, this area should be avoided in the placement of development footprints. Furthermore, archaeological field surveys of the proposed development footprint areas during the Heritage Impact Assessment should identify any tangible remains of the battle and the associated heritage impact assessment would address any perceived significant impacts on this battle and its associated tangible remains. Additionally, such field assessments must be augmented by further archival and historical research, especially should any of the development footprints be proposed within 1 000 m of the identified sensitive area. If required, further mitigation measures will be outlined in the Heritage Impact Assessment.

### **Boer Position at Boschrand**

After the Battle of Zand River, an artillery duel took place between the forward units of Lord Roberts's army and a strong Boer position entrenched on a ridge known as Boschrand on both sides of the railway line some six miles (9.7 km) south of Kroonstad. The railway station Boschrand (Bosrand) is located within the study area. It would therefore appear that the ridge in question as well as the Boer position (which would in all likelihood have included defensive stonework and sangars) as well as a significant component of the associated artillery duel, would have been located within the study area. However, the exact location of the position held by the Boer forces is not clear from available information. Furthermore, the artillery duel is not supported by all available historic records. These realities, meant that this historic event was not recorded on the heritage sensitivity maps.

Archaeological field surveys of the proposed development footprint areas during the Heritage Impact Assessment should identify any tangible remains of these activities. These surveys should be augmented by further archival desktop study work on the exact location of the Boer position at Boschrand. Should archaeological sites be identified, suitable mitigation measures will have to be outlined in the Heritage Impact Assessment.

## **Black Concentration Camps**

During the guerrilla phase of the South African War, black concentration camps were established by the British military authorities across the former Boer republics, including within the study area at Geneva, Boschrand and potentially at Holfontein. While the exact positions of the three concentration camps are not known, the available information indicates that these camps were always established in proximity to railway lines. Furthermore, with the names of these concentration camps derived from the railway station or siding names, it seems evident that these camps would have been built in the general surroundings of the three stations or sidings. It is worth noting as well that Benneyworth (2006) indicates that during the war all black concentration camps were built within two miles from the nearest British military base or position. As military positions would have been concentrated at each railway station or siding in the form of blockhouses and defensive structures, a circular area with a radius of two miles was used as the most likely area within which these camps (and their associated cemeteries and archaeological middens) would have been located. These demarcated sensitive areas would necessarily include any remains of the original blockhouses and defensive structures erected at these same railway stations and sidings during the war, and would also include any historic structures and buildings that may be associated with these sidings and stations.

The areas included in the sensitivity maps should ideally be avoided during the placement of development footprints. Archaeological and heritage field surveys of the development footprint areas must be undertaken once these have been established. Additionally, such field assessments must be augmented by further archival and historical research, especially should any of the development footprints be proposed within 1 000 m of the identified sensitive area. If required, further mitigation measures will be outlined in the Heritage Impact Assessment Report.

## **Archaeological Sites**

The background research has revealed that at least one Stone Age site is located within the study area (known as Le Roux 717) (Rudner et. al., 2011). Furthermore, a number of Late Iron Age stonewalled sites in the form of so-called Type Z and Type V settlements had been identified within the study area and its surroundings during the 1970s (Maggs, 1976). The Google Earth scan identified a total of 15 Late Iron Age stonewalled settlements from within the study area. The positions of these sites were recorded on the heritage sensitivity maps. The likelihood that even more archaeological sites (Stone Age, Iron Age and Historic) are located within the study area, is high. All these archaeological sites are protected by the National Heritage Resources Act.

The recorded localities of these archaeological sites as recorded on the heritage sensitivity maps should ideally be avoided during the placement of development footprint areas. All proposed development footprints will have to be assessed in the field by way of archaeological field surveys to identify any archaeological sites and features which may be located within those footprint areas. These studies will be required to determine the significance of each site and

to assess the possible development impacts on each of them during the Heritage Impact Assessment phase. If required, further mitigation measures will be outlined in the Heritage Impact Assessment Report.

### **Historic Buildings and Structures**

The existence of historic buildings and structures within the study area was revealed during the desktop study, when the first edition topographic sheets were found to depict a large number of historic buildings and structures. These depicted structures include farmhouses, farm structures such as sheds and wagon sheds as well as farmworker accommodation. Due to the massive extent of the study area as well as the large number of these depicted features, the historic structures and buildings depicted on these maps were not individually recorded nor included in the existing heritage significance maps. An assessment of previous archaeological and heritage studies from within the study area has revealed the presence of one such a historic structure within the study area.

Once development footprints are defined, such footprint areas will have to be assessed in the field by way of archaeological field surveys to identify any historic buildings or structures, which may be located within the development footprint areas. Additionally, an assessment by an architectural historian of each historic building and structure located within or near such footprint areas will also have to be undertaken. These studies will be required to determine significance of each building or structure and will assess the possible development impacts on each of them during the Heritage Impact Assessment phase. At the same time, appropriate mitigation measures will also be outlined.

### **Graves and Cemeteries**

The existence of graves and cemeteries has been confirmed during the desktop study work, with the presence of 32 cemeteries within the study area revealed during an assessment of historic topographic maps sheets. The individual positions of these cemeteries were recorded and these were included in the sensitivity maps. The possibility that even more cemeteries may be located within the study area is a distinct possibility.

The recorded localities of these cemeteries as depicted on the heritage sensitivity maps should ideally be avoided during the placement of development footprint areas. Any marked graves and cemeteries located within future development footprint areas will be identified during the archaeological walkthroughs of those footprint areas. Cemeteries and grave sites are protected by various legislations and the best option would be the in situ preservation of the sites. Should this not be possible, a standard grave relocation process (including a detailed social consultation process) must be undertaken.

## Unmarked Graves in Homesteads

An evaluation of the available historic maps has revealed a significant number of historic homesteads of black African communities within the study area. The presence of these features raises another heritage concern, that of unmarked stillborn babies. In terms of black African tradition, stillborn babies were often buried in unmarked graves underneath or adjacent to the homesteads of their parents. Cemeteries and grave sites are protected by various legislations and the best option would be social consultation with the former (or present) residents of this area to assess whether any such unmarked graves are located within the final study area for the Heritage Impact Assessment. This mitigation measure must be supported by archaeological monitoring of the development activities.

## Palaeontology

The palaeontological significance of the study area is not known at the moment. However, during the EIA Phase a palaeontologist will be appointed to undertake a palaeontological desktop study of the exploration footprint areas.

The data on the different types of heritage resources identified from the fieldwork will be compiled in a final HIA report. This report will utilise the Plan of Study for the EIA/HIA (**Section 8**) as well as the significance rating (**ANNEXURES A and B**) to identify and rank the impacts on the heritage resources into the final detailed EIA investigation.

Potential impacts to be identified and evaluated during the EIA include:

- Disturbance / destruction of components of the battlefield on which the Battle of Zand River (7-10 May 1900) took place during the South African War
- Disturbance / destruction of possible tangible remains which may be associated with the Boer position at Boschrand
- Disturbance / destruction of black concentrations camps at Holfontein, Geneva and Boschrand
- Destruction / damage of archaeological sites
- Disturbance / destruction of historic buildings and structures
- Disturbance / destruction of cemeteries and graves
- Disturbance / destruction of unmarked stillborn graves
- Disturbance / destruction of palaeontological material

Once the development footprint areas are defined, these will have to be assessed by way of detailed walkthroughs during the HIA phase of the project. This will allow for an assessment of the impact of the proposed development on any heritage sites located there.

Table 1- Potential Impacts to Consider for the Heritage Impact Assessment Phase

	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF SECTIONS OF THE BATTLE OF ZAND RIVER</b>	<b>CONSTRUCTION</b>
<b>DISCUSSION</b>	The archival and historical desktop study has revealed that during the Battle of Zand River (7 May -10 May 1902) events such as the crossing of the Junction Drift over the drift by British forces under General Ian Hamilton and especially the subsequent battle for the Boer position on a low ridge north and north-east of the drift, occurred almost entirely within the present study area.	
<b>EXISTING IMPACT</b>	None known.	
<b>PREDICTED IMPACT</b>	Battlefields are protected by the NHRA, and under certain circumstances the core components of a particular battle site can be defined as a cultural landscape worth protecting. The area within which this component of the battle took place was included in the sensitivity mapping. This area should ideally be excluded from any future work. However, should any footprints be located within or near this area, archaeological fieldwork and further archival and historical research coupled with the compilation of an heritage impact assessment should represent sufficient identification of any remaining tangible heritage aspects.	Destruction or damage during exploration activities.
<b>EIA INVESTIGATION REQUIRED</b>	The area included in the sensitivity map should ideally be avoided during the placement of development footprints. If this proves impossible, archaeological and heritage field surveys of the footprint areas must be undertaken once these have been established. This should be augmented by further archival desktop study work on the battle whenever development footprints closer than 1 000 m to the recorded sensitive area are proposed. Should tangible or intangible sites or features be identified that will be impacted upon by the proposed development, suitable mitigation measures will have to be outlined.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction no-go areas (if required) need to be demarcated. Alternatively, mitigation

		measures such as the archaeological excavation and mitigation of identified tangible components of the battle must be planned and scheduled to fit within the timing of the project phases.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF THE BOER POSITION AT BOSCHRAND</b>	<b>CONSTRUCTION</b>
<b>DISCUSSION</b>	<p>The archival and historical desktop study has revealed that after the defeat of the Boer forces at Zand River, a strong entrenched Boer position was established on a ridge known as Boschrand on both sides of the railway line leading northward to Kroonstad. While no battle took place here, some historic sources indicate that an artillery duel ensued between Boer artillery at Boschrand and the British artillery to the south.</p> <p>While a ridge known as Boschrand was identified on a topographical map sheet, this ridge runs parallel to the railway line and not across it. Similarly, the position of the railway siding named Boschrand is also known, however the exact location of the Boer position at Boschrand could not be confirmed.</p>	
<b>EXISTING IMPACT</b>	None known.	
<b>PREDICTED IMPACT</b>	Unidentified archaeological sites can seriously hamper construction and development activities and timelines. Destruction or damage of such sites requires a permit from the responsible heritage authority (NHRA, section 35). Fieldwork can provide valuable information on such sites in the study area and provide timeous management of such sites through various mitigation measures, including the realignment of the construction activities, if necessary.	Destruction or damage during exploration activities.
<b>EIA INVESTIGATION REQUIRED</b>	Archaeological and heritage field survey of the footprint areas, once these have been established. This should be augmented by further archival desktop study work on the exact location of the Boer position at Boschrand. Should archaeological sites be identified, suitable mitigation measures will have to be outlined.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction no-go areas (if required) need to be

		demarcated. Alternatively, mitigation measures such as the archaeological excavation of sites must be planned and scheduled to fit within the timing of the project phases.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF THREE BLACK CONCENTRATION CAMPS</b>	<b>CONSTRUCTION</b>
<b>DISCUSSION</b>	<p>The archival and historical desktop study has revealed that during the South African War (1899 – 1902), three black concentration camps were established by the British military authorities within the study area. These camps were established at the following railway sidings or stations: Holfontein (partially located within the study area), Geneva and Boschrand. With Honing Spruit (not located within the study area), Geneva and Boschrand represented the three largest black concentration camps established during the entire war and combined housed as many as 7 000 people.</p> <p>Apart for their association with the existing railway sidings and stations from within the study area named Holfontein, Geneva and Boschrand, the exact localities of these three camps are not presently known. The available historic information on black concentrations camps suggest that they were always built in proximity to the existing railway lines, whereas one source indicated that these camps were never located more than two miles from the nearest British military positions. Assuming that each of these three sidings or stations would have had military positions in the form of blockhouses, a circular area with a radius of two miles were demarcated around each railway siding or station on the sensitivity maps. These sensitive areas should ideally be avoided.</p>	
<b>EXISTING IMPACT</b>	None known, however the landscapes surroundings these railway stations or sidings (especially Holfontein and Geneva) are characterised by extensive agricultural fields.	
<b>PREDICTED IMPACT</b>	Unidentified archaeological sites can seriously hamper construction and development activities and timelines. Destruction or damage of such sites requires a permit from the responsible heritage authority (NHRA, section 35). Fieldwork can provide valuable information on such sites in the study area and provide	Destruction or damage during exploration activities.

	timeous management through various mitigation measures, including the realignment of the construction activities, if necessary.	
<b>EIA INVESTIGATION REQUIRED</b>	The areas included in the sensitivity maps should ideally be avoided during the placement of development footprints. If this proves impossible, archaeological and heritage field surveys of the development footprint areas must be undertaken once these have been established. This should be augmented by further archival desktop study work on these concentration camps whenever development footprints closer than 1 000 m to the recorded sensitive area are proposed. Should archaeological sites be identified, suitable mitigation measures will have to be outlined.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction no-go areas (if required) need to be demarcated. Alternatively, mitigation measures such as the archaeological excavation of sites must be planned and scheduled to fit within the timing of the project phases.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF ARCHAEOLOGICAL SITES</b>	<b>CONSTRUCTION</b>
<b>DISCUSSION</b>	As seen from the desktop studies, the presence of archaeological sites such as Middle Stone Age and Later Stone Age sites is known. Additionally, the archaeological research project of Maggs (1976) and others have shown that Late Iron Age stonewalled settlements in the form so-called Type Z and Type V sites are known to be located within the study area. During the Google Earth scan, a total of 15 such Late Iron Age stonewalled settlements were identified within the study area and their individual positions recorded. The possibility certainly exists for more archaeological sites to be located within the study area, Once the development footprint areas have been confirmed, an archaeological foot survey must be undertaken of these footprint areas to identify any archaeological sites located there. This would assist in developing a comprehensive Heritage Management Plan for the construction activities.	
<b>EXISTING IMPACT</b>	None known.	



<b>PREDICTED IMPACT</b>	Unidentified archaeological sites can seriously hamper construction and development activities and timelines. Destruction or damage of such sites requires a permit from the responsible heritage authority (NHRA, section 35). Fieldwork can provide valuable information on such sites in the study area and provide timeous management of such sites through various mitigation measures, including the realignment of the construction activities, if necessary.	Destruction or damage during exploration activities.
<b>EIA INVESTIGATION REQUIRED</b>	The known archaeological sites as revealed by way of the background study and Google Earth scan should be avoided during the placement of development footprints. The identification of yet undiscovered archaeological sites would be addressed by way of archaeological and heritage field surveys of the footprint areas, once these have been established. Should archaeological sites be identified, suitable mitigation measures will have to be outlined.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction no-go areas (if required) need to be demarcated. Alternatively, mitigation measures such as the archaeological excavation of sites must be planned and scheduled to fit within the timing of the project phases.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF HISTORIC BUILDINGS OR STRUCTURES</b>	<b>CONSTRUCTION, OPERATION</b>
<b>DISCUSSION</b>	The existence of historic buildings and structures within the study area was revealed during the desktop study, when the first edition topographic sheets were found to depict a large number of historic buildings and structures. These depicted structures include farmhouses, farm structures such as sheds and wagon sheds as well as farmworker accommodation. Due to the massive extent of the study area, and the large number of these depicted features, the historic structures and buildings depicted on these maps were not individually recorded nor included in the existing heritage significance maps. The possible presence of even more historic structures appears likely.	
<b>EXISTING IMPACT</b>	None known.	

<b>PREDICTED IMPACT</b>	Damage/destruction of farm buildings and associated structures. Destruction or damage of such sites older than 60 years, would require a permit from the responsible heritage authority.	Destruction or damage during exploration activities.
<b>EIA INVESTIGATION REQUIRED</b>	An archaeological and heritage field survey of any additional footprint areas not yet assessed. Should such sites be identified, suitable mitigation measures will have to be outlined.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction no-go areas (if required) need to be demarcated. Alternatively, mitigation measures such as the archaeological excavation of sites must be planned and scheduled to fit within the timing of the project phases.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF GRAVES AND CEMETERIES</b>	<b>CONSTRUCTION</b>
<b>DISCUSSION</b>	The existence of graves and cemeteries has been confirmed during the desktop study work, with the presence of 32 cemeteries within the study area revealed during an assessment of historic topographic maps. The individual positions of these cemeteries were recorded and were included in the sensitivity maps. The possibility that more cemeteries may be located within the study area is a distinct possibility.	
<b>EXISTING IMPACT</b>	None known.	
<b>PREDICTED IMPACT</b>	<p>Unidentified graves and cemeteries and the discovery of such sites can seriously hamper construction and development timelines. Damage, destruction or removal of such sites requires a permit from various responsible authorities, including the Heritage Authority (NHRA, section 36), Provincial Health Department and the SA Police Service. Such a process can take up to 12 months to finalise.</p> <p>Fieldwork can provide valuable information on the presence of such sites in the study area and provide timeous management of such sites, which may include the realignment of the proposed development activities.</p> <p>In the event that identified graves and cemeteries cannot be avoided, a grave relocation process needs to be initiated, bearing in mind that such a process impacts on the</p>	Destruction or damage during exploration activities.

	spiritual and social fabric of the next of kin and associated communities.	
<b>EIA INVESTIGATION REQUIRED</b>	Avoidance of the identified cemeteries and graves in future proposed exploration footprints (where possible) and an archaeological field survey of any additional footprint areas not yet assessed. Should graves and cemeteries be identified, suitable mitigation measures will have to be outlined.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction no-go areas need to be demarcated. Alternatively, mitigation measures such as the physical relocation of the graves in question (including aspects such as detailed social consultation) needs to be planned and scheduled to fit within the timing of the project phases. It must be understood that such a process may have an impact on the spiritual and social fabric of the next of kin and associated communities.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF UNMARKED GRAVES</b>	<b>CONSTRUCTION</b>
<b>DISCUSSION</b>	From experience on similar sites and the knowledge of cultural customs and traditions, it is known that stillborn babies and deceased infants occasionally were buried within the homesteads of black rural communities. These children were sometimes buried underneath the floors and walls of houses and huts and the burials were not marked, but were known to the immediate family.	
<b>EXISTING IMPACT</b>	None known.	
<b>PREDICTED IMPACT</b>	Unidentified graves and the discovery of such sites can seriously hamper construction and development timelines. Damage, destruction or removal of such sites requires a permit from various responsible authorities, including the Heritage Authority (NHRA, section 36), Provincial Health Department and the SA Police Service. Such a process can take up to 12 months to finalise.  Social consultation with present and former residents of the study area can provide valuable information on the presence of such sites in the study area and provide timeous management of	Destruction or damage during exploration activities.

	<p>such sites, which may include the realignment of the proposed development activities.</p> <p>Archaeological monitoring of the development footprint areas will identify any unmarked human skeletal remains.</p> <p>In the event that such graves cannot be avoided, a grave relocation process needs to be initiated, bearing in mind that such a process impacts on the spiritual and social fabric of the next of kin and associated communities.</p>	
<b>EIA INVESTIGATION REQUIRED</b>	A social consultation process with current and former residents of the study area can assess whether such sites are located within the study area. Archaeological monitoring during construction will also identify any human skeletal remains.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction, social consultation needs to take place to assess whether such sites are located within the footprint areas. Archaeological monitoring during the construction phase will also identify any human remains.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE, DAMAGE OR DESTRUCTION OF PALAEOLOGICAL RESOURCES</b>	<b>CONSTRUCTION, OPERATIONAL</b>
<b>DISCUSSION</b>	The palaeontological significance of the study area is not known at the moment. However, during the EIA Phase a palaeontologist will be appointed to undertake a palaeontological desktop study of the footprint areas.	
<b>EXISTING IMPACT</b>	None known.	
<b>PREDICTED IMPACT</b>	Unidentified palaeontological resources and the discovery of such resources can seriously hamper construction and development timelines. Damage, destruction or removal of such sites require a permit from the responsible heritage authority (NHRA, section 35).	Destruction or damage during the construction of the pipelines and other development components.
<b>EIA INVESTIGATION REQUIRED</b>	The mitigation measures recommended in the palaeontological desktop study must be undertaken.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction, the mitigation measures outlined in the palaeontological desktop study will have to be undertaken.

## TABLE OF CONTENTS

<b>1. INTRODUCTION</b>	<b>18</b>
<b>2. SCOPE OF WORK</b>	<b>18</b>
<b>3. METHODOLOGY</b>	<b>21</b>
<b>4. LEGISLATIVE AND POLICY FRAMEWORK</b>	<b>21</b>
<b>5. TECHNICAL DETAILS OF THE PROJECT</b>	<b>27</b>
<b>6. GENERAL BACKGROUND TO THE STUDY AREA AND SURROUNDING LANDSCAPE</b>	<b>29</b>
<b>7. KNOWN HERITAGE RESOURCES FROM WITHIN THE STUDY AREA</b>	<b>55</b>
<b>8. DESCRIPTION OF POTENTIAL IMPACTS</b>	<b>71</b>
<b>9. DETAILED PLAN OF STUDY FOR THE EIA AND EMP</b>	<b>78</b>
<b>10. POTENTIAL IMPACTS AND FURTHER WORK FOR EIA PHASE</b>	<b>78</b>
<b>11. CONCLUSIONS AND RECOMMENDATIONS</b>	<b>87</b>
<b>12. REFERENCES</b>	<b>92</b>

## ANNEXURES

ANNEXURE A - HERITAGE ASSESSMENT METHODOLOGY

ANNEXURE B - THE SIGNIFICANCE RATING RANKINGS FOR THE EIA

ANNEXURE C – IMPACT ASSESSMENT SHEETS

## 1. INTRODUCTION

PGS Heritage was appointed by Environmental Impact Management Services (EIMS) to undertake a Heritage Scoping Report for the proposed Motuoane Hennenman Exploration Right. The study area is located between Kroonstad and Winburg within the Matjhabeng, Masilonyana and Moqhaka Local Municipalities of the Fezile Dabi and Lejweleputswa District Municipalities and is situated within the Free State Province.

## 2. SCOPE OF WORK

PGS Heritage was appointed by EIMS, to undertake a Heritage Scoping Assessment (HSA), that will be used (with other specialist desktop studies) to assess the feasibility of the proposed project as well as to design the proposed project in such a way that impacts are minimised. The HSR is aimed at identifying potential heritage resources located within the study area and surrounds and to identify the potential impacts that may be experienced by the resources as a result of the proposed project. In addition, the scoping study will serve as a Plan of Study for the HIR, which will include a detailed investigation of the heritage resources and the impact the proposed project may have on them. Mitigation measures will then also be suggested that will contribute to the overall EMPR for the whole project.

The scope of work for the Scoping Phase of the project can be itemised as follows:

- Desktop description of the baseline receiving environment specific to the field of expertise (general surrounding as well as site specific environment);
- Identification and description of any sensitive receptors in terms of heritage features that occur in the study area, and the manner in which these sensitive receptors may be affected by the activity;
- Screening to identify any critical issues relating to cultural heritage (potential fatal flaws) that may result in project delays or rejection of the application;
- Provide a map identifying sensitive receptors in the study area, based on available maps, database information & site visit verification;
- Provide a GIS sensitivity map of the study area;
- Identification and description of any impacts that may result from the proposed activities (both mining and supplementary) during all phases of the project, including cumulative, residual and latent impacts. All phases of the project should be considered and these phases shall be classified as: (a) Planning and Design (b) Construction (c) Operation (d) Decommissioning and (e) Rehabilitation and Closure.
- Identification of any legislated constraints (e.g. "No-Go" areas or buffer zones) and preparation of a map illustrating No-Go areas and buffers (if relevant);
- Identify any gaps in knowledge, data or information that could hamper the impact identification and evaluation process;

- Identification and justification (screening to obtain key issues) of impacts which require further investigation during the EIA phase (including further specialist inputs);
- Identify any legal provisions relevant to the specific field of expertise and the proposed activity (including relevant legislation, both National and Provincial, Department Guidelines and Management Frameworks);
- Provide a detailed plan of study for the EIA and EMP, including;
- A description of the tasks that should be undertaken and the manner in which these tasks should be undertaken;
- A description of the proposed methodology;
- Presentation of the study findings to the client.

## 2.1 Site Location

The study area is located between Kroonstad in the north and Theunissen in the south-west, is situated east of Hennenman and Virginia with Ventersburg located immediately adjacent to its eastern boundary. The Sand River cuts horizontally across its centre, with the N1 highway between Bloemfontein and Gauteng passing through the northern half of the study area.

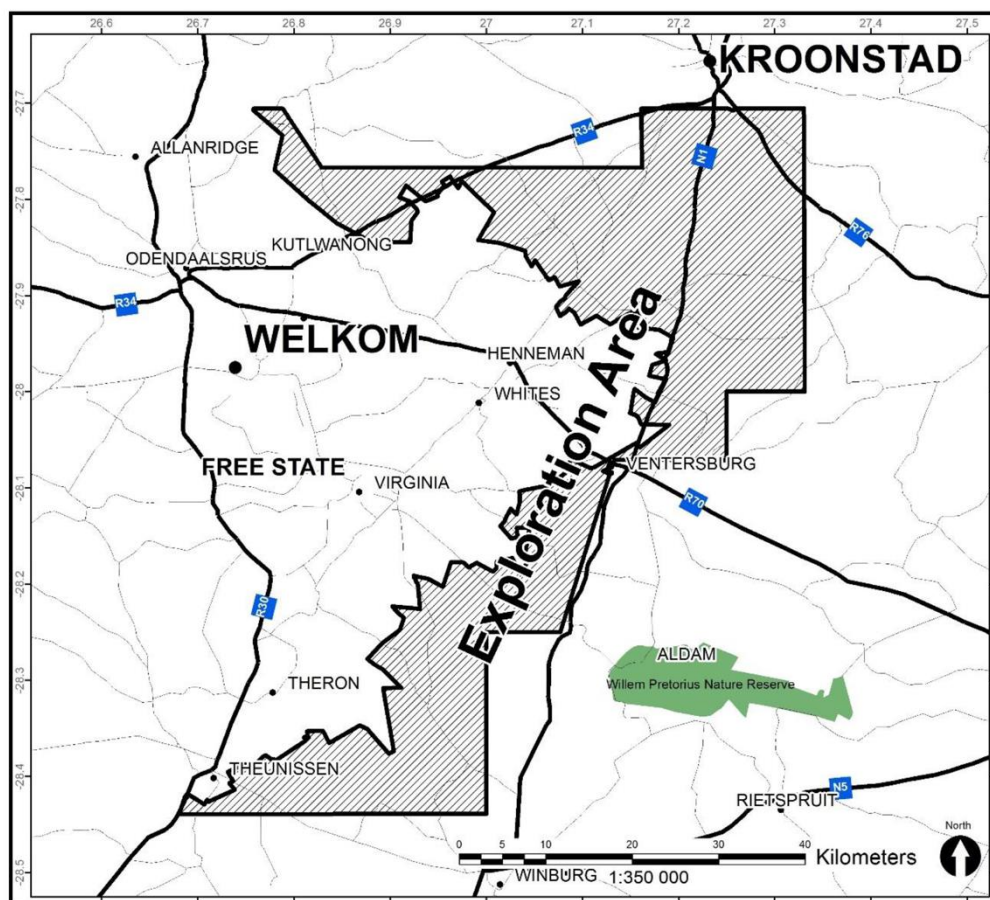


Figure 1 - The study area within its regional context. This plan was supplied by the client.



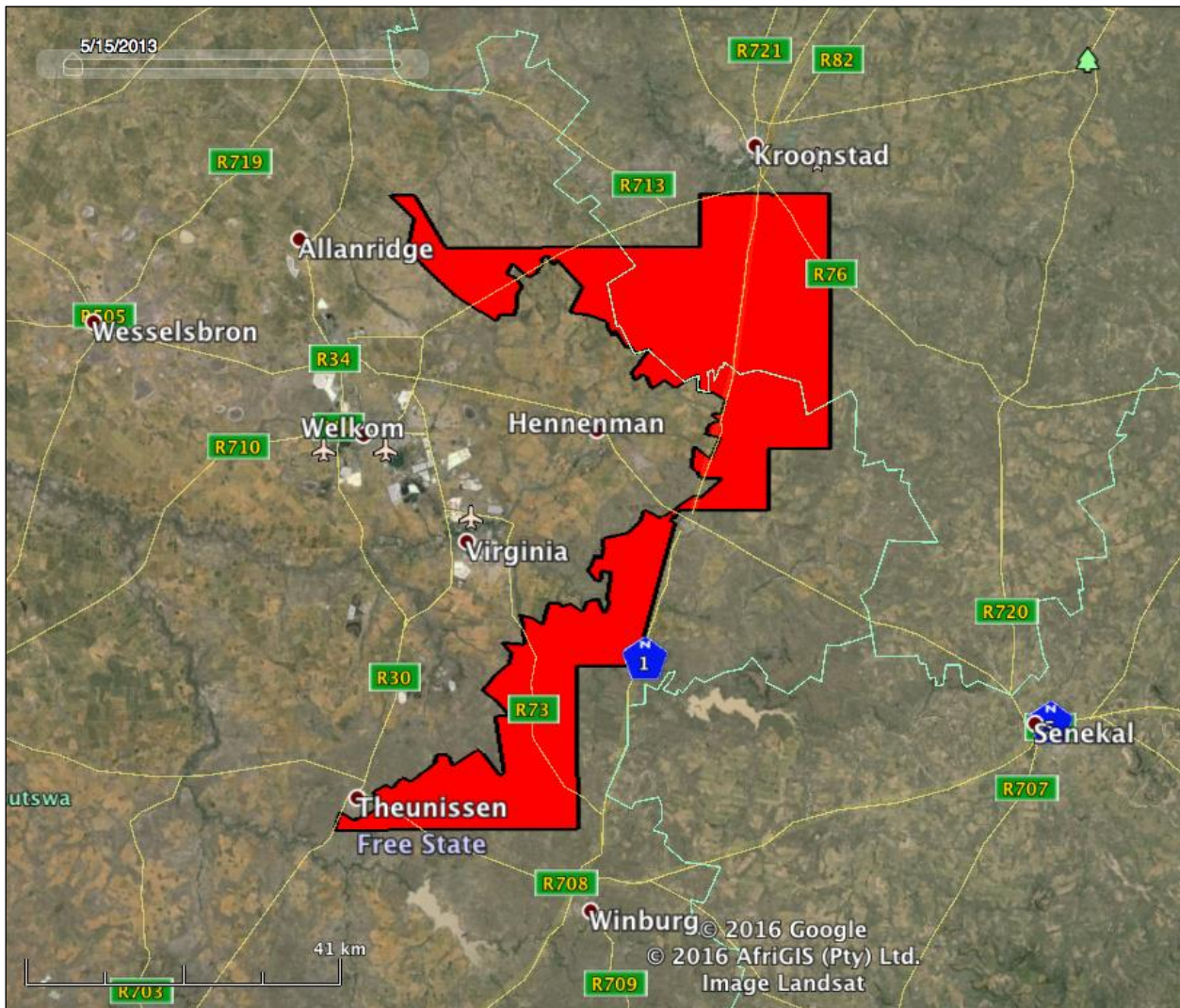


Figure 2 – Google Earth image depicting the study area within its regional context

The coordinates defining the study area boundary are as follows:

- Northernmost point near Kroonstad - S 27.705636 E 27.160880
- Westernmost point near Theunissen - S 28.439510 E 26.680543
- Easternmost point near Wonderkop - S 27.853525 E 27.330739
- Southernmost point near Winburg - S 28.438774 E 26.999936
- Approximate Centre Point at Ventersburg - S 28.083797 E 27.133517

As such, the overall study area for the present Heritage Scoping Report covers an area of approximately 149 866 ha, with an approximate boundary circumference of 436 000 m.

Locality maps depicting the study area within its regional context can be seen in Figures 1 and 2.



### 3. METHODOLOGY

An evaluation of the archaeological and historical background of the study area was required to establish the possible heritage resources to be found. Therefore, a literature search of published sources, archival sources and internet sources were undertaken to compile a general background of the study area and surrounding landscape. This was followed by study area specific research to identify potential heritage impacts, which may be located within the study area. This component comprised an assessment of archival and historical maps as well as an examination of Google Earth satellite imagery. All of the desktop study findings were used to compile heritage sensitivity maps for the study area.

It is important to note that the archaeological and heritage sites revealed during the desktop study do not represent the entire heritage site database of the study area. As such, a more detailed footprint-specific heritage inventory would be required during the Heritage Impact Report phase of the project.

### 4. LEGISLATIVE AND POLICY FRAMEWORK

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

- i. National Environmental Management Act (NEMA), Act 107 of 1998
- ii. National Heritage Resources Act (NHRA), Act 25 of 1999
- iii. Minerals and Petroleum Resources Development Act (MPRDA), Act 28 of 2002
- iv. Development Facilitation Act (DFA), Act 67 of 1995

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources:

- i. National Environmental Management Act (NEMA), Act 107 of 1998:
  - a. Basic Environmental Assessment (BEA) – Section (23)(2)(d)
  - b. Environmental Scoping Report (ESR) – Section (29)(1)(d)
  - c. Environmental Impacts Assessment (EIA) – Section (32)(2)(d)
  - d. Environmental Management Plan (EMP) – Section (34)(b)
- ii. National Heritage Resources Act (NHRA), Act 25 of 1999:
  - a. Protection of Heritage resources – Sections 34 to 36; and
  - b. Heritage Resources Management – Section 38
- iii. Minerals and Petroleum Resources Development Act (MPRDA), Act 28 of 2002:
  - a. Section 39(3)
- iv. Development Facilitation Act (DFA), Act 67 of 1995:

- a. The GNR.1 of 7 January 2000: Regulations and rules in terms of the Development Facilitation Act, 1995. Section 31.

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34(1) of the NHRA states that, “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...” The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and in the case of CRM those resources specifically impacted on by development as stipulated in Section 38 of NHRA, and those developments administered through NEMA, MPRDA and the DFA legislation. In the latter cases, the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorizations are granted for development. The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impacts Processes required by NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008b):

The NEMA 23(2)(b) states that an integrated environmental management plan should, “...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage”.

A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken account of in the Regulations under NEMA is the Specialist Report requirements laid down in Section 33 of the regulations (Fourie, 2008b).

MPRDA defines ‘environment’ as it is in the NEMA and therefore acknowledges cultural resources as part of the environment. Section 39(3)(b) of this Act specifically refers to the evaluation, assessment and identification of impacts on all heritage resources as identified in Section 3(2) of the National Heritage Resources Act that are to be impacted on by activities governed by the MPRDA. Section 40 of the same Act requires the consultation with any State Department administering any law that has relevance on such an application through Section 39 of the MPRDA. This implies the evaluation of Heritage Assessment Reports in Environmental Management Plans or Programmes by the relevant heritage authorities (Fourie, 2008b).

In accordance with the legislative requirements and EIA rating criteria, the regulations of the South African Heritage Resources Agency (SAHRA) and Association of Southern African Professional Archaeologists (ASAPA) have also been incorporated to ensure that a comprehensive and legally compatible HSR report is compiled.

The heritage impact assessment criteria to be utilised in the HIR are described in more detail in **Annexure A**; while the Environmental Impact Scoring criteria to be utilised in the HIR, are provided in **Annexure B**.

#### 4.1 Assumptions and Limitations

The following assumptions and limitations with regard to the present study exist:

- The aim of the Heritage Scoping Report is to identify the possible types of heritage resources that might be present in the study area, as well as possible hotspots for the locality of such resources. From this, the possible impacts from mining and ancillary activities must be predicted. It must be noted that the findings of this report will require confirmation by undertaking a physical survey as part of the final evaluation of the development footprints during the EIA Phase. Since the current information is based only on a literature and archival search and investigation of other desktop resources (maps and satellite imagery), **this report can certainly not be seen as at the level required for a HIR.**
- Due to the massive extent of the study area assessed for this Heritage Scoping Report (approximately 149 866 hectares), it is clear that not all possible heritage sites located within the study area could be included in this report. A case in point of this would be the large number of possible heritage buildings and structures (farmhouses, farm buildings and farmworker accommodation) depicted on the First Edition Topographical Map Sheets. Due to their large number, the massive extent of the study area and temporal constraints, these numerous possible heritage sites were not included in the findings of this report. Fieldwork focussed on the development footprints during the EIA phase would address this aspect.
- Due to the massive extent of the study area, this Heritage Scoping Report does not include any findings or assessments relating to palaeontological heritage. Once the EIA phases commences the palaeontological significance of the actual footprint areas will be assessed by way of a palaeontological desktop study, subsequent to which further mitigation measures may be required.
- The archaeological and historical study has revealed that after the Battle of Zand River in May 1900, the retreating Boer forces entrenched themselves on both sides of the railway line on a ridge known as Boschrand. While no battle ensued here, one available reference indicates that an artillery duel did take place between the Boer forces holding the ridge and the British forces south of the ridge. Although a ridge with the name of Boschrand was identified on the available topographic sheets and a railway siding of the same name identified nearby, the exact geographic locality of the Boer position could not be established with any certainty as the depicted Boschrand ridge runs parallel to the railway line and not across it. As a result, this aspect of the history of the study area could not be depicted on the heritage sensitivity maps.

## Terminology/Abbreviations

Table 2- Abbreviations

<b>ACRONYMS</b>	<b>DESCRIPTION</b>
<b>ASAPA</b>	Association of South African Professional Archaeologists
<b>DEA</b>	Department of Environmental Affairs
<b>DWA</b>	Department of Water Affairs
<b>DMR</b>	Department of Mineral Resources
<b>EIA practitioner</b>	Environmental Impact Assessment Practitioner
<b>EIA</b>	Environmental Impact Assessment
<b>EMPR</b>	Environmental Management Programme Report
<b>ESA</b>	Early Stone Age
<b>GPS</b>	Global Positioning System
<b>HIA</b>	Heritage Impact Assessment
<b>HIR</b>	Heritage Impact Report
<b>HSR</b>	Heritage Scoping Report
<b>I&amp;AP</b>	Interested & Affected Party
<b>LSA</b>	Later Stone Age
<b>LIA</b>	Late Iron Age
<b>MSA</b>	Middle Stone Age
<b>NEMA</b>	National Environmental Management Act
<b>NHRA</b>	National Heritage Resources Act
<b>PASA</b>	Petroleum Agency South Africa
<b>PHRA</b>	Provincial Heritage Resources Authority
<b>PSSA</b>	Palaeontological Society of South Africa
<b>RoD</b>	Record of Decision
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SAHRIS</b>	South African Heritage Resources Agency

The following definitions are taken from the National Heritage Resources Act, no 25 of 1999 (NHRA, section 2):

*Archaeological resources*

This includes:

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

*Cultural significance*

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

*Development*

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

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

### *Fossil*

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

### *Heritage*

That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

### *Heritage resources*

This means any place or object of cultural significance.

### *Holocene*

The most recent geological time period which commenced 10 000 years ago.

### *Palaeontology*

Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

## 5. TECHNICAL DETAILS OF THE PROJECT

### 5.1 Overview of Proposed Project

This project entails exploration for hydrocarbons and associated gas. The exploration techniques to be employed during the operations include *inter alia* geological mapping, geochemical soil sampling, water sampling and drilling for geological core samples.

Approximately three (3) boreholes will be drilled. The boreholes will be drilled in order to obtain core samples (rock samples), which will be analysed to determine hydrocarbon content (if any). **No well stimulation (e.g. fracking) will be undertaken during this drilling process.**

The proposed Motuoane Hennenman Exploration Project, if approved, will allow Motuoane Energy to determine if there is an economically viable resource available in the area. It is important to note that the exploration right does not approve any production activities. As such, any future intention to undertake production of hydrocarbons within the exploration right area would require a further application, investigation (including comprehensive EIA) and public consultation process.

The Motuoane Hennenman Exploration Project covers an area of approximately 149 377 hectares (ha). The total area to be disturbed by exploration activities will be minimal based on the relatively non-invasive exploration techniques (3 X (30mX30m) drill sites = 0.27 ha with associated access roads). **As indicated above, no well stimulation (e.g. fracking) is to take place during this exploration activity.** This proposed project does not include hydrocarbon production (i.e. a production right application would be required at a later stage should the applicant wish to pursue this option and additional public consultation would be required during this process).

### 5.2 Proposed Drilling Activities

Drilling of approximately 3 boreholes will provide solid core samples that can be analysed for the presence of hydrocarbons and the physical properties of the rocks.

Drilling requires the clearance of an area of 30m by 30m at each drill site for the placement of the drill rig with subsequent rehabilitation of the disturbed area following completion of the drilling operation. Typical boreholes size is NQ 75.5 mm in diameter on the inside.

Diamond core drilling is the most common style of exploration drilling, which produces a solid core sample that is extracted for examination on the surface. This method of drilling provides an accurate assessment of the deposit as no other particles have a chance to contaminate the sample.

The key technology to diamond drilling is the actual diamond drill bit, which is comprised of industrial diamonds set into a soft metallic matrix. The drill bit is mounted onto a drill stem, which is connected to a rotary drill. Water (~5m<sup>3</sup>/day and obtained from licensed sources and not the local environment) is injected into the drill pipe to wash out the rock cuttings produced by the bit. Return water will be stored in sumps, which comprise compartmentalised steel tanks that will be placed on surface to contain the drilling mud. No sumps will therefore be dug into the soil. This water will be recycled (sediments removed) and reused in the drilling process. No disposal of water or sediments into the environment will be permissible).

On completion of the exploratory drill sites, the boreholes would be suitably capped to prevent ingress or egress of materials, substances, etc. and the disturbed area will be reinstated and rehabilitated (EIMS, 2016).



*Figure 3*

*A typical drill rig used during diamond core drilling. This image was supplied by the client (EIMS, 2016).*



## 6. GENERAL BACKGROUND TO THE STUDY AREA AND SURROUNDING LANDSCAPE

### 6.1 Historical and Archaeological Overview of the Study Area and Surrounding Landscape

The Free State has a rich archaeological and historical history going back millions of years and includes significant aspects such as Later Stone Age rock art, Battlefields and Iron Age stonewalled enclosures. The general surroundings of the study area became a melting pot of contact and conflict as it represents one of many frontiers where San hunter-gatherers, Nguni agro-pastoralists, Dutch Voortrekkers and British Colonists all came together. The ravages of war also swept across these plains, and in particular the South African War (1899-1902) as well as the Boer Rebellion (1914-1915).

The archaeological history of the area can broadly be divided into a Stone Age, Iron Age and Historic Period. Both the Stone and Iron Ages form part of what is referred to as the Pre-Colonial Period (Prehistoric Period) whereas the Historic Period is referred to as the Colonial Period (Historic Period) (refer **Figure 2**).

In the table below a detailed archaeological and historical overview of the study area and surrounding landscape is presented in a chronological manner. This overview is based on intensive archival and literature research and whenever possible, the relative distances between the study area and mentioned sites, features and events are provided.

It must be noted that such an overview, which is based on available literature and archival research, would necessarily reflect a bias toward a traditional white history of the region as this would have been the focus of publications and archival documents during the last 150 years.

In Section 7.3 below a discussion on previous archaeological and heritage studies from within the study area as well its surroundings will be provided. This discussion is based on previous reports that could be located on the South African Heritage Resources Information System (known as SAHRIS) and records of the SAHRA APM Report Mapping Project.

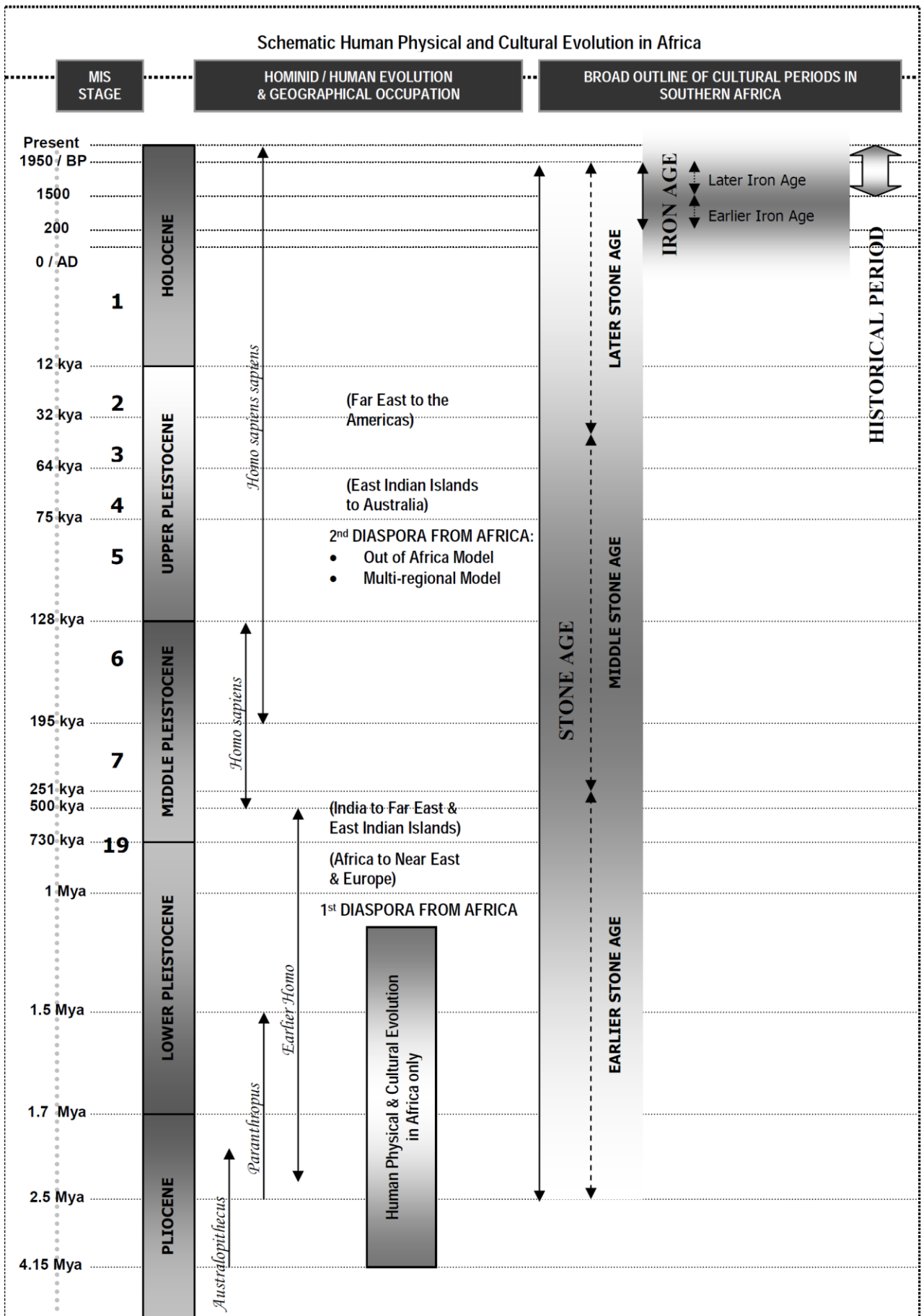


Figure 4 – Human and Cultural Time line in Africa (Morris, 2008)

Table 3- Archaeological and Historical Overview of the Study Area and Surrounding Landscape

DATE	DESCRIPTION
<b>The Study Area during the Stone Age</b>	
<p>Very little is known about the Stone Age archaeology of the study area and its immediate surroundings. In the wider surroundings, probably the most significant Stone Age is at Florisbad, located roughly 69 km south-west of the present study area. Closer to the study area, a number of Middle and Later Stone Age material in associated with mammal fossil remains have been identified in erosion gulleys along the Sand, Doring and Vet Rivers between Virginia and Theunissen (De Ruiter <i>et. al.</i> 2011). See also Rossouw (n.d.).</p>	
<p>2.5 million to 250 000 years ago</p>	<p>The Earlier Stone Age (ESA) is the first and oldest phase identified in South Africa’s archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates back to approximately 1.5 million years ago.</p> <p>No information regarding Early Stone Age sites from the study area or surroundings could be located.</p>
<p>&gt;250 000 to 40 000 years ago</p>	<p>The Middle Stone Age (MSA) is associated with flakes, points and blades manufactured by means of the prepared core technique. This phase is furthermore associated with modern humans and complex cognition (Wadley, 2013).</p> <p>During research fieldwork by the National Museum in Bloemfontein, ten sites were recorded where Middle Stone Age and/or Later Stone Age lithics were identified in association with mammal fossil remains from erosion gulleys along the Sand, Vet and Doring Rivers (De Ruiter <i>et. al.</i> 2011). While many of these sites are located within a distance of 20 km of the present study area, one site is located within the study area. This site is named Le Roux 717, and comprises a number of Middle Stone Age lithics exposed by erosion with some Later Stone Age lithics identified on the overlying undisturbed horizon above.</p>



Figure 5 – Photograph of the archaeological field survey as published in De Ruiter *et. al.* (2011).

<p>40 000 years ago to c. 1800s</p>	<p>The Later Stone Age (LSA) is the third archaeological phase identified and is characterised by an abundance of very small stone tools known as microliths as well many rock art sites across the country. This period is associated with hunter-gatherers (San) as well as early pastoralists (Khoekhoe) and lasted up until - and in many cases a considerable number of years after – the arrival of Iron Age and European communities.</p> <p>Apart from the occurrence of Later Stone Age lithics along the Sand, Vet and Doring Rivers (see above), no other Later Stone Age sites are known from the surroundings of the study area. Similarly, no known rock art sites are known from the study area or its wider surroundings.</p>
<p><b>The Study Area during the Iron Age</b></p>	
<p>The arrival of early farming communities during the first millennium, heralded in the start of the Iron Age for South Africa. The Iron Age is that period in South Africa’s archaeological history associated with pre-colonial farming communities associated with agricultural and pastoralist farming activities, metal working, cultural customs such as lobola as well as the tangible representation of the significance of cattle imprinted on their settlement layouts (known as the Central Cattle Pattern) (Huffman, 2007).</p> <p>According to the distribution map for Iron Age settlements on the Southern Highveld as published in Maggs (1976), the largest majority of such known Late Iron Age sites from within the study area are located in proximity to the Sand River as well as the Erasmus Spruit. With these Late Iron Age sites located within the study area, the majority comprise what is referred to as Type Z settlements, with a lesser number of Type V settlements also found. The distribution maps published by Huffman (2007), indicate that two Iron Age facies occurred in the surroundings of the study area during roughly the same period. These two comprise the Thabeng and Makgwereng facies.</p>	
<p>AD 1700 – AD 1840</p>	<p>The Thabeng facies of the Moloko Branch of the Urewe Tradition is one of the facies identified within the study area. The decoration on the ceramics associated with this facies is characterised by incised triangles, coloured chevrons and arcades. The Thaping at Dithakong, Rolong at Platberg and the Kubung from the Free State form a Southwestern Sotho-Tswana cluster that is associated with this Thabeng facies pottery and Type Z settlement layouts (Huffman, 2007).</p> <p>The Type Z settlements are one of the Late Iron Age stonewalled settlement types identified by Tim Maggs during his extensive archaeological research project on the Iron Age of the southern Highveld, which includes the present study area (Maggs, 1976). These sites are characterised by large primary enclosures enclosed by a ‘discontinuous ring’ of characteristic bilobial dwellings. Each of these bilobial dwellings comprises a hut at its front with a semicircular courtyard at the back. With the area in front of the hut enclosed by a low stone wall and the courtyard at the back similarly enclosed by a smaller enclosure, the layout plan of these huts comprise two lobes, one larger than the other. The huts are defined by a ring of upright stones and are usually paved with flat stones. Unlike Type V settlements (see below), corbelled hut are rarely associated with these Type Z settlements, and appear to be the result of contact with the Type V settlements located to the east.</p> <p>While a number of Type Z sites are located within the study area, one of the more prominent ones is OXF1, located roughly 2.5 km north of the present study area and a short distance north-west of the town of Ventersburg. This site was excavated by Tim Maggs during the 1970s as part of his overall research project alluded to above (Maggs, 1976).</p> <p>In his conclusions on the history of his entire study area, Maggs (1976:317) states that “...the conclusion seems inescapable that the Kubung were the builders of Type Z. This conclusion could be put forward on the typological evidence alone, for the Kubung are the only known off-shoot of the Rolong to have settled in our area, and the Type Z industry was clearly the work of a group related to the rolong.”</p>

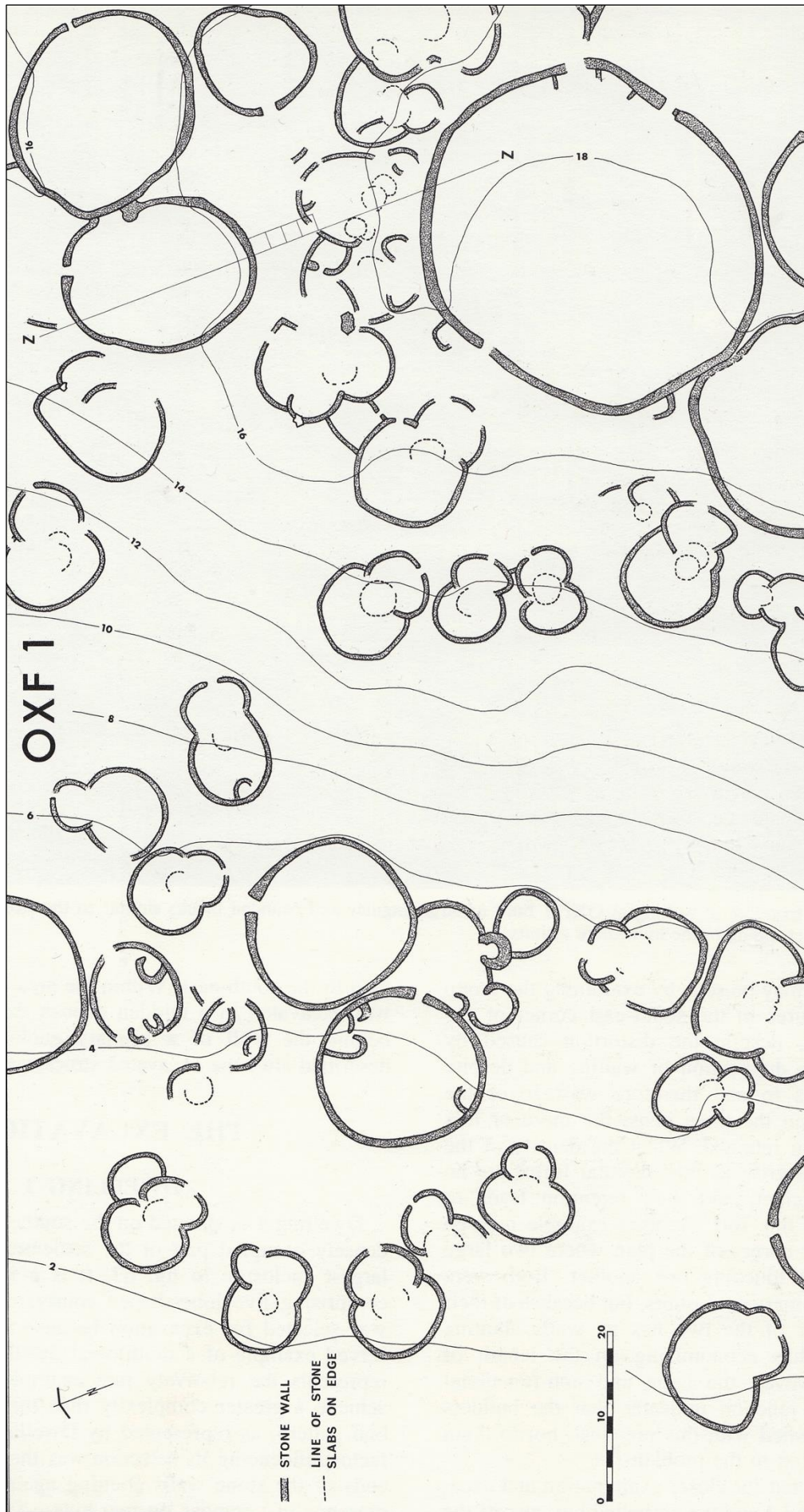


Figure 6 – This plan depicts the settlement layout of a typical Type Z site, and was recorded at site OXF 1 (Maggs, 1976:233)



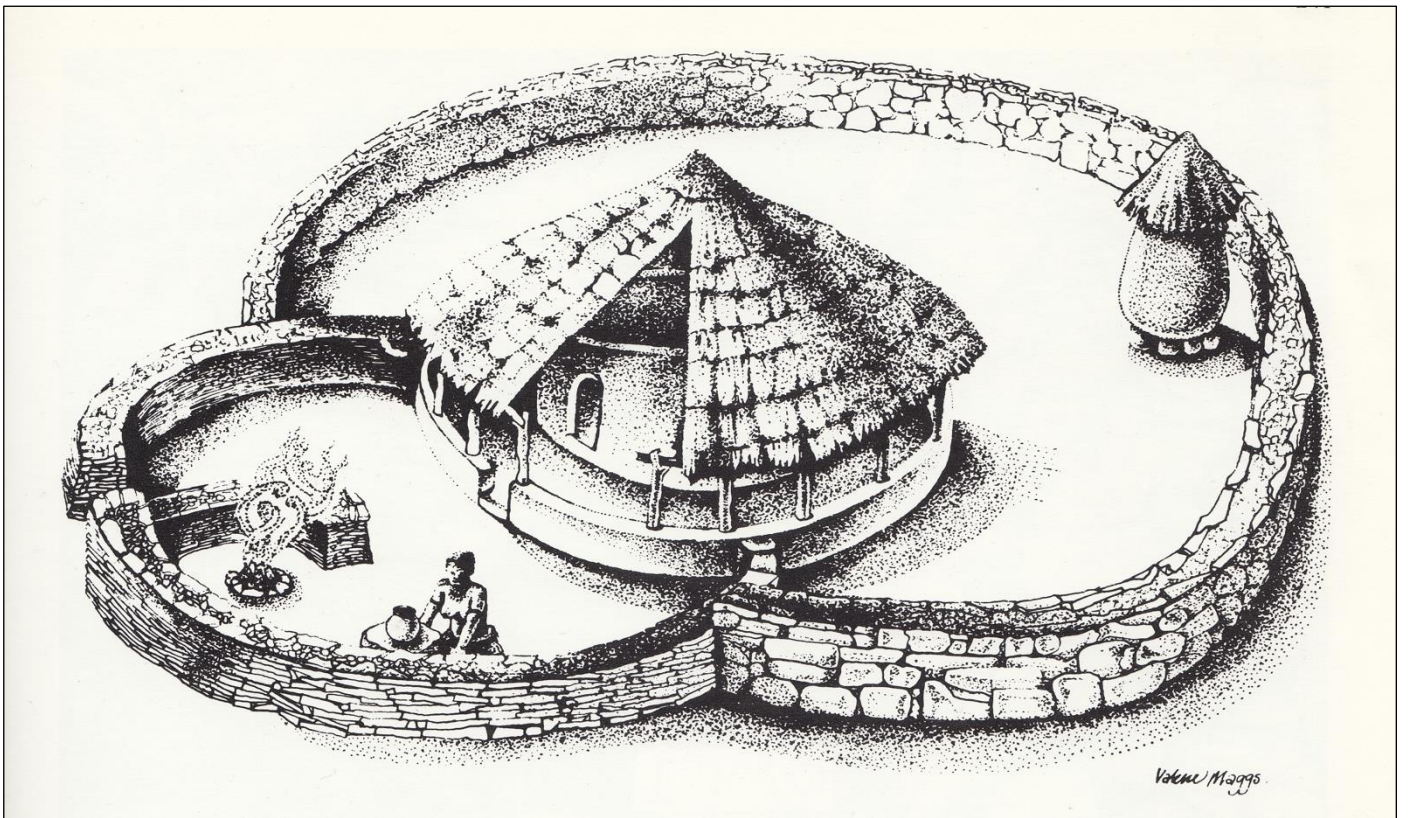


Figure 7 – Artist’s impression of a bilobial dwelling at site OXF 1. These bilobial dwellings represent a characteristic element of Type Z settlements (Maggs, 1976:241).

AD 1700 – AD 1820

The Makgwareng facies of the Blackburn Branch of the Urewe Ceramic Tradition represents the next known Iron Age period within the surroundings of the study area. The decoration on the ceramics from this facies is characterised by finely stamped triangles, rim notching and appliqué (Huffman, 2007).

This facies developed from Ntsuanatsatsi south of the Vaal River and can be associated with the Type V stone walling settlement type (Huffman, 2007), the name of which is derived from Vegkop (Maggs, 1976). Van Riet Lowe (1927) was one of the first to record these structures. Dreyer (1990) also conducted excavations on Type V Late Iron Age stonewalled settlements located a short distance south-west of Winburg.

The Type V settlements comprise a core of cattle enclosures surrounded by beehive huts. Corbelled stone huts are associated with this walling type, and can be seen as characteristic. They are low stone huts located at the edge of the cattle enclosures and were where the boys herding the cattle often lived (Huffman 2007). As suggested by Huffman (2007), the corbelled huts were in fact beehive huts made of stone rather than grass and reeds. Furthermore, the presence of beehive huts at these sites necessarily indicates a Nguni association or origin with these settlements.

Based in information presently available, the best known site of this type found within the surroundings of the study area, comprises a so-called “Early Sotho Settlement, Waterval, Sandrivierhoogte” that was originally declared a National Monument and which is now registered as a Provincial Heritage Site. The site is located a short distance outside the boundaries of the present study area. The site was proclaimed a national monument by virtue of a notice in the Government Gazette on 17 December 1982. In the declaration, the site is described as a ‘Leghoya Village’ comprising corbelled huts and stonewalls. The site has since been declared a Provincial Heritage Site in terms of the National Heritage Resources Act ([www.sahra.org.za](http://www.sahra.org.za)).



Figure 8 – Corbelled stone huts associated with a Type V settlement (Huffman, 2007:39).

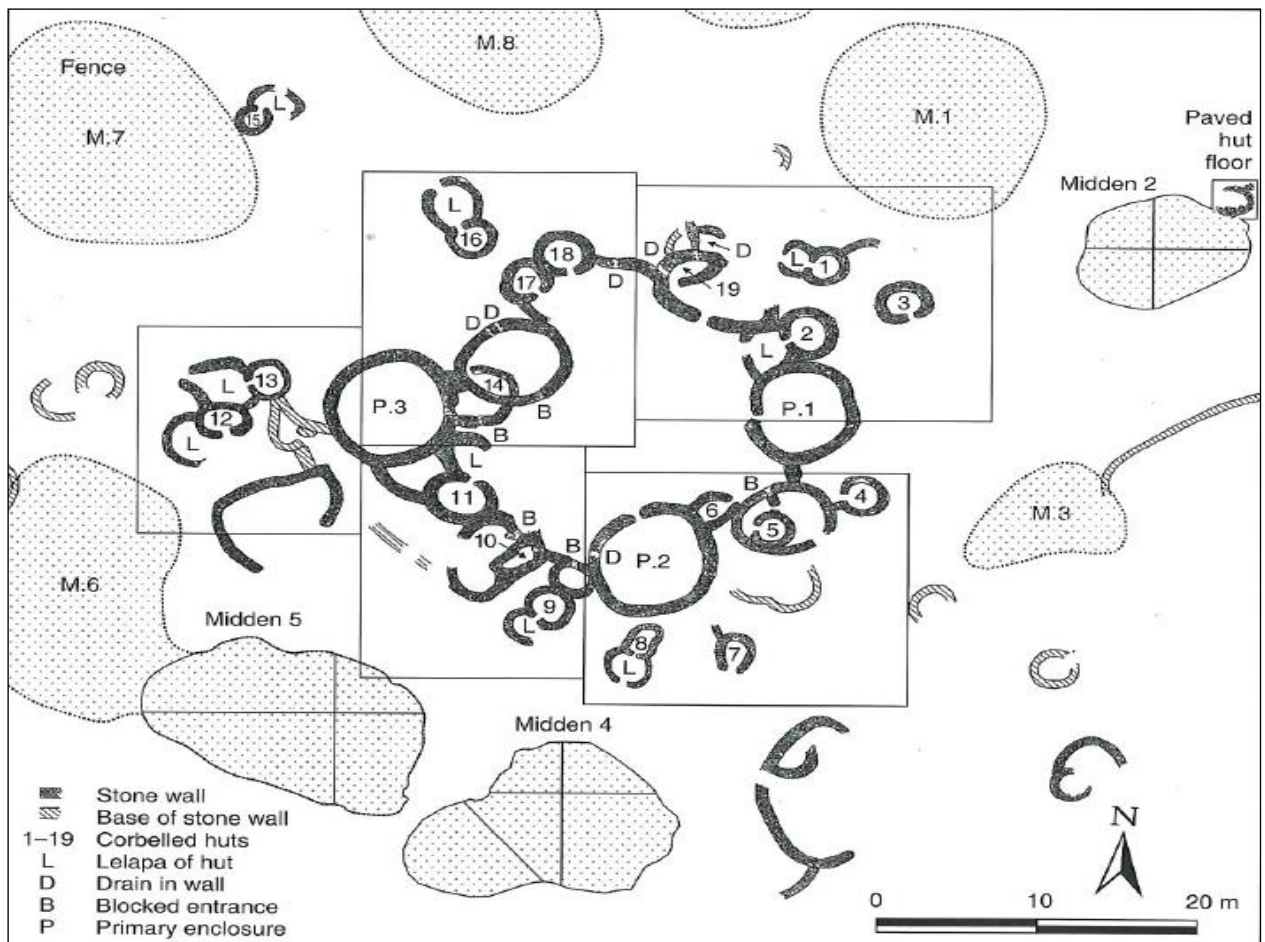


Figure 9 – Layout of a Type V Settlement (Huffman, 2007:38).



1820s

Across the Southern Highveld, this period was characterised by warfare and unrest. Known as the Mfecane, these years of upheaval originated primarily in the migration of three Nguni groups from present day Kwazulu-Natal into the present day Free State as a result of the conquests of the Zulu under King Shaka. The three Nguni groups were the Hlubi of Mpangazitha, the Ngwane of Matiwane and the Khumalo Ndebele (Matabele) of Mzilikazi.

In c. 1821, the Hlubi migrated across the Drakensberg Mountains in a westerly direction (Maggs, 1976) and attacked the Tlokwa of MaNthatisi along the banks of the Wilge River. This river has its source near Harrismith and flows into the Vaal River where the Vaal Dam is located today. While it is not exactly certain where MaNthatisi's settlements would have been located (in all likelihood further south), the Tlokwa fled westward as a result of the Hlubi attack and in turn attacked other groups in its path. This started a period of unrest and warfare, which rippled across the Highveld on both sides of the Vaal River (Legassick, 2010) (Lye and Murray, 1980).

The Ngwane followed closely on the Hlubi and further augmented the unrest and warfare along the southern Highveld (Legassick, 2010).

Although the effects of the migrations of the Hlubi and Ngwane would certainly have had a profound impact on the northern Free State, this was also the case in terms of the Khumalo Ndebele who would have played a significant role in the surroundings of the study area during this time.

The Khumalo Ndebele (also known as the Matabele) were also forced to leave Kwazulu-Natal and between 1823 and 1827 settled along the central Vaal River (Bergh, 1999). Mzilikazi attacked a number of Sotho-Tswana groups and settlements and incorporated them into his kingdom. As a result, his activities would have had a definite impact on the northern Free State at the time.

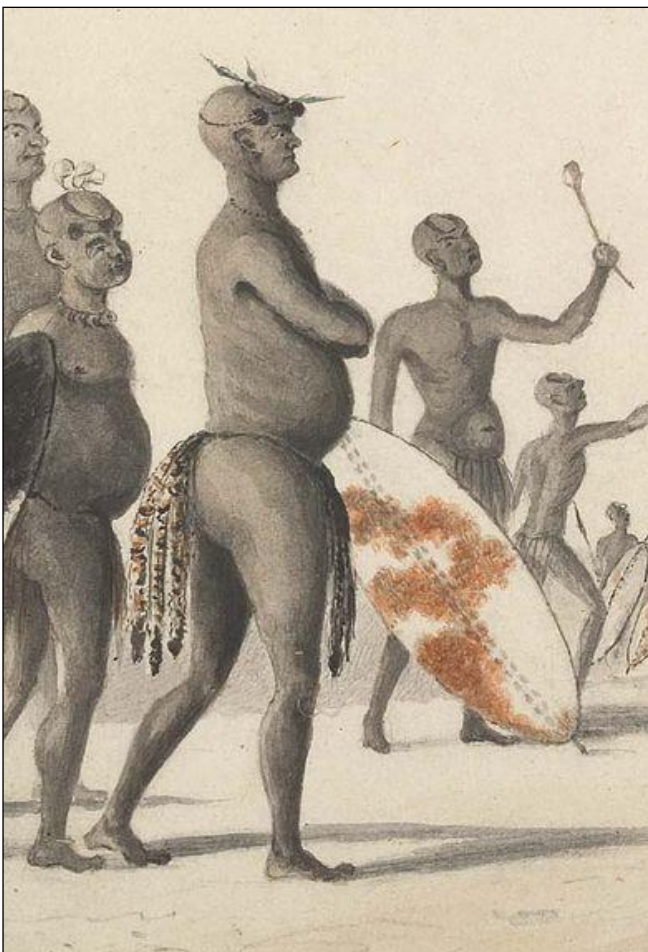


Figure 10

King Mzilikazi of the Matabele. This illustration was made by Captain Cornwallis Harris in c. 1838  
(www.sahistory.org.za)



<b>The Early Colonial Period</b>	
<p>The early Colonial Period within the study area and surroundings was characterised by the arrival of newcomers to the Transoraniga. The first arrivals were the Griqua followed by white Trekboers, who for the most part practiced a nomadic pastoralist way of life and were small in number. During the 1830s a mass migration of roughly 2 540 Afrikaner families (comprising approximately 12 000 individuals) from the frontier zone of the Cape Colony to the interior of Southern Africa took place. The people who took part in this Great Trek were later to be known as Voortrekkers (Visagie, 2011).</p>	
1804	<p>The Griqua were of European and Khoikhoi descent, and although they had been present on the Orange River for some time, they only established themselves permanently north of the Orange River in 1804, when they settled at Klaarwater, between present-day Danielskuil and Prieska (Reader's Digest, 1994).</p>
Early 1800s	<p>During the early 1800s, frequent droughts forced white farmers from the Cape Colony to move with their livestock across the Orange River to look for better grazing. Initially, these Trekboers first obtained permission from the Cape authorities before departing across the frontier, however with time, increasing numbers of Trekboers moved across this river into the Transorangia (as it became known) without any prior permission (Schoeman, 1980).</p>
Early 1836	<p>The first Voortrekker party of some 70 wagons crossed over the Orange River during early 1836. More groups followed and primarily established themselves along the Vet River (Schoeman, 1980).</p> <p>Of significance for the study area, is that during this same period, a family trek under the leadership of Petrus Albertus Venter departed from Renosterberg in the Graaff-Reinet district and arrived in proximity to the present-day town Ventersburg, where their farm Kromfontein was later inspected and proclaimed (Visagie, 2011). A number of farms from the surroundings of Ventersburg that are located within the study area, still memorialise the surname of this Voortrekker leader and group. These include Venters Hoek, Venterskraal and Venterskroon while the town of Ventersburg was also named after Petrus Albertus Venter.</p> <p>One of the few tangible reminders of these Voortrekkers are their graves, buried at the reconstructed remains of a stone rampart immediately west of Ventersburg. The Voortrekkers buried here include Petrus Albertus Venter (17 April 1790 – 11 January 1858) and his wife Wilhelmina Catharina Francina Venter (10 February 1796 – 12 October 1868), as well as an unknown number of their relatives. One reference was found which indicates that these graves were originally buried along the Perdespruit (locality unknown, but more than likely situated on the farm Kromfontein). However, due to frequent flooding of the banks of this stream, the graves were relocated in 1983 to their current place of burial (<a href="https://pathfinda.com/en/ventersburg/attractions/skanskraal-monument">https://pathfinda.com/en/ventersburg/attractions/skanskraal-monument</a>).</p> <p>The stone rampart and Voortrekker graves were declared a National Monument on 9 December 1988, and is currently a Free State Provincial Heritage Site (<a href="http://www.sahra.org.za">www.sahra.org.za</a>).</p> <p>The site is located 67 m east of the present study area boundary, on the western edge of the town of Ventersburg.</p>
1837 - 1843	<p>In 1841 the town of Winburg was established on the banks of the Vet river. After the annexation of Natal by the British in 1843 and the subsequent dissolution of the Voortrekker Republic of Natalia, Winburg became the capital of the Voortrekkers in what is today known as the Free State (Erasmus, 2004). Winburg is located 9.2 km south-east of the study area.</p> <p>On 10 October 1968, an extensive Voortrekker Monument was opened south of Winburg (<a href="http://www.artefacts.co.za">www.artefacts.co.za</a>). This monument is located 12 km south of the study area.</p>



Figure 11 – Depiction of an oxwagon crossing a river during the Great Trek (Reader’s Digest, 1994:116).

### The Mid to Late Nineteenth Century

3 February 1848	<p>The Orange River Sovereignty was proclaimed over the Transorangia by Great Britain and had its capital at the newly established Bloemfontein (<a href="http://www.wikipedia.org">www.wikipedia.org</a>). The sovereignty came about after one-sided agreements (favouring the British) had been reached by Great Britain with King Moshesh of the Basotho and Adam Kok III of the Griqua. The Voortrekkers present in the Transorangia were completely by-passed by these agreements, which led to serious dismay and disappointment amongst them. In terms of the surroundings of the study area, the response of the Voortrekkers was to force the British magistrate at Winburg, Thomas Biddulph, out of town and proclaim the Republic of Winburg (Reader’s Digest, 1994).</p>
16 January 1852	<p>On this day, the Sand River Convention was signed between the British Government, represented by British Assistant Commissioners W.S. Hogge and C.M. Owen, and the Transvaal Boers under the leadership of General Andries Pretorius. This convention formally recognised the existence and independence of the Boer Republic north of the Vaal River by the British Government, and was the foundation for the creation of the <i>Zuid-Afrikaansche Republiek</i> (South African Republic) (Oberholster, 1972).</p> <p>The site where the signing of the convention took place, was declared a monument and for many years was marked by a stone cairn and plaque (Oberholster, 1972). The present condition of the monument is not known.</p> <p>The site is located near the bridge where the N1 highway passes over the Sand River, and is located approximately 622 m east of the present study area.</p>
23 February 1854	<p>The Orange River Convention (sometimes referred to as the Bloemfontein Convention) was signed by representatives of Great Britain and the Boers, and resulted in the proclamation of the Boer Republic of the Orange Free State. The convention was signed at Bloemfontein (<a href="http://www.wikipedia.org">www.wikipedia.org</a>).</p> <p>As with the proclamation of the Sovereignty, the Orange River Convention was again one-sided and did not obtain the blessing or inputs of all the major role-players in the Free State. While the Voortrekkers were excluded in 1848, the signing of the Orange River Convention in 1854 did the same to the Basotho and Griqua.</p> <p>For the next 48 years, the study area fell within the boundaries of the Boer Republic of the Orange Free State.</p>

July 1854	<p>In July 1854, the <i>Volksraad</i> of the newly established Free State Republic instructed the <i>landdrost</i> of Winburg, Joseph Orpen, to look for a site for the establishment of a new town within the northern region of the Boer republic. Orpen chose the farm Klipplaatsdrift and Kroonstad's first residential stands were sold on 30 April 1855 (Erasmus, 2004). The town of Kroonstad is located 6.2 km north of the present study area.</p>
1858	<p>The first war between the newly established Free State Republic and the Basotho of Moshoeshoe took place. To protect the local people in this war, a stone rampart was constructed on the farm Kromfontein which had originally been owned by Field-Cornet P.A. Venter (Erasmus, 2004).</p> <p>Some sources indicate that Field-Cornet P.A. Venter and King Moshoeshoe were good friends, and before the start of hostilities the king made a force of 200 Basotho men available to the Field-Cornet to assist in the building of the stone rampart. See for example <i>Kontrei</i> of 22 June 2005.</p> <p>The remains of this rampart can still be seen immediately west of the town of Ventersburg, and is located where the Voortrekker graves alluded to before are situated (Erasmus, 2004). The site is 67 m east of the present study area.</p>
1872	<p>The town of Ventersburg was laid out on the farm Kromfontein in 1872. As indicated above, the farm Kromfontein had originally belonged to one of the early Voortrekker leaders, namely Field-Cornet P.A. Venter. After his death in 1857, his son B.G. Venter allowed church services to be held in his father's homestead. The second Gereformeerde (Dopper) church north of the Orange River was also established at Kromfontein in 1859. The use of the farm for church services led to the establishment of a town. The new town was named after Field-Cornet P.A. Venter, and formal proclamation for Ventersburg took place in 1876 (Erasmus, 2004). Ventersburg is located immediately to the east of the present study boundaries.</p>
Early 1890s	<p>The railway line between Bloemfontein and Johannesburg was built during the early 1890s, and eventually reached Johannesburg during September 1891 and Pretoria in January 1892 (Schoeman, 1980). In terms of the study area, this railway line cuts through the northern end of the present study area, with sidings and stations along this line such as Holfontein (partially), Geneva and Bosrand located within the present study area.</p>
Mid 1890s	<p>During the mid 1890s two men arrived on the farm Aandenk to undertake prospecting work. Alexander Edward King Donaldson was a prospector and his associate Herbert Hinds an engineer. They excavated an 18-meter-deep shaft and took samples from their excavations for further testing and analysis. On their return journey to England, both men died when their ship, the Drummond Castle, wrecked at Ushant off France, and with it the samples they had brought from the Free State (<a href="http://www.sahra.org.za">www.sahra.org.za</a>) (Felstar Publishers, 1968).</p> <p>The activities of these two men laid the foundation for the discovery and development of the Free State Goldfields. The farm Aandenk is located immediately south of Allanridge today, some 13 km west of the present study area.</p>
<b>The South African War (1899 – 1902)</b>	
<p>The South African War was fought between the Boer Republics of the Transvaal and Free State on the one side and the Great Britain on the other, but is referred to as the South African War as the victims and participants of the war were not excluded to British or Boer alone.</p> <p>As will be discussed in more detail below, the march of Lord Roberts from Bloemfontein to Pretoria in May and June 1900 was especially significant in terms of the study area. In particular, the so-called Battle of Zand River (7 – 10 May 1900) was fought very close to the study area, with at least the movement of troops during the battle taking place across the study area.</p>	



13 March 1900 –  
6 May 1900

Bloemfontein, the capital of the Boer Republic of the Orange Free, was occupied by the British Army under Lord Roberts on 13 March 1900. The Boer Republic of the Orange Free State was renamed the Orange River Colony.

With the Republican forces of the Transvaal and Free State retreating northwards from Bloemfontein, Lord Roberts's eyes drifted further north, where the greatest prize of the war lay waiting, Pretoria. Lord Roberts and his staff strongly believed that once the capital of the *Zuid-Afrikaansche Republiek* fell, the war would be over.

However, the success of the British Army required all focus on the immediate front, as the land between Bloemfontein and Pretoria was bisected by a myriad of rivers, dongas and hills, all strategically significant obstacles from where the Boer forces could implement a solid defence. The Boer forces standing between Lord Roberts and Transvaal capital were estimated by British Intelligence to comprise two main groups namely a force of between 5 000 to 6 000 burghers with 18 guns under General Louis Botha and a similarly large force in the surroundings of Kroonstad (Maurice & Grant, 1906).

After departing from Bloemfontein, Lord Roberts's force was involved in a couple of successful actions on their way to Pretoria, including Brandfort (3 May 1900) and Vet River (4 - 6 May 1900). With the successful conclusion of the battle of Vet River, Lord Roberts and almost his entire army crossed over the river successfully, and by the evening of 6 May 1900 bivouacked at the small railway siding known as Smaldeel. The town of Theunissen is located here today and is roughly 12 km south of the present study area (Maurice & Grant, 1906).

A short distance to the north lay the next, and far more daunting, obstacle on Lord Roberts's march to Pretoria, the Zand (or Sand) River. It was here, at this river, that General Louis Botha, the commanders-in-chief of the Transvaal republican forces, was determined to halt Lord Roberts's march on Pretoria.

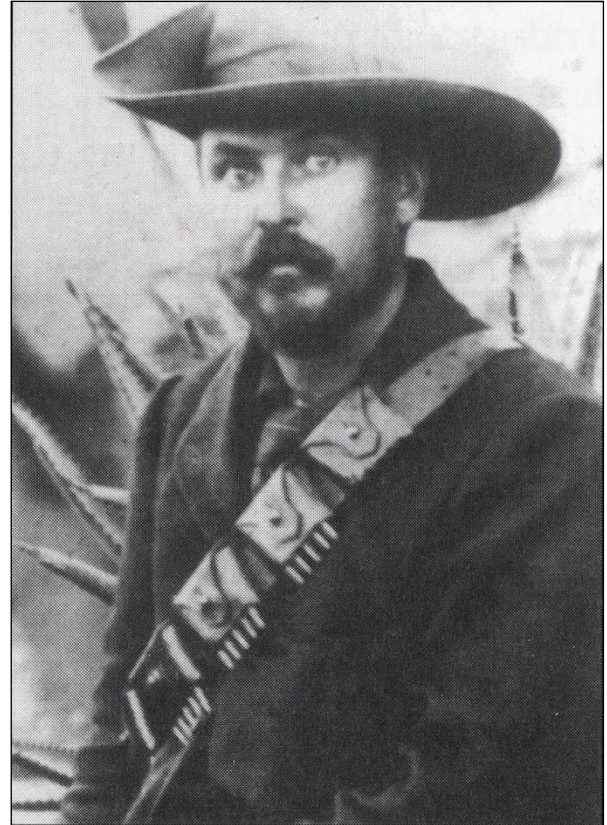


Figure 12 – Lord Frederick Sleigh Roberts (left) and General Louis Botha (right). These two officers commanded the opposing forces at the Battle of Zand River (Changuion, 2001:77 & 117).

<p>7 – 10 May 1900</p>	<p>On 7 May 1900 a reconnaissance of the Zand River by General Edward Hutton indicated that the northern bank of the river was held by a force of roughly 6 000 Boers supported by two heavy and eight light pieces of artillery. These estimates provided by General Hutton allowed Lord Roberts to draw up a battle plan (Maurice &amp; Grant, 1906).</p> <p>On the 9<sup>th</sup> of May 1900, Lord Roberts moved his army forward and established his headquarters at the Welgelegen Station, roughly 7.8 km west of the study area. The movement of the British Army under Lord Roberts from a position a short distance south of the study area at Smaldeel (present-day Theunissen) to a position a short distance east of it, suggests that the main component of Lord Roberts's force followed the railway line and in this way skirted around the study area. However, in view of the closeness of this railway line to the present study area, sections of his force would almost certainly have crossed over the study area as well.</p> <p>Lord Roberts's battle plan focussed on securing significant drifts that provide safe crossing for his infantry over the Zand River, and especially so Junction Drift (the farm of this name is located within the study area with the actual drift either within or very close to the study area), Merriespruit (8.8 km north-west of the study area), Du Preez Leger Drift (24.8 km north-west of the study area) and De Klerks Kraal Drift (roughly 25.7 km north-west of the present study area). For the purposes of this discussion, the events associated with the Junction Drift will be discussed in more detail below.</p> <p>On 9 May 1900, Lord Roberts and his army advanced on the Zand River. On his army's eastern flank, General Ian Hamilton advanced on the river and arrived at the farm Bloemplaats, roughly three miles south of his destination. No farm of this name could be found south of the river, however the farm Bloemskraal is located at this distance south of the river and is situated within the present study area. From this farm, Hamilton was to orchestrate the crossing of the river at Junction Drift.</p> <p>Anxious to secure the drift, Hamilton ordered the 5<sup>th</sup> Corps Mounted Infantry and 1<sup>st</sup> Derbyshire Regiment forward and that same evening both the southern and northern banks of the river at the drift were held by Hamilton's men. Meanwhile, unaware of Hamilton's occupation of the drift, Colonel Charles Tucker of the VII<sup>th</sup> Division ordered the 2<sup>nd</sup> Cheshire Regiment from his 15<sup>th</sup> Brigade to the drift. Upon reaching the drift, his men realised that the crossing had already been secured, and camped on the southern bank of the river. The southern bank of another unnamed drift located to the east of Junction Drift, was also occupied that same evening by picquets of the Mounted Infantry.</p> <p>Hamilton's men at Junction Drift was faced by a strong Boer force, which occupied a range of hills from Doornkop in the west to Boskop (Baskop) in the east. This range of hills is located north of the Zand River, and stretches roughly parallel to it. While Doornkop and the western end of this position were located outside of the study area, the remainder of the Boer position all the way to Baskop was located within the study area.</p> <p>On the morning of 10 May 1900, Lord Roberts's army advanced on the river. At dawn of the same day, the 1<sup>st</sup> Royal Sussex Regiment under fire from Boer artillery, advanced from the northern bank of the drift to occupy a low ridge located two miles to the east. From this foothold, Hamilton advanced the infantry of his 21<sup>st</sup> Brigade in the following order: the 1<sup>st</sup> Royal Sussex Regiment and 1<sup>st</sup> Cameron Highlanders in the front, followed by the 1<sup>st</sup> Derbyshire Regiment and City Imperial Volunteers. The 1<sup>st</sup> Gordon Highlanders from the 19<sup>th</sup> Brigade was attached to Major-General Bruce Hamilton's force, which was in the process of advancing on the right flank of the infantry assault. With General Ian Hamilton's infantry advancing on the Boer position, and the drift and northern banks of the river secure, his 76<sup>th</sup> Battery crossed the stream and started engaging the enemy from the ridge north of the river.</p> <p>Meanwhile, Tucker of the VII<sup>th</sup> Division also advanced on Junction Drift and ordered two batteries to cover the drift and at 8h30 that morning ordered the 1<sup>st</sup> East Lancashire and 2<sup>nd</sup></p>
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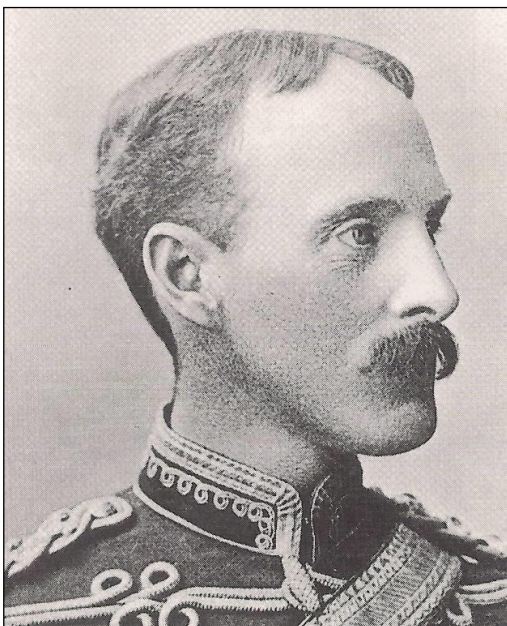


Cheshire Regiment, which had camped the previous night on the southern bank of the drift, across the drift to provide assistance on Hamilton's left flank north of the river. They eventually engaged the Boers occupying Doornkop, so no further mention will be made of these Tucker's men.

With his infantry advancing, General Hamilton deployed his artillery along the river to cover the assault. The 74<sup>th</sup> and 82<sup>nd</sup> Batteries occupied a position on the south bank of the river, a short distance east of Junction Drift while a battery of two 5-inch guns opened up on the Boer position from a spot four hundred yards to the south. An intensive crossfire developed between the British artillery along the river and the Boer guns on the ridge a few miles to the north and north-east. The effective British barrage on the Boers allowed for the infantry under Major-General Bruce Hamilton to advance closely on the enemy position, from which point well-executed infantry assaults started clearing the Boer position. However, the Boer artillery comprising two guns to the west and a Vickers Maxim to the east started having an effect on the battle, until both artillery positions were targeted by the British artillery and effectively neutralised. With no artillery support, the Boer positions were quickly taken by Hamilton's infantry.

By 11 am that same morning all the hills and ridges north of Junction Drift were taken by Hamilton's men. With the Boer forces retreating towards Kroonstad, Hamilton ordered his Mounted Infantry under General Robert George Broadwood to pursue them and push the assault forward. At this critical time, a Boer flanking manoeuvre took place on the rear right flank of General Ian Hamilton's position, where the 10<sup>th</sup> Hussars and Kitchener's Horse guarding a hill roughly seven miles south-east of Junction Drift, were attacked. The Boer attack was supported by fresh artillery, and Hamilton, fearing that his entire flank would fall, brought two guns to support the defence. The Mounted Infantry under Broadwood also temporarily halted their pursuit should they be required to the south-east. After receiving news that Hamilton's flank was no longer threatened, Broadwood continued with his pursuit and was in Ventersburg by 14h30 that afternoon. In his pursuit, his force managed to capture 28 prisoners and five wagons before darkness halted the pursuit.

That evening Lord Robert's army had all crossed the Zand River successfully, and were holding positions some 20 miles north of the river. In terms of the study area, General Ian Hamilton's cavalry had reached Ventersburg whereas his 21<sup>st</sup> Infantry Brigade occupied Baskop. The Battle of Zand River was a resounding victory for Lord Roberts and cleared the way for his next objective on the road to Pretoria, the town of Kroonstad (Maurice & Grant, 1906).



*Figure 13 – The two Hamiltons who were closely associated with the events associated with the Battle of Zand River located within the present study area. General Ian Hamilton (left) commanded the entire eastern flank of Lord Roberts's army in the attack, whereas Major-General Bruce Hamilton (right) controlled the infantry assault on the Boer position north of the river.*

*Changuion, 2001: 123 & [www.wikipedia.org](http://www.wikipedia.org)*





Figure 14 – Lord Roberts’s infantry crossing the Zand River at the conclusion of the Battle of Zand River. This photograph was in all likelihood taken during the afternoon of 10 May 1900, after all the significant drifts across the river had been cleared by the cavalry and other units. The crossing and surrounding landscape are monitored by an observation balloon (see top right). It is not possible to identify the exact drift where this crossing took place, although the remnants of a bridge foundation structure can be seen in the river bed (Raath, 2007:351).


10 May 1900

In a last ditch attempt to halt the British advance through the Free State, the Boer leaders decided to entrench themselves on both sides of the railway line along a ridge known as Boschrand some six miles south of Kroonstad. This strong position was supported by artillery as well.

However, Lord Roberts acquired intelligence on 10 May 1900, which informed him of the strong Boer position at Boschrand. In an attempt to outflank the Boer position and at the same time place more pressure on the Boer forces and their leaders, Lord Roberts ordered General French and his cavalry to flank around Boschrand and Kroonstad, and destroy the railway line leading north out of town. Lord Roberts’s intention with this manoeuvre was to trap the majority of the Boer artillery, goods and ammunition in the town.

11 May 1900	<p>Early on the morning of 11 May 1900, General French and his cavalry started on their journey to outflank the Boer position. However, he became bogged down by the Boer defenders to the west of Kroonstad, and was unable to push forward. Nonetheless, the destruction of the railway was successfully executed that evening by a small force of 50 hand-picked men of the 1<sup>st</sup> Cavalry Brigade and eight mounted Sappers, all under the command of Major A.G. Hunter-Weston and assisted by an American scout named F.R. Burnam (Maurice &amp; Grant, 1906).</p> <p>Meanwhile, on the morning of 11 May 1900, Lord Roberts's forces moved slowly forward toward Kroonstad, until their advance was halted by the Boer position at Boschrand. An artillery duel ensued between the British artillery forming part of Lord Roberts's advance and the Boer artillery ensconced at Boschrand. The artillery duel lasted until sunset, and the infantry units at the front of Lord Roberts's forces bivouacked below Boschrand while Lord Roberts established his headquarters at Geneva Station.</p> <p>That evening, the Boer positions at Boschrand and Kroonstad were evacuated and the Boer armies retreated further north (Maurice &amp; Grant, 1906). In this way, the window of history moved away from the study area and surroundings as Lord Roberts's march on the Transvaal capital continued in earnest.</p> <p>While the flanking movement of General French as well as the destruction of the railway line occurred outside the present study area, the Boer position at Boschrand was located within the study area. Geneva Station, where Lord Roberts placed his headquarters on the night of 11 May 1900, was also located within the present study area. Lastly, the artillery duel would also have taken place within the study area.</p>
1900 - 1902	<p>After the fall of Pretoria on 5 June 1900 and the subsequent battles of Diamond Hill (11-12 June 1900) and Bergendal (21-27 August 1900), the Boer generals decided that the only way to proceed with the war would be the implement of a completely different strategy, a strategy based on mobility by using smaller commandos to attack and harass the British on all fronts in what was to become known as guerrilla warfare. This style of warfare had significant successes, and extended the war for nearly another two years. However, these successes came with significant losses as the war increasingly dragged the civilian population of the Boer Republics into the carnage of war.</p> <p>No skirmishes or battles associated with the guerrilla war are known from within the study area or its immediate surroundings. This said, the study area and surroundings, as with almost the entire South Africa, experienced the effects of guerrilla warfare. For example, after reports had been received that the Boer commandoes were using Ventersburg as a storage place for food, Major-General Bruce Hamilton was ordered to burn a number of houses in town.</p> <p>Furthermore, in retaliation to the new form of warfare, the British High Command devised a strategy of building extensive blockhouse lines across the country as a way of hindering the mobility of the Boer commandoes. By December 1900, earth and stone blockhouses had been built at a number of places along the main railway line between Bloemfontein and Pretoria, including at Boschrand and Holfontein stations located within the study area. Shortly thereafter, a number of key positions along the railway line in proximity to Kroonstad were further fortified. Within the study area, a soil defensive structure was erected at Boschrand while a hexagonal fort was built at Holfontein. Between December 1900 and early 1901, a number of stone blockhouses were also erected in proximity to Kroonstad, including two such stone blockhouses built by contractors at Holfontein. From early 1901 onward, the existing soil and stone defensive works along the railway line between Kroonstad and Bloemfontein were replaced by stone and corrugated iron blockhouses. For example, the non-permanent defensive works at Boschrand were replaced by a Rice-type blockhouse (Hattingh &amp; Wessels, 1997).</p>



1900 - 1902	<p>Lord Kitchener, in particular, also implemented a strategy that was to become known as scorched earth whereby Boer farms were burnt to the ground and the civilian population (both white and black) remaining on these farms forced into concentration camps. Untold hardship ensued in these camps, and many women and children died as a result of exposure, inadequate nutrition and poor medical facilities.</p> <p>Three black concentration camps were located within the study area. While their exact localities are not known, these camps were situated along the railway line at the following stations: Holfontein, Geneva and Boschrand. It is worth noting that Campbell (1995) indicates that the latter two camps were two of the three largest camps during the war, and with Honing Spruit (the third camp located outside of the present study area) housed a combined population of an incredible 7 000 people. None of the white concentration camps were located within the study area, with the closest two such camps located at Kroonstad (north of the study area) and Winburg (south of the study area) (<a href="http://www.angloboerwar.com">www.angloboerwar.com</a>).</p>
<b>The Early Twentieth Century (1902 – 1913)</b>	
1904	<p>After the South African War, renewed efforts were made to carry out gold prospecting work in the area. In 1904, a prospector named Archibald Megson arrived on the farm Aandenk, and the farmer showed him the trench where Donaldson and Hind had looked for gold. Megson opened up the old trench and continued with the excavations. At a depth of 30 meters, he found indications of gold and took a number of samples. Megson returned to Johannesburg with his samples and attempted to gain the interest of various mining houses and investors on the rand. However, with the rapid development and expansion of the Witwatersrand gold mining industry attracting all of the attention, no one seemed interested in possible gold discoveries so far away from Johannesburg (<a href="http://www.sahra.org.za">www.sahra.org.za</a>).</p>
	
<p>Figure 15 – Archibald Megson standing in the prospecting trench on the farm Aandenk (Felstar Publications, 1968).</p>	
August 1907	<p>In August 1907, the town of Theunissen was proclaimed. This proclamation followed on a petition by farmers living in proximity to Smaldeel Siding. The town was named in honour of Commandant Helgaardt Theunissen, who led the petition and had also been the leader of the local commando during the South African War. The town of Theunissen became a municipality in 1912 (Erasmus, 2004). Theunissen is located 2.5 km from the study area.</p>

### The Boer Rebellion (1914 – 1918)

At the end of the South African War (1899 – 1902), the Transvaal and Orange Free State republics lost their independence to the British Empire. In 1910, the Union of South Africa was established consisting of the Cape Colony, Natal, the Transvaal Colony and the Orange River Colony. General Louis Botha was appointed the Union's first prime minister and believed that South Africa's future would be best served as apart of the British Commonwealth. In 1914, the South African government under General Louis Botha decided to assist Great Britain in its war with Germany. A number of Boer leaders were not happy about this turn of events, and when General Koos de la Rey was killed at a roadblock in Johannesburg, emotions reached a boiling point and rebellion broke out across the former Boer republics. This rebellion saw more than 11 000 Boer men under the leadership of some of the former Boer War generals such as De Wet, Maritz, Kemp and Beyers rebelling against the South African government and its armed forces under the leadership of former Boer War generals Louis Botha and Jan Smuts.

16 November 1914

In terms of the study area, the most notable event relating to the Boer Rebellion was the battle, which occurred between the commando of General De Wet and the Government forces under the command of Colonel Enslin at the Virginia railway station on 16 November 1914. This battle followed on the defeat of De Wet's rebels at Mushroom Valley, south-east of Winburg, at the hands of General Louis Botha. De Wet and 2 000 rebels managed to escape from Mushroom Valley and followed the railway line north-eastwards towards the Virginia Station on the Zand River. De Wet wanted to cross over the railway line, and as a result, a fight ensued with Colonel Enslin's forces stationed at Virginia Station. General De Wet suffered a number of casualties and 50 of his men were also taken prisoner. After the battle, De Wet and his men followed the Zand River in a western direction and crossed over the river into the Transvaal Colony in proximity to Hoopstad (Union of South Africa, 1916).

The Virginia Station is located 7.6 km west of the study area, and as a result the battle would have taken place outside the study area boundaries.

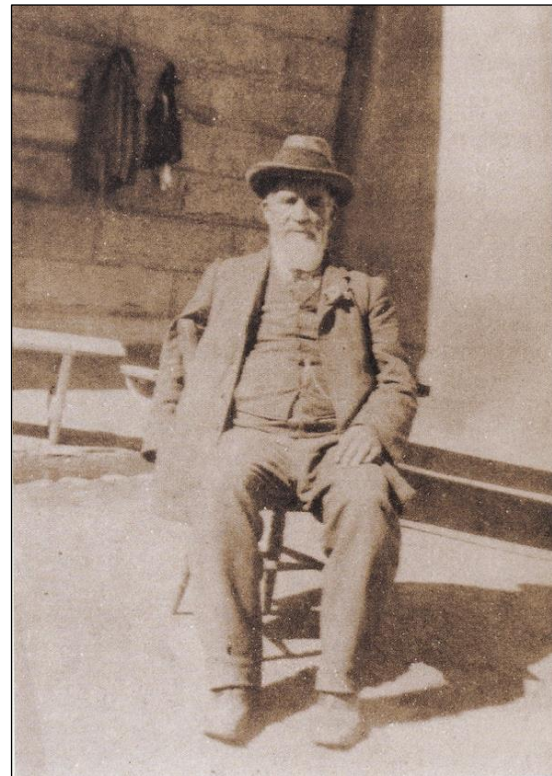


Figure 16 –The hardships experienced by General C.R. de Wet during the rebellion can be seen on these photographs. The one on the left shows De Wet shortly after the South African War (Van Schoor, 2007) with the image on the right depicting the general in the Bloemfontein prison after his capture late in 1914 (Raath & Langner, 2014:119).



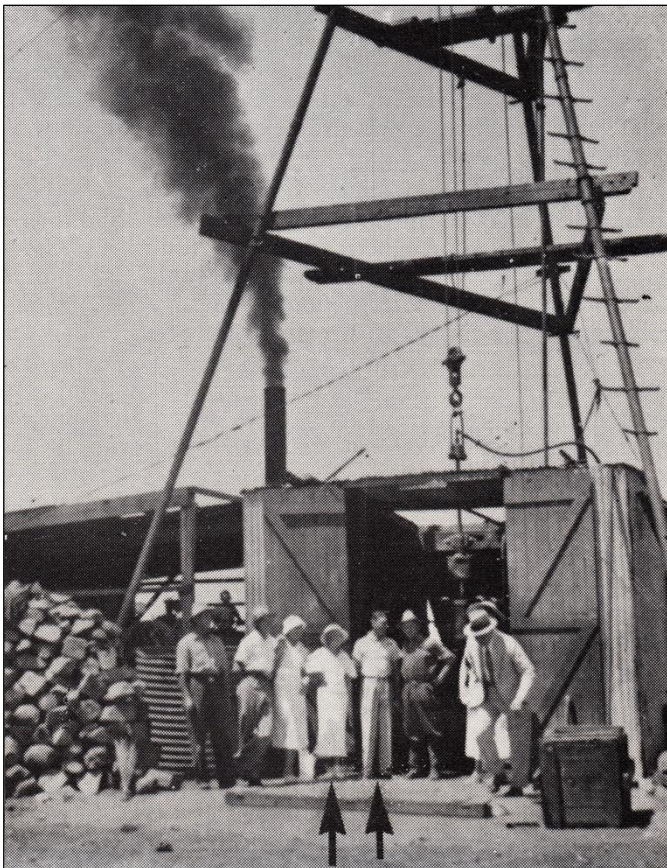
### The Remainder of the Twentieth Century (1915 – Present Day)

1929 - 1933

Nearly 25 years after finding the first indications of gold on the farm Aandenk, Archibald Megson finally managed to raise the interests of possible investors in Johannesburg. In 1929, during a chance encounter with Joseph Freedman, Megson found a more welcoming response. Freedman introduced the prospector to Johannesburg attorney, Emmanuel Jacobson, and his friend Allan Roberts, a dental technician. Despite being interested in what the prospector had to say, it took almost four years before Jacobson, Roberts and Megson travelled to the Free State (Shorten, 1970).

Allan Roberts, who was an amateur prospector, was able to trace a conglomerate outcrop all along the farm Aandenk, and incorrectly identified it as part of the Upper Witwatersrand series. The two friends returned to Johannesburg and formed a syndicate comprising themselves, F.L. Marx, Dr. E.B. Woolf, Samuel Potter and Joseph Freedman. Freedman represented the interests of the old prospector Archibald Megson in the syndicate (Shorten, 1970).

The syndicate acquired prospecting options on 31 farms in the area and the company Wit. Extensions Limited was established by the syndicate. On 23 October 1933, drilling commenced at a point roughly 80 m from Megson's trench on the same farm Aandenk. However, by February 1935 the drilling work had to be halted due to a lack of funds without any evidence for gold-bearing reefs identified. Many years later, it was estimated that if the two friends had only managed to deepen the hole by another 400 feet, they would have become very rich men and the discoverers of the Free State goldfields. Sadly, this was not to be their fate. Allan Roberts died in such poverty in 1939 and his friends had to pay for his funeral whereas Emmanuel Jacobson had to sell all his assets to survive (Shorten, 1970). Today, the town of Allanridge (named after Allan Roberts) and a monument to the west of the road between Welkom and Bothaville are all that is left of the dreams and expectations of these two mining pioneers.



*Figure 17 – The first gold prospecting borehole in the Free State was sunk on the farm Aandenk between October 1933 and February 1935. The arrows indicate the positions of Allan Roberts and his wife (Felstar Publications, 1968:11).*

<p>1935</p>	<p>After the failure of Wit. Extensions Limited, an agreement was reached with the Anglo-French Exploration Company to continue prospecting work at Aandenk. However, instead of continuing deeper on the same borehole, the Anglo-French Exploration Company decided to rather deflect the borehole and no results were achieved. It was later estimated that if either one of these companies had deepened the borehole by only another 400 feet, payable gold would have been discovered (Shorten, 1970).</p> <p>The agreement between Wit. Extensions Limited and Anglo-French Exploration Company came to an end and the famous geologist Dr. Hans Merensky acquired an interest in Wit. Extensions Limited. He subsequently carried out extensive prospecting work including the drilling of further boreholes. However, even these more extensive attempts by Merensky to find the Free State goldfields also failed (Shorten, 1970). Machens (2009) indicates that when news broke that the famous discoverer of inter alia South Africa’s platinum reserves owned options in a company working on the Free State goldfields, the interest from investors and mining companies to this part of the Free State was further awakened.</p>
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Figure 18 –The famous geologist Dr. Hans Merensky, who had his role to play in the discovery of the Free State goldfields (Machens, 2009).

<p>1 February 1937 – April 1939</p>	<p>After failing to discover any payable gold, Merensky sold his shares in Wit. Extensions to the Anglo American Corporation, who on 1 February 1937 established the West Rand Investment Trust. The trust also carried out an extensive drilling operation. The activities and interest of the Anglo American Corporation in this part of the Free State attracted the interest of other mining houses and investment companies, and prospecting options were taken out on a large number of farms from this area (Shorten, 1970).</p>
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	<p>Despite all this interest, the first payable gold in the Free state was only identified in March 1939 during drilling operations by the African and European Investment Company on the farm Uitsig at a depth of 2 701 feet (Felstar Publishers, 1968). One month later, during April 1939, another discovery of payable gold was made on the farm St. Helena at a depth of 1 143 feet (Shorten, 1970).</p> <p>The discoveries of payable gold at Uitsig and St. Helena created significant excitement amongst mining companies and investors, and increasing numbers of prospecting options and eventually mines were acquired and developed. The Free State gold rush had begun.</p> <p>The farm Uitsig is located 27 km north-west of the present study area with the farm St. Helena roughly 25.3 km to the north-west.</p>
1941	<p>The first gold mining lease in the Free State was granted by the government of the Union of South Africa for the farm St. Helena in 1941, and the St. Helena Gold Mining Company was established to mine and develop the property (Felstar Publishers, 1968). A number of other gold mining companies were also established in a relatively short spate of time, including the Welkom Gold Mining Company, President Steyn Gold Mining Company and the President Brand Gold Mining Company.</p>
	
<p>Figure 19 –The first mine shaft ever sunk along the Free State goldfields, namely the No. 3 Incline Shaft at the St. Helena Gold Mine (Felstar Publishers, 1968:151).</p>	
16 April 1946	<p>The borehole of the Blinkpoort Gold Syndicate Limited on the boundary of the farms Geduld and Friedenheim, reached payable gold in 1946. On 16 April 1946 it was announced that the gold-bearing material retrieved at a depth of 3 922 feet from this borehole assayed at an impressive 1 252 dwts per ton which was unique in the history of gold prospecting and mining in South Africa, with averages usually in the region of 250 dwts per ton. This discovery led to further interest in the Free State goldfields (Felstar Publishers, 1968).</p>
11 July 1946 – 15 April 1947	<p>On 11 July 1946 an application was made by the land company of Sir Ernest Oppenheimer's Anglo American Corporation, namely the South African Township and Mining and Finance Corporation, for the establishment of a new town called Welkom. After some legal and procedural processes and debate between the township applicants and its opponents (including the Odendaalsrus Town Council), the application for the establishment of the town of Welkom was approved on 15 April 1947 (Felstar Publishers, 1968).</p> <p>William Backhouse designed the town as a garden city with a commercial centre built around a town square and traffic circles rather than stop streets or traffic lights. More than a million trees were also planted (Erasmus 2014).</p>





Figure 20 –This photograph of Welkom was taken during the 1960s, roughly ten years after its establishment (Felstar Publications, 1968:171).

<p>1953</p>	<p>After gold was discovered in the area, Odendaalsrus became a prominent town in the Free State. A railway line was built from Allanridge to Odendaalsrus in 1953 and served the two Freddie’s mines (Nienaber et al. 1982).</p>
<p>1954</p>	<p>Three of the six mines surrounding Welkom had reached production stage by 1954. These were the Welkom, Western Holdings and St. Helena Mines.</p> <p>During the same year, the town of Virginia was laid out on the banks of the Zand River. As indicated elsewhere, the name of this town was derived from the nearby railway station, which in turn was named this after two American engineers working on the line in 1890 had carved the name “Virginia” on a boulder from a nearby hill (Erasmus 2014).</p> <p>Virginia is located 11.6 km north-west of the present study area.</p>

## 6.2 Heritage Sensitivity as Revealed in the Historical and Archaeological Overview

It is clear that the historical and archaeological overview revealed various aspects relating to the surroundings of the study area. While this assists with reconstructing the historical landscape, it does however provide some indication of the relatively limited historical significance of the study area as a whole. The following historical events and sites can be directly associated with the study area:

- During archaeological research undertaken by the National Museum in Bloemfontein, a total of 10 Middle Stone Age and Later Stone Age sites were identified in association with mammal fossil bones in drainage gulleys along the Vet, Doring and Sand Rivers. It is important to note that this research was not focused on identifying Stone Age sites without the associated presence of mammal fossil bones. The chances for finding more Stone Age sites along these rivers are therefore high. Of the 10 Middle Stone Age and Later Stone Age sites identified by the National Museum, one is located within the study area, namely site Le Roux 717 (S 28.181389 E 26.978333).
- The historical and archaeological review has revealed that during the eighteenth and early nineteenth centuries two main Late Iron Age groups were living within the study area and its immediate surroundings. These Late Iron Age groups comprise the Thabeng Facies, which is associated with Type Z stonewalled settlements, and the Makgwereng Facies associated with Type V stonewalled settlements. The identification of Late Iron Age stonewalled settlements were undertaken during the Google Earth scan, and as a result a total of 15 such Late Iron Age stonewalled settlements were identified. The distributions of these settlements within the study area will be discussed in more detail in the section dealing with the overall findings of the Google Earth scan below.
- During the Great Trek of the 1830s, a family trek under the leadership of Petrus Albertus Venter departed from the Graaff-Reinet district and arrived in proximity to the present-day town of Ventersburg. The farm Kromfontein was subsequently transferred to Pieter Albertus Venter and in 1872, a section of the farm was used for the establishment of Ventersburg (Visagie, 2011). While the town was named in honour of Voortrekker leader Petrus Albertus Venter, a number of farms from the surrounding landscape that are located within the study area, also memorialise the surname of this Voortrekker leader and group and appears to have been owned by this family. These include Venters Hoek, Venterskraal and Venterskroon. Although the only known tangible heritage site relating directly to these early Voortrekkers comprises a cemetery and stone rampart located 67 m outside of the present study area on the outskirts of Ventersburg, the Venter family would have had a strong presence in the study area as is shown by the number of farms from within the area containing their name.
- The railway line between Bloemfontein and Pretoria was built during the early 1890s, and completed in January 1892 (Schoeman, 1980). This line was built through the northern end of the study area, where the following stations and sidings along this line are located within the study area: Holfontein, Geneva and Bosrand (Boschrand).

- The South African War (1899-1902) had a significant impact across the country, and also within the study area. During the Battle of Zand River (7 – 10 May 1900), the most significant drifts across the river were earmarked for attention by Lord Robers in his attack, including Junction Drift. The farm of this name is located within the present study area, whereas the drift itself was either located within the study area or very close to it. While the drift was taken with relative ease by General Ian Hamilton's men, a range of hills north of the river between Doornkop in the west and Baskop in the east, were strongly occupied by the Boer forces of General Louis Botha. The ensuing battle for control of this ridge, which included an infantry assault and artillery duel, was almost entirely located within the present study area.
- After the Battle of Zand River, an artillery duel took place between the forward units of Lord Roberts's army and a strong Boer position entrenched on a ridge known as Boschrand on both sides of the railway line some six miles (9.7 km) south of Kroonstad. The railway station Boschrand (Bosrand) is located within the study area. It would therefore appear that the ridge in question as well as the Boer position (which would in all likelihood have included defensive stonework and sangars) as well as a significant component of the associated artillery duel, would have been located within the study area. However, the exact location of the position held by the Boer forces is not clear from available information. Furthermore, the artillery duel is not supported by all available historic records. These realities meant that this historic event was not recorded on the heritage sensitivity maps.
- During the guerrilla phase of the South African War, black concentration camps were established by the British military authorities across the former Boer republics, including within the study area at Geneva, Boschrand and potentially at Holfontein. While the exact positions of the three concentration camps are not known, the available information indicates that these camps were always established in proximity to railway lines. Furthermore, with the names of these concentration camps derived from the railway station or siding names, it seems evident that these camps would have been built in the general surroundings of the three stations or sidings. It is worth noting as well that Benneyworth (2006) indicates that during the war all black concentration camps were built within two miles from the nearest British military base or position. As military positions would have been concentrated at each railway station or siding in the form of blockhouses and defensive structures, a circular area with a radius of two miles was used as the most likely area within which these camps (and their associated cemeteries and archaeological middens) would have been located. These demarcated sensitive areas would necessarily include any remains of the original blockhouses and defensive structures erected at these same railway stations and sidings during the war, and would also include any historic structures and buildings, which may be associated with these sidings and stations.
- In March and April 1939 and 16 April 1946 significant discoveries of payable gold were made during prospecting drilling operations on the farms Uitsig, St. Helena and Geduld. While these farms are located outside of the study area, these discoveries led to the rapid development of the Free State goldfields, which significantly changed the entire landscape, including the present study area.



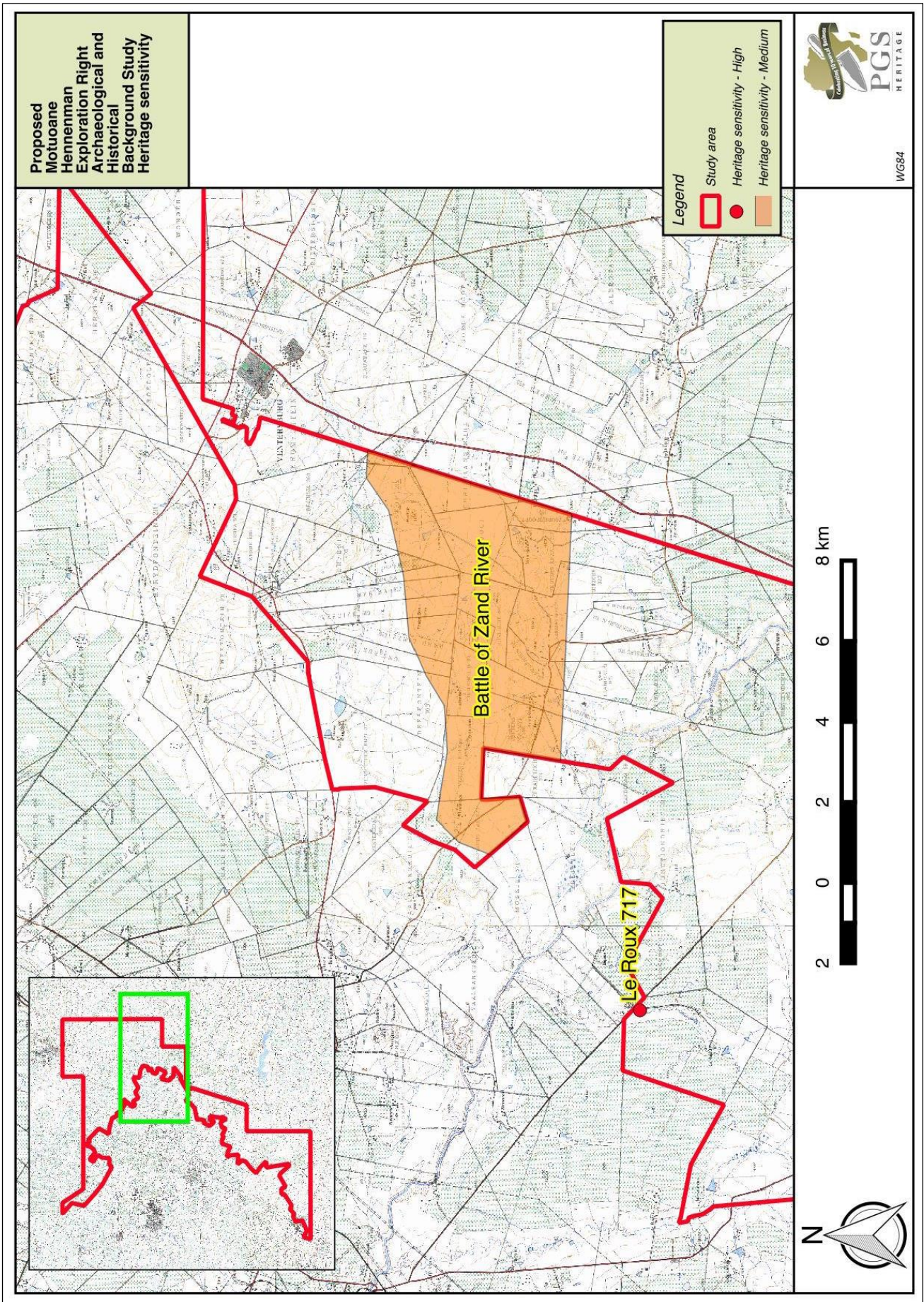


Figure 21 – Map showing the sensitivities identified during the archaeological and historical research. These sensitivities are the MSA site at Le Roux and the section of the Battle of Zand River located within the study area.



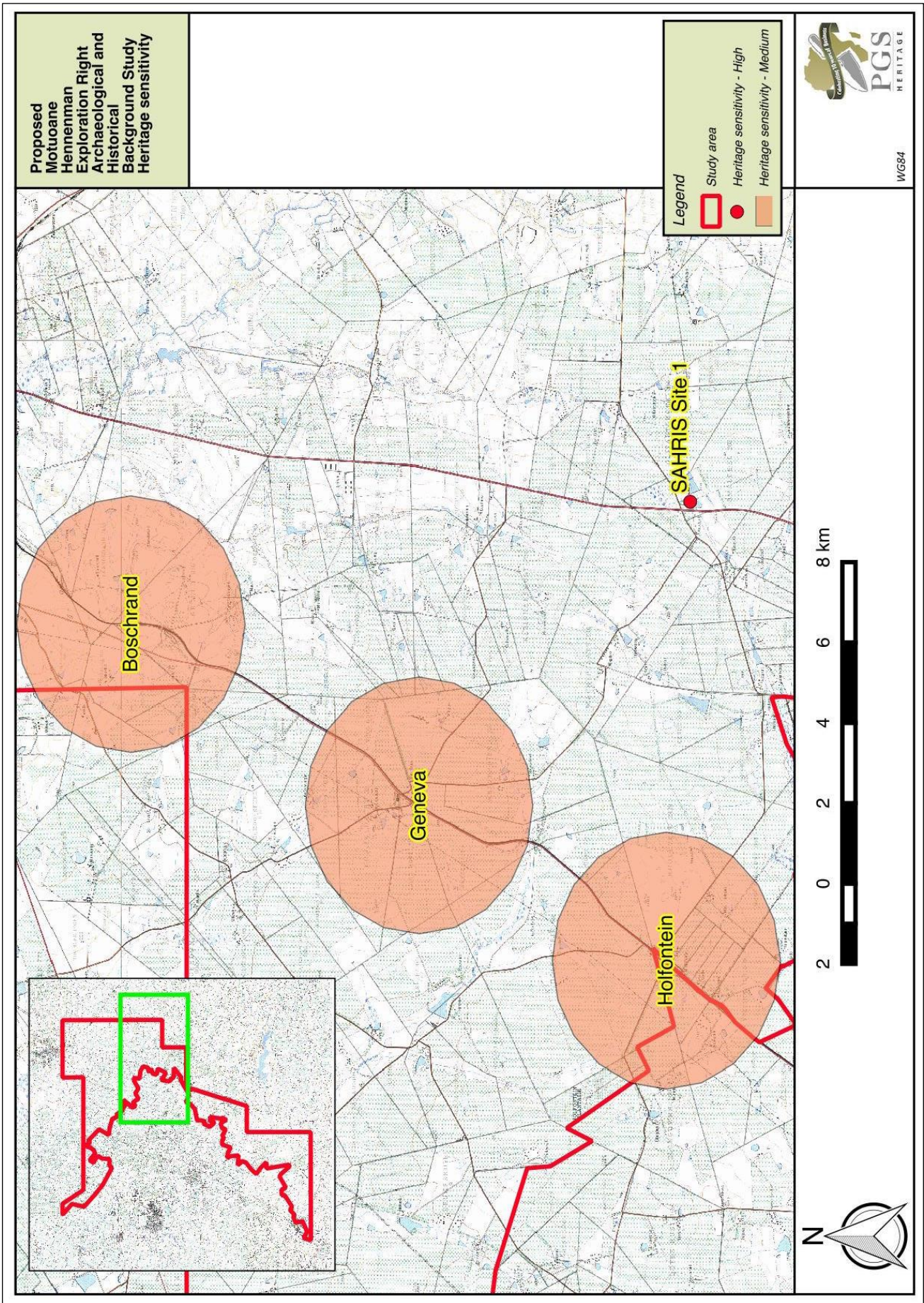


Figure 22 – Map depicting the sensitivities identified during the archaeological and historical research. The sensitivities shown here are possible location areas for three Black concentration camps.



## 7. KNOWN HERITAGE RESOURCES FROM WITHIN THE STUDY AREA

A number of different techniques were used to identify known heritage resources from within the study area. These will be discussed individually below.

### 7.1 Examination of Archival and Historic Maps

Maps obtained from the Directorate: Surveys and Mapping in Cape Town were used to compile a historic layering of the study area and at the same time also to provide augmentative information to the identified heritage sites. Overlays were made on Google Earth. This allowed for the recording of GPS coordinates for each depicted feature and also to assess the position of these map features in relation to heritage sites identified during the present study. Due to the massive extent of the study area, it proved impractical to include all possible heritage features such as farm buildings, and farm worker accommodation in this study. As a result, and for the purposes of this study, all points marked as graves and cemeteries are included. This does of course not mean that the historic farmsteads or farmworker houses are not necessarily of no heritage importance.

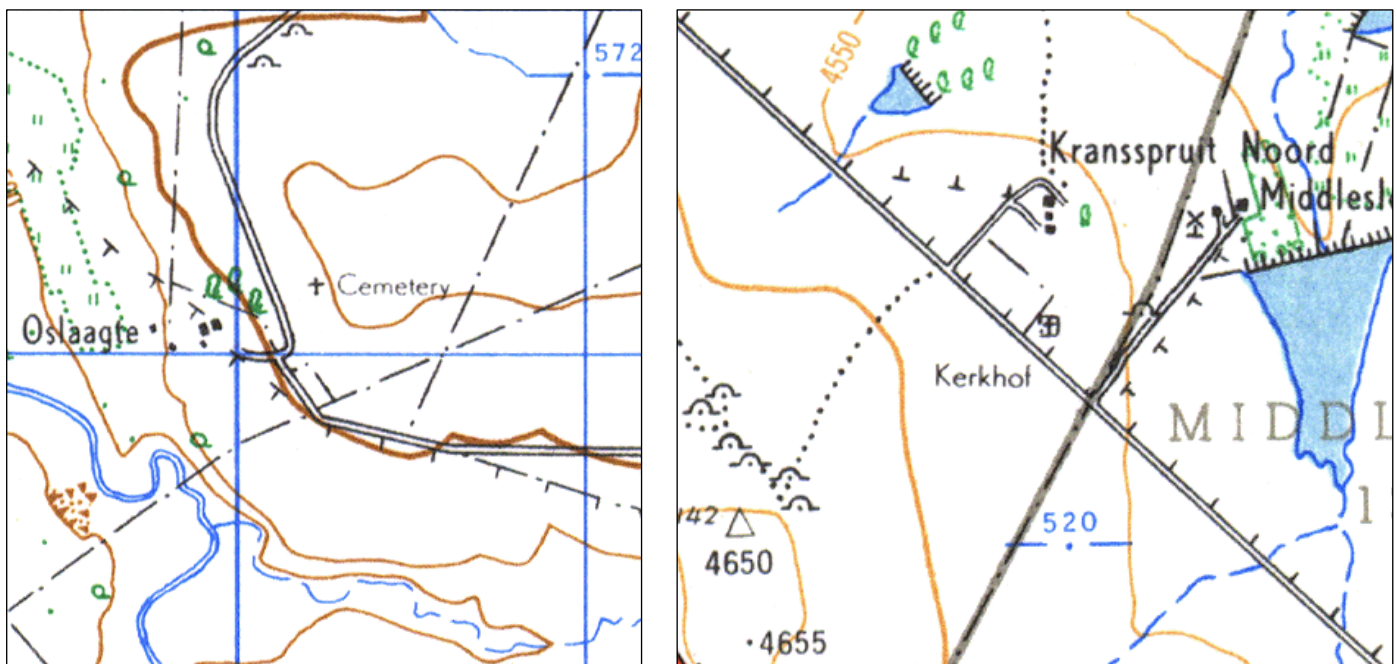


Figure 23 – Examples of cemeteries depicted on the First Edition topographical sheets. On the left, a section of the 2727CD Topographical Sheet that was surveyed in 1960 is shown. The depicted cemetery is included in this report as Cemetery 16. On the right, a section of the 2727CB Topographical Sheet that was surveyed in 1959. The depicted cemetery is included in this report as Cemetery 19.

#### 7.1.1 First Edition of the 2826BC Topographical Sheet

In this section the First Edition of the 2826BC Topographical Sheet will be discussed. This map sheet was based on aerial photography carried out in 1945, was surveyed and compiled in 1947 and drawn in the Trigonometrical Survey Office in 1951. No cemeteries are depicted within the study area on this particular map sheet.

### 7.1.2 First Edition of the 2826BD Topographical Sheet

In this section the First Edition of the 2826BD Topographical Sheet will be discussed. This map sheet was based on aerial photography carried out in 1945, was surveyed and compiled in 1947 and drawn in the Trigonometrical Survey Office in 1951. The cemeteries depicted within the study area on this map sheet are listed in the table below.

*Table 4- List of Cemeteries depicted on the First Edition of the 2826BD Topographic Sheet*

CEMETERY NUMBER	CONFIRMATION	COORDINATES	COMMENTS
Cemetery 1	Google Earth	S 28.419969 E 26.846230	A cemetery is depicted on the map. Using Google Earth, a small rectangular enclosure was observed a short distance away. This point was used to mark the position of the cemetery.
Cemetery 2	Map only	S 28.435752 E 26.883696	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.
Cemetery 3	Google Earth	S 28.426469 E 26.973542	A cemetery is depicted on the map. Using Google Earth, a row of rectangular features not dissimilar to graves was observed a short distance away. This point was used to mark the position of the cemetery.
Cemetery 4	Map only	S 28.430507 E 26.976889	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.
Cemetery 5	Map only	S 28.406165 E 26.783564	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.
Cemetery 6	Map only	S 28.370788 E 26.997837	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.
Cemetery 7	Map only	S 28.357846 E 26.964652	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.
Cemetery 8	Google Earth	S 28.337392 E 26.951616	A cemetery is depicted on the map. Using Google Earth, an area comprising white features not dissimilar to graves was observed a short distance away, and was used to mark the cemetery position.
Cemetery 9	Google Earth	S 28.321065 E 26.905847	A cemetery is shown on the map. With Google Earth, a rectangular enclosure was seen a short distance away and was used as the cemetery position.
Cemetery 10	Map only	S 28.262461 E 26.939941	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.

### 7.1.3 First Edition of the 2826BB Topographical Sheet

In this section the First Edition of the 2826BB Topographical Sheet will be discussed. This map sheet was based on aerial photography carried out in 1944, was surveyed in 1958 and drawn in the Trigonometrical Survey Office in 1960. The cemeteries depicted within the study area on this map sheet are listed in the table below.

*Table 5- List of Cemeteries depicted on the First Edition of the 2826BB Topographical sheet*

CEMETERY NUMBER	CONFIRMATION	COORDINATES	COMMENTS
Cemetery 11	Map only	S 28.244285 E 26.974479	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.

### 7.1.4 First Edition of the 2827AA Topographical Sheet

In this section the First Edition of the 2827AA Topographical Sheet will be discussed. This map sheet was based on aerial photography carried out in 1951, was surveyed in 1961 and drawn in the Trigonometrical Survey Office in 1962. The cemeteries depicted within the study area on this map sheet are listed in the table below.

*Table 6- List of Cemeteries depicted on the First Edition of the 2827AA Topographical sheet*

CEMETERY NUMBER	CONFIRMATION	COORDINATES	COMMENTS
Cemetery 12	Map only	S 28.211717 E 27.029811	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.
Cemetery 13	Google Earth	S 28.084986 E 27.083035	A cemetery is depicted on the map. Using Google Earth, a small rectangular enclosure was observed a short distance away. This point was used to mark the position of the cemetery.
Cemetery 14	Map only	S 28.065198 E 27.155017	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.

### 7.1.5 First Edition of the 2727CD Topographical Sheet

In this section the First Edition of the 2727CD Topographical Sheet will be discussed. This map sheet was based on aerial photography carried out in 1951, was surveyed in 1960 and drawn in the Trigonometrical Survey Office in 1962. The cemeteries depicted within the study area on this map sheet are listed in the table below.

*Table 7- List of Cemeteries depicted on the First Edition of the 2727CD Topographical sheet*

CEMETERY NUMBER	CONFIRMATION	COORDINATES	COMMENTS
Cemetery 15	Map only	S 27.890769 E 27.261707	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.
Cemetery 16	Google Earth	S 27.889138 E 27.328678	A cemetery is depicted on the map. Using Google Earth, an extensive rectangular enclosure was observed a short distance away. This enclosure was used to mark the position of the cemetery.
Cemetery 17	Google Earth	S 27.818223 E 27.306349	A cemetery is depicted on the map. Using Google Earth, a rectangular enclosure was observed a short distance away. This enclosure was used to mark the position of the cemetery.
Cemetery 18	Google Earth	S 27.772312 E 27.279822	A cemetery is depicted on the map. Using Google Earth, a faint rectangular enclosure was observed a short distance away. This enclosure was used to mark the position of the cemetery.

#### 7.1.6 First Edition of the 2727CB Topographical Sheet

In this section the First Edition of the 2727CB Topographical Sheet will be discussed. This map sheet was based on aerial photography carried out in 1951, was surveyed in 1959 and drawn in the Trigonometrical Survey Office in 1960. The cemeteries depicted within the study area on this map sheet are listed in the table below.

*Table 8- List of Cemeteries depicted on the First Edition of the 2727CB Topographical sheet*

CEMETERY NUMBER	CONFIRMATION	COORDINATES	COMMENTS
Cemetery 19	Google Earth	S 27.723531 E 27.291722	A cemetery is depicted on the map. Using Google Earth, a rectangular enclosure was observed a short distance away. This enclosure was used to mark the position of the cemetery.
Cemetery 20	Google Earth	S 27.723949 E 27.255639	A cemetery is depicted on the map. Using Google Earth, an extensive rectangular enclosure was observed a short distance away. This enclosure was used to mark the position of the cemetery.

#### 7.1.7 First Edition of the 2727CA Topographical Sheet

In this section the First Edition of the 2727CA Topographical Sheet will be discussed. This map sheet was based on aerial photography carried out in 1951, was surveyed in 1954 and drawn in the Trigonometrical Survey Office in 1957. No cemeteries are depicted within the study area on this particular map sheet.

### 7.1.8 First Edition of the 2727CC Topographical Sheet

In this section the First Edition of the 2727CC Topographical Sheet will be discussed. This map sheet was based on aerial photography carried out in 1951, was surveyed in 1958 and drawn in the Trigonometrical Survey Office in 1960. The cemeteries depicted within the study area on this map sheet are listed in the table below.

*Table 9- List of Cemeteries depicted on the First Edition of the 2727CC Topographical sheet*

CEMETERY NUMBER	CONFIRMATION	COORDINATES	COMMENTS
Cemetery 21	Map only	S 27.793399 E 27.038498	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.
Cemetery 22	Google Earth	S 27.816314 E 27.237130	A cemetery is depicted on the map. Using Google Earth, a rectangular enclosure was observed a short distance away. This enclosure was used to mark the position of the cemetery.
Cemetery 23	Map only	S 27.809542 E 27.198408	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.
Cemetery 24	Google Earth	S 27.818211 E 27.029841	A cemetery is depicted on the map. Using Google Earth, a rectangular enclosure was observed a short distance away. This enclosure was used to mark the position of the cemetery.
Cemetery 25	Google Earth	S 27.825166 E 27.072281	A cemetery is depicted on the map. Using Google Earth, a rectangular enclosure was observed a short distance away. This enclosure was used to mark the position of the cemetery.
Cemetery 26	Map only	S 27.858792 E 27.227729	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.
Cemetery 27	Map only	S 27.840030 E 27.200960	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.
Cemetery 28	Google Earth	S 27.862200 E 27.093681	A cemetery is depicted on the map. Using Google Earth, an extensive rectangular uncultivated portion of land located within an agricultural field was observed a short distance away. This portion of land was used to mark the position of the cemetery.
Cemetery 29	Google Earth	S 27.910562 E 27.160859	A cemetery is depicted on the map. Using Google Earth, an extensive rectangular uncultivated portion of land located within an agricultural field was

			observed a short distance away. This portion of land was used to mark the position of the cemetery.
Cemetery 30	Google Earth	S 27.936284 E 27.234467	A cemetery is depicted on the map. Using Google Earth, a rectangular enclosure was observed a short distance away. This enclosure was used to mark the position of the cemetery.
Cemetery 31	Map only	S 27.994873 E 27.221297	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.

#### 7.1.9 First Edition of the 2726DD Topographical Sheet

In this section the First Edition of the 2726DD Topographical Sheet will be discussed. This map sheet was surveyed in 1945 by the 45 Survey Company of the Union Defence Force and was drawn by the Trigonometrical Survey Office in 1946. As can be seen below, only one cemetery is depicted on this map sheet within the study area.

*Table 10- List of Cemeteries depicted on the First Edition of the 2726DD Topographical sheet*

CEMETERY NUMBER	CONFIRMATION	COORDINATES	COMMENTS
Cemetery 32	Map only	S 27.814464 E 26.841433	A cemetery is depicted on the map. No clear indications for a cemetery could be found on Google Earth, and as a result the map depiction was used.

#### 7.1.10 First Edition of the 2726DB Topographical Sheet

In this section the First Edition of the 2726DB Topographical Sheet will be discussed. This map sheet was surveyed in 1946, drawn by the Trigonometrical Survey Office in 1947 and revised in 1948.

No cemeteries are depicted within the study area on this particular map sheet.



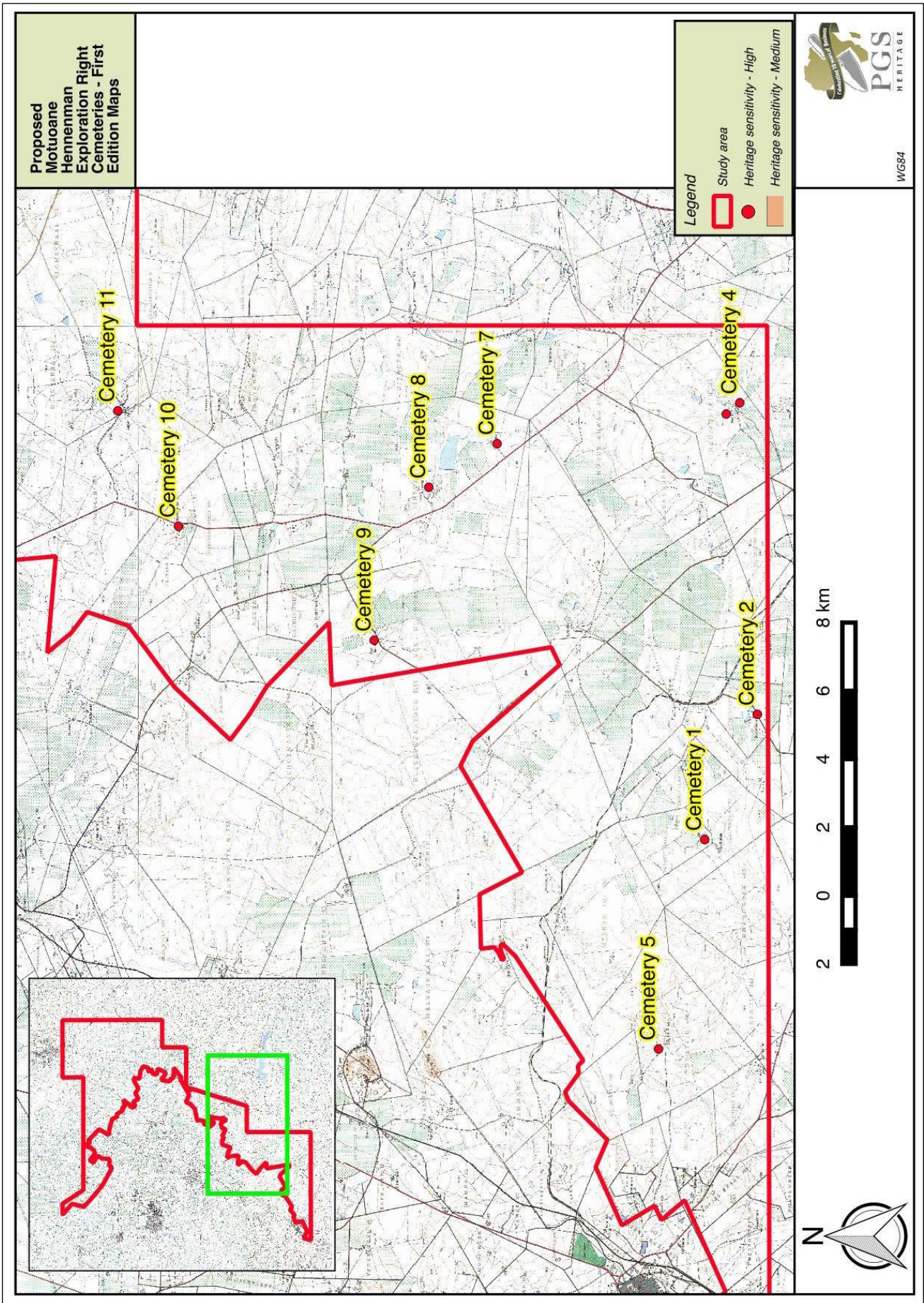


Figure 24 – Map depicting the cemeteries identified within the study area by using the First Edition Topographic Maps. The southern section of the study area is shown.



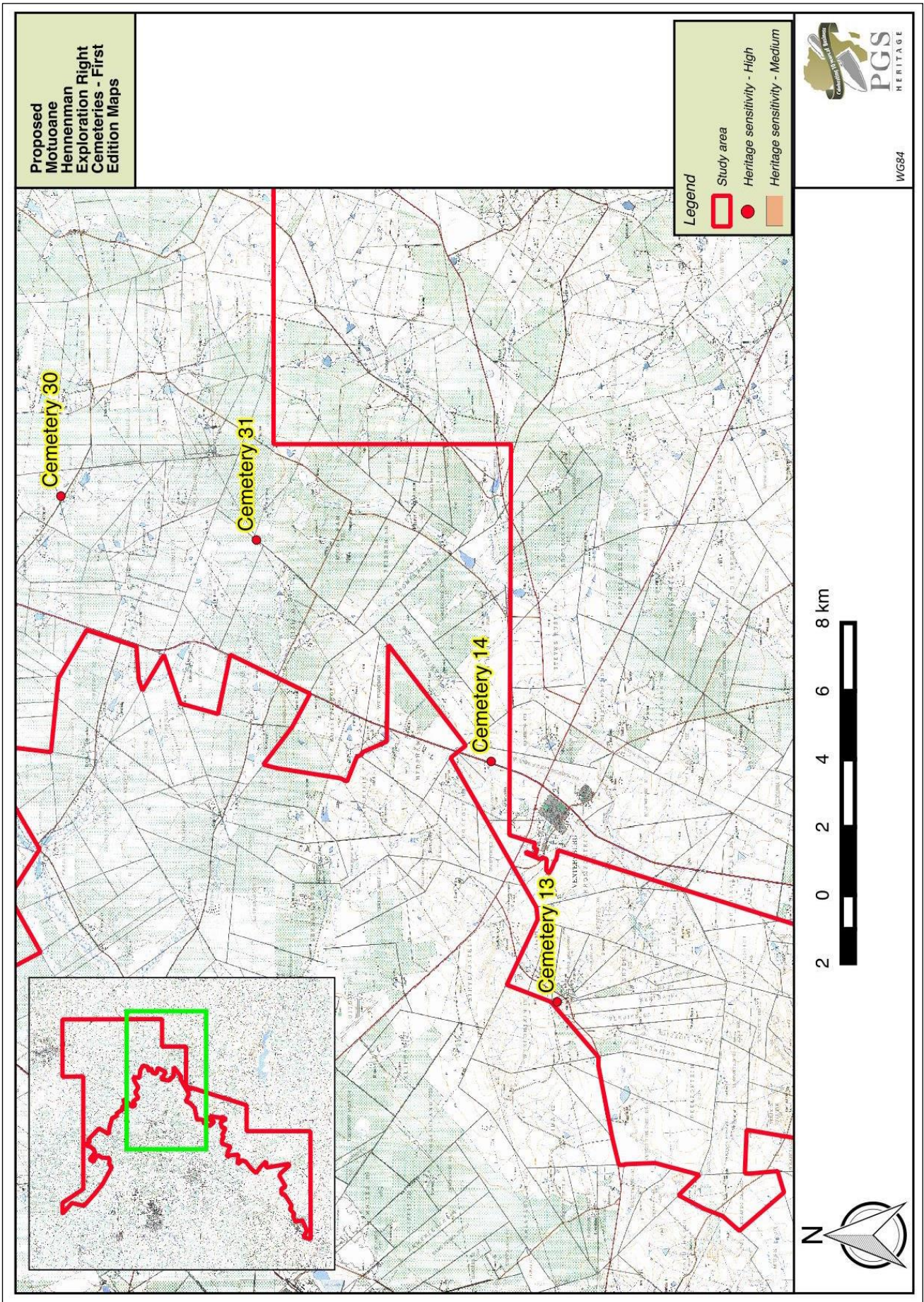


Figure 25 – Map depicting the cemeteries identified within the study area by using the First Edition Topographic Maps. The central section of the study area is shown.



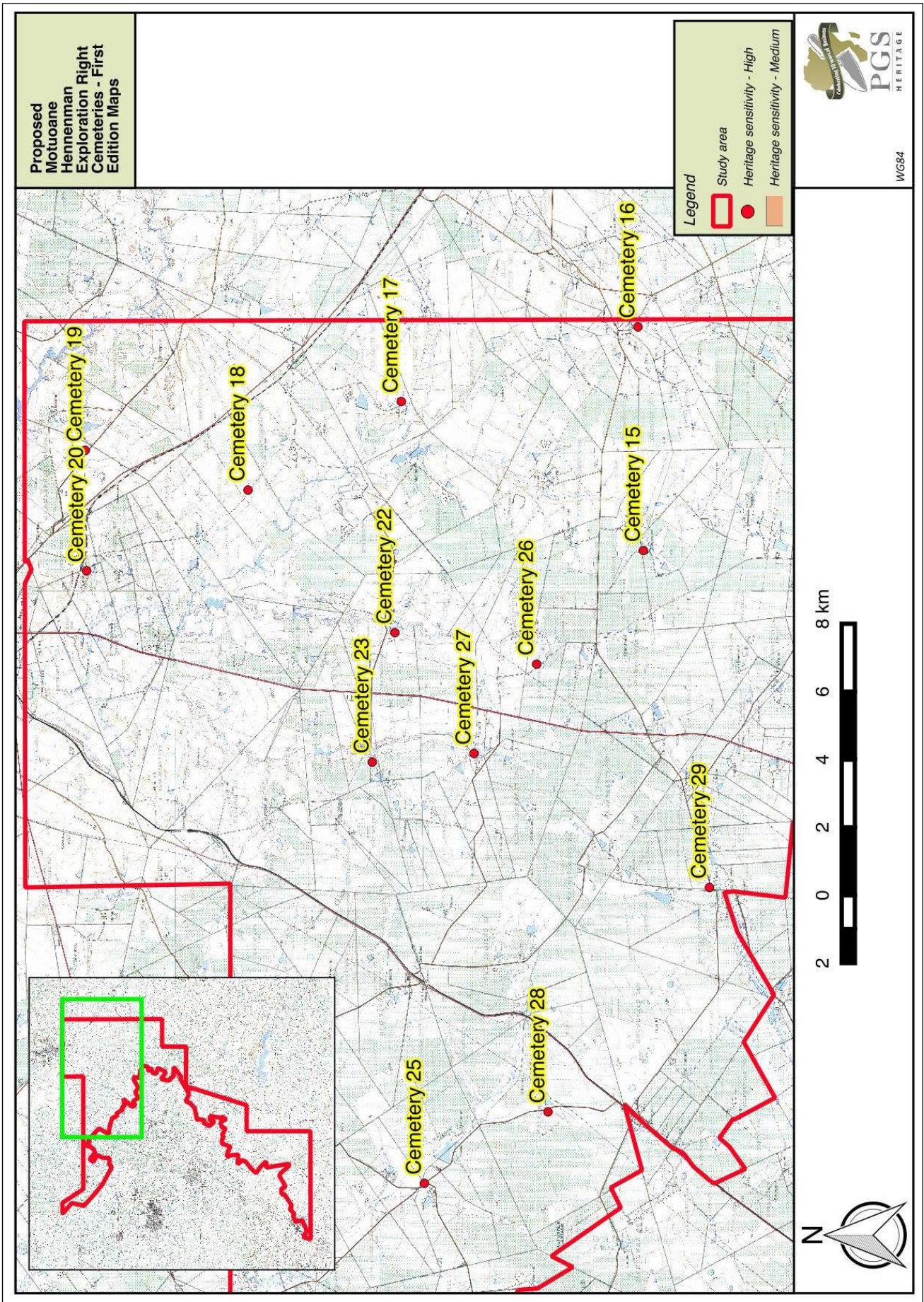


Figure 26 – Map depicting the cemeteries identified within the study area by using the First Edition Topographic Maps. The north-eastern section of the study area is shown.



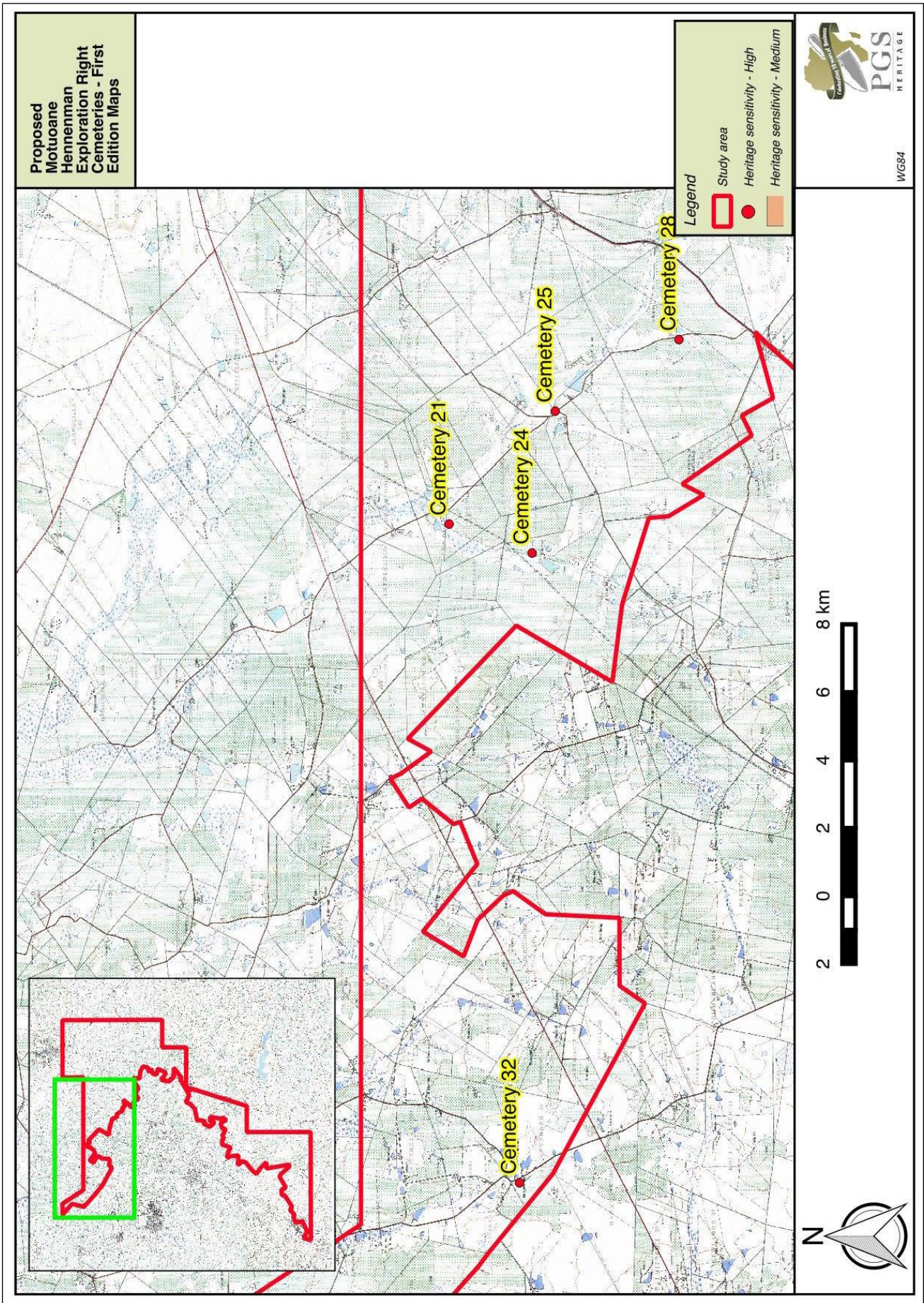


Figure 27 – Map depicting the cemeteries identified within the study area by using the First Edition Topographic Maps. The north-western section of the study area is shown.



## 7.2 Examination of Google Earth Satellite Imagery

An aerial scan was carried out of the study area as depicted on Google Earth satellite images to compare and verify the presence of potential heritage sites. Due to the massive extent of the study area, coupled with temporal constraints, the emphasis in this examination was placed on archaeological sites in the form of stonewalled settlements as well as visible cemeteries. It is worth noting that a large number of farmsteads and associated structures were observed within the study area on Google Earth, many of which appears to be quite old.

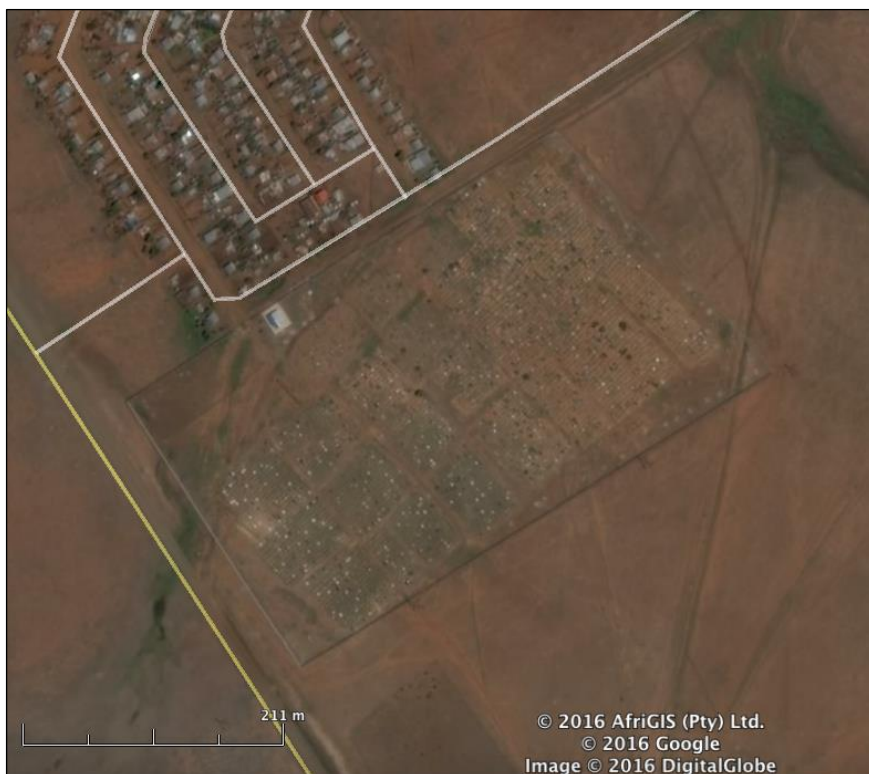
The discussion that follows will be split according to the type of heritage resources that were identified using Google Earth, and starts with Late Iron Age stonewalled settlements followed by cemeteries.

### 7.2.1 Cemeteries identified within the Study Area

One cemetery was identified using Google Earth.

*Table 11- List of cemeteries identified using Google Earth*

FEATURE NUMBER	FEATURE	COORDINATES	COMMENTS
Google Earth Site 1	Cemetery	S 28.429115 E 26.693726	An extensive cemetery associated with Masilo is located here.



*Figure 28 – Example of one of the cemeteries located within the study area. The site depicted here is included in this report as Google Earth Site 1.*



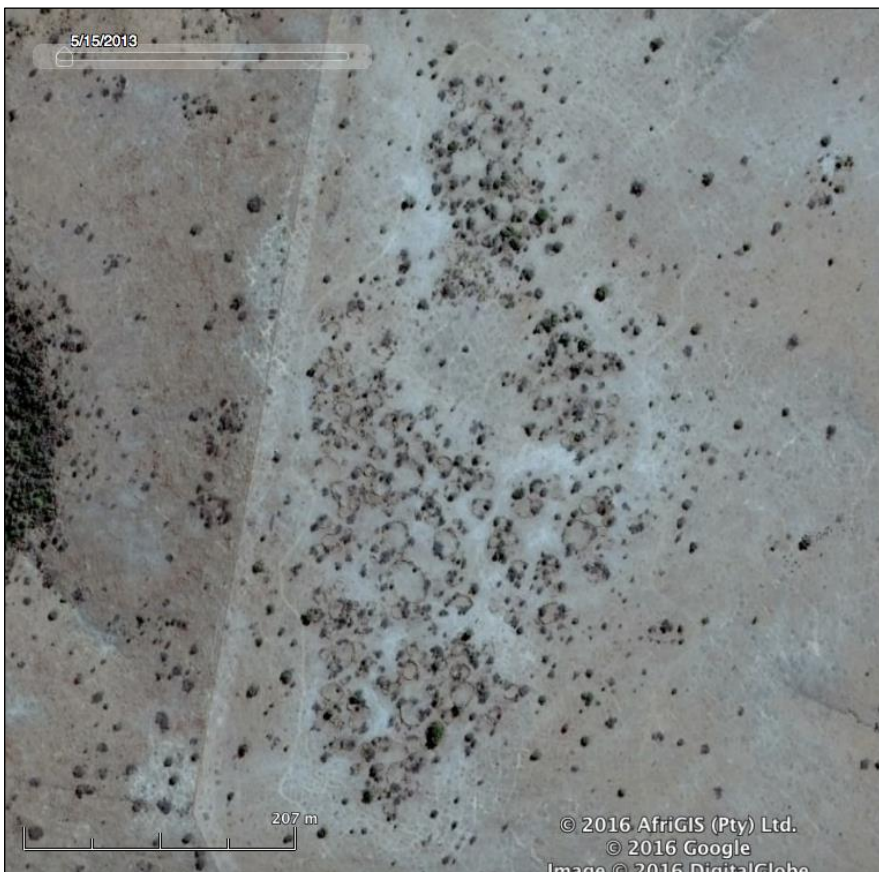
## 7.2.2 Late Iron Age Stonewalled Settlements identified within the Study Area

A total of 15 Late Iron Age stonewalled settlements were identified using Google Earth.

*Table 12- List of archaeological sites identified using Google Earth*

FEATURE NUMBER	FEATURE	COORDINATES	COMMENTS
Google Earth Site 2	LIA	S 28.247958 E 27.053556	An extensive Late Iron Age stonewalled settlement is located here, which corresponds with the Type Z sites of Maggs (1976).
Google Earth Site 3	LIA	S 28.248556 E 27.074689	A Late Iron Age stonewalled settlement is located here, which corresponds with the Type Z sites of Maggs (1976).
Google Earth Site 4	LIA	S 28.244119 E 27.065459	A Late Iron Age stonewalled settlement is located here, which corresponds with the Type Z sites of Maggs (1976).
Google Earth Site 5	LIA	S 28.243608 E 27.078184	A Late Iron Age stonewalled settlement is located here. While the layout is not clear, it is possible that it corresponds with the Type V sites of Maggs (1976). The so-called “Early Sotho Settlement, Waterval, Sandrivierhoogte” that was originally declared a National Monument and which is now registered as a Provincial Heritage Site, is located a short distance from this site, just outside of the study area boundaries.
Google Earth Site 6	LIA	S 28.191122 E 27.061624	An extensive Late Iron Age stonewalled settlement is located here. The layout of the site corresponds with the Type Z sites and is depicted on a site distribution map published on page 231 of Maggs (1976).
Google Earth Site 7	LIA	S 28.155719 E 27.073419	A Late Iron Age stonewalled settlement is located here. The layout of the site corresponds with the Type Z sites and is depicted on a site distribution map published on page 231 of Maggs (1976).
Google Earth Site 8	LIA	S 28.149437 E 27.068682	A Late Iron Age stonewalled settlement is located here. The layout of the site corresponds with the Type Z sites and is depicted on a site distribution map published on page 231 of Maggs (1976).
Google Earth Site 9	LIA	S 28.148327 E 27.061237	A Late Iron Age stonewalled settlement is located here. The layout of the site corresponds with the Type Z sites and is depicted on a site distribution map published on page 231 of Maggs (1976).
Google Earth Site 10	LIA	S 28.148654 E 27.059013	A Late Iron Age stonewalled settlement is located here. The layout of the site corresponds with the Type Z sites and is depicted on a site distribution map published on page 231 of Maggs (1976).

Google Earth Site 11	LIA	S 28.139984 E 27.054751	A Late Iron Age stonewalled settlement is located here. The layout of the site corresponds with the Type Z sites and is depicted on a site distribution map published on page 231 of Maggs (1976).
Google Earth Site 12	LIA	S 28.140416 E 27.070833	A Late Iron Age stonewalled settlement is located here. The site is depicted on a site distribution map published on page 231 of Maggs (1976), and on this plan is classified as "Other Iron Age Sites".
Google Earth Site 13	LIA	S 28.130992 E 27.084245	A Late Iron Age stonewalled settlement is located here. The site is depicted on a site distribution map published on page 231 of Maggs (1976), and on this plan is classified as "Other Iron Age Sites".
Google Earth Site 14	LIA	S 28.127783 E 27.077819	A Late Iron Age stonewalled settlement is located here. The layout of the site corresponds with the Type Z sites and is depicted on a site distribution map published on page 231 of Maggs (1976).
Google Earth Site 15	LIA	S 28.104588 E 27.049976	A Late Iron Age stonewalled settlement is located here, which corresponds with the Type Z sites of Maggs (1976).
Google Earth Site 16	LIA	S 28.106003 E 27.091616	A Late Iron Age stonewalled settlement is located here. The layout of the site corresponds with the Type Z sites and is depicted on a site distribution map published on page 231 of Maggs (1976).



*Figure 29 –Example of one of the Late Iron Age stonewalled settlements located within the study area. The site depicted here is included in this report as Google Earth Site 2.*



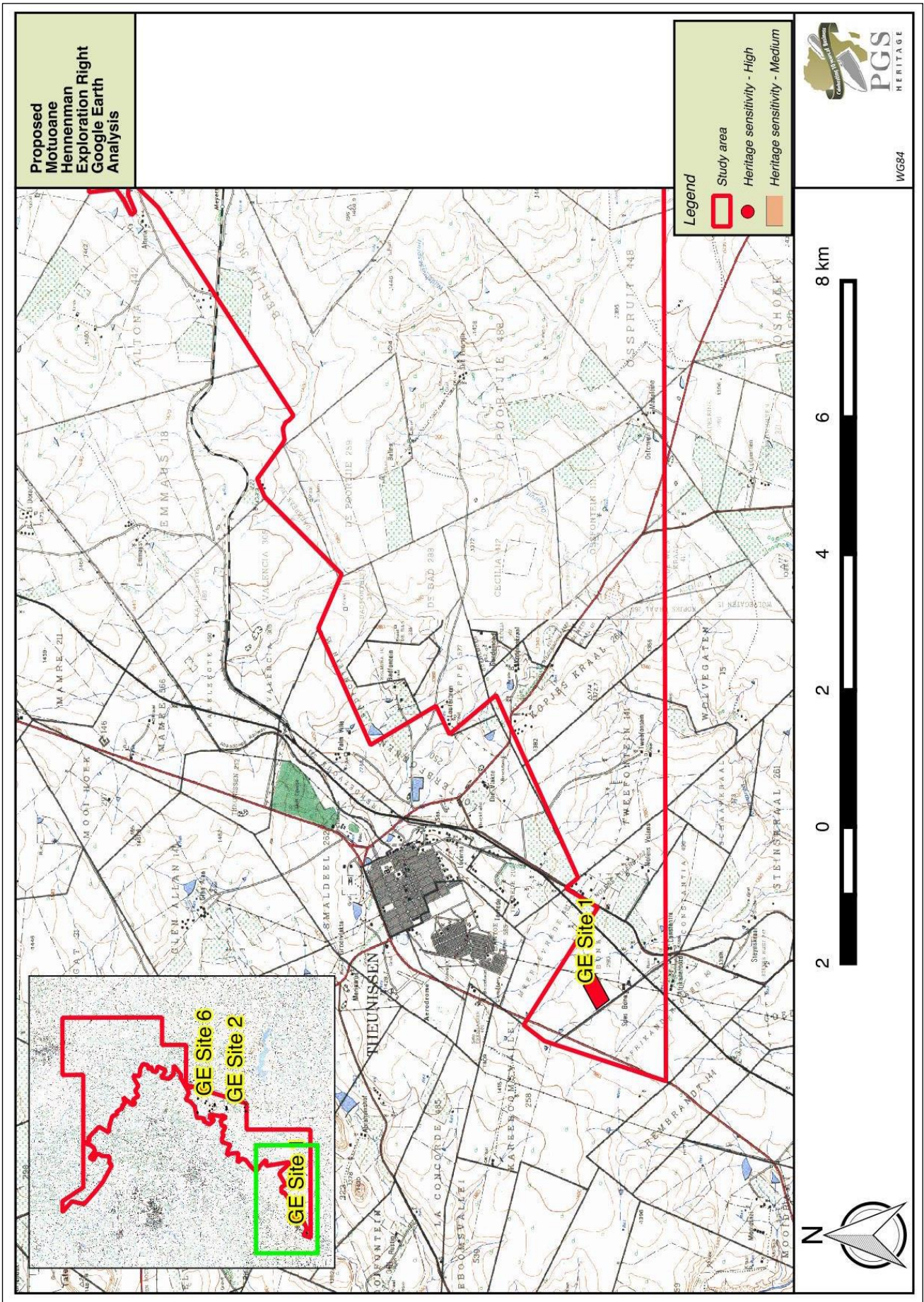


Figure 30 – Map depicting the sites identified through Google Earth analysis. The south-western end of the study area is shown.





### 7.3 Previous Archaeological and Heritage Research undertaken within the Study Area

#### 7.3.1 Previous Archaeological and Heritage Contract Studies listed in SAHRIS

##### 7.3.1.1 *Previous Studies from within the Study Area*

As far as could be established, the South African Heritage Resources Information System (SAHRIS) lists seven previous studies from within the present study area. Of these, the following five could be accessed online.

- **Dreyer, C. 2004. Archaeological and Historical Investigation of the Proposed Developments at Ventersburg, Free State. Prepared for Cebo Environmental Consultants.**
- **Dreyer, C. 2005. Historical Investigation of the Existing Outbuildings at the farm Smaldeel 202, Kroonstad, Free State. Prepared for Cebo Environmental Consultants.**
- **Rossouw, L. 2012. Phase 1 Heritage Impact Assessment of a Proposed 10 MW Solar Facility at Grootspruit 252/0 near Allanridge, Odendaalsrus District, Free State. Prepared for H2ON Environmental Consultants.**
- **Rossouw, L. 2013. Phase 1 Heritage Impact Assessment of a Proposed New Cemetery at Theunissen, Free State. Prepared for Spatial Solutions Environmental Consultants.**
- **Van Schalkwyk, J. 2014. Cultural Heritage Impact Assessment of the Proposed Development of Photovoltaic Power Plants on Seven Different Locations in North West and Free State Provinces. Prepared for Subsolar.**

No archaeological or heritage sites were identified during the studies of Dreyer (2004), Rossouw (2012 & 2013) and Van Schalkwyk (2014). The report of Dreyer (2005) identifies one historic building that was erected between 1949 and 1952.

*Table 13- List of heritage sites identified within the study area during previous archaeological and heritage studies.*

FEATURE NUMBER	FEATURE TYPE	COORDINATES	COMMENTS
SAHRIS Site 1	Building	S 27.895103 E 27.208692	Brick-built barn located on the farm Smaldeel.



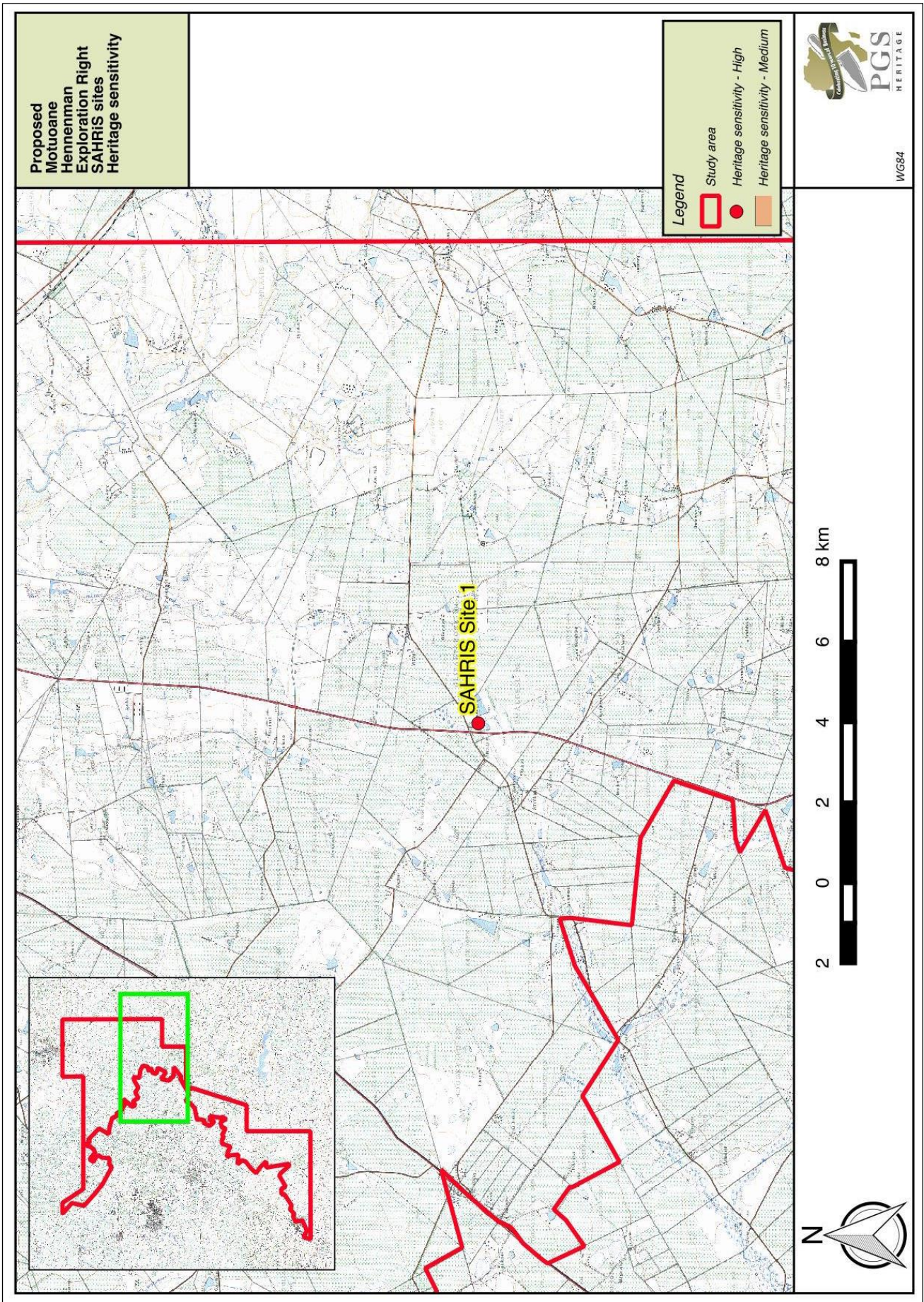


Figure 32 – Map depicting the sites identified by making an assessment of previous heritage and archaeological reports on SAHRIS.



## 8. DESCRIPTION OF POTENTIAL IMPACTS

### 8.1 Potential Fatal Flaws

Fatal flaws would constitute environmental characteristics, which cannot or may not interact with the proposed development. From a heritage point of view, fatal flaws can be seen as a heritage resource/s present on the site that will halt the project and that cannot be mitigated due to site constraints such as limited space to implement buffer or no-go zones. In most case the implementation of buffer zones and extensive conservation management plans can change possible fatal flaws as noted in **Table 27**.

*Table 14—Examples of heritage resources are provided below that could constitute a fatal flaw on a development site where buffer zones and exclusion zones are impossible to implement*

Heritage Resource	Example
<b>Rock Art</b>	Rock art, in the form of paintings or engravings situated within a development area are seen as immovable resources and can only be moved under exceptional circumstances.
<b>National or Provincial Heritage Sites</b>	Site specific monuments like battles or major sites or structures with considerable significance.
<b>Sacred Sites</b>	Immovable sites associated with religion or cultural groupings, such as sacred pools, historic initiation school sites, etc.
<b>Archaeological sites of National Significance</b>	Sites such as Mapungubwe Hill or an archaeological landscape such as the Limpopo Valley or The Cradle of Humankind.
<b>Cultural Landscapes of significance</b>	Landscapes such as valleys and vistas held as being of national or international importance.

### 8.2 Identified Non-Fatal Flaws

- i. During the archival and historical desktop study, evidence was found that a significant component of the Battle of Zand River (7 – 10 May 1900) occurred within the study area. The Junction Drift, located either within the study area or very close to its boundary, was used by the forces of General Ian Hamilton to cross over the Zand River. The Boer forces under General Louis Botha occupied a low ridge north of the river stretching from Doornkop in the west to Baskop in the east. The central and eastern sections of this ridge were attacked by the British infantry, and the Boer positions were eventually overrun. These significant aspects of the Battle of Zand River occurred within the present study area.
- ii. After the defeat of the Boer forces along the Zand River, they entrenched themselves on both sides of the railway line on a ridge known as Boschrand. While no battle took place here, some historic references indicate that the Boer position included trenches. One historic reference also suggests that an artillery duel took place between the Boer position at Boschrand and the British forces to the south.

- iii. During the same war, the British military authorities established three black concentrations camps within the study area at the following railway sidings: Holfontein (partially located within the study area), Geneva and Boschrand. The latter two camps comprised two of the three largest black concentration camps built by the British during the war (the third camp being Honing Spruit) and the combined population of these three largest camps were 7 000 people.
- iv. The historical and archaeological background study has revealed that both Stone Age and Late Iron Age sites are known from within the study area. One Stone Age site had previously been identified on the farm Le Roux, whereas the extensive research project of Tim Maggs (1976) had revealed the existence of a number of so-called Type Z and Type V stonewalled settlements from within the study area. During the Google Earth scan, a total of 15 such Late Iron Age stonewalled sites were identified and their positions recorded.
- v. With the use of historical topographic sheets, a total of 32 cemeteries were identified within the study area. The positions of these cemeteries were recorded and included in this report. At the same time, the existence of a large number historic structures and buildings (farmhouses, agricultural buildings such as sheds and barns as well as farm worker accommodation) were revealed. However, due to the massive extent of the study area, their individual positions could not be recorded. However, the significance of these built structures can only be assessed at the ground verification stage. It is also important to note that the presence of historical structures is often associated with individual graves or cemeteries. The possible presence of graves can only be verified at the ground verification stage. Furthermore, and as indicated elsewhere, experience has shown that according to African tradition, graves of small children were traditionally buried in close proximity to the houses of their parents. This feature should be addressed as part of the project social consultation process.

### **8.3 Identification of Areas for Further Specific Fieldwork**

As noted previously, a large number of cemeteries have been identified from historic map analysis. Further potential sites were also identified during the archival research undertaken for the study. Lastly, an examination of the Google Earth imagery has identified a number of areas with the potential for heritage sites. The structures and sites will be evaluated during the field verification stage and incorporated into the HIR. This said, it is also important to note that the entire study area as defined during the impact assessment phase will have to be covered by detailed fieldwork.

### **8.4 Identification of Areas of Heritage Sensitivity**

All the relevant sources of heritage information used in this study was summarised in a heritage sensitivity map. This map provides a zoned depiction of the study area wherein areas of varying heritage sensitivity are indicated. This map will be used in conjunction with the other sensitivity maps produced by the specialists to assess the feasibility of the proposed development and to allow the planning of the layout of the proposed development in such a way that the least possible impact is generated.



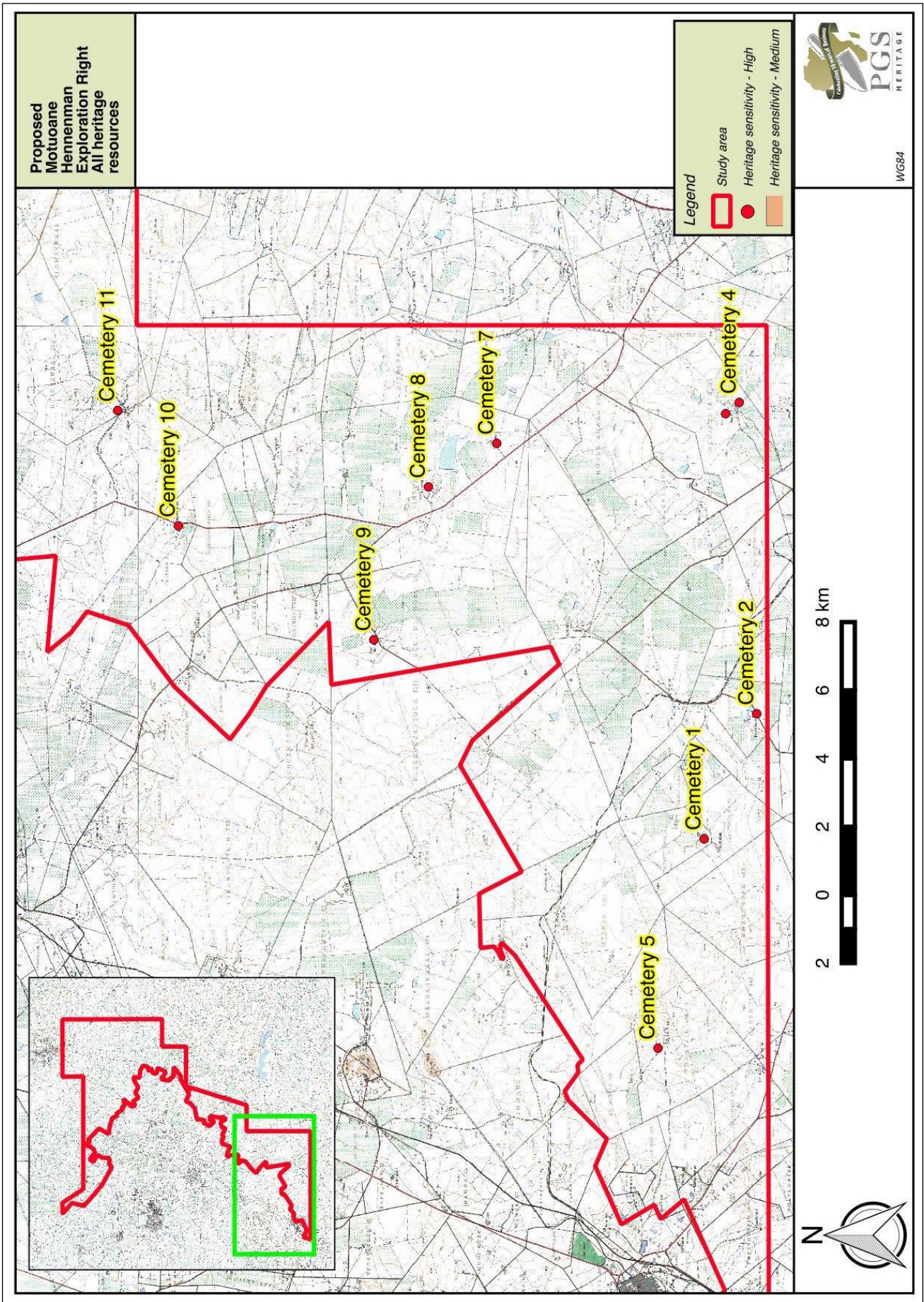


Figure 33 – Map depicting the combined heritage sensitivities for the southern end of the study area.



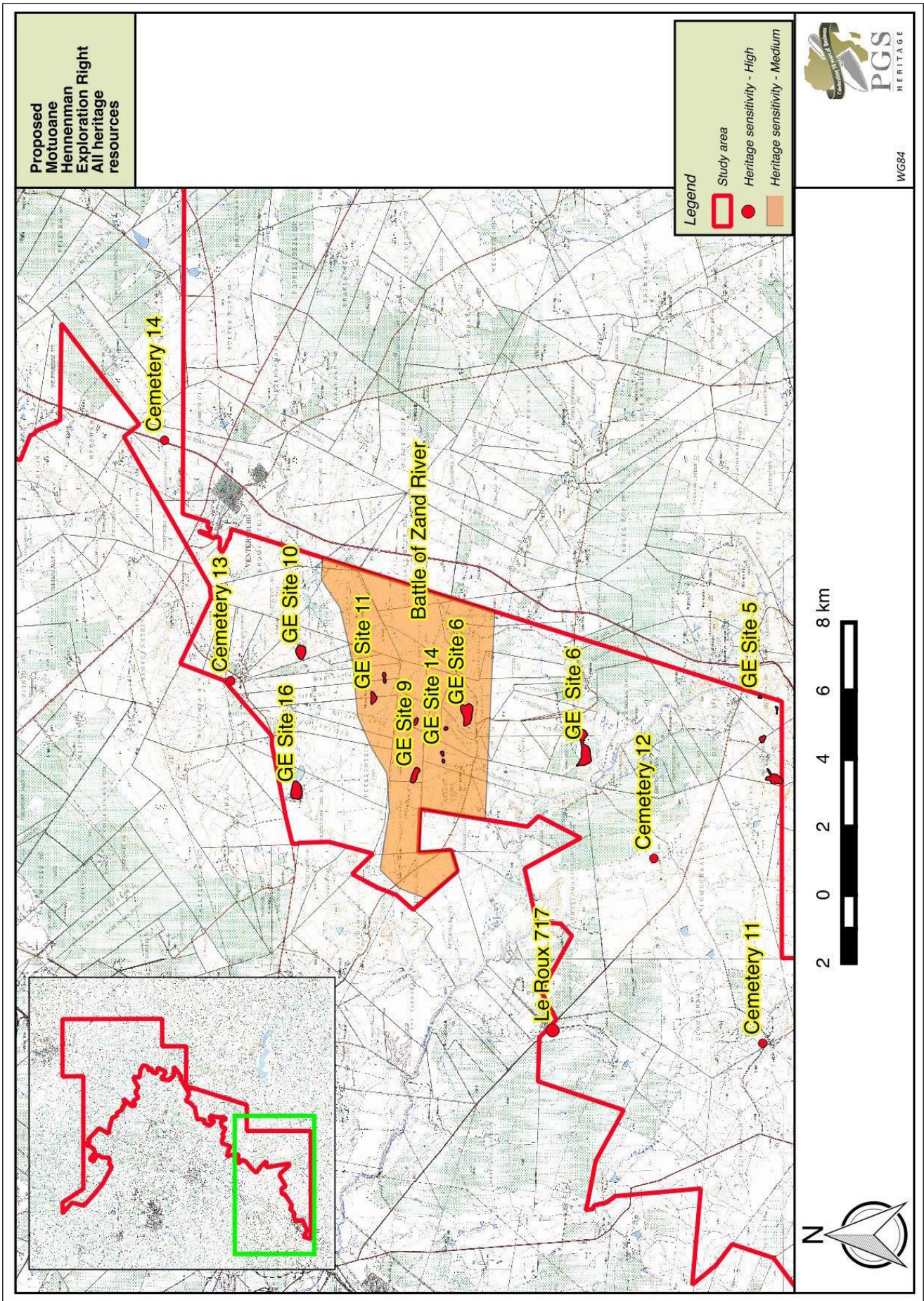


Figure 34 – Map depicting the combined heritage sensitivities for the central component of the study area.



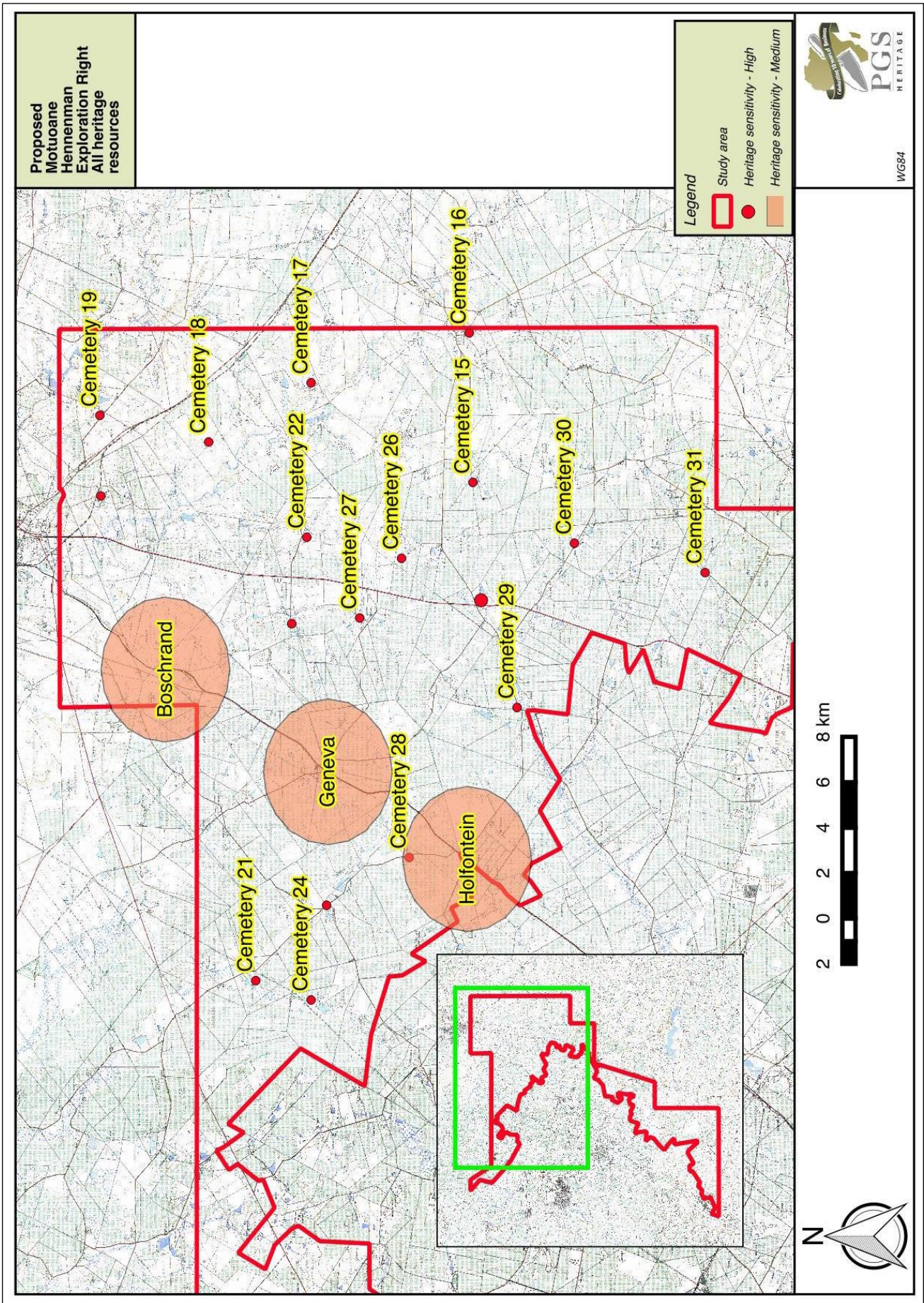


Figure 35 – Map depicting the combined heritage sensitivities for the north-eastern component of the study area.



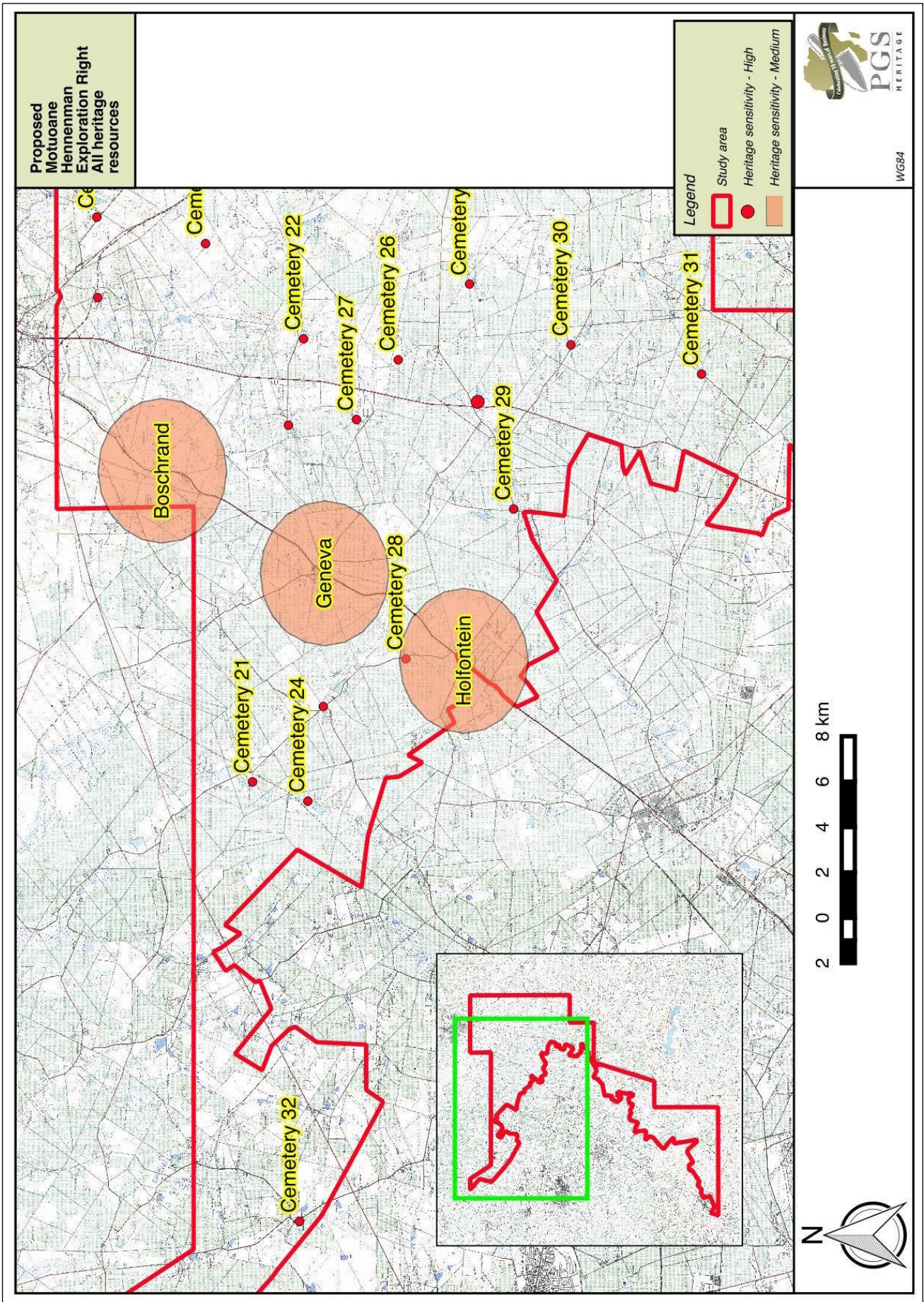


Figure 36 – Map depicting the combined heritage sensitivities for the north-western component of the study area.



## 9. DETAILED PLAN OF STUDY FOR THE EIA AND EMP

The following will be required to develop a final HIA to manage the heritage resources within the proposed mining area.

### 9.1 Methodology

#### 9.1.1 Physical Surveying

The fieldwork component will consist of a detailed walk through of the proposed exploration footprint areas and is aimed at locating heritage resources falling within the proposed footprint areas. The locations of all heritage resources that are recorded during the survey will be documented using a hand-held GPS. Furthermore, the documentation will reflect a brief qualitative description and statement of significance for each site and include a photographic record of all the sites.

It is important to also note that informal social consultation (i.e. with local community members, residents and knowledgeable individuals) may be undertaken during the fieldwork component. The aim of social consultation is to identify any tangible and intangible resources (i.e. sacred places, myths and indigenous knowledge resources) that may exist.

#### 9.1.2 Deliverables

A report will be written which would include the following components:

- The identification and mapping of all heritage resources in the affected area;
- An assessment of the significance of such resources in terms of the heritage assessment criteria;
- An assessment of the impact of the development of such heritage resources;
- If heritage resources will be adversely affected by the proposed development, consideration of the alternatives;
- Proposed mitigation of any adverse effects during and after the completion of the proposed development.

## 10. POTENTIAL IMPACTS AND FURTHER WORK FOR EIA PHASE

The desktop evaluation of the study area and surrounds has shown that the possibility exists of finding various heritage resources in the proposed study area, including Stone Age sites, Late Iron Age stonewalled settlements, historical structures, graves and cemeteries as well as battlefields.

Once the final study area has been defined, this will have to be assessed by way of detailed walkthroughs during the HIA phase of the project. This will allow for an assessment of the actual impact of the proposed development on any heritage sites located there i.e. a footprint area specific heritage impact assessment.

Table 15- Potential Impacts to Consider for the Heritage Impact Assessment Phase

	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF SECTIONS OF THE BATTLE OF ZAND RIVER</b>	<b>CONSTRUCTION</b>
<b>DISCUSSION</b>	The archival and historical desktop study has revealed that during the Battle of Zand River (7 May -10 May 1902) events such as the crossing of the Junction Drift over the drift by British forces under General Ian Hamilton and especially the subsequent battle for the Boer position on a low ridge north and north-east of the drift, occurred almost entirely within the present study area.	
<b>EXISTING IMPACT</b>	None known.	
<b>PREDICTED IMPACT</b>	Battlefields are protected by the NHRA, and under certain circumstances the core components of a particular battle site can be defined as a cultural landscape worth protecting. The area within which this component of the battle took place was included in the sensitivity mapping. This area should ideally be excluded from any future work. However, should any footprints be located within or near this area, archaeological fieldwork and further archival and historical research coupled with the compilation of an heritage impact assessment should represent sufficient identification of any remaining tangible heritage aspects.	Destruction or damage during exploration activities.
<b>EIA INVESTIGATION REQUIRED</b>	The area included in the sensitivity map should ideally be avoided during the placement of development footprints. If this proves impossible, archaeological and heritage field surveys of the footprint areas must be undertaken once these have been established. This should be augmented by further archival desktop study work on the battle whenever development footprints closer than 1 000 m to the recorded sensitive area are proposed. Should tangible or intangible sites or features be identified that will be impacted upon by the proposed development, suitable mitigation measures will have to be outlined.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction no-go areas (if required) need to be demarcated. Alternatively, mitigation

		measures such as the archaeological excavation and mitigation of identified tangible components of the battle must be planned and scheduled to fit within the timing of the project phases.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF THE BOER POSITION AT BOSCHRAND</b>	<b>CONSTRUCTION</b>
<b>DISCUSSION</b>	<p>The archival and historical desktop study has revealed that after the defeat of the Boer forces at Zand River, a strong entrenched Boer position was established on a ridge known as Boschrand on both sides of the railway line leading northward to Kroonstad. While no battle took place here, some historic sources indicate that an artillery duel ensued between Boer artillery at Boschrand and the British artillery to the south.</p> <p>While a ridge known as Boschrand was identified on a topographical map sheet, this ridge runs parallel to the railway line and not across it. Similarly, the position of the railway siding named Boschrand is also known, however the exact location of the Boer position at Boschrand could not be confirmed.</p>	
<b>EXISTING IMPACT</b>	None known.	
<b>PREDICTED IMPACT</b>	Unidentified archaeological sites can seriously hamper construction and development activities and timelines. Destruction or damage of such sites requires a permit from the responsible heritage authority (NHRA, section 35). Fieldwork can provide valuable information on such sites in the study area and provide timeous management of such sites through various mitigation measures, including the realignment of the construction activities, if necessary.	Destruction or damage during exploration activities.
<b>EIA INVESTIGATION REQUIRED</b>	Archaeological and heritage field survey of the footprint areas, once these have been established. This should be augmented by further archival desktop study work on the exact location of the Boer position at Boschrand. Should archaeological sites be identified, suitable mitigation measures will have to be outlined.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction no-go areas (if required) need to be



		demarcated. Alternatively, mitigation measures such as the archaeological excavation of sites must be planned and scheduled to fit within the timing of the project phases.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF THREE BLACK CONCENTRATION CAMPS</b>	<b>CONSTRUCTION</b>
<b>DISCUSSION</b>	<p>The archival and historical desktop study has revealed that during the South African War (1899 – 1902), three black concentration camps were established by the British military authorities within the study area. These camps were established at the following railway sidings or stations: Holfontein (partially located within the study area), Geneva and Boschrand. With Honing Spruit (not located within the study area), Geneva and Boschrand represented the three largest black concentration camps established during the entire war and combined housed as many as 7 000 people.</p> <p>Apart for their association with the existing railway sidings and stations from within the study area named Holfontein, Geneva and Boschrand, the exact localities of these three camps are not presently known. The available historic information on black concentrations camps suggest that they were always built in proximity to the existing railway lines, whereas one source indicated that these camps were never located more than two miles from the nearest British military positions. Assuming that each of these three sidings or stations would have had military positions in the form of blockhouses, a circular area with a radius of two miles were demarcated around each railway siding or station on the sensitivity maps. These sensitive areas should ideally be avoided.</p>	
<b>EXISTING IMPACT</b>	None known, however the landscapes surroundings these railway stations or sidings (especially Holfontein and Geneva) are characterised by extensive agricultural fields.	
<b>PREDICTED IMPACT</b>	Unidentified archaeological sites can seriously hamper construction and development activities and timelines. Destruction or damage of such sites requires a permit from the responsible heritage authority (NHRA, section 35). Fieldwork can provide valuable information on such sites in the study area and provide	Destruction or damage during exploration activities.

	timeous management through various mitigation measures, including the realignment of the construction activities, if necessary.	
<b>EIA INVESTIGATION REQUIRED</b>	The areas included in the sensitivity maps should ideally be avoided during the placement of development footprints. If this proves impossible, archaeological and heritage field surveys of the development footprint areas must be undertaken once these have been established. This should be augmented by further archival desktop study work on these concentration camps whenever development footprints closer than 1 000 m to the recorded sensitive area are proposed. Should archaeological sites be identified, suitable mitigation measures will have to be outlined.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction no-go areas (if required) need to be demarcated. Alternatively, mitigation measures such as the archaeological excavation of sites must be planned and scheduled to fit within the timing of the project phases.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF ARCHAEOLOGICAL SITES</b>	<b>CONSTRUCTION</b>
<b>DISCUSSION</b>	As seen from the desktop studies, the presence of archaeological sites such as Middle Stone Age and Later Stone Age sites is known. Additionally, the archaeological research project of Maggs (1976) and others have shown that Late Iron Age stonewalled settlements in the form so-called Type Z and Type V sites are known to be located within the study area. During the Google Earth scan, a total of 15 such Late Iron Age stonewalled settlements were identified within the study area and their individual positions recorded. The possibility certainly exists for more archaeological sites to be located within the study area, Once the development footprint areas have been confirmed, an archaeological foot survey must be undertaken of these footprint areas to identify any archaeological sites located there. This would assist in developing a comprehensive Heritage Management Plan for the construction activities.	
<b>EXISTING IMPACT</b>	None known.	

<b>PREDICTED IMPACT</b>	Unidentified archaeological sites can seriously hamper construction and development activities and timelines. Destruction or damage of such sites requires a permit from the responsible heritage authority (NHRA, section 35). Fieldwork can provide valuable information on such sites in the study area and provide timeous management of such sites through various mitigation measures, including the realignment of the construction activities, if necessary.	Destruction or damage during exploration activities.
<b>EIA INVESTIGATION REQUIRED</b>	The known archaeological sites as revealed by way of the background study and Google Earth scan should be avoided during the placement of development footprints. The identification of yet undiscovered archaeological sites would be addressed by way of archaeological and heritage field surveys of the footprint areas, once these have been established. Should archaeological sites be identified, suitable mitigation measures will have to be outlined.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction no-go areas (if required) need to be demarcated. Alternatively, mitigation measures such as the archaeological excavation of sites must be planned and scheduled to fit within the timing of the project phases.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF HISTORIC BUILDINGS OR STRUCTURES</b>	<b>CONSTRUCTION, OPERATION</b>
<b>DISCUSSION</b>	The existence of historic buildings and structures within the study area was revealed during the desktop study, when the first edition topographic sheets were found to depict a large number of historic buildings and structures. These depicted structures include farmhouses, farm structures such as sheds and wagon sheds as well as farmworker accommodation. Due to the massive extent of the study area, and the large number of these depicted features, the historic structures and buildings depicted on these maps were not individually recorded nor included in the existing heritage significance maps. The possible presence of even more historic structures appears likely.	
<b>EXISTING IMPACT</b>	None known.	



<b>PREDICTED IMPACT</b>	Damage/destruction of farm buildings and associated structures. Destruction or damage of such sites older than 60 years, would require a permit from the responsible heritage authority.	Destruction or damage during exploration activities.
<b>EIA INVESTIGATION REQUIRED</b>	An archaeological and heritage field survey of any additional footprint areas not yet assessed. Should such sites be identified, suitable mitigation measures will have to be outlined.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction no-go areas (if required) need to be demarcated. Alternatively, mitigation measures such as the archaeological excavation of sites must be planned and scheduled to fit within the timing of the project phases.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF GRAVES AND CEMETERIES</b>	<b>CONSTRUCTION</b>
<b>DISCUSSION</b>	The existence of graves and cemeteries has been confirmed during the desktop study work, with the presence of 32 cemeteries within the study area revealed during an assessment of historic topographic maps. The individual positions of these cemeteries were recorded and were included in the sensitivity maps. The possibility that more cemeteries may be located within the study area is a distinct possibility.	
<b>EXISTING IMPACT</b>	None known.	
<b>PREDICTED IMPACT</b>	<p>Unidentified graves and cemeteries and the discovery of such sites can seriously hamper construction and development timelines. Damage, destruction or removal of such sites requires a permit from various responsible authorities, including the Heritage Authority (NHRA, section 36), Provincial Health Department and the SA Police Service. Such a process can take up to 12 months to finalise.</p> <p>Fieldwork can provide valuable information on the presence of such sites in the study area and provide timeous management of such sites, which may include the realignment of the proposed development activities.</p> <p>In the event that identified graves and cemeteries cannot be avoided, a grave relocation process needs to be initiated, bearing in mind that such a process impacts on the</p>	Destruction or damage during exploration activities.

	spiritual and social fabric of the next of kin and associated communities.	
<b>EIA INVESTIGATION REQUIRED</b>	Avoidance of the identified cemeteries and graves in future proposed exploration footprints (where possible) and an archaeological field survey of any additional footprint areas not yet assessed. Should graves and cemeteries be identified, suitable mitigation measures will have to be outlined.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction no-go areas need to be demarcated. Alternatively, mitigation measures such as the physical relocation of the graves in question (including aspects such as detailed social consultation) needs to be planned and scheduled to fit within the timing of the project phases. It must be understood that such a process may have an impact on the spiritual and social fabric of the next of kin and associated communities.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE OR DESTRUCTION OF UNMARKED GRAVES</b>	<b>CONSTRUCTION</b>
<b>DISCUSSION</b>	From experience on similar sites and the knowledge of cultural customs and traditions, it is known that stillborn babies and deceased infants occasionally were buried within the homesteads of black rural communities. These children were sometimes buried underneath the floors and walls of houses and huts and the burials were not marked, but were known to the immediate family.	
<b>EXISTING IMPACT</b>	None known.	
<b>PREDICTED IMPACT</b>	Unidentified graves and the discovery of such sites can seriously hamper construction and development timelines. Damage, destruction or removal of such sites requires a permit from various responsible authorities, including the Heritage Authority (NHRA, section 36), Provincial Health Department and the SA Police Service. Such a process can take up to 12 months to finalise.  Social consultation with present and former residents of the study area can provide valuable information on the presence of such sites in the study area and provide timeous management of	Destruction or damage during exploration activities.

	<p>such sites, which may include the realignment of the proposed development activities.</p> <p>Archaeological monitoring of the development footprint areas will identify any unmarked human skeletal remains.</p> <p>In the event that such graves cannot be avoided, a grave relocation process needs to be initiated, bearing in mind that such a process impacts on the spiritual and social fabric of the next of kin and associated communities.</p>	
<b>EIA INVESTIGATION REQUIRED</b>	A social consultation process with current and former residents of the study area can assess whether such sites are located within the study area. Archaeological monitoring during construction will also identify any human skeletal remains.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction, social consultation needs to take place to assess whether such sites are located within the footprint areas. Archaeological monitoring during the construction phase will also identify any human remains.
	<b>IMPACT</b>	<b>STAGE OF PROJECT</b>
<b>ISSUE</b>	<b>DISTURBANCE, DAMAGE OR DESTRUCTION OF PALAEOLOGICAL RESOURCES</b>	<b>CONSTRUCTION, OPERATIONAL</b>
<b>DISCUSSION</b>	The palaeontological significance of the study area is not known at the moment. However, during the EIA Phase a palaeontologist will be appointed to undertake a palaeontological desktop study of the footprint areas.	
<b>EXISTING IMPACT</b>	None known.	
<b>PREDICTED IMPACT</b>	Unidentified palaeontological resources and the discovery of such resources can seriously hamper construction and development timelines. Damage, destruction or removal of such sites require a permit from the responsible heritage authority (NHRA, section 35).	Destruction or damage during the construction of the pipelines and other development components.
<b>EIA INVESTIGATION REQUIRED</b>	The mitigation measures recommended in the palaeontological desktop study must be undertaken.	
<b>WHEN IS MITIGATION REQUIRED</b>		During design and before construction, the mitigation measures outlined in the palaeontological desktop study will have to be undertaken.



## 11. CONCLUSIONS AND RECOMMENDATIONS

PGS Heritage was appointed by Environmental Impact Management Services (EIMS) to undertake a Heritage Scoping Report for the proposed Motuoane Hennenman Exploration Right. The study area is located between Kroonstad and Winburg within the Matjhabeng, Masilonyana and Moqhaka Local Municipalities of the Fezile Dabi and Lejweleputswa District Municipalities and is situated within the Free State Province.

The purpose of the Heritage Scoping report is to identify at a desktop level what the probability is of heritage resources being identified in the study area. This is important because heritage resources are protected in terms of the National Heritage Resources Act, No 25 of 1999, (NHRA) from *inter alia*, destruction or damage, excavation or removal, or other disturbance, without a permit from the responsible heritage resources authority. The National Heritage Resources Act, No 25 of 1999, (NHRA) states that heritage resources are unique and non-renewable and, as such, any impact on such resources must be seen as significant (NHRA, section 5(1)(a)). The NHRA specifically protects certain categories of heritage resources, i.e.: structures, archaeological and paleontological (including meteorological) sites and material and graves and burial grounds (NHRA, sections 34, 35 and 36). Furthermore, Section 38 of the NHRA provides for and regulates the compilation of impact assessment reports of heritage resources that may be affected by construction or development activities.

The desktop research for the Heritage Scoping Report has revealed that the study area and surrounding landscape have a long and diverse historical and archaeological history and that significant potential exists for archaeological and historical sites and material to be located within the study area. The research has also identified specific possible heritage sensitive areas within the study area.

The Scoping Report will be followed by a Heritage Impact Assessment (HIA), which would include the findings of this desktop study report and would provide recommendations for mitigation (destruction, recording and/or avoidance) of the confirmed heritage resources to be impacted upon by the proposed development. The period in-between the existing Heritage Scoping Report and the Final Heritage Impact Assessment Report will be used to finalise any footprints relating to the proposed exploration activities.

The Heritage Scoping Report has highlighted a number of heritage aspects, some of which would require further assessment and mitigation in the subsequent Heritage Impact Assessment report. These aspects include three sensitivities associated with the South African War (1899-1902) namely the Battle of Zand River, the Boer defensive position at Boschrand as well as the three black concentrations camps situated within the study area at Holfontein, Geneva and Boshrand. Other aspects identified include archaeological sites, historic buildings and structures, cemeteries, palaeontology as well as unmarked graves from within the study area.

### **Battle of Zand River (7 – 10 May 1900)**

The South African War (1899-1902) had a significant impact across the country, and also within the study area. During the Battle of Zand River (7 – 10 May 1900), the most significant drifts across the river were earmarked for attention by Lord Robers in his attack, including Junction Drift. The farm of this name is located within the present study area, whereas the drift itself was either located within the study area or very close to it. While the drift was taken with relative ease by General Ian Hamilton's men, a range of hills north of the river between Doornkop in the west and Baskop in the east, were strongly occupied by the Boer forces of General Louis Botha. The ensuing battle for control of this ridge, which included an infantry assault and artillery duel, was almost entirely located within the present study area.

An area of expected sensitivity in terms of this battle was highlighted on the sensitivity map. If at all possible, this area should be avoided in the placement of development footprints. Furthermore, archaeological field surveys of the proposed development footprint areas during the Heritage Impact Assessment should identify any tangible remains of the battle and the associated heritage impact assessment would address any perceived significant impacts on this battle and its associated tangible remains. Additionally, such field assessments must be augmented by further archival and historical research, especially should any of the development footprints be proposed within 1 000 m of the identified sensitive area. If required, further mitigation measures will be outlined in the Heritage Impact Assessment.

### **Boer Position at Boschrand**

After the Battle of Zand River, an artillery duel took place between the forward units of Lord Roberts's army and a strong Boer position entrenched on a ridge known as Boschrand on both sides of the railway line some six miles (9.7 km) south of Kroonstad. The railway station Boschrand (Bosrand) is located within the study area. It would therefore appear that the ridge in question as well as the Boer position (which would in all likelihood have included defensive stonework and sangars) as well as a significant component of the associated artillery duel, would have been located within the study area. However, the exact location of the position held by the Boer forces is not clear from available information. Furthermore, the artillery duel is not supported by all available historic records. These realities meant that this historic event was not recorded on the heritage sensitivity maps.

Archaeological field surveys of the proposed development footprint areas during the Heritage Impact Assessment should identify any tangible remains of these activities. These surveys should be augmented by further archival desktop study work on the exact location of the Boer position at Boschrand. Should archaeological sites be identified, suitable mitigation measures will have to be outlined in the Heritage Impact Assessment.

## **Black Concentration Camps**

During the guerrilla phase of the South African War, black concentration camps were established by the British military authorities across the former Boer republics, including within the study area at Geneva, Boschrand and potentially at Holfontein. While the exact positions of the three concentration camps are not known, the available information indicates that these camps were always established in proximity to railway lines. Furthermore, with the names of these concentration camps derived from the railway station or siding names, it seems evident that these camps would have been built in the general surroundings of the three stations or sidings. It is worth noting as well that Benneyworth (2006) indicates that during the war all black concentration camps were built within two miles from the nearest British military base or position. As military positions would have been concentrated at each railway station or siding in the form of blockhouses and defensive structures, a circular area with a radius of two miles was used as the most likely area within which these camps (and their associated cemeteries and archaeological middens) would have been located. These demarcated sensitive areas would necessarily include any remains of the original blockhouses and defensive structures erected at these same railway stations and sidings during the war, and would also include any historic structures and buildings, which may be associated with these sidings and stations.

The areas included in the sensitivity maps should ideally be avoided during the placement of development footprints. Archaeological and heritage field surveys of the development footprint areas must be undertaken once these have been established. Additionally, such field assessments must be augmented by further archival and historical research, especially should any of the development footprints be proposed within 1 000 m of the identified sensitive area. If required, further mitigation measures will be outlined in the Heritage Impact Assessment Report.

## **Archaeological Sites**

The background research has revealed that at least one Stone Age site is located within the study area (known as Le Roux 717) (Rudner et. al., 2011). Furthermore, a number of Late Iron Age stonewalled sites in the form of so-called Type Z and Type V settlements had been identified within the study area and its surroundings during the 1970s (Maggs, 1976). The Google Earth scan identified a total of 15 Late Iron Age stonewalled settlements from within the study area. The positions of these sites were recorded on the heritage sensitivity maps. The likelihood that even more archaeological sites (Stone Age, Iron Age and Historic) are located within the study area, is high. All these archaeological sites are protected by the National Heritage Resources Act.

The recorded localities of these archaeological sites as recorded on the heritage sensitivity maps should ideally be avoided during the placement of development footprint areas. All proposed development footprints will have to be assessed in the field by way of archaeological field surveys to identify any archaeological sites and features which may be located within those footprint areas. These studies will be required to determine the significance of each site and



to assess the possible development impacts on each of them during the Heritage Impact Assessment phase. If required, further mitigation measures will be outlined in the Heritage Impact Assessment Report.

### **Historic Buildings and Structures**

The existence of historic buildings and structures within the study area was revealed during the desktop study, when the first edition topographic sheets were found to depict a large number of historic buildings and structures. These depicted structures include farmhouses, farm structures such as sheds and wagon sheds as well as farmworker accommodation. Due to the massive extent of the study area as well as the large number of these depicted features, the historic structures and buildings depicted on these maps were not individually recorded nor included in the existing heritage significance maps. An assessment of previous archaeological and heritage studies from within the study area has revealed the presence of one such a historic structure within the study area.

Once development footprints are defined, such footprint areas will have to be assessed in the field by way of archaeological field surveys to identify any historic buildings or structures, which may be located within the development footprint areas. Additionally, an assessment by an architectural historian of each historic building and structure located within or near such footprint areas will also have to be undertaken. These studies will be required to determine significance of each building or structure and will assess the possible development impacts on each of them during the Heritage Impact Assessment phase. At the same time, appropriate mitigation measures will also be outlined.

### **Graves and Cemeteries**

The existence of graves and cemeteries has been confirmed during the desktop study work, with the presence of 32 cemeteries within the study area revealed during an assessment of historic topographic maps sheets. The individual positions of these cemeteries were recorded and these were included in the sensitivity maps. The possibility that even more cemeteries may be located within the study area is a distinct possibility.

The recorded localities of these cemeteries as depicted on the heritage sensitivity maps should ideally be avoided during the placement of development footprint areas. Any marked graves and cemeteries located within future development footprint areas will be identified during the archaeological walkthroughs of those footprint areas. Cemeteries and grave sites are protected by various legislations and the best option would be the in situ preservation of the sites. Should this not be possible, a standard grave relocation process (including a detailed social consultation process) must be undertaken.

## Unmarked Graves in Homesteads

An evaluation of the available historic maps has revealed a significant number of historic homesteads of black African communities within the study area. The presence of these features raises another heritage concern, that of unmarked stillborn babies. In terms of black African tradition, stillborn babies were often buried in unmarked graves underneath or adjacent to the homesteads of their parents. Cemeteries and grave sites are protected by various legislations and the best option would be social consultation with the former (or present) residents of this area to assess whether any such unmarked graves are located within the final study area for the Heritage Impact Assessment. This mitigation measure must be supported by archaeological monitoring of the development activities.

## Palaeontology

The palaeontological significance of the study area is not known at the moment. However, during the EIA Phase a palaeontologist will be appointed to undertake a palaeontological desktop study of the exploration footprint areas.

The data on the different types of heritage resources identified from the fieldwork will be compiled in a final HIA report. This report will utilise the Plan of Study for the EIA/HIA (**Section 8**) as well as the significance rating (**ANNEXURES A and B**) to identify and rank the impacts on the heritage resources into the final detailed EIA investigation.

Potential impacts to be identified and evaluated during the EIA include:

- Disturbance / destruction of components of the battlefield on which the Battle of Zand River (7-10 May 1900) took place during the South African War
- Disturbance / destruction of possible tangible remains which may be associated with the Boer position at Boschrand
- Disturbance / destruction of black concentrations camps at Holfontein, Geneva and Boschrand
- Destruction / damage of archaeological sites
- Disturbance / destruction of historic buildings and structures
- Disturbance / destruction of cemeteries and graves
- Disturbance / destruction of unmarked stillborn graves
- Disturbance / destruction of palaeontological material

Once the development footprint areas are defined, these will have to be assessed by way of detailed walkthroughs during the HIA phase of the project. This will allow for an assessment of the impact of the proposed development on any heritage sites located there.

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### **Historic Topographic Maps**

All the historic topographic maps used in this report were obtained from the Directorate: National Geo-spatial Information of the Department of Rural Development and Land Reform in Cape Town.

### **Google Earth**

All the aerial depictions used in this report are from Google Earth.

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## HERITAGE ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies to be utilised in the HIA.

The Heritage Impact Assessment (HIA) report to be compiled by PGS Heritage and Grave Relocation Consultants (PGS) for the proposed project will assess the heritage resources found on site. This report will contain the applicable maps, tables and figures as stipulated in the National Heritage Resources Act (NHRA) (no 25 of 1999), the National Environmental Management Act (NEMA) (no 107 of 1998) and the Minerals and Petroleum Resources Development Act (MPRDA) (28 of 2002). The HIA process consisted of three steps:

- Step I – Literature Review: The background information to the field survey leans greatly on the Heritage Scoping Report completed by PGS for this site.
- Step II – Physical Survey: A physical survey will be conducted on foot through the proposed project area by qualified archaeologists', aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.
- Step III – The final step involves the recording and documentation of relevant archaeological resources, as well as the assessment of resources in terms of the heritage impact assessment criteria and report writing, as well as mapping and constructive recommendations

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

- **site integrity** (i.e. primary vs. secondary context),
- **amount of deposit, range of features** (e.g., stonewalling, stone tools and enclosures),
  - Density of scatter (dispersed scatter)
    - Low - <10/50m<sup>2</sup>
    - Medium - 10-50/50m<sup>2</sup>
    - High - >50/50m<sup>2</sup>
- **uniqueness** and
- **potential** to answer present research questions.



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

- A - No further action necessary;
- B - Mapping of the site and controlled sampling required;
- C - No-go or relocate pylon position
- D - Preserve site, or extensive data collection and mapping of the site; and
- E - Preserve site

#### Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, will be used for the purpose of this report.

Table 16: Site significance classification standards as prescribed by SAHRA

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

**ANNEXURE B**  
**THE SIGNIFICANCE RATING SCALES FOR THE EIA**

### Method of Assessing Impacts

The impact assessment methodology is guided by the requirements of the NEMA EIA Regulations (2010). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. This determines the environmental risk. In addition other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).

### Determination of Environmental Risk

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER).

The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E+D+M+R)}{4} \times N$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 17.

*Table 17: Criteria for determination of impact consequence.*

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),

	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per Table 19 below.

*Table 18: Probability scoring.*

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

$$ER = C \times P.$$

Consequence	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
	Probability					

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 19 below.

*Table 19: Significance classes.*

Environmental Risk Score	
Value	Description
< 9	Low (i.e. where this impact is unlikely to be a significant environmental risk),
≥9; <17	Medium (i.e. where the impact could have a significant environmental risk),
≥ 17	High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/ mitigated.

#### Impact Prioritisation

In accordance with the requirements of Regulation 31 (2)(l) of the EIA Regulations (GNR 543), and further to the assessment criteria presented in Section 0 it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

In addition it is important that the public opinion and sentiment regarding a prospective development and consequent potential impacts is considered in the decision making process.

In an effort to ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority / significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/ mitigation impacts are implemented.



Table 20: Criteria for the determination of prioritisation.

Public response (PR)	Low (1)	Not raised as a concern by the I&AP's
	Medium (2)	Issue/ impact raised by the I&AP's
	High (3)	Significant and meaningful response from the I&AP's
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 20. The impact priority is therefore determined as follows:

$$\text{Priority} = \text{PR} + \text{CI} + \text{LR}$$

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (refer to Table 21).

Table 21: Determination of prioritisation factor.

Priority	Ranking	Prioritisation Factor
= 3	Low	1
3 > 9	Medium	1.5
= 9	High	2

In order to determine the final impact significance the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is to be able to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Environmental Significance Rating	
Value	Description
< 9	Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
≥9; <17	Medium (i.e. where the impact could influence the decision to develop in the area),
≥ 17	High (i.e. where the impact must have an influence on the decision process to develop in the area).

For ease of use a template impact assessment form has been drafted which will need to be completed by each specialist for each relevant impact, and where necessary for each alternative. The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

**ANNEXURE C****IMPACT ASSESSMENT SHEETS**

*While five project phases exist (Planning, Construction, Operation, Decommissioning and Rehab and Closure), only impact sheets for the Construction Phase are included here. The reason for this is that limited to no impacts are expected on the identified heritage issues during the other phases of the project. Please also note that although palaeontology was raised as a possible concern, its exact significance within the study area is not presently known. A palaeontologist will be appointed during the EIA phase to address this aspect. As a result, no impact assessment sheets will be completed for palaeontology.*

Impact Name	Disturbance/ Destruction of Sections of the Battle of Zand River				
Alternative	Not Applicable				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	4	3
Extent	5	4	Reversibility	5	5
Duration	5	5	Probability	4	2
Environmental Risk (Pre-mitigation)					-14.25
Mitigation Measures					
See above.					
Environmental Risk (Post-mitigation)					-8.50
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					2
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.					
Prioritisation Factor					1.17
<b>Final Significance</b>					<b>-9.92</b>

Impact Name	Disturbance/ Destruction of the Boer Position at Boschrand				
Alternative	Not Applicable				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	3	2
Extent	4	3	Reversibility	5	5
Duration	5	5	Probability	3	2
Environmental Risk (Pre-mitigation)					-12.75
Mitigation Measures					
See above.					
Environmental Risk (Post-mitigation)					-7.50
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					2
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.					
Prioritisation Factor					1.17
<b>Final Significance</b>					<b>-8.75</b>



Impact Name	Disturbance/ Destruction of Black Concentration Camps				
Alternative	Not Applicable				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	5	4
Extent	5	4	Reversibility	5	5
Duration	5	5	Probability	3	2
Environmental Risk (Pre-mitigation)					-15.00
Mitigation Measures					
See above.					
Environmental Risk (Post-mitigation)					-9.00
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					2
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.					
Prioritisation Factor					1.17
<b>Final Significance</b>					<b>-10.50</b>

Impact Name	Disturbance/Destruction of Archaeological Sites				
Alternative	Not Applicable				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	4	3
Extent	4	3	Reversibility	5	5
Duration	5	5	Probability	4	3
Environmental Risk (Pre-mitigation)					-18.00
Mitigation Measures					
See above.					
Environmental Risk (Post-mitigation)					-12.00
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					2
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.					
Prioritisation Factor					1.17
<b>Final Significance</b>					<b>-14.00</b>

Impact Name	Disturbance/Destruction of Historic Buildings or Structures				
Alternative	Not Applicable				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	3	2
Extent	4	3	Reversibility	5	4
Duration	5	5	Probability	3	2
Environmental Risk (Pre-mitigation)					-12.75
Mitigation Measures					
See above.					
Environmental Risk (Post-mitigation)					-7.00
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					2
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.					
Prioritisation Factor					1.17
<b>Final Significance</b>					<b>-8.17</b>

Impact Name	Disturbance/ Destruction of Graves and Cemeteries				
Alternative	Not Applicable				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	5	4
Extent	5	4	Reversibility	5	5
Duration	5	5	Probability	4	3
Environmental Risk (Pre-mitigation)					-20.00
Mitigation Measures					
See above.					
Environmental Risk (Post-mitigation)					-13.50
Degree of confidence in impact prediction:					Medium
Impact Prioritisation					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					2
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.					
Prioritisation Factor					1.17
<b>Final Significance</b>					<b>-15.75</b>

<b>Impact Name</b>	<b>Disturbance/ Destruction of Unmarked Graves</b>				
<b>Alternative</b>	<b>Not Applicable</b>				
<b>Environmental Risk</b>					
<b>Attribute</b>	<b>Pre-mitigation</b>	<b>Post-mitigation</b>	<b>Attribute</b>	<b>Pre-mitigation</b>	<b>Post-mitigation</b>
Nature	-1	-1	Magnitude	5	4
Extent	5	4	Reversibility	5	5
Duration	5	5	Probability	3	2
Environmental Risk (Pre-mitigation)					-15.00
Mitigation Measures					
See above.					
Environmental Risk (Post-mitigation)					-9.00
Degree of confidence in impact prediction:					Medium
<b>Impact Prioritisation</b>					
Public Response					1
Low: Issue not raised in public responses					
Cumulative Impacts					1
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources					2
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.					
Prioritisation Factor					1.17
<b>Final Significance</b>					-10.50

