Cultural Heritage Impact Assessment:

Phase 1 Investigation for the Proposed Development of a Mixed-Use Township Development on Erf 8898, Portion of Erf 506, Vryburg, Naledi Local Municipality, Dr Ruth Segomotsi Mompati District Municipality, North West Province

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Executive Summary

This report contains a comprehensive heritage impact assessment investigation in accordance with the provisions of Sections 38(1) and 38(3) of the *National Heritage Resources Act* (Act No. 25 of 1999) (NHRA) and focuses on the survey results from a cultural heritage survey as requested by Funani Environmental Management Solutions. The EIA process will be followed as prescribed by the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), National Water Act, 1998 (Act No. 36 of 1998) and 2014 EIA regulations (as amended) for the proposed development of a mixed-use township development on Erf 8898, Portion of Erf 506, Vryburg, Naledi Local Municipality, Dr Ruth Segomotsi Mompati District Municipality, North West Province. The commenting authority is North West Department of Rural, Environment and Agriculture Development (READ).

No historical or archaeological (both Stone Age and Iron Age) artefacts, assemblages, features, structures or settlements were recorded during the survey of the project footprint.

It is therefore recommended, from a cultural heritage perspective that the proposed township development may proceed.

Also, please note:

Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place **(*cf*. NHRA (Act No. 25 of 1999)**, Section 36 (6)).

Definitions and abbreviations

Midden:	Refuse that accumulates in a concentrated heap.
Stone Age:	An archaeological term used to define a period of stone tool use and manufacture
Iron Age:	An archaeological term used to define a period associated with domesticated livestock and grains, metal working and ceramic manufacture
LIA:	Late Iron Age sites are usually demarcated by stone-walled enclosures
NHRA:	National Heritage Resources Act (Act No. 25 of 1999)
SAHRA:	South African Heritage Resources Agency
SAHRIS:	South African Heritage Resources Information System
PHRA-G:	Provincial Heritage Resources Authority - Gauteng
GDARD:	Gauteng Department of Agriculture and Rural Development
HIA:	Heritage Impact Assessment
DMR:	Department of Mineral Resources
I&APs:	Interested and Affected Parties

I, Francois Coetzee, hereby confirm my independence as a cultural heritage specialist and declare that I do not have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of the listed environmental processes, other than fair remuneration for work performed on this project.

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1. Introduction and Terms of Reference

Funani Environmental Management Solutions an independent environmental consultant was contracted to undertake the EIA process which will be followed as prescribed by the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), National Water Act, 1998 (Act No. 36 of 1998) and 2014 EIA regulations (as amended) for the proposed development of a mixed-use township development on Erf 8898, Portion of Erf 506, Vryburg, Naledi Local Municipality, Dr Ruth Segomotsi Mompati District Municipality, North West Province.

A Cultural Heritage Impact Assessment (HIA) was requested by Funani Environmental Management Solutions on behalf of the client to evaluate the potential impact of the proposed township development on cultural heritage remains. All reports will be presented to the North West Department of Rural, Environment and Agriculture Development (READ) for comment.

2. Objectives

The general objective of the cultural heritage survey is to record and document cultural heritage remains consisting of both tangible and intangible archaeological and historical artefacts, structures (including graves), settlements and oral traditions of cultural significance.

As such the terms of reference of this survey are as follows:

- Identify and provide a detailed description of all artefacts, assemblages, settlements and structures of an archaeological or historical nature (cultural heritage sites) located on the study area,
- Estimate the level of significance/importance of these remains in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value,
- Assess any impact on the archaeological and historical remains within the area emanating from the development activities, and
- Propose recommendations to mitigate heritage resources where complete or partial conservation may not be possible and thereby limit or prevent any further impact.

3. Description of Physical Environment of Study Area

The heritage survey focussed on an area situated on the northern boundary of the town of Vryburg, North West Province.

Farm Name(s) and Portions	Erf 506 • Erf 8898 (portion of Erf 506)
Size of Survey Area	77 ha
Magisterial District	Naledi Local Municipality Dr Ruth Segomotsi Mompati District Municipality
1:50 000 Map Sheet	2624DC
1:250 0000 Map Sheet	2624
Central Coordinates of the Development	26.934910°S 24.732350°E

Table 1: Physical Environment

The northern parts of the survey area falls within the Savanna Biome, particularly the Eastern Kalahari Bushveld Bioregion and more specifically the Ghaap Plateau Vaalbosveld (SVk 7).

This veldtype occurs in the Northern Cape and North West Provinces along flat plateau from around Campbell in the south, east of Danielskuil through Reivilo to around Vryburg in the north (Mucina & Rutherford 2006).

The survey footprint is characterised as a flat and open piece of land with sparse vegetation (no trees). The N18 runs along the western boundary with housing developments located on the southern boundary. A dirt road borders the area on the north east. The eastern section has been extensive disturbed by surface digging and lately rubbish dumping. Infrastructure at the site includes roads, fences and a dam wall (southern corner).

Vryburg normally receives about 344 mm of rain per year, with most rainfall occuring mainly during the summer months. The region receives the lowest rainfall (0 mm) in June and the highest (70 mm) in February. The monthly distribution of average daily maximum temperatures indicates that the average midday temperatures for Vryburg range from 19°C in June to 32.9°C in January. The region is the coldest during July when the mercury drops to 0°C on average during the night (SAExplorer 2018).

Current Zoning	Urban (municipality)
Economic activities	Industrial Agriculture
Soil and basic geology	The Vryburg region comprises rocks ranging in age from early Swazian to the Quaternary. The oldest rocks belong to the Basement Complex which is represented by the Kraaipan Group, and Archaean granite and gneiss. The Kraaipan Group is subdivided into the Gold Ridge, Ferndale and Khunwana formations. The Basement Complex is overlain by rocks of the Dominion Group, and Witwatersrand and Ventersdorp Supergroups. The Ventersdorp Supergroup, comprising amygdaloidal lava, pyroclastic rocks, breccia, conglomerate, greywacke and quartz porphyry, is subdivided into the Klipriviersberg and Platberg Groups. The Transvaal and Griqualand West Sequences, which are correlates, overlie the Ventersdorp Supergroup unconformably. The Karoo Sequence is represented by boulder mudstone and shale of the Dwyka formation. Diabase and dolerite dykes of different ages intrude all the Proterozoic lithological units, as well as the Dwyka formation. The Kalahari Group, calcrete, sand and soil represent the Quaternary deposits in the area. Salt, gold, iron and diamonds are the most important economic minerals.
Prior activities	Agriculture
Socio Economic Environment	The dominant employment sectors in Dr Ruth Segomotsi Mompati District are the services sector (providing 36.80% of the total number of employment opportunities) and the agricultural sector (providing 33% of the total number of employment opportunities). The total population numbers approximately 358 166. The larger proportion of the population is in the schoolgoing age group (0–19 years of age). There is extreme poverty throughout the district with 82% of households living at or below subsistence level (that is, earning R1 600 or less a month); a large portion (42.61%) of the economically active population is unemployed. When the large numbers of young people are taken into account alongside those not working, it is clear that the dependency ratio is extremely high. A contributory factor to the high level of poverty is the low level of education of the inhabitants of Dr Ruth Segomotsi Mompati. A large portion of the population (30.27%) has no education at all and 33.41% have only some primary education. Only 1.38% have a tertiary

	qualification. More than 88% of households in the district have access to acceptable levels of water services. Sanitation services are less well supplied; the district only supplies just over 26% of households with adequate sanitation services. More than 59% of households have access to electricity. Less than 28% of households have their refuse removed by a local authority at least once a week. Social services are also unevenly distributed. Not all of the district's local municipalities provide cemeteries, sports facilities or parks, arguing a shortage of funding for such purposes (Dr Ruth Segomotsi Mompati District IDP 2017).
Evaluation of Impact	An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits NHRA (Act No. 25 of 1999, Section 38(3d)): **Positive**

Table 2: Socio-economic environment

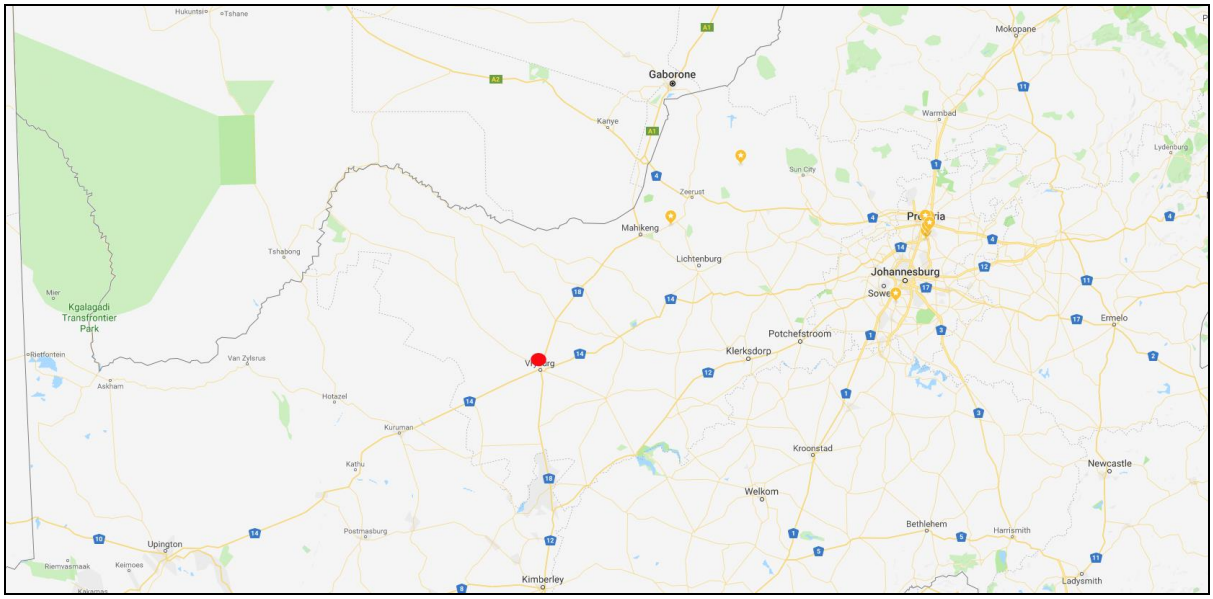

Figure 1: Regional map of the survey area (situated at Vryburg) (indicated by the red area)

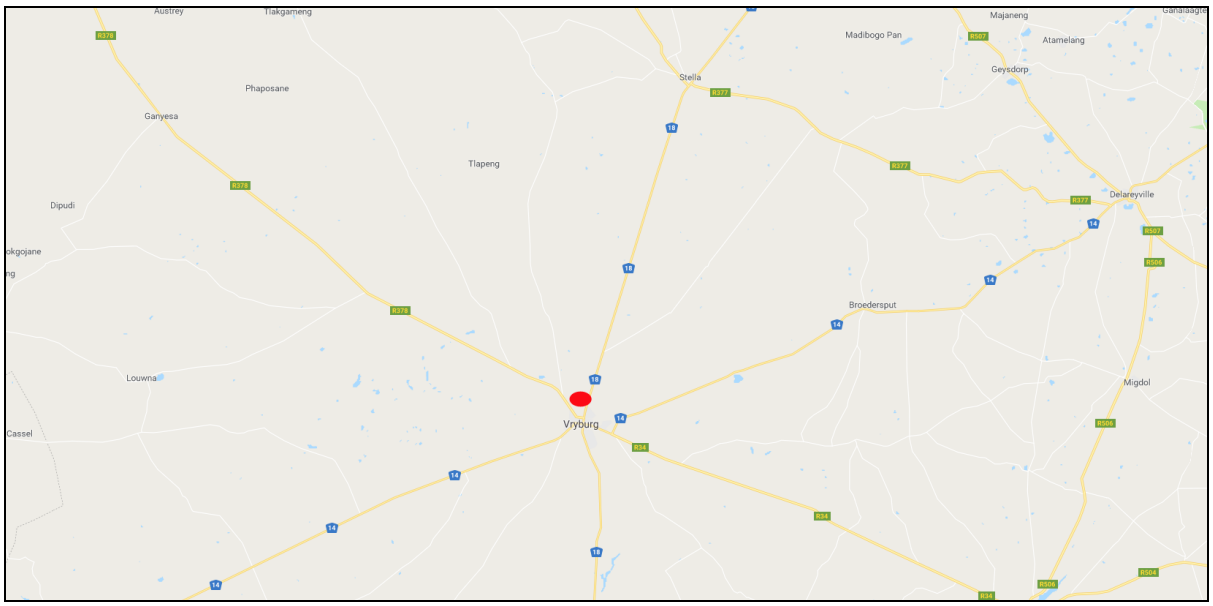

Figure 2: Regional context of the survey footprint located north of Vryburg (indicated by the red area)

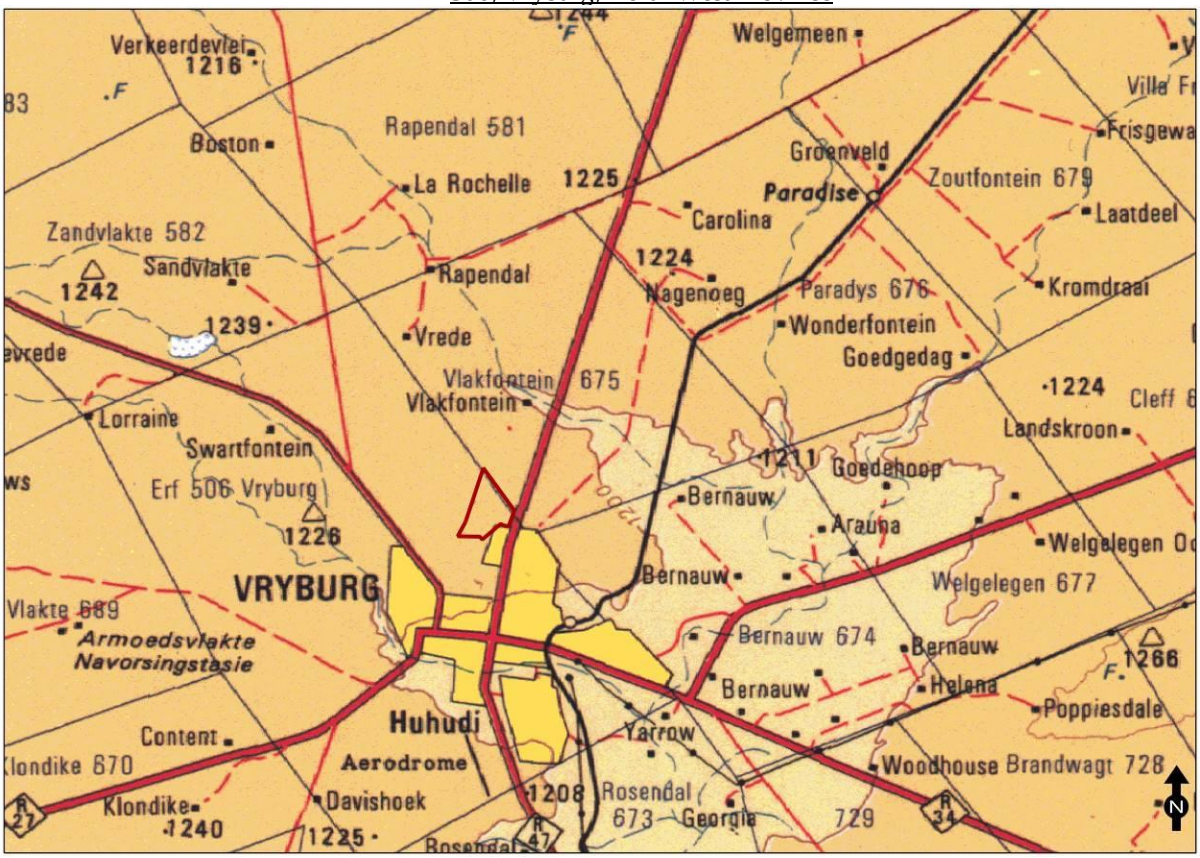

Figure 3: Local context of the survey footprint (1:250 000 Topographical Map 2624)

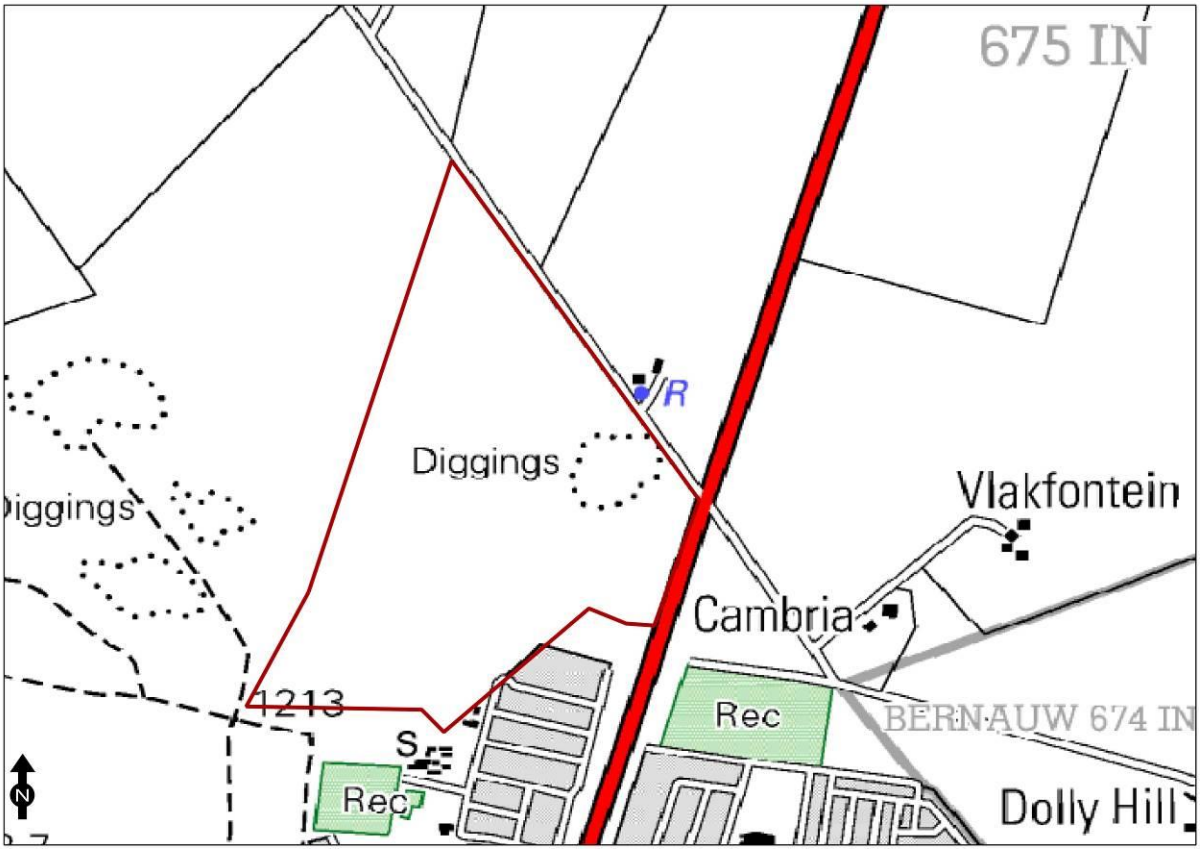

Figure 4: The survey area as indicated on the 1:50 000 topographic map 2624DC (2001)

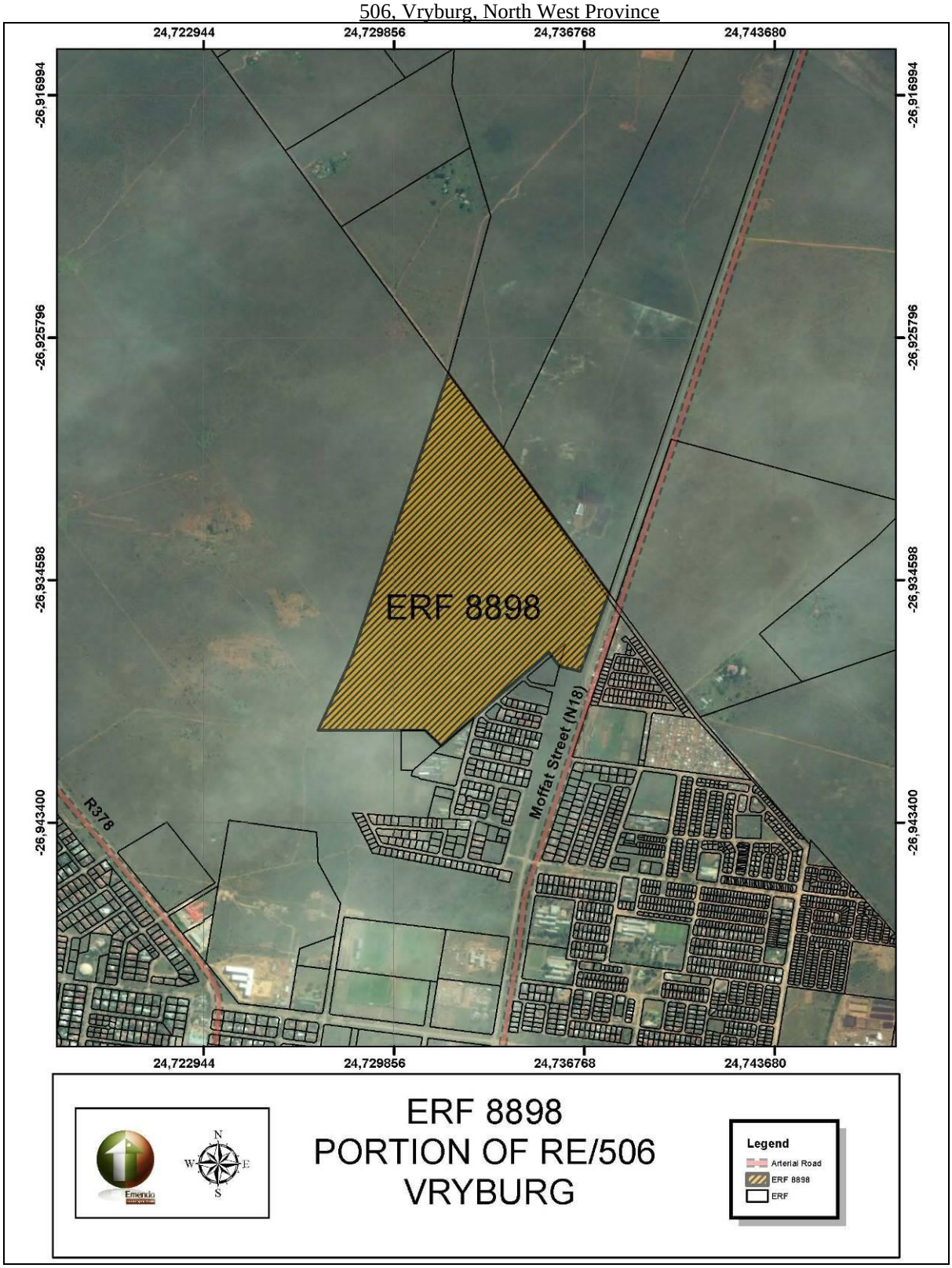

Figure 5: Location of the proposed township development

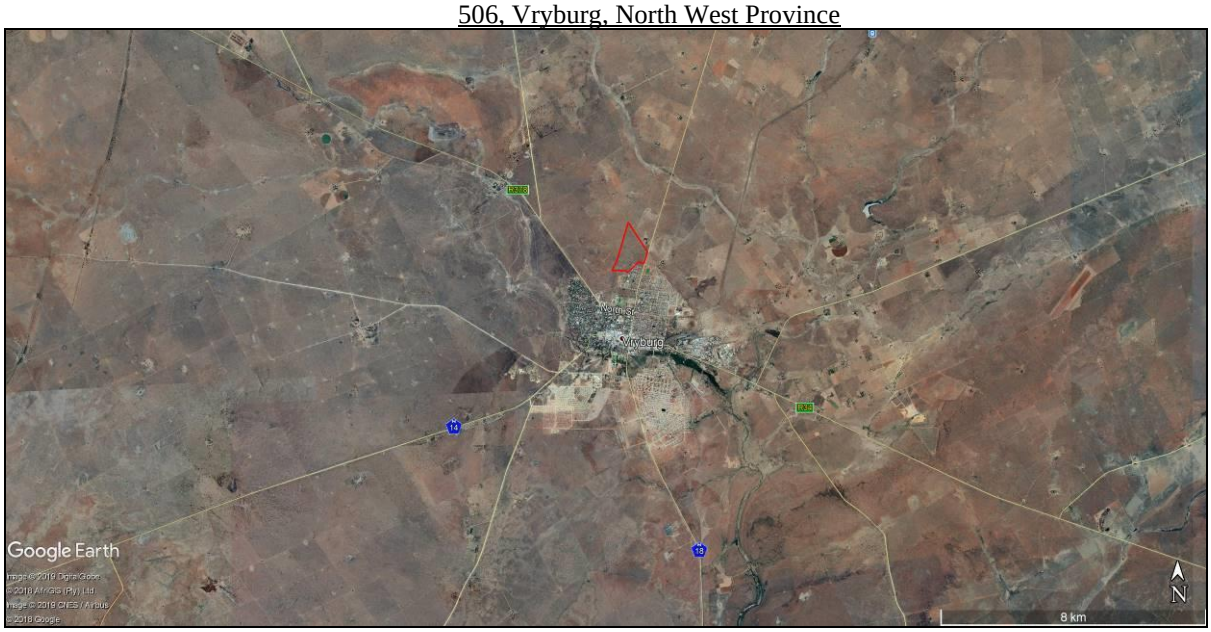

Figure 6: Survey area within general context (Google Earth Pro 2019)

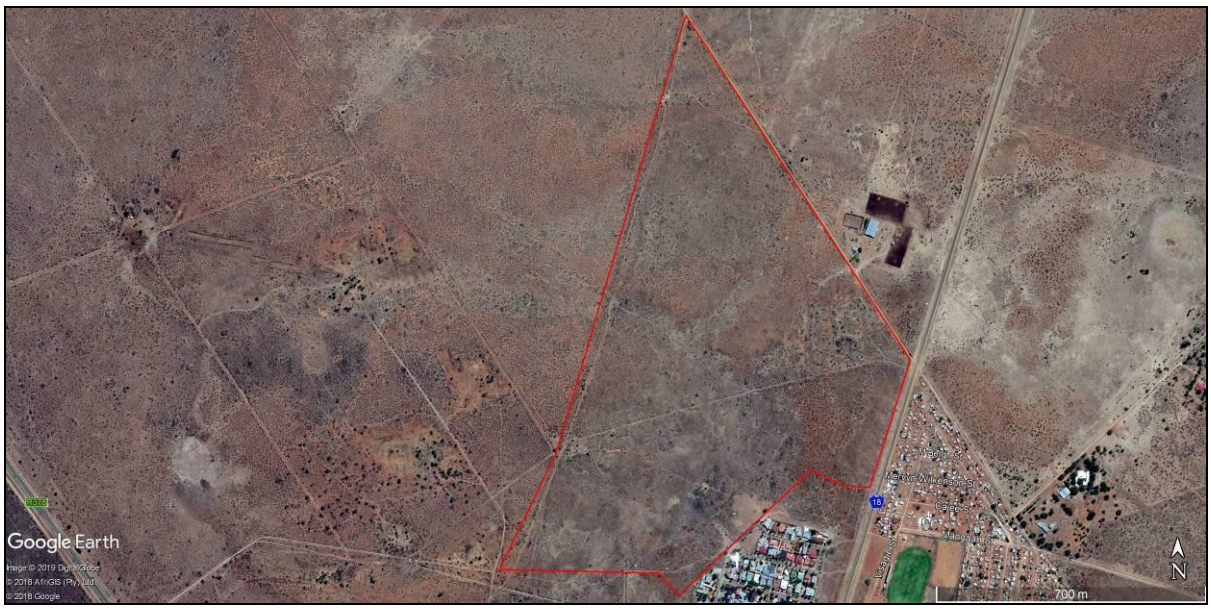

Figure 7: Survey area within local context (Google Earth Pro 2019)

Figure 8: General view of the central section of the survey footprint

Figure 9: General view of the southern section along the survey footprint

Figure 10: General view of the eastern section of the survey footprint

Figure 11: General view of the southern section of the survey footprint (near the dam wall)

Figure 12: General view of the existing diggings near the northern border of the survey footprint

Figure 13: General view of recent occupations of the area near the eastern periphery of the survey footprint

4. Proposed Project Description

The proposed development will entail establishing a mixed use development which will comprise of residential and supplementary land uses. The development will mainly include the following land uses:

- Residential 1,
- Residential 2,
- Commercial,
- Filling station/s (Industrial 4),
- Cultural village (Institutional 2),
- Schools (including Crèches),
- Community facilities,
- Public open space, and
- Bulk infrastructure such as internal routes, storm water management system, connections to the municipal electrical, water and sewer mains, etc. will form part of this development.

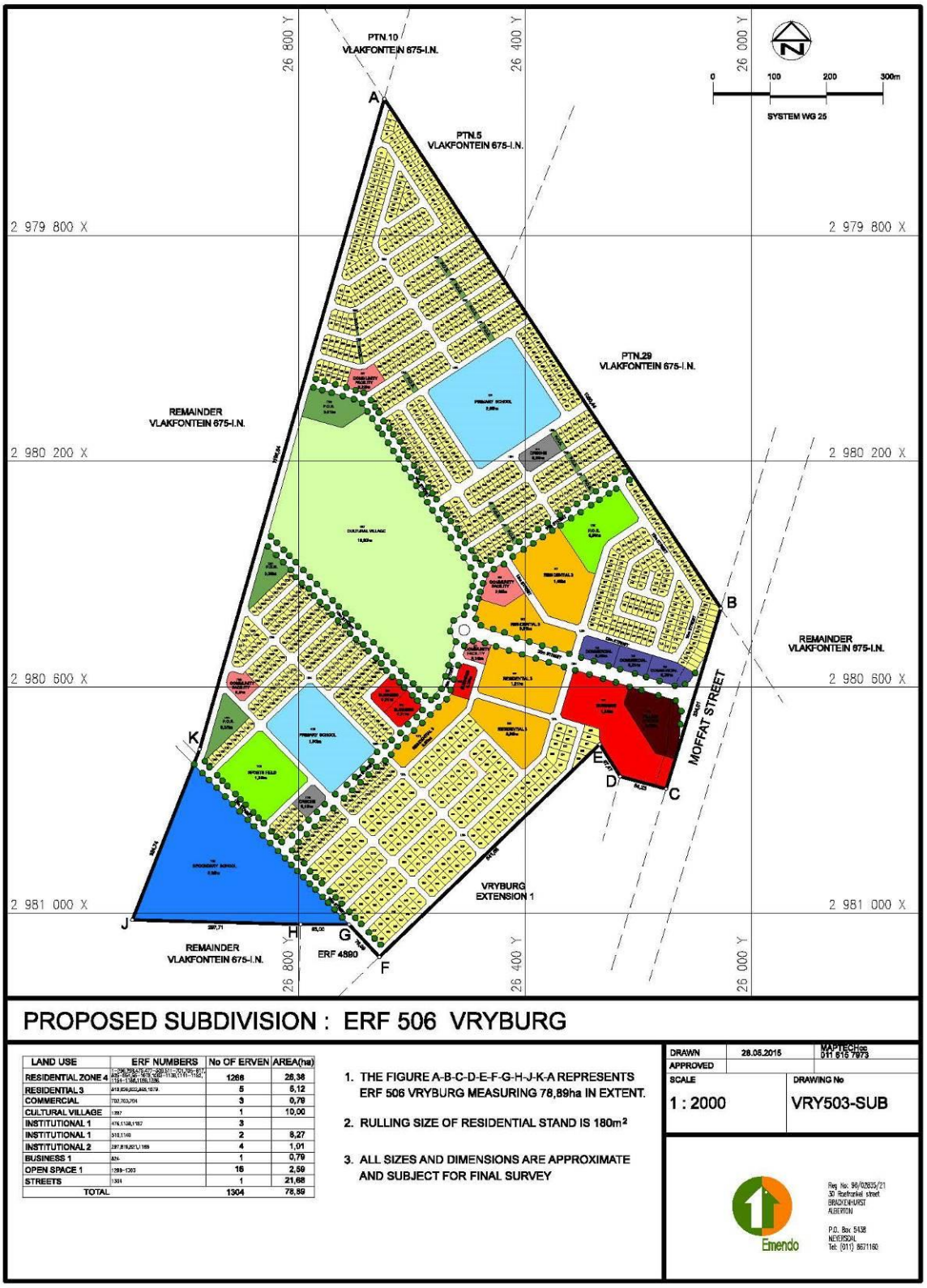

Figure 14: Planned layout of the proposed township development

5. Legal Framework

Activity Number	Describe each listed activity as per the wording in the listing notice/act:	Why is it Applicable?

9	The development of infrastructure exceeding 1000 metres in length for bulk transportation of water or storm water – i) With the internal diameter of 0.36 or more; or ii) With the peak throughput of 120 litres per second or more;	As per the Bulk Services Study done connection is possible from the adjacent townships Kismet Park and Colridge. The townships are supported by high pressure 400mm and 600mm primary distributer pipes.
10	The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewer, affluent, processed water, waste water, return water, industrial discharge of slimes – i) With the internal diameter of 0.36 or more; or ii) With the peak throughput of 120 litres per second or more;	Connection is possible at the 160mm sewer collector running within Kismet park.
11	The development of infrastructure for transmission and distribution of electricity – i) Outside urban areas or industrial complexes with the capacity of 33 but less than 275 kilovolts; or ii) inside urban areas or industrial complexes with the capacity of 275 kilovolts;	This listed activity is included should any substation be considered in the future.
24	The development – iii) A road with a reserve wider than 13.5 metres , or where no reserves exists where the road is wider than 8 metres;	Internal access routes will be constructed.
14	The development of facilities or infrastructure for the storage or for the storage and handling, of dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.	The filling station will be one of the activities forming part of proposed development (however, the capacity of the underground storage tanks is not known yet).
25	The development related operation of facilities or infrastructure for the treatment of effluent, waste water or sewage with a daily throughput capacity of more than 2000 cubic metres but less than 15 000 cubic metres.	This listed activity is included just in case it is required to build the waste water treatment works.
27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The site is approximately 78.8958 ha (seventy eight comma eight nine five eight hectares) in extent.
29	Residential, mixed, retail, commercial,	The proposed development will

	industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	include different types of institutions, residential types, retail and commercial activities.

Table 3: Listed activities as per the Government Notice No. 983 of December 2014: NEMA, EIA Regulations, Listing Notice 1 and therefore Require Basic Environmental Application Route

Activity Number	**Describe each listed activity as per the wording in the listing notice/act:**	**Application Route and Authorization Required**
4	The development of facilities or infrastructure for the storage or for the storage and handling, of dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	The filling station will be one of the activities forming part of proposed development (however, the capacity of the underground storage tanks is not known yet).
9	The development of infrastructure for transmission and distribution of electricity – iii) Outside urban areas or industrial complexes with the capacity of 33 but less than 275 kilovolts; or iv) inside urban areas or industrial complexes with the capacity of 275 kilovolts;	This listed activity is included should any substation be considered in the future.
15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for – i) the undertaking of a linear activity; or ii) Maintenance purpose undertaken in accordance with a maintenance management plan.	More than 20 hectares will be cleared during the con

Table 4: Listed activities as per the Government Notice No. 984 of December 2014: NEMA, EIA Regulations, Listing Notice 2 and therefore require scoping and EIA application process in order to obtain Environmental Authorization (EA) Application Route

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	**REFERENCE APPLIED**
The Constitution of the Republic of South Africa (Act No. 108 of 1996)	
The National Environmental Management Act (Act No. 107 of 1998)	
The National Water Act (Act No. 36 of 1998)	
Air Quality Act (Act No. 39 of 2004)	-
National Forests Act, Act of 84 of 1998	-

The National Heritage Resources Act (Act No. 25 of 1999)	Section 38, 34, 35, 36
Conservation of Agricultural Resources Act (Act No. 85 of 1983)	
Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)	
The National Water Act (Act No. 36 of 1998);	
Mine Health and Safety Act (Act No. 29 of 1996) (MHSA)	
Biodiversity Act (Act 10 of 2004)	
Naledi Local Municipality Integrated Development Plan 2016/17 – 2020/21	Various sections

Table 5: Legal framework

- Section 24 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that activities (e.g. construction), which may impact on the environment must obtain an Environmental Authorization (EA) from a relevant competent authority before commencing with the listed activities. Such activities are listed under GN 983, GN 984 and GN 985 (Dated 2 December 2014) of NEMA. In terms of the proposed project, the Gauteng Department of Agriculture and Rural Development (GDARD) is the competent authority for EA.

- The project will also trigger Water Use in terms of Section 21 of the National Water Act (Act No. 36 of 1998), as the pipeline will cross a watercourse. Thus, the Water Use Licence (WUL) (through the General Licence, 2016) will be required for the project. The Water Use Licence application will be for the following:
  (c) Impeding or diverting the flow of water in a watercourse.
  (i) Altering the bed, banks, course or characteristics of a watercourse.

- Section 38 of the NHRA (Act No. 25 of 1999) stipulates that the following activities trigger a heritage survey:

Development criteria in terms of Section 38(1a-e) of the NHRA (Act No. 25 of 1999)	**Yes/No**
Construction of road, wall, powerline, pipeline, canal or other linear form of development or barrier exceeding 300m in length	Yes
Construction of bridge or similar structure exceeding 50m in length	No
Development exceeding 5000 m^2 in extent	Yes
Development involving three or more existing erven or subdivisions	Yes
Development involving three or more erven or divisions that have been consolidated within past five years	No
Rezoning of site exceeding 10 000 m^2	No
Any other development category, public open space, squares, parks, recreation grounds	No

Table 6: Activities that trigger Section 38 of the NHRA

- Field rating system as recommended by SAHRA:

Field Rating	Grade	Significance	Recommended Mitigation
National Significance	Grade I	High significance	Conservation by SAHRA, national site nomination, mention any relevant international ranking. No alteration whatsoever without permit from SAHRA.
Provincial Significance	Grade II	High significance	Conservation by provincial heritage authority, provincial site nomination. No alteration whatsoever without permit from provincial heritage authority.
Local Significance	Grade III-A	High significance	Conservation by local authority, no alteration whatsoever without permit from provincial heritage authority. Mitigation as part of development process not advised.
Local Significance	Grade III-B	High significance	Conservation by local authority, no external alteration without permit from provincial heritage authority. Could be mitigated and (part) retained as heritage register site.

Generally Protected A	Grade IV-A	High/medium significance	Conservation by local authority. Site should be mitigated before destruction. Destruction permit required from provincial heritage authority.
Generally Protected B	Grade IV-B	Medium significance	Conservation by local authority. Site should be recorded before destruction. Destruction permit required from provincial heritage authority.
Generally Protected C	Grade IV-C	Low significance	Conservation by local authority. Site has been sufficiently recorded in the Phase 1 HIA. It requires no further recording before destruction. Destruction permit required from provincial heritage authority.

Table 7: Field rating system to determine site significance

- Heritage resources have lasting value in their own right and provide evidence of the origins of South African society and they are valuable, finite, non-renewable and irreplaceable.

- All archaeological remains, features, structures and artefacts older than 100 years and historic structures older than 60 years are protected by the relevant legislation, in this case the **National Heritage Resources Act (NHRA) (Act No. 25 of 1999, Section 34 & 35)**. The Act makes an archaeological impact assessment as part of an EIA and EMPR mandatory (see **Section 38**). No archaeological artefact, assemblage or settlement (site) may be moved or destroyed without the necessary approval from the **South African Heritage Resources Agency (SAHRA)**. Full cognisance is taken of this Act in making recommendations in this report.

- Cognisance will also be taken of the Mineral and Petroleum Resources Development Act (Act No 28 of 2002) and the National Environmental Management Act (Act No 107 of 1998) when making any recommendations.

- Human remains older than 60 years are protected by the NHRA, with reference to Section 36. Human remains that are less than 60 years old are protected by the Regulations Relating to the Management of Human Remains (GNR 363 of 22 May 2013) made in terms of the National Health Act No. 61 of 2003 as well as local Ordinances and regulations.

- With reference to the evaluation of sites, the certainty of prediction is definite, unless stated otherwise.

- The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3, and the Australian ICOMOS (International Council on Monuments and Sites) Charter (also known as the Burra Charter) are used when determining the cultural significance or other special value of archaeological or historical sites.

- A copy of this report will be submitted on SAHRIS as stipulated by the National Heritage Resources Act (NHRA) (Act No. 25 of 1999), Section 38 (especially subsection 4) and the relevant Provincial Heritage Resources Authority (PHRA).

- Note that the final decision for the approval of permits, or the removal or destruction of sites, structures and artefacts identified in this report, rests with the SAHRA (or relevant PHRA).

6. Study Approach/Methodology

Geographical information (KML and shapefiles) on the proposed prospecting activities was supplied by Funani Environmental Management Solutions. The most up-to-date Google Earth images and topographic maps were used to indicate the survey area. Topographic maps were sources from the Surveyor General. Please note that all maps are orientated with north facing upwards (unless stated otherwise).

The strategy during this survey was to survey most of the footprint that form part of the proposed township development. The survey footprint was surveyed by detailed pedestrian (foot) survey techniques.

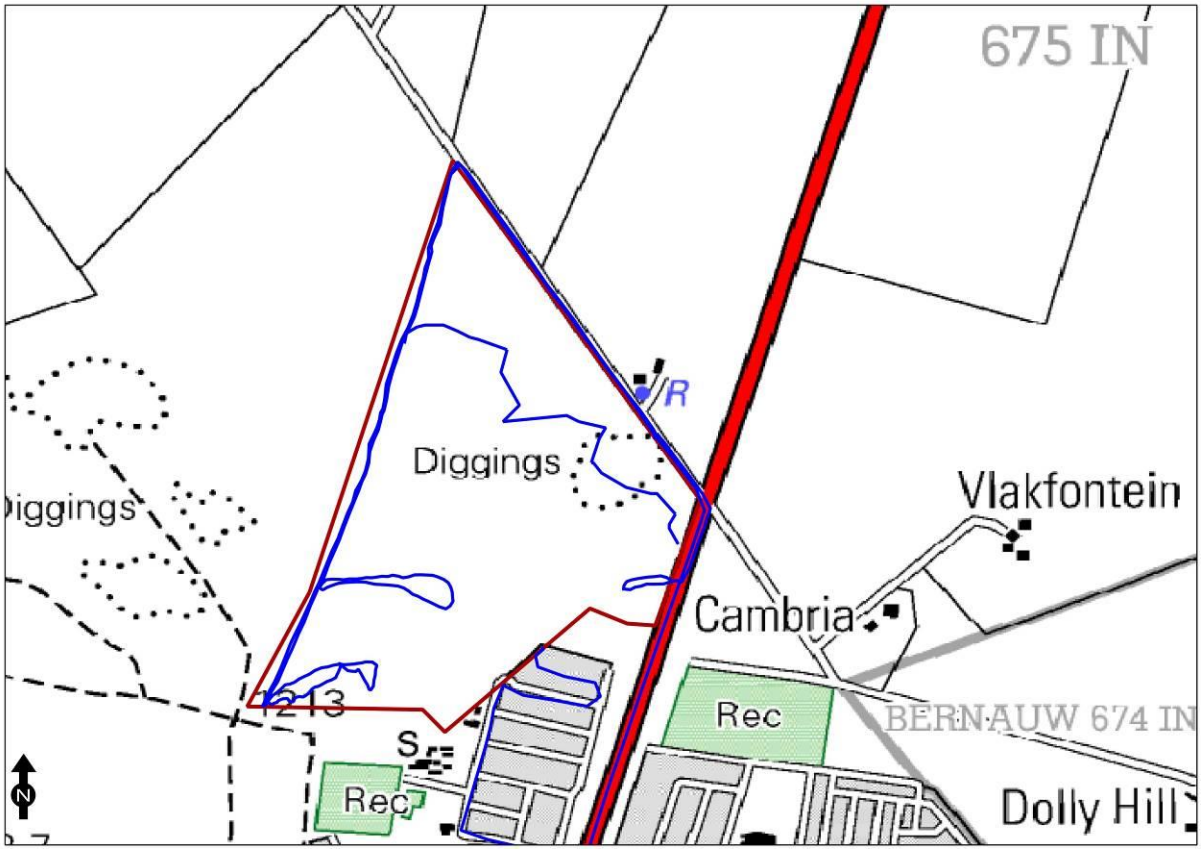

Figure 15: Recorded survey tracks for the project

6.1 Review of existing information/data

Additional information on the cultural heritage of the area was sourced from the following records:

- National Mapping Project by SAHRA (which lists heritage impact assessment reports submitted for South Africa);
- Environmental Potential Atlas (ENPAT);
- Online SAHRIS database;
- National Automated Archival Information retrieval System (NAAIRS);
- Maps and information documents supplied by the client; and
- Several heritage surveys have been conducted in the vicinity of the survey area (published and unpublished material) on the area (Dreyer 2007; Van Schalkwyk 2012a, 2012b, 2014, 2016).

Several heritage surveys have been conducted in the general region during the last few years, but they fall outside the project footprint (Dreyer 2007; Van Schalkwyk 2012a, 2012b, 2014, 2016). Also note that several graves and cemeteries associated with the Anglo-Boer War (2nd South African War) (1899-1902) occur to the west and south of Vryburg (Commonwealth War Graves Commission: https://www.cwgc.org)

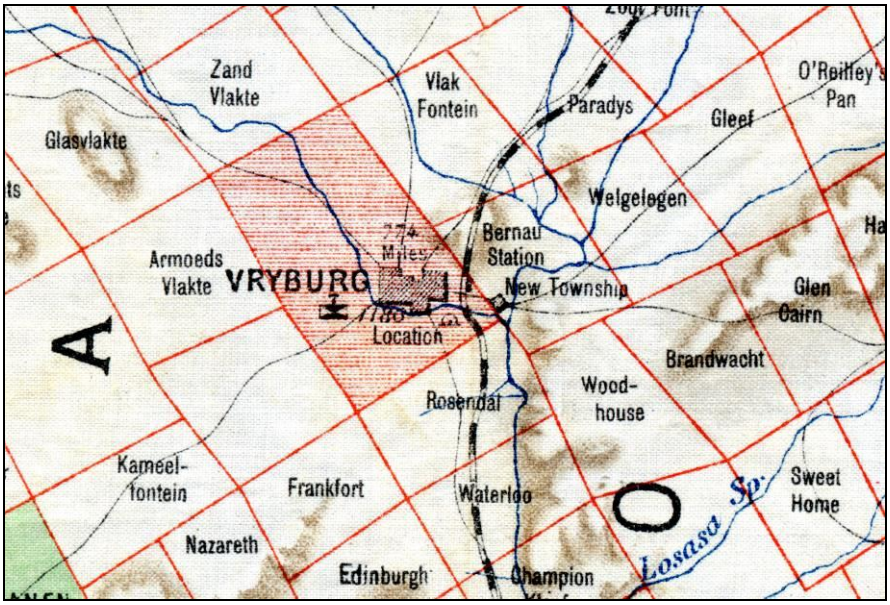

Figure 16: Jeppe's Map indicates the general occupation north of Vryburg during 1899

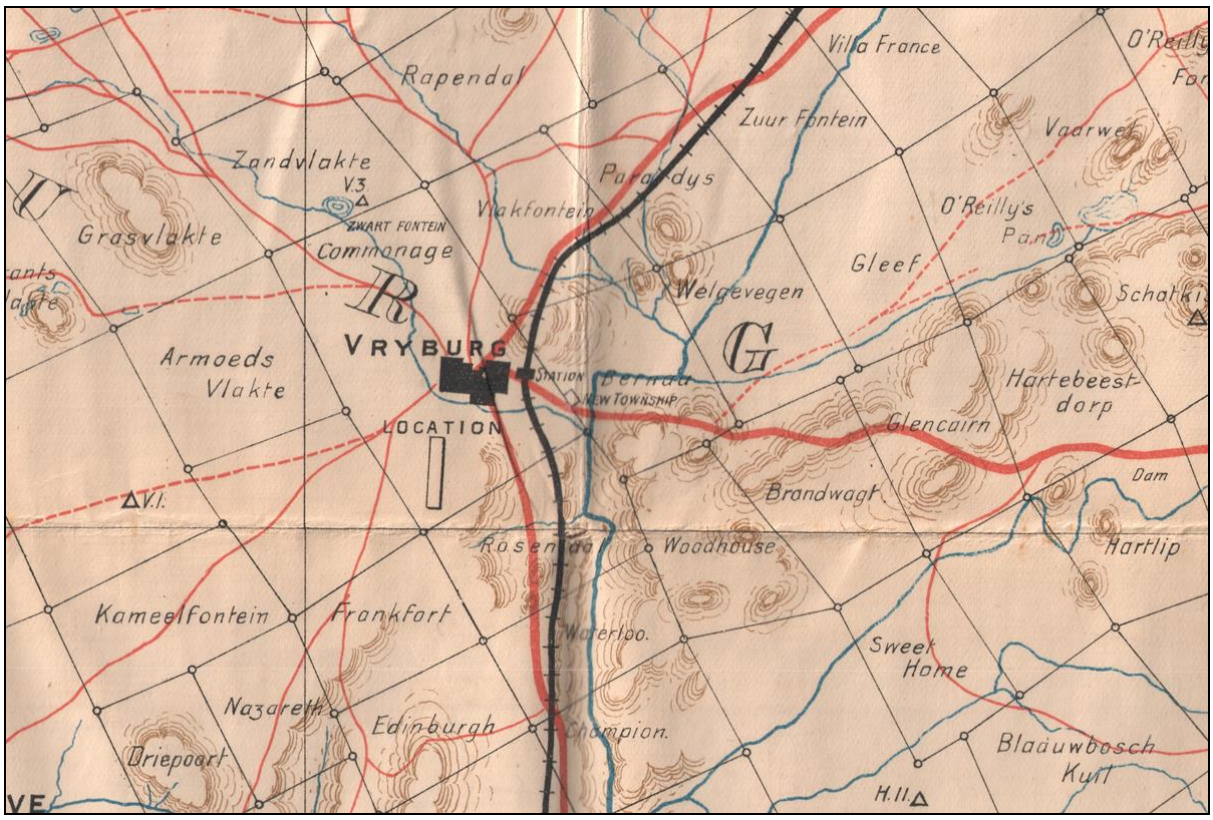

Figure 17: War Office Map indicating the location of the survey area in 1900

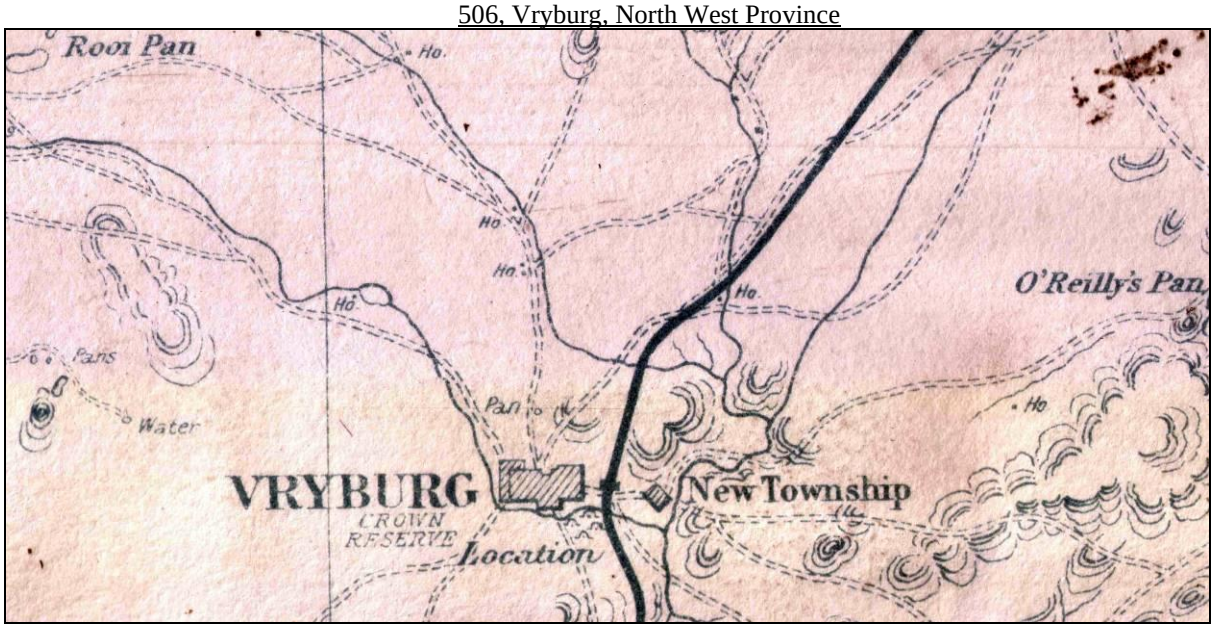

Figure 18: War Office Map indicating the general layout of Vryburg in 1899

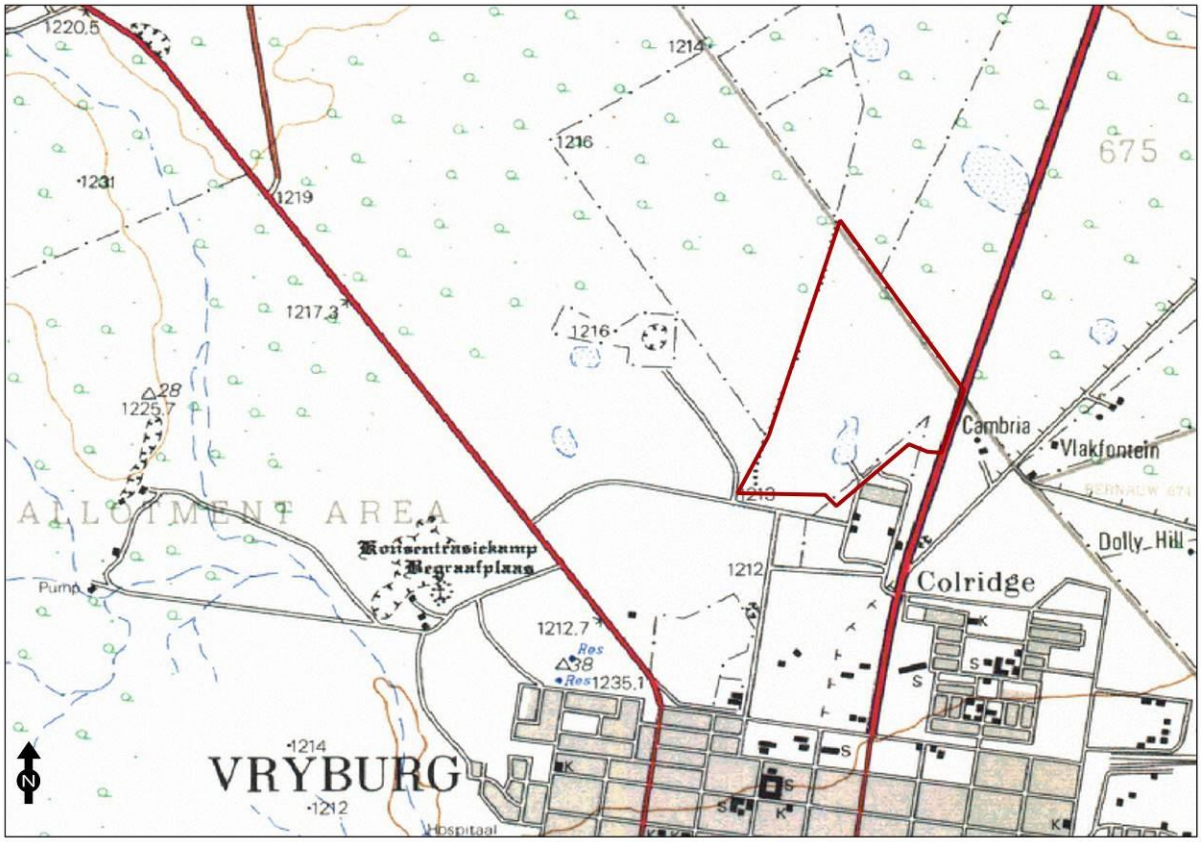

Figure 19: The survey area as indicated on the 1:50 000 topographic map 2624DC (1980)

6.2 Palaeontological sensitivity

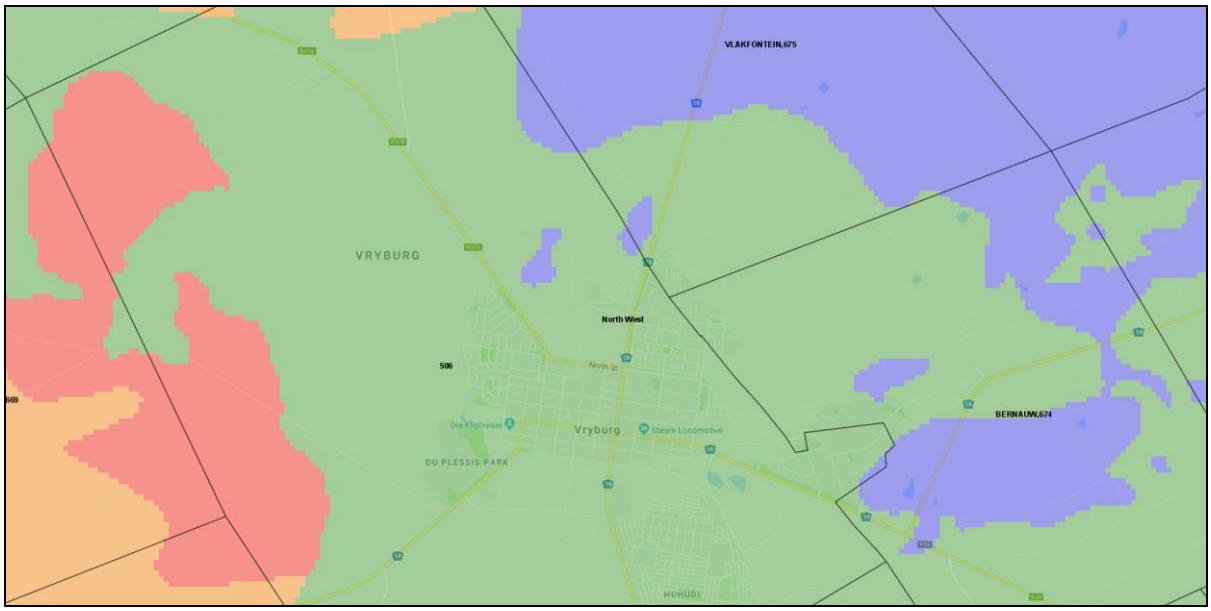

Figure 20: Palaeontological sensitivity zones as indicated for the survey footprint (SAHRIS 2018)

Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	Will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

The palaeontological sensitivity map was extracted from the SAHRIS database and clearly shows sections with green (low), and blue (low) sensitivity. As a result a desktop palaeontological assessment will be required for the survey footprint.

6.3 Site visits

The field survey was conducted on 15 January 2019.

6.4 Social interaction and current inhabitants

The survey footprint is not currently inhabited.

6.5 Public Consultation and Stakeholder Engagement

A Public Participation Process (PPP) will be conducted in terms of Chapter 6 of GN No. 982 of 04 December 2014, of the NEMA, 1998 (Act No. 107 of 1998). The Public Participation Guideline in the Integrated Environmental Management Guideline Series (Guideline 7) is also used, as published in Government Gazette No. 35769 on 10 October 2012.

- Site notices which will be erected at prominent points on and around the study area.

- Flyers that will be distributed to the neighbouring properties and estates/ developments that may be affected by the proposed development.
- Registered mail/hand delivery Letters that will be sent to all surrounding landowners within a 100m radius of the study area.
- Notices regarding the project will be e-mailed or faxed to the councillors in the area and possible stakeholders (including authorities and state departments).
- An advertisement, which will be placed in a local newspaper.

6.6 Assumptions, restrictions, gaps and limitations

No severe physical restrictions were encountered as the survey footprint was fairly accessible.

6.7 Methodology for assessment of potential impacts

All impacts identified during the EIA stage of the study will be classified in terms of their significance. Issues were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected and how it will be affected;
- The **physical exten**t (scale), wherein it is indicated whether:
  - 1 - the impact will be limited to the site;
  - 2 - the impact will be limited to the local area;
  - 3 - the impact will be limited to the region;
  - 4 - the impact will be national; or
  - 5 - the impact will be international.
- The **duration**, wherein it is indicated whether the lifetime of the impact will be:
  - 1 - of a very short duration (0–1 years);
  - 2 - of a short duration (2-5 years);
  - 3 - of a medium-term (5–15 years);
  - 4 - of a long term (> 15 years); or
  - 5 - permanent.
- The **magnitude** of impact, quantified on a scale from 0-10, where a score is assigned:
  - 0 - small and will have no effect;
  - 2 - minor and will not result in an impact;
  - 4 - low and will cause a slight impact;
  - 6 - moderate and will result in processes continuing but in a modified way;
  - 8 - high, (processes are altered to the extent that they temporarily cease); or
  - 10 - very high and results in complete destruction of patterns and permanent cessation of processes;
- The **probability** of occurrence, which describes the likelihood of the impact actually occurring and is estimated on a scale where:
  - 1 - very improbable (probably will not happen);
  - 2 - improbable (some possibility, but low likelihood);
  - 3 - probable (distinct possibility);
  - 4 - highly probable (most likely); or
  - 5 - definite (impact will occur regardless of any prevention measures);
- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- The **status**, which is described as either positive, negative or neutral;
  - The degree to which the impact can be reversed;

- The degree to which the impact may cause irreplaceable loss of resources; and
- The degree to which the impact can be mitigated.

The significance is determined by combining the criteria in the following formula:

S = (E+D+M) x P; where:
S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

Points	Significance Weighting	Discussion
< 30 points	Low	Where this impact would not have a direct influence on the decision to develop in the area.
31-60 point	Medium	Where the impact could influence the decision to develop in the area unless it is effectively mitigated.
> 60 points	High	Where the impact must have an influence on the decision process to develop in the area.

7. The Cultural Heritage Sites

7.1. Isolated occurrences

Isolated occurrences are artefacts or small features recorded on the surface with no contextual information. No other associated material culture (in the form of structures or deposits) was noted that might provide any further context. This can be the result of various impacts and environmental factors such as erosion and modern developments. By contrast archaeological sites are often complex sites with evidence of archaeological deposit and various interrelated features such as complex deposits, stone walls and middens. However, these isolated occurrences are seen as remains of erstwhile complex or larger sites and they therefore provide a broad indication of possible types of sites or structures that might be expected to occur or have occurred in the survey footprint.

Throughout the survey footprint no isolated finds were recorded.

7.2 Heritage sites

No historical or archaeological remains were recorded during the survey.

8. Locations and Evaluation of Sites

None

9. Management Measures

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the proposed development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

9.1 Objectives

- Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.
- The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities

The following shall apply:
- Known sites should be clearly marked in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1).

9.2 Control

In order to achieve this, the following should be in place:
- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.
- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

10. Recommendations and Conclusions

No historical or archaeological (both Stone Age and Iron Age) artefacts, assemblages, features, structures or settlements were recorded during the survey of the project footprint.

It is therefore recommended, from a cultural heritage perspective that the proposed township development may proceed.

Also, please note:

Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should

be halted, and a university or museum notified in order for an investigation and evaluation of the find(s) to take place **(*cf*. NHRA (Act No. 25 of 1999)**, Section 36 (6)).

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Addendum 1: Archaeological and Historical Sequence

The table provides a general overview of the chronological sequence of the archaeological periods in South Africa.

PERIOD	APPROXIMATE DATES
Earlier Stone Age	more than 2 million years ago to >200 000 years ago
Middle Stone Age	<300 000 years ago to >20 000 years ago
Later Stone Age (Includes hunter-gatherer rock art)	<40 000 years ago up to historical times in certain areas
Early Iron Age	c. AD 200 - c. AD 900
Middle Iron Age	c. AD 900 – c. AD 1300
Late Iron Age (Stonewalled sites)	c. AD 1300 - c. AD 1840 (c. AD 1640 - c. AD 1840)

< = less than; > = greater than

Archaeological Context

Stone Age Sequence

Concentrations of Early Stone Age (ESA) sites are usually present on the flood-plains of perennial rivers and may date to over 2 million years ago. These ESA open sites may contain scatters of stone tools and manufacturing debris and secondly, large concentrated deposits ranging from pebble tool choppers to core tools such as handaxes and cleavers. The earliest hominins who made these stone tools, probably not always actively hunted, instead relying on the opportunistic scavenging of meat from carnivore fill sites.

Middle Stone Age (MSA) sites also occur on flood plains, but are also associated with caves and rock shelters (overhangs). Sites usually consist of large concentrations of knapped stone flakes such as scrapers, points and blades and associated manufacturing debris. Tools may have been hafted but organic materials, such as those used in hafting, seldom preserve. Limited drive-hunting activities are also associated with this period.

Sites dating to the Later Stone Age (LSA) are better preserved in rock shelters, although open sites with scatters of mainly stone tools can occur. Well-protected deposits in shelters allow for stable conditions that result in the preservation of organic materials such as wood, bone, hearths, ostrich eggshell beads and even bedding material. By using San (Bushman) ethnographic data a better understanding of this period is possible. South African rock art is also associated with the LSA.

The following chronological sequence was recently established by prominent Stone Age archaeologists (Lombard et al 2012):

Later Stone Age

- Age Range: recent to 20-40 thousand years ago

- General characteristics: expect variability between assemblages, a wide range of formal tools, particularly scrapers (microlithic and macrolithic), backed artefacts, evidence of hafted stone and bone tools, borers, bored stones, upper and lower grindstones, grooved stones, ostrich eggshell (OES) beads and other orna ments, undecorated/decorated OES fragments, flasks/flask fragments, bone tools (sometimes with decoration), fishing equipment, rock art, and ceramics in the final phase.

    - **Ceramic or Final Later Stone Age**
        - Generally < 2 thousand years ago
        - MIS 1
        - Contemporaneous with, and broadly similar to, final Later Stone Age, but includes ceramics
        - Economy may be associated with hunter-gatherers or herders

      Technological characteristics
        - Stone tool assemblages are often microlithic
        - In some areas they are dominated by long end scrapers and few backed microliths; in others formal tools are absent or rare
        - Grindstones are common, ground stone artefacts, stone bowls and boat-shaped grinding grooves may occur
        - Includes grit- or grass-tempered pottery
        - Ceramics can be coarse, or well-fired and thin-walled; some times with lugs, spouts and conical bases; sometimes with decoration; sometimes shaped as bowls
        - Ochre is common
        - Ostrich eggshell (OES) is common
        - Metal objects, glass beads and glass artefacts also occur

    - **Final Later Stone Age**
        - 100 – 4000 years ago
        - MIS 1
        - Hunter-gatherer economy

      Technological characteristics
        - Much variability can be expected
        - Variants include macrolithic (similar to Smithfield [Sampson 1974]) and/or microlithic (similar to Wilton) assemblages
        - Assemblages are mostly informal (Smithfield)
        - Often characterised by large untrimmed flakes (Smithfield)
        - Sometimes microlithic with scrapers, blades and bladelets, backed tools and adzes (Wilton-like)
        - Worked bone is common
        - OES is common
        - Ochre is common
        - Iron objects are rare
        - Ceramics are absent

    - **Wilton**
        - 4000 – 8000 years ago
        - MIS 1

- At some sites continues into the final Later Stone Age as regional variants (e.g. Wilton Large Rock Shelter and Cave James)

Technological characteristics

- Fully developed microlithic tradition with numerous formal tools
- Highly standardised backed microliths and small convex scrapers (for definition
- of standardisation see Eerkens & Bettinger 2001)
- OES is common
- Ochre is common
- Bone, shell and wooden artefacts occur

- **Oakhurst**
  - 7000 – 12 000 years ago
  - MIS 1
  - Includes Albany, Lockshoek and Kuruman as regional variants

Technological characteristics

- Flake based industry
- Characterised by round, end, and D-shaped scrapers and adzes
- Wide range of polished bone tools
- Few or no microliths

- **Robberg**
  - 12 000 to 18 000 years ago
  - MIS 2

Technological characteristics

- Characterised by systematic bladelet (<26mm) production and the occurance of outils ecailles or scaled pieces
- Significant numbers of unretouched bladelets and bladelet cores
- Few formal tools
- Some sites have significant macrolithic elements

- **Early Late Stone Age**
  - 18 000 – 40 000 years ago
  - MIS 2-3
  - Informal designation
  - Also known as transitional MSA-LSA
  - Overlapping in time with final Middle Stone Age

Technological Characteristics

- Characterised by unstandardised, often microlithic, pieces and includes the bipolar technique
- Described at some sites, but not always clear whether assemblages represent a real archaeological phase or a mixture of LSA/MSA artefacts

Middle Stone Age

- Age Range: 20 000 – 30 000 years ago

- General characteristics: Levallois or prepared core techniques (for definitions see Van Peer 1992; Boeda 1995; Pleurdeau 2005) occur in which triangular flakes with convergent dorsal scars, often with faceted striking platforms, are produced. Discoidal systems (for definition see Inizan et al. 1999) and intentional blade production from volumetric cores (for definition see Pleurdeau 2005) also occur; formal tools may include unifacially and bifacially retouched points, backed artefacts, scrapers, and denticulates (for definition see Bisson 2000); evidence of hafted tools; occasionally includes marine shell beads, bone points, engraved ochre nodules, engraved OES fragments, engraved bone fragments, and grindstones.
- In the sequence below we highlight differences or characteristics that may be used to refine interpretations depending on context.

- **Final Middle Stone Age**
  - 20 000 – 40 000 years ago
  - MIS 3
  - Informal designation partly based on the Sibudu sequence

Technological characteristics
- Characterised by high regional variability that may include, e.g. bifacial tools, bifacially retouched points, hollow-based points
- Triangular flake and blade industries (similar to Strathalan and Melikane)
- Small bifacial and unifacial points (similar to Sibudu and Rose Cottage Cave)
- Sibudu point characteristics: short, stout, lighter in mass com pared to points from the Sibudu technocomplex, but heavier than those from the Still Bay
- Can be microlithic
- Can include bipolar technology
- Could include backed geometric shapes such as segments, as well as side scrapers

Sibudu
- 45 000 – 58 000 years ago
- MIS 3
- Previously published as informal late Middle Stone Age and post-Howieson's Poort at Sibudu
- Formerly known post-Howieson's Poort, MSA 3 generally, and MSA III at Klasies River

Technological characteristics
- Most points are produced using Levallois technique
- Most formal retouch aimed at producing unifacial points
- Sibudu unifacial point (type fossil) characteristics: faceted platform; shape is somewhat elongated with a mean length of 43.9 mm), a mean breadth of 26.8 mm and mean thickness of 8.8 mm (L/B ratio 1.7); their mean mass is 11.8 g (Mohapi, 2012)
- Some plain butts
- Rare bifacially retouched points
- Some side scrapers are present
- Backed pieces are rare

- **Howieson’s Poort**
- 58 000 – 66 000 years ago
- MIS 3-4

Technological characteristics

- Characterised by blade technology
- Includes small (<4 cm) backed tools, e.g. segments, scrapers, trapezes and backed blades
- Some denticulate blades
- Pointed forms are rare or absent

- **Still Bay**
  - 70 000 – 77 000 years ago
  - MIS 4-5a

Technological characteristics

- Characterised by thin (<10 mm), bifacially worked foliate or lanceolate points
- Semi-circular or wide-angled pointed butts
- Could include blades and finely serrated points (Lombard et al. 2010)

- **Pre-Still Bay**
  - 72 000 – 96 000 years ago
  - MIS 4-5

Technological characteristics

- Characteristics currently being determined / studied

- **Mossel Bay**
  - 77 000 to —105 000 years ago
  - MIS 5a-4
  - Also known as MSA II at Klasies River or MSA 2b generally

Technological characteristics

- Characterised by recurrent unipolar Levallois point and blade reduction
- Products have straight profiles; percussion bulbs are prominent and often splintered or ring-cracked
- Formal retouch is infrequent and restricted to sharpening the tip orshaping the butt

- **Klasies River**
  - 105 000 to —130 000 years ago
  - MIS 5d-5e
  - Also referred to as MSA I at Klasies River or MSA 2a generally

Technological characteristics

- Recurrent blade and convergent flake production
- End products are elongated and relatively thin, often with curved profiles
- Platforms are often small with diffused bulbs
- Low frequencies of retouch
- Denticulate pieces

- **Early Middle Stone Age**
  - Suggested age MIS 6 to MIS 8 (130 000 to —300 000 years ago)
  - Informal designation

Technological characteristics

- This phase needs future clarification regarding the designation of cultural material and sequencing
- Includes discoidal and Levallois flake technologies, blades from volumetric cores and a generalised toolkit

- **Earlier Stone Age**
  - Age range: >200 000 to 2 000 000 years ago
  - General characteristics: early stages include simple flakes struck from cobbles, core and pebble tools; later stages include intentionally shaped handaxes, cleavers and picks; final or transitional stages have tools that are smaller than the preceding stages and include large blades.
  - In the sequence below we highlight differences or characteristics that may be used to refine interpretations depending on context.

- **ESA-MSA transition**
- 200 to —600 thousand years ago
- MIS 7-15

Technological characteristics

- Described at some sites as Fauresmith or Sangoan
- Relationships, descriptions, issues of mixing and ages yet to be clarified
- Fauresmith assemblages have large blades, points, Levallois technology, and the remaining ESA components have small bifaces
- The Sangoan contains small bifaces (<100 mm), picks, heavy and light-duty denticulated and notched scrapers
- The Sangoan is less well described than the Fauresmith

- **Acheulean**
  - 300 thousand to —1.5 million years ago
  - MIS 8-50

Technological characteristics

- Bifacially worked handaxes and cleavers, large flakes > 10 cm
- Some flakes with deliberate retouch, sometimes classifiedas scrapers
- Gives impression of being deliberately shaped, but could indicate result of knapping strategy
- Sometimes shows core preparation
- Generally found in disturbed open-air locations

- **Oldowan**
  - 1.5 to >2 million years ago
  - MIS 50-75

Technological characteristics

- Cobble, core or flake tools with little retouch and no flaking to predetermined patterns
- Hammerstones, manuports, cores
- Polished bone fragments/tools

Iron Age Sequence

In the northern regions of South Africa at least three settlement phases have been distinguished for early prehistoric agropastoralist settlements during the **Early Iron Age** (EIA). Diagnostic pottery assemblages can be used to infer group identities and to trace movements across the landscape. The first phase of the Early Iron Age, known as **Happy Rest** (named after the site where the ceramics were first identified), is representative of the Western Stream of migrations, and dates to AD 400 - AD 600. The second phase of **Diamant** is dated to AD 600 - AD 900 and was first recognized at the eponymous site of Diamant in the western Waterberg. The third phase, characterised by herringbone-decorated pottery of the **Eiland** tradition, is regarded as the final expression of the Early Iron Age (EIA) and occurs over large parts of the North West Province, Northern Province, Gauteng and Mpumalanga. This phase has been dated to about AD 900 - AD 1200. These sites are usually located on low-lying spurs close to water.

The Late Iron Age (LIA) settlements are characterised by stone-walled enclosures situated on defensive hilltops c. AD 1640 - AD 1830). This occupation phase has been linked to the arrival of ancestral Northern Sotho, Tswana and Ndebele (Nguni–speakers) in the northern regions of South Africa with associated sites dating between the sixteenth and seventeenth centuries AD. The terminal LIA is represented by late 18th/early 19th century settlements with multichrome Moloko pottery commonly attributed to the Sotho-Tswana. These settlements can in many instances be correlated with oral traditions on population movements during which African farming communities sought refuge in mountainous regions during the processes of disruption in the northern interior of South Africa, resulting from the so-called difaqane (or mfecane).

Sites that were identified during the survey are archaeological sites dated to the later (stone walled) phase of the Late Iron Age (c. AD 1640 - AD 1830s) also known as the Late Moloko. These sites all conform to a general settlement layout that forms part of a certain worldview. As such, the livestock enclosures are situated in the central area of a settlement. The court (kgotla) is also located in this central area and is associated with men (men are usually also buried here). The surrounding scalloped walling is where the houses are situated and is associated with women. This type of settlement layout is generally known as the Central Cattle Pattern (CCP) (Huffman 2007).

Ethno-historical Context

Vryburg (meaning town of liberty) had a unsettling beginning with conflict between the Chief Mankwarane of the Tlhaping and the Koranna lead by David Massouw. Local European mercenaries were hired by Massouw with the promise of land and a share in the loot if they win. Command Sarel Cilliers managed to recruit over 400 men in support of Massouw. A small followed during which four of Massouw's followers were killed. Peace was signed on 26 July 1882 and 416 farms duly given to the mercenaries. The occupants of these farms decided to organise their own state and established the Stellaland Republic in August 1833 with Gerrit Jokobus van Niekerk elected as the first president. The capital of the republic, Vryburg, was laid out next to a river (Huhudi, running stream). A postal service soon followed, they designed their own flag. The republic however was short-lived. Meanwhile another small republic, Goshen, was established which caused disturbances in the region which prompted President Paul Kruger of the Transvaal (ZAR) to annex the area. The British intervened and sent a force under Sir Charles Warren to prevent any further movement in the region. Warren occupied the area in 1885 and the region was stabilised as part of the British Bechuanaland. Both these rough republics ceased to exist. British

Bechuanaland became part of the Cape Colony in 1895 and today the region is known for pastoralist farming with Vryburg a prosperous ranching area.

Vryburg is on Cecil Rhodes's great northern railroad, which ran from Cape Town through the Kimberley diamond fields, Vryburg, Mafikeng, and northwards beyond Victoria Falls. It is also on the N14 National Road which runs from Gauteng Province in a southwesterly direction through Vryburg, Kuruman and Upington to the mining town of Springbok in the North-western Cape. This road also connects Gauteng Province with Namibia.

During the Second Boer War, the British built a concentration camp here to house Boer women and children (situated to the west of the town).

Addendum 2: Description of the Recorded Sites

A system for grading the significance of heritage sites was established by the NHRA (Act No. 25 of 1999) and further developed by the South African Heritage Resources Agency (SAHRA 2007) and has been approved by ASAPA for use in southern Africa and was utilised during this assessment.

Example

A. GENERAL SITE DESCRIPTION				
Site type				
Site Period				
Physical description				
Integrity of deposits or structures				
Site extent				
B. SITE EVALUATION				
B1. HERITAGE VALUE			**Yes**	**No**
Historic Value				
It has importance to the community or pattern of South Africa's history or precolonial history.				
It has strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.				
It has significance relating to the history of slavery in South Africa.				
Aesthetic Value				
It has importance in exhibiting particular aesthetic characteristics valued by a particular community or cultural group.				
Scientific Value				
It has potential to yield information that will contribute to an understanding of South Africa's natural and cultural heritage.				
It has importance in demonstrating a high degree of creative or technical achievement at a particular period.				
It has importance to the wider understanding of the temporal change of cultural landscapes, settlement patterns and human occupation.				
Social Value				
It has strong or special association with a particular community or cultural group for social, cultural or spiritual reasons (sense of place).				
Tourism Value				
It has significance through its contribution towards the promotion of a local sociocultural identity and can be developed as tourist destination.				
Rarity Value				
It possesses unique, uncommon, rare or endangered aspects of South Africa's natural or cultural heritage.				
Representative Value				
It is importance in demonstrating the principle characteristics of a particular class of South Africa's natural or cultural places or objects.				
B2. REGIONAL CONTEXT				
Other similar sites in the regional landscape.				
C. SPHERE OF SIGNIFICANCE	**High**	**Medium**	**Low**	
International				
National				
Provincial				
Local				
Specific community				
D. FIELD REGISTER RATING				
National/Grade 1 [should be registered, retained]				
Provincial/Grade 2 [should be registered, retained]				

Local/Grade 3A [should be registered, mitigation not advised]	
Local/Grade 3B [High significance; mitigation, partly retained]	
Generally Protected A [High/Medium significance, mitigation]	
Generally protected B [Medium significance, to be recorded]	
Generally Protected C [Low significance, no further action]	
E. GENERAL STATEMENT OF SITE SIGNIFICANCE	
Low	
Medium	
High	
F. RATING OF POTENTIAL IMPACT OF DEVELOPMENT	
None	
Peripheral	
Destruction	
Uncertain	
G. RECOMMENDED MITIGATION •	
H. APPLICABLE LEGISLATION AND LEGAL REQUIREMENTS •	
I. PHOTOGRAPHS	

Addendum 3: Relocation of Graves

Marked graves younger than 60 years do not fall under the protection of the NHRA (Act No. 25 of 1999) with the result that exhumation, relocation and reburial can be conducted by an undertaker. This will include logistical aspects such as social consultation, purchasing of plots in cemeteries, procurement of coffins, etc. Other legislative measures which may be pertinent include the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), Regulations Relating to the Management of Human Remains (GNR 363 of 22 May 2013) made in terms of the National Health Act No. 61 of 2003, Ordinance on Exhumations (Ordinance No. 12 of 1980) as well as any local and regional provisions, laws and by-laws that may be in place.

Marked graves older than 60 years are protected by the NHRA (Act No. 25 of 1999) an as a result an archaeologist must be in attendance to assist with the exhumation and documentation of the graves. Note that unmarked graves are by default regarded as older than 60 years and therefore also falls under the NHRA (Act No. 25 of 1999, Section 36).

The relocation of graves entails the following procedure:

- Notices of intent to relocate the graves must be put up at the burial site for a period of 60 days. This should contain contact information where communities and family members can register as interested and affected parties. All information pertaining to the identification of the graves must be documented for the application of a SAHRA permit. All notices must be in at least 3 languages, of which English is one. This is a requirement by law.
- These notices of intention must also be placed in at least two local newspapers and have the same information as above.
- Local radio stations can also be used to try contact family members. This is not required by law, but can be helpful.
- During this time (60 days) a suitable cemetery must be identified near to the development or otherwise one specified by the family of the deceased.
- An open day for family members should be arranged after the period of 60 days so that they can gather to discuss the way forward, and to sort out any problems. The developer needs to take the families requirements into account.
- Once the 60 days have passed and all the information from the family members have been received, a permit can be requested from SAHRA. This is a requirement by law.
- Once the permit has been issued, the graves may be exhumed and relocated.
- All headstones must be relocated with the graves as well as any remains and any additional objects found in the grave.

Information needed for the SAHRA permit application

- The permit application must be done by an archaeologist.
- A map of the area where the graves have been located.
- A survey report of the area prepared by an archaeologist.
- All the information on the families that have identified graves.
- A letter of permission from the landowner granting permission to the developer to exhume and relocate the graves.

- A letter (or proof of purchase of the plots) from the new cemetery confirming that the graves will be reburied there.
- Details of the farm name and number, magisterial district and GPS coordinates of the gravesite.

Graves are generally be classified into four categories. These are:

- Graves younger than 60 years;
- Graves older than 60 years, but younger than 100 years;
- Graves older than 100 years; and
- Graves of victims of conflict or of individuals of royal descent.