

**Phase 1 Heritage Impact Assessment of the proposed
extension of the Rustfontein Dam WTW facility, Free
State Province.**



Report prepared for
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Executive Summary

At the request of Metadel Consulting Engineers, a Phase 1 Heritage Impact Assessment was carried out for the proposed extension of the Rustfontein Water Treatment Works facility at the Rustfontein Dam situated 10 km south of the N8 national road between Bloemfontein and Thaba Nchu in the Free State Province. The terrain has been extensively altered by the construction of the existing WTW facility. The site is capped by disturbed and geologically recent residual soils underlain by palaeontologically sterile dolerite intrusions along the southern perimeter. Impact on potential palaeontological heritage resources within the overlying Quaternary soils is considered unlikely. There is no evidence of *in situ* Stone Age archaeological material, rock art, prehistoric structures, graves or historically significant structures older than 60 years within the area demarcated for development. The terrain is regarded as of low archaeological and palaeontological significance and is assigned the rating of Generally Protected C (GP.C).

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Introduction

At the request of Metadel Consulting Engineers, a Phase 1 Heritage Impact Assessment was carried out for the proposed extension of the Rustfontein Water Treatment Works facility at the Rustfontein Dam situated 10 km south of the N8 national road between Bloemfontein and Thaba Nchu in the Free State Province (**Fig. 1**). The region's unique and non-renewable archaeological and palaeontological heritage sites are „Generally“ protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. As many such heritage sites are threatened daily by development, both the environmental and heritage legislation require impact assessment reports that identify all heritage resources including

archaeological and palaeontological sites in the area to be developed, and that make recommendations for protection or mitigation of the impact of the sites.

Where possible archaeological and palaeontological sites should be saved, but where this is not possible, the loss of information about our heritage resources can be mitigated against or minimized through a process of excavation (or sampling) and dating of a representative sample of the evidence from the site. This allows the heritage specialist to record at least part of the history of the place. Early assessment and mitigation minimizes the negative effects of development and often saves the developer considerable delays and related costs.

Archaeological Impact Assessments (AIAs) and Palaeontological Impact Assessments (PIAs), or overarching Heritage Impact Assessments (HIAs) are most often specialist reports that form part of the wider heritage component of Environmental Impact Assessments (EIAs) required in terms of the National Environmental Management Act or of the Environment Conservation Act by the provincial Department of Environment Affairs; or Environmental Management Plans (EMPs) required by the Department of Minerals and Energy.

Legislative framework

The primary legal trigger for identifying when heritage specialist involvement is required in the Environmental Impact Assessment process is the National Heritage Resources (NHR) Act (Act No 25 of 1999). The NHR Act requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance are protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures over 60 years of age, living heritage and the collection of oral histories, historical settlements, landscapes, geological sites, palaeontological sites and objects.

The Act identifies what is defined as a heritage resource, the criteria for establishing its significance and lists specific activities for which a heritage specialist study may be required. In this regard, categories of development listed in Section 38 (1) of the NHR Act are:

- The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

- The construction of a bridge or similar structure exceeding 50m in length;
- Any development or other activity which will change the character of the site;
- Exceeding 5000 m² in extent;
- Involving three or more existing erven or subdivisions thereof;
- Involving three or more subdivisions thereof which have been consolidated within the past five years;
- Costs of which will exceed a sum set in terms of regulations by the South African Heritage Resources Agency (SAHRA).
- The rezoning of a site exceeding 10 000 m².
- Any other category of development provided for in regulations by the South African Heritage Resources Agency (SAHRA).

If a heritage resource is likely to be impacted by a development listed in Section 38 (1) of the NHR Act (**Appendix 1**), a heritage assessment will be required either as a separate HIA or as the heritage specialist component (AIA or PIA) of an EIA.

The significance or sensitivity of heritage resources within a particular area or region can inform the EIA process on potential impacts and whether or not the expertise of a heritage specialist is required. A range of contexts can be identified which typically have high or potential cultural significance and which would require some form of heritage specialist involvement (**Table 1**). This may include formally protected heritage sites or unprotected, but potentially significant sites or landscapes (**Table 2**). The involvement of the heritage specialist in such a process is usually necessary when a proposed development may affect a heritage resource, whether it is formally protected or unprotected, known or unknown. In many cases, the nature and degree of heritage significance is largely unknown pending further investigation (e.g. capped sites, assemblages or subsurface fossil remains). On the other hand, it is also possible that a site may contain heritage resources (e.g. structures older than 60 years), with little or no conservation value. In most cases it will be necessary to engage the professional opinion of a heritage specialist in determining whether or not further heritage specialist input in an EIA process is required. This may involve site-significance classification standards as prescribed by SAHRA (**Table 3**). Alternatively, useful sources of information on heritage resources in South Africa can also be obtained through SAHRA's national database of heritage resources, including

existing heritage survey information as well as other published or secondary source material on the overall history of a particular area or site.

Methodology

The archaeological significance of the affected area was evaluated through a desktop study and carried out on the basis of existing field data, database information and published literature. This was followed by a field assessment by means of a pedestrian survey. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera were used for recording purposes. Relevant archaeological information, aerial photographs and site records were consulted and integrated with data acquired during the on-site inspection.

The task also involved identification and assessment of possible archaeological heritage within the proposed project area, in accordance with section 9(8) and appendix 6 (“Specialist reports”) of the NEMA EIA Regulations, 2014 , whereby the specialist report takes into account the following terms of reference:

- Identify and map possible archaeological sites and occurrences using available resources.
- Determine and assess the potential impacts of the proposed development on potential archaeological resources;
- Recommend mitigation measures to minimize potential impacts associated with the proposed development.

The study area is rated according to field rating categories as prescribed by SAHRA (**Table 3**) as well as a probability of impact methodology for assessing the Duration (time scale), Extent (spatial scale), Irreplaceable loss of resources, Reversibility of the potential impacts and the Probability of occurrence of potential impacts (**Table 4**).

Description of the Affected Area

Locality data

1 : 50 000 scale topographic map: 2926BC Meadows

1 : 250 000 scale geological map 2924 Bloemfontein

Site coordinates (**Fig. 2**):

- 1) 29°16'20.14"S 26°37'10.58"E

- 2) 29°16'17.85"S 26°37'3.57"E
- 3) 29°16'6.17"S 26°37'8.29"E
- 4) 29°16'3.03"S 26°37'27.01"E
- 5) 29°16'16.87"S 26°37'22.77"E

The site consists of the existing Water Treatment Works located next to the dam wall of the Rustfontein Dam near the Rustfontein Nature Reserve (**Fig. 3**). The Rustfontein Dam was built in 1955.

Geology

Sedimentary rocks underlying the area belong to fossil – bearing sandstones, shales and mudstones of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup). Jurassic-age dolerite intrusions, in the form of sills and dykes, occur extensively in the region. Quaternary deposits younger than two million years in age, comprising unconsolidated soils and alluvial sediments, represent the Neogene regolith in the area.

Background

The Karoo geological strata within the affected area are generally accepted to be Late Permian in age and are assigned to the *Dicynodon* Assemblage Zone (AZ) (**Fig. 4**). This biozone is characterized by the presence of a distinctive and fairly common dicynodont genus. Therapsids and other vertebrate fossils from this biozone are usually found as dispersed and isolated specimens in mudrock horizons, associated with an abundance of calcareous nodules (**Fig. 5**). Plant fossils (*Dadoxylon*, *Glossopteris*) and trace fossils (arthropod trails, worm burrows) are also present. The sediments assigned to the *Dicynodon* AZ are associated with stream deposits consisting of floodplain mudstones and subordinate, lenticular channel sandstones.

Numerous Quaternary-age fossils, assigned to the Pleistocene Period, have been recorded from various localities along the Honingspruit and Modder River near Sannaspos northwest of the study area and include the extinct species *Equus capensis*, *Megalotragus priscus*, *Pelorovis antiquus*, *Antidorcas bondi* and *Equus lylei* (**Fig. 5**). Surface scatters of Later Stone Age and Middle Stone Age artefacts are frequent archaeological components along erosional gullies of the nearby Modder River and its

tributaries. Stone tools are mostly made of hornfels, a dark, fine-grained isotropic rock found in the hot-contact zone between the dolerites and shales in the area.

Historically, the Thaba Nchu area east of the Modder River has a rich historical past and was for a short period proclaimed as a traditional Basutho area (Moroka) by the British authorities up until 1884. Following the capture of Bloemfontein by British forces during the Anglo-Boer War, military movements occurred well towards the east of Bloemfontein around Sannaspos and Thaba Nchu. The British were dealt a severe blow when Boer forces under command of Genl. Christiaan de Wet defeated Brigadier-General R.G. Broadwood's forces in a brief battle at Sannaspos, about 12 km northwest of the affected area (**Fig. 5**).

Field Assessment

The terrain has been extensively altered by the construction of the existing WTW facility (**Fig. 6**). The site is capped by disturbed and geologically recent residual soils underlain by palaeontologically sterile dolerite intrusions along the southern perimeter. (Point 1 & 5, **Fig. 7**).

Impact Statement and Recommendation

Significance of impacts is summarized in **Table 4**. The southern part of the study area is primarily underlain by dolerite bedrock and is not considered palaeontologically significant, while impact on potential palaeontological heritage resources within the overlying Quaternary soils is considered unlikely. There is no evidence of *in situ* Stone Age archaeological material, rock art, prehistoric structures, graves or historically significant structures older than 60 years within the area demarcated for development. The terrain is regarded as of low archaeological and palaeontological significance and is assigned the rating of Generally Protected C (GP.C).

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Tables and Figures

Table 1: Relationship between different heritage contexts, heritage resources likely to occur within these contexts, and likely sources of heritage impacts in the central interior of South Africa.

Heritage Context	Heritage Resources (Central Interior)	Impact
Palaeontology	Palaeozoic and Mesozoic fossil remains, e.g. Karoo Supergroup Neogene regolith	Road cuttings Quarry excavation Bridge and pipeline construction (Quaternary alluvial deposits)
Archaeology Early Stone Age Middle Stone Age LSA - Herder Historical	Types of sites that could occur in the Free State include: Localized Stone Age sites containing artifacts, animal and human remains found near <i>inter alia</i> the following: River courses/springs Stone tool making sites Cave sites and rock shelters Freshwater shell middens Ancient, kraals and stonewalled complexes Abandoned areas of past human settlement Burials over 100 years old Historical dumps Structural remains Objects including industrial machinery, aircraft and maritime objects	Subsurface excavations including ground levelling, landscaping, foundation preparation, road building, bridge building, pipeline construction, construction of electrical infrastructure and alternative energy facilities, township development.
History	Historical townscapes Historical structures, i.e. older than 60 years Historical burial sites Places associated with social identity/displacement, e.g. Witsieshoek Cave Historical mission settlements, e.g. Bethulie, Beersheba	Demolition or alteration work. New development.
Natural Landscapes	Formally proclaimed nature reserves Evidence of pre-colonial occupation Scenic resources, e.g. view corridors, viewing sites, Historical structures/settlements older than 60 years Geological sites of cultural significance.	Demolition or alteration work. New development.
Relic Landscape Context	Battle and military sites, e.g. Magersfontein Precolonial settlement and burial sites Historical graves (marked or unmarked, known or unknown) Human remains (older than 100 years) Associated burial goods (older than 100 years) Burial architecture (older than 60 years)	Demolition or alteration work. New development.

Table 2. Examples of heritage resources located in the Free State Province.

Historically, archaeologically and palaeontologically significant heritage sites & landscapes	Examples
Landscapes with unique geological or palaeontological history	Karoo Basin Beaufort Group sedimentary strata Vredefort Dome World Heritage Site.
Landscapes characterised by certain geomorphological attributes where a range of archaeological and palaeontological sites could be located.	Vaal, Modder and Riet River valleys Pans, pandunes and natural springs of the Free State panveld.
Relic landscapes with evidence of past, now discontinued human activities	Cave sites in the Maluti Drakensberg region Southern Highveld pre-colonial settlement complexes.
Landscapes containing concentrations of historical structures.	Concentration camps & cemeteries from the South African War.
Historical towns, historically significant farmsteads, settlements & routes	Batho historical township area in Mangaung (Bloemfontein).
Battlefield Sites, burial grounds and grave sites older than 60 years.	

Table 3. Field rating categories as prescribed by SAHRA.

Field Rating	Grade	Significance	Mitigation
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

Table 4. Summary of potential Heritage Impact at the site before and after the Phase 1 Impact Assessment.

Duration	Extent	Irreplaceability	Reversibility Impact	Probability of Archaeological Impact	Probability of Palaeontological Impact	Cumulative Impact
Before site visit						
Permanent	Local	Moderate potential for loss	Irreversible	High	Medium	Low
After site visit						
Permanent	Local	Low potential for loss	Irreversible	Improbable	Improbable	Low

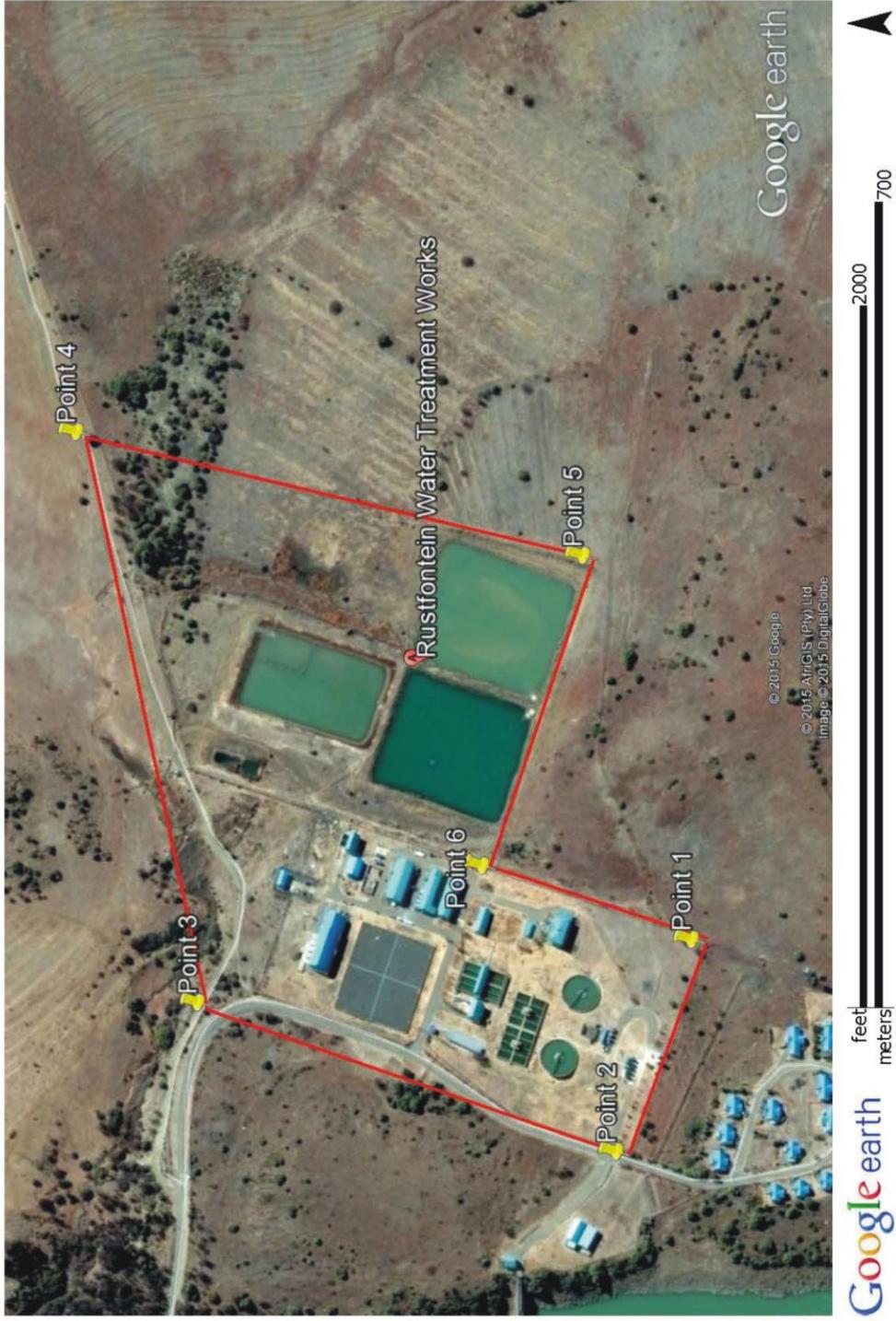


Figure 2. Aerial view of the study area.



Figure 3. Panoramic view of the facility, looking south-southwest (above) and northeast (below).

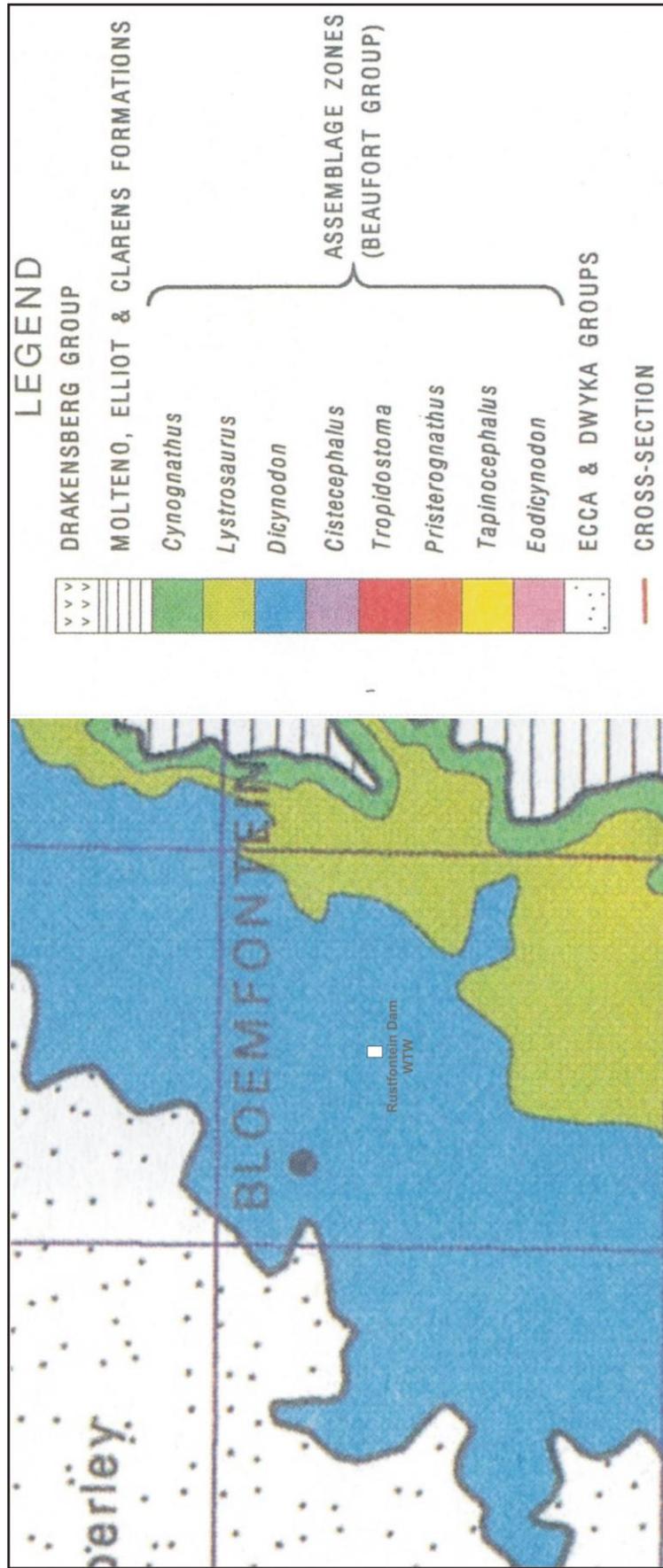


Figure 4. Distribution of vertebrate biozones of the Beaufort Group (after Rubidge 1995).



Figure 5. Distribution of archaeological and palaeontological localities in the vicinity of the study area.

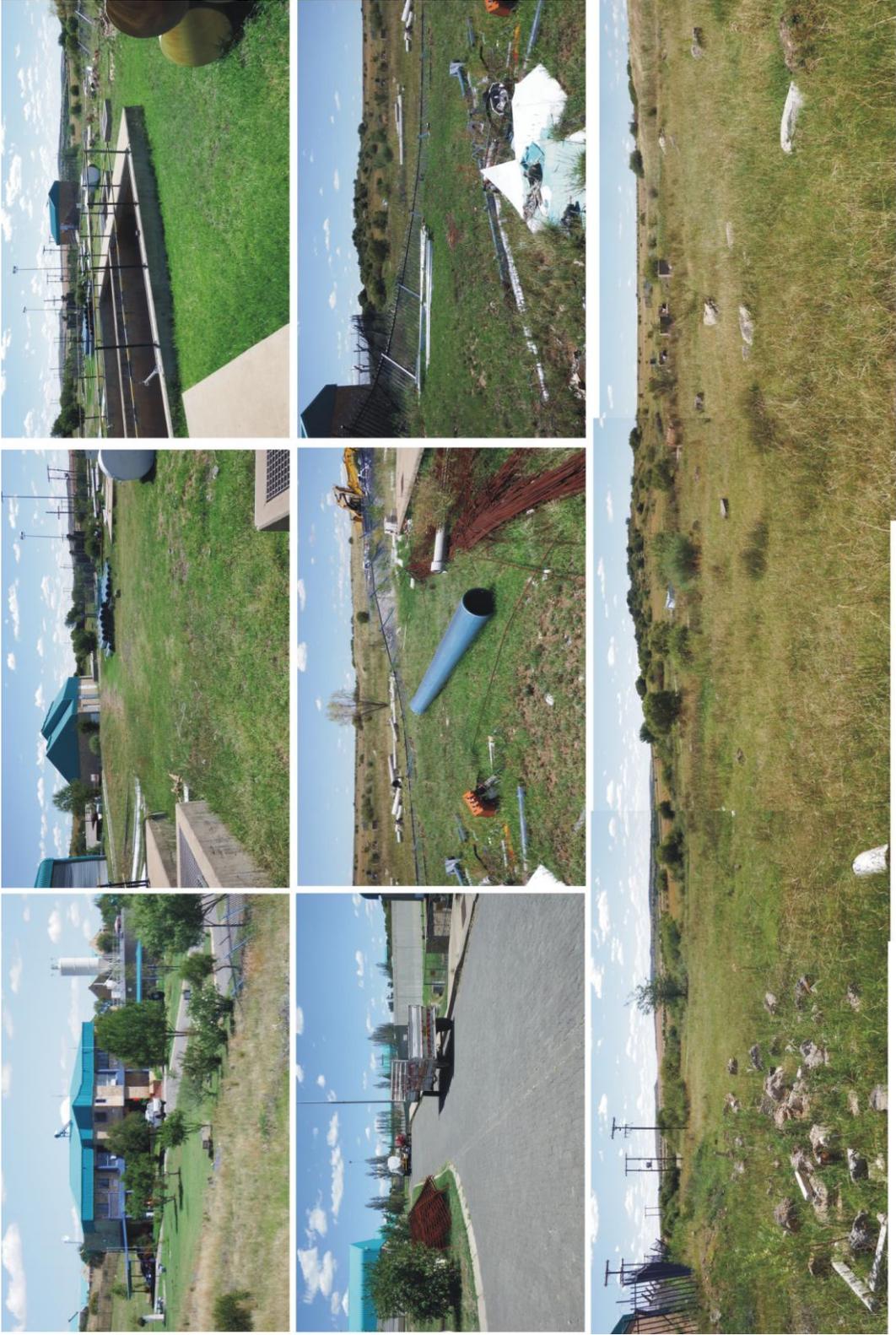


Figure 6. The terrain has been extensively altered by the construction of the existing WTW facility.



Figure 7. Dolerite outcrop is exposed along the southern perimeter of the study area.

Appendices

Appendix 1

Heritage resources management

- 38.** (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—
- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
 - (b) the construction of a bridge or similar structure exceeding 50 m in length;
 - (c) any development or other activity which will change the character of a site—
 - (i) exceeding 5 000 m² in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
 - (d) the re-zoning of a site exceeding 10 000 m² in extent; or
 - (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,
- must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.
- (2) The responsible heritage resources authority must, within 14 days of receipt of a notification in terms of subsection (1)—
- (a) if there is reason to believe that heritage resources will be affected by such development, notify the person who intends to undertake the development to submit an impact assessment report. Such report must be compiled at the cost of the person proposing the development, by a person or persons approved by the responsible heritage resources authority with relevant qualifications and experience and professional standing in heritage resources management; or
 - (b) notify the person concerned that this section does not apply.
- (3) The responsible heritage resources authority must specify the information to be

provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;

(b) an assessment of the significance of such resources in terms of the heritage

assessment criteria set out in section 6(2) or prescribed under section 7;

(c) an assessment of the impact of the development on such heritage resources;

(d) an evaluation of the impact of the development on heritage resources relative

to the sustainable social and economic benefits to be derived from the development;

(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(f) if heritage resources will be adversely affected by the proposed development,

the consideration of alternatives; and

(g) plans for mitigation of any adverse effects during and after the completion of

the proposed development.

(4) The report must be considered timeously by the responsible heritage resources

authority which must, after consultation with the person proposing the development,

decide—

(a) whether or not the development may proceed;

(b) any limitations or conditions to be applied to the development;

(c) what general protections in terms of this Act apply, and what formal protections may be applied, to such heritage resources;

(d) whether compensatory action is required in respect of any heritage resources

damaged or destroyed as a result of the development; and

(e) whether the appointment of specialists is required as a condition of approval

of the proposal.

(5) A provincial heritage resources authority shall not make any decision under

subsection (4) with respect to any development which impacts on a heritage resource

protected at national level unless it has consulted SAHRA.

(6) The applicant may appeal against the decision of the provincial heritage resources

authority to the MEC, who—

(a) must consider the views of both parties; and

(b) may at his or her discretion—

(i) appoint a committee to undertake an independent review of the impact assessment report and the decision of the responsible heritage authority;

and

(ii) consult SAHRA; and

(c) must uphold, amend or overturn such decision.

(7) The provisions of this section do not apply to a development described in

subsection (1) affecting any heritage resource formally protected by SAHRA unless the

authority concerned decides otherwise.

(8) The provisions of this section do not apply to a development as described in

subsection (1) if an evaluation of the impact of such development on heritage resources

is required in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989),

or the integrated environmental management guidelines issued by the Department of

Environment Affairs and Tourism, or the Minerals Act, 1991 (Act No. 50 of 1991), or

any other legislation: Provided that the consenting authority must ensure that the

evaluation fulfils the requirements of the relevant heritage resources authority in terms

of subsection (3), and any comments and recommendations of the relevant heritage

resources authority with regard to such development have been taken into account prior

to the granting of the consent.

(9) The provincial heritage resources authority, with the approval of the MEC, may,

by notice in the *Provincial Gazette*, exempt from the requirements of this section any

place specified in the notice.

(10) Any person who has complied with the decision of a provincial heritage

resources authority in subsection (4) or of the MEC in terms of subsection (6) or other

requirements referred to in subsection (8), must be exempted from compliance with all other protections in terms of this Part, but any existing heritage agreements made in terms of section 42 must continue to apply.