Phase 1 Heritage Impact Assessment of a 68 ha area for the purpose of crop production under irrigation onPortion 1of the farm Harrisdale 226, near Riverton in the Northern Cape Province.

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Summary

A Phase 1 Heritage Impact Assessment was carried out for the development of a 68 ha area for the purpose of crop production under irrigation on Portion 1of the farm Harrisdale 226, near Riverton in the Northern Cape Province. The underlying geology of the area consists of a pre-Karoo platform of Ventersdorp basalts and andesites (Allanridge Formation, Ra), capped by Quaternary-age sediments made up of a thick mantle of Kalahari sand (Qs) of aeolian and alluvial origins. The site has been severely degraded by previous agricultural activities. There are no indications of rock engravings, prehistoric or historical structures within the footprint area. The survey revealed no evidence of or Stone Age archaeological sites along the section. Isolated stone tools were recorded on the surface. Uncapped and exposed, these artefacts are most likely out of context, being laterally displaced over time. Two separate grave localities have been recorded but these are not located within in the demarcated development area. Quaternary-age sediments adjoining the Vaal River in the area are known for their *in situ* Stone Age archaeological and late Cenozoic palaeontological heritage. However the impact area covering these sediments has already been disturbed by prior agricultural activities. Therefore impact on potential in situ fossil or archaeological material is considered to be unlikely or low. Provided that any *in situ* (below surface) palaeontological or archaeological finds uncovered during the course of excavation activities exceeding 1m in depth into these Ouaternary deposits are reported to the appropriate heritage authorities, there are no objections to the proposed development on archaeological and palaeontological grounds. The study area is considered to be of low archaeological significance and is assigned a site rating of Generally Protected C. The footprint has been sufficiently recorded, mapped and documented in terms of conditions necessary for a Phase 1 Heritage impact assessment and can be accessed for further development.

Introduction

Anticipated development calls for the development of crop production under irrigation on the farm Harrisdale 226, near Riverton in the Northern Cape Province. At the request of Turn 180 Environmental Consultants, a Phase 1 Heritage Impact Assessment was carried out within the designated area (**Fig. 1 & 2**). The survey is required as a prerequisite for new development in terms of the National Environmental Management Act and is also called for in terms of the National Heritage Resources Act 25 of 1999. The site visit and subsequent assessment took place in February 2012. The task involved identification of possible archaeological sites or occurrences in the proposed zone, an assessment of their significance, possible impact by the proposed development and recommendations for mitigation where relevant.

Site information

1:50 000 scale topographic map 2824 BC Windsorton

1:250 000 scale geological map 2826 Kimberley

The proposed development entails the establishment of a 68 ha area for crop production under irrigation (pivot) on Portion 1 of the farm Harrisdale 226, situated about 10 km northeast of Riverton on the bank of the Vaal River (**Fig. 3 & 4**).

Geology

According to the 1:250 000 scale geological map 2826 Kimberley, the underlying geology of the area consists of a pre-Karoo platform of Ventersdorp basalts and andesites (Allanridge Formation, Ra), capped by Quaternary-age sediments made up of a thick mantle of Kalahari sand (Qs) of aeolian and alluvial origins, which varies in thickness of up to 3 m (**Fig. 5**).

Methodology

The baseline study involved a pedestrian survey of the pipeline. This included a 30 m wide section flanking both sides of the pipeline. Common intrusive features like springhare hollows, aardvark dugouts and testpits were also investigated for tell-tale signs of excavated archaeological and paleontological material. Evaluation was based on the following considerations:

- The sections underlain by Quaternary age sediments (*Qc*, *Qs*) should be verified for possible Stone Age artefacts and Quaternary fossils.
- The sections underlain by andesite outcrops (*Ra*) should be verified for possible rock engravings along the footprint.
- The sections underlain by andesites are not fossiliferous and can be excluded from further consideration in the present palaeontological assessment.

A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera, were used to record relevant data. Relevant archaeological information were assimilated for the report and integrated with data acquired during the on-site inspection.

Site significance classification standards prescribed by SAHRA (2005) were used to indicate overall significance and mitigation procedures where relevant (**Table**).

Terms of reference for assessment

- Identify and map possible archaeological heritage resources along the footprint.
- Determine and assess the potential impacts of the proposed development on potential archaeological heritage resources in the proposed areas of impact;
- Recommend mitigation measures to minimize impacts associated with the proposed development.

Regional Archaeology

The lower Vaal River basin is generally rich in archaeological heritage, especially in terms of Stone Age human occupation on the landscape (**Table 1, Fig. 6**). A large majority of archaeological finds associated with the river, are derived from fluvially deposited river gravels. The gravel deposits along the lower Vaal River drainage between Warrenton and Barkley West are laterally widespread. Gravel terraces occur up to a 100m above the present river level. Younger stratified gravel deposits contain a sequence of alluvial deposits ranging in age from the early Middle Pleistocene right up to the Late Pleistocene and Holocene on the basis of palaeontological and archaeological evidence. An abundance of Early Stone Age handaxes, cleavers and

core-axes, primarily made from quartzite have been recovered in the gravel deposits, from the primary alluvial contexts. Early Stone Age handaxe and Middle Stone Age flake blade assemblages as well as human burial sites have been found nearby on the farms De Hoop 65, Nooitgedacht 66 and Pniel 281 in exposures along the riverbed of the Vaal (1:50 000 topo 2824 DA Barkley West). Grave sites have also been located and excavated north of Riverton during the 1920's.

Undifferentiated deposits of unconsolidated to semi-consolidated sediments including calcretes, surface limestones and aeolian sand cap the gravels and bedrock andesites, with the characteristically red-brown Late Quaternary Kalahari sands representing the latest phase. The base and lower levels of the Kalahari sands, which cover vast areas around Kimberley, have produced localized densities of Fauresmith and Middle Stone Age artefacts . The Fauresmith types are regarded as an important transitional stone tool industry at the beginning of the Middle Stone Age. Later Stone Age surface scatters is also frequent on the modern landscape. In addition, many rock engraving sites are located in the Lower Vaal River Basin including the area around Riverton where andesites outcrops occur.

Regional Palaeontology

The Vaal River dates back to the late Cretaceous and is one of the principal fluvial conduits in southern Africa. In the Middle to Lower Vaal River Basin the river is flanked by fluvial and rudaceous gravel formations deposited throughout the Cenozoic as a result of factors like cyclic development, climatic change, local tectonics, lithological variations and river capture. The alluvial formations of the Vaal River basin are best developed along the lower 300 km of the river. It has provided good exposures for diamond digging and has gained world acclaim with the discovery of diamonds in the late 1860. Diamond-diggers also recovered rare mammal fossils and stone tools so that at the turn of the 19th century, the Vaal River gravels represented an important Late Cenozoic fossil mammal locality in sub-Saharan Africa.

Late Cenozoic fossil fauna of uncertain provenance have been retrieved from the alluvial and terrace gravels between Bloemhof and the Vaal River's junction with the Orange (**Table 1, Fig 4**). Gravel terraces between 21m and 30m above present river level, contain frequent sandy lenses and have yielded Pio-Pleistocene vertebrate fauna

such as the extinct proboscidian, *Mammuthus subplanifrons* that are estimated to be ranging in age from 4.5 to 3.5 million years old. Other fossil remains include extinct suids, hipparions, bovids and other proboscidian taxa, notably *Notochoerus capensis*, and *Elephas iolensis*. Finds from river silts near the Warrenton townlands include an upper right third molar of the plains zebra, *Equus burchelli*, a well-mineralized left mandibular ramus of the spotted hyaena, *Crocuta crocuta*, and a lower right first molar of the giant extinct buffalo, *Homoioceras antiquus*.

Quaternary fossils are abundant in the youngest river gravels along the river itself, but intrusive features within the gravels, such as fossilized hyaena dens, are also located higher up outside the present valleys.

Results of Survey

Evaluation was based on the following considerations:

- The sections underlain by Quaternary age sediments (*Qs*) were verified for possible Stone Age artefacts and Quaternary fossils.
- The sections underlain by andesite outcrops (*Ra*) were verified for possible rock engravings along the footprint.
- The sections underlain by andesite outcrop (*Ra*) are not fossiliferous and can be excluded from further consideration in the present palaeontological assessment.

The site has been severely degraded by previous agricultural activities (**Fig. 7**). There are no indications of rock engravings, prehistoric or historical structures within the footprint area. The survey revealed no evidence of or Stone Age archaeological sites along the section. Isolated stone tools were recorded on the surface. Uncapped and exposed, these artefacts are most likely out of context, being laterally displaced over time (**Fig. 8**). Two separate grave localities have been recorded but these are not located within in the demarcated development area (**Table 2; Fig. 9 - 14**).

Impact Statement and Recommendation

Quaternary-age sediments adjoining the Vaal River in the area are known for their *in situ* Stone Age archaeological and late Cenozoic palaeontological heritage. However the impact area covering these sediments has already been disturbed by prior

agricultural activities. Therefore impact on potential *in situ* fossil or archaeological material is considered to be unlikely or low. Provided that any *in situ* (below surface) palaeontological or archaeological finds uncovered during the course of excavation activities exceeding 1m in depth into these Quaternary deposits are reported to the appropriate heritage authorities, there are no objections to the proposed development on archaeological and palaeontological grounds.

The study area is considered to be of low archaeological significance and is assigned a site rating of Generally Protected C (**Table 3**). The footprint has been sufficiently recorded, mapped and documented in terms of conditions necessary for a Phase 1 Heritage impact assessment and can be accessed for further development.

References

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AUTHOR DETAILS

Dr. Lloyd Rossouw specializes in the southern African Quaternary and has over twenty years of extensive fieldwork experience. He graduated with Archaeology and Cultural Anthropology for his BA degree and went on to receive training in southern African archaeology at Honours level at the University of Stellenbosch's Archaeology Department. He received specialized training in faunal osteology and Quaternary palaeontology for his MSc-degree at the Bernard Price Institute of Palaeontology (Wits) and obtained his PhD-degree at the University of the Free State, specializing in plant microfossil research. He is a member of the Association for Southern African Professional Archaeologists (ASAPA) and the Palaeontological Society of Southern Africa (PSSA).

DECLARATION OF INDEPENDENCE

I, Lloyd Rossouw, declare that I act as an independent specialist consultant. I do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference. I have no interest in secondary or downstream developments as a result of the authorization of this project.

Yours truly,

18 July 2019

Tables and Figures

| Table 1. Summary of archaeological and palaeontological sites located within 20kr | n |
|---|---|
| of Riverton (see Fig. 3). LSA, MSA, ESA refers to temporally different | |
| archaeological industries. | |

| | Locality | Context | Archaeology | Vertebrate Mammal |
|-------|------------------------|---|---|----------------------|
| | | | | Fossils (Late |
| | | | | Cenozoic) |
| 1 | Kantienkoppie | Gravel deposits, | LSA, MSA, ESA | Loxodonta, |
| | | Late Quaternary overburden | | Hippopotamus, |
| | | | | Phacochoerus, Equus, |
| | | | | Syncerus, |
| | | | | Connochaetes, |
| | | | | Damaliscus, |
| | | | | Antidorcas |
| 2 | The Bend (Pniel 6) | Gravel deposits, Late Quaternary overburden | Ceramics, LSA, ESA, Pastoralist burials | Proboscidea Indet., |
| | | | | Equus, |
| | | | | Ceratotherium, |
| | | | | Hippopotamus, |
| | | | | Phacochoerus, |
| | | | | Kobus, Damaliscus, |
| | | | | Megalotragus, |
| | | | | Connochaetes, |
| | | | | Antidorcas |
| 3 | Pniel 1 (Power's Site) | Gravel deposits | MSA, ESA | Elephas, |
| | | | | Hippopotamus, |
| | | | | Ceratotherium, |
| | | | | Phacochoerus, |
| | | | | Metridiochoerus, |
| | | | | Equus, Megalotragus, |
| | | | | Homoiocerus, |
| | | | | Syncerus, |
| | | | | Taurotragus |
| | | | | Antidorcas |
| 4 - 8 | Nooitgedacht | Gravel deposits | MSA, ESA, | Loxodonta, |
| | | | Pastoralist burials | Hippopotamus, |
| | | | | Phacochoerus, Equus, |
| | | | | Taurotragus, |
| | | | | Damaliscus, |
| | | | | Connochaetes, |

| | | | | Megalotragus |
|----|-------------|------------------------------------|------------------|----------------------|
| 9 | Riverton | Gravel Deposits, | ESA, Pastoralist | Equus, Phacochoerus, |
| | | Unknown | burials | Hippopotamus |
| 10 | Bestpan | Farm a short | MSA | Connochaetes, |
| | | distance upstream from Riverton | | Megalotragus |
| | | pumping station | | |
| 11 | Willowbank | Gravel deposits in | MSA | cf. Aepyceros, |
| | | bend of Vaal | | Connochaetes. |
| | | opposite Riverton | LSA | |
| | | pumping station | | Megalotragus, |
| | | | | Syncerus |
| 12 | Morrisdraai | Island in Vaal | ESA | Equus, |
| | | River, gravel | | Hippopotamus cf |
| | | deposit | | mppopotantas, cj. |
| | | | | Hippotragus |

 Table 2. Grave locality coordinates.

| Feature | Coordinates | |
|---------------------|----------------------------|--|
| Grave with marker | 28°29'0.00"S 24°40'19.40"E | |
| Two unmarked graves | 28°29'27.21"S 24°39'1.80"E | |

| Field Rating | Grade | Significance | Mitigation |
|---------------------|----------|-------------------|---------------------|
| National | Grade 1 | - | Conservation; |
| Significance (NS) | | | national site |
| | | | nomination |
| Provincial | Grade 2 | - | Conservation; |
| Significance (PS) | | | provincial site |
| | | | nomination |
| Local Significance | Grade 3A | High significance | Conservation; |
| (LS) | | | mitigation not |
| | | | advised |
| Local Significance | Grade 3B | High significance | Mitigation (part of |
| (LS) | | | site should be |
| | | | retained) |
| Generally Protected | - | High/medium | Mitigation before |
| A (GP.A) | | significance | destruction |
| Generally Protected | - | Medium | Recording before |
| B (GP.B) | | significance | destruction |
| Generally Protected | - | Low significance | Destruction |
| C (GP.C) | | | |

Table 3. Field rating categories as prescribed by SAHRA.



Figure 1. Map of the proposed development area on Portion 1 of the farm Harrisdale 226 (portion of 1:50 000 topographic 2824 BC Windsorton).



Figure 2. Layout of the proposed development.



Figure 3. Aerial view of the site.



Figure 4. Aerial view of the old pivot area (yellow circle).



Figure 5.According to the above portion of the 1:250 000 scale geological map 2824 Kimberley, the underlying geology of the study area consists of a pre-Karoo platform of Ventersdorp basalts and andesites (Allanridge Formation, *Ra*), capped by Quaternary-age sediments made up of a thick mantle of Kalahari sand (*Qs*) of aeolian and alluvial origin, which varies in thickness of up to 3 m in depth.



Figure 6. Map of archaeologically and palaeontologically significant sites numbered from 1 to 12 previously recorded in the region. The site is marked by a yellow star.





Figure 7. General view of the proposed development footprint.



Figure 8. General view of the old pivot site (above) and an isolated and derived LSA scraper (below).



Figure 9. Aerial view of gravesite localities recorded in the area.



Figure 10. Isolates gravesite with modern marker located about 1.5 km west-northwest of the impact area.



Figure 11. Unmarked Grave 1 located 70 m northeast of the old pivot area. . Scale 1 = 10 cm.



Figure 12. Unmarked Grave 2 located 70 m northeast of the old pivot area. Scale 1 = 10 cm.



Figure 13. Aerial view of the 2 unmarked graves located 70 m northeast of the impact area.



Figure 14. Aerial view of the 2 unmarked graves located 70 m northeast of the impact area.