



**Application for Exemption for the proposed Lethabo Power Station East Cooling Water Treatment Plant, Vereeniging, Free State Province.**



**Date: March 2016**

**Archaeology and Heritage Services**

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## **DECLARATION OF INDEPENDENCE**

This report has been compiled by Makhosazana Mngomezulu, principal archaeologist and heritage consultant. The views expressed in this report are independent of the client and no other interest was displayed during the decision making process for the redevelopment of the site.

SIGNATURE:

A handwritten signature in black ink, appearing to read "M. Mngomezulu", is written over a horizontal line.

## **TERMINOLOGY**

<b>BP</b>	Before Present
<b>EIA</b>	Early Iron Age
<b>MIA</b>	Middle Iron Age
<b>LIA</b>	Late Iron Age
<b>ESA</b>	Early Stone Age
<b>MSA</b>	Middle Stone Age
<b>LSA</b>	Late Stone Age
<b>ya</b>	years ago
<b>Ibid</b>	<i>Ibidem</i> , Latin word meaning same as the previous source
<b>ECWTP</b>	East Cooling Water Treatment Plant
<b>HIA</b>	Heritage Impact Assessment
<b>FSPHRA</b>	Free State Heritage Resources Authority
<b>SAHRA</b>	South African National Resources Agency
<b>NHRA</b>	National Heritage Resources Act
<b>SAPS</b>	South African Police Services

## **DEFINITIONS**

ESA dates between 2 million ya to 2 00 000 BP. Industries associated with this time period includes Oldowan, Acheulean and Fauresmith. ESA stone tools include hammer stones, flakes, cores, handaxes and cleavers (Pelsler 2009).

MSA dates between 2 00 000 and 25 000 to 20 000 BP, this varies with location. Industries associated with this time period includes the Howieson's Poort. The stone tools which characterise this period include scrapers, blades, points and flake.

LSA which dates between 25 000 and 20 000 to 2 000 BP. Stone tools of this period are characterised by their small size; this includes backed knives and borers (Pelsler 2009).

EIA dates to AD 200 – 900 (Huffman 2007).

MIA dates to AD 900 – 1300 (ibid).

LIA dates to AD 1300 – 1840 (ibid).

## Project Structure

<b>Introduction</b>	<ul style="list-style-type: none"><li>• Report background</li><li>• Methodology</li><li>• Assumptions &amp; limitations</li></ul>
<b>Project locality</b>	<ul style="list-style-type: none"><li>• Location (include mapping)</li></ul>
<b>Findings</b>	<ul style="list-style-type: none"><li>• Types of findings (if any)</li><li>• Level of significance</li><li>• Potential impacts</li></ul>
<b>Recommendations &amp; conclusion</b>	<ul style="list-style-type: none"><li>• Mitigation measures</li></ul>
<b>Appendices</b>	<ul style="list-style-type: none"><li>• Appendix A : Legislation</li><li>• Appendix B: Letter of exemption</li></ul>

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## 1. INTRODUCTION

Vungandze Projects was appointed by Senkosi Consulting to undertake a heritage study on the proposed Lethabo Power Station East Cooling Water Treatment Plant. The Lethabo power station, which is situated in the Northern Free State Province, is currently serviced by one Cooling Water Treatment Plant (CWTP) which is located on the western side of the station. This system treats the entire power station's cooling water to maintain the water management and cooling water chemistry for the station. With only one CWTP the following challenges are experienced:

- The current plant cannot be taken out for maintenance because there is no spare capacity for treatment. The plant is therefore being operated at maximum availability, which may impact negatively on the Long Term Plant Health (LTPH).
- In the event of a half-station shutdown, the cooling water chemistry on the east side of the power station cannot be maintained as the transfer system is taken offline. This will make the salt and scale concentrations to increase thus reducing the thermal efficiency of the units and will put the LTPH of the condensers at risk.
- The west side lime softening clarifiers are stressed as they are operating at maximum capacity when the station is on full load.

The above challenges, therefore, necessitates the construction of a CWTP on the east side of the station. The proposed facility will improve the overall cooling water availability and reliability by sharing the total quantity of water treated. The overall quantity of cooling water will remain the same. The treatment load will be shared between plants, thus providing opportunity for critical and routine maintenance.

### **Description of CWTP**

The proposed CWTP will be built within the footprint of the power station. The plant will remove dissolved and suspended solids using lime softening and reverse osmosis with pre-treatment from a fraction of the cooling water to reduce blow down and ensure compliance of the cooling water chemistry with cooling water standards. The required footprint of CWTP is between 6400m<sup>2</sup> & 10000m<sup>2</sup>.

A maximum of 17MI/day of water shall be extracted for lime softening treatment from the cooling water circulating system. A maximum of 10MI/day of clarified water will be sent through to ultrafiltration with the remainder sent to cooling tower ponds on the eastern side of the power station. The ultra-filtered water will then be fed to the reverse osmosis section and permeate generated will be removed to the cooling tower ponds. The desalination plant is designed for a total permeate flow of 7.5 MI/day at a recovery rate of 75-80%. The effluent from this process will be sent via pipeline to the existing ash conditioning system where the effluent will be mixed with the ash generated by the power station in order to dampen the ash before it is disposed of at the ash disposal site.

According to Section 38 of the National Heritage Resources Act (Act 25 of 1999) “(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-

“...(c) any development or other activity which will change the character of a site—

- (i) exceeding 5 000 m<sup>2</sup> in extent;...” (see Appendix A for Section 38 of the Act),

should conduct a Phase 1 Heritage Impact Assessment. This is to determine if there are any heritage resources within the proposed area and how they will be impacted. If any resources are found, mitigation measures and recommendations for the protection of such resources needs to be provided. The report will be submitted to the Provincial Heritage Resources Authority of Free State for comments and for a decision as per the National Heritage Resources Act (Act No 25 of 1999).

## 2. TERMS OF REFERENCE (TOR)

The approach used for this report was:

- To undertake a Phase 1 Desktop Heritage Impact Assessment in accordance with the National Heritage Resources Act, 1999 (Act no. 25 of 1999);
- To identify and map all heritage resources in the area affected, as defined in Section 3 of the National Heritage Resources Act (Act No. 25 of 1999), including archaeological sites on or close (within 100m) to the proposed site;

- To assess the significance of such resources in terms of the heritage assessment criteria as set out in the SAHRA regulations;
- 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;
- To provide mitigation measures to safeguard heritage resources; and
- To comply with specific requirements and guidelines of the Provincial Heritage Resources Authority of Free State (FSPHRA).

### 3. METHODOLOGY

This report was prepared according to the National Heritage Resources Act (Act No 25 of 1999). Background research of the study area was conducted using literature such as books, previously conducted Heritage Impact Assessments (HIAs) on the study area and the internet before and after the site visit.

The purpose of the research prior to the physical survey was to acquire information on what to expect within the study area. The site visit itself was completed to identify heritage resources that may be impacted on due to the proposed construction.

Heritage resource means any place or object of cultural significance (NHRA No. 25 of 1999). The National Heritage Resources Act 1999 (Act No. 25 of 1999) was used as a source of reference to identify what is known as a heritage resource (see Appendix A for list of heritage resources).

A desktop study was conducted due to the disturbed nature of the site. The Environmental Assessment Practitioner provided feedback and photographs of the site.

#### 3.1 Assumptions

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It is assumed that no heritage resources will be found on site; the area appears to be severely disturbed as seen on Google Earth.

#### 3.2 Limitations

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No limitations are anticipated on site.

## 4. LOCALITY AREA

The Lethabo Power Station was built in the 1980s in the Northern Free State Province. It is situated on portion 1814 of Farm Bankfontein within the Metsimaholo Local Municipality which forms part of the Fezile Dabi District Municipality. The power station is located east of Viljoensdrif and south-east of Vereeniging and is situated close to the Vaal River at the following co-ordinates S26°44'24.94" and E27°58'29.89"; SG Code: F01600000000181400000. See Figures 1 and 2 below.

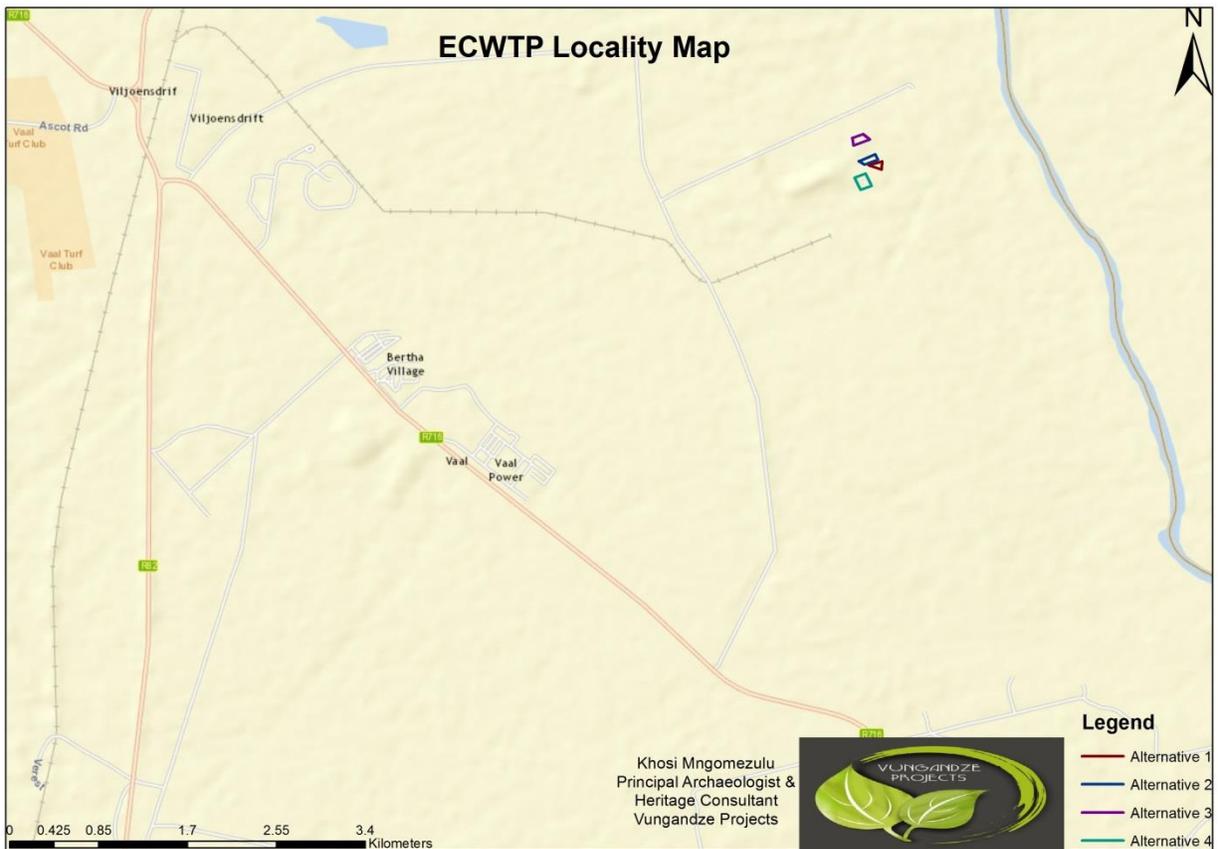


Figure 1: Locality map of the study area.

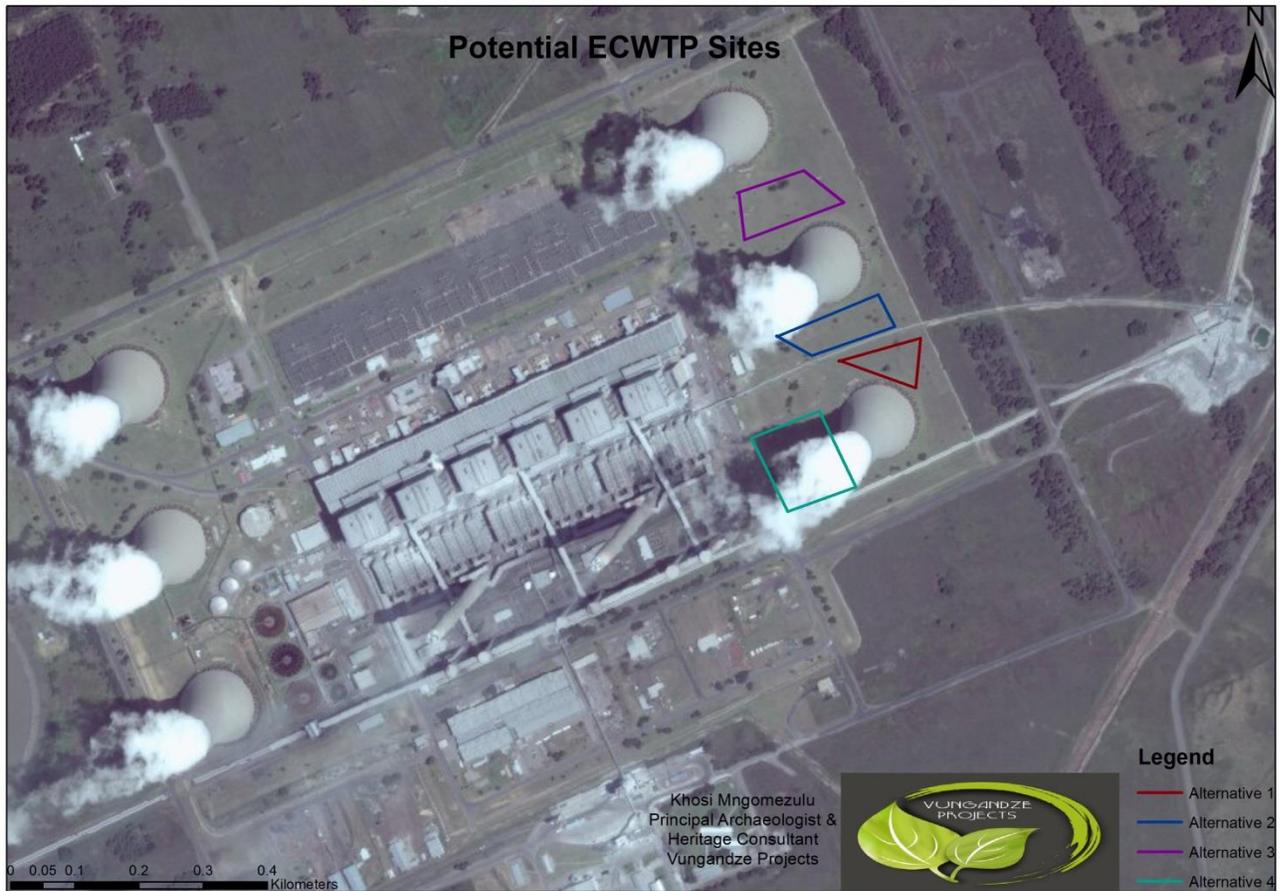


Figure 2: Aerial view of the proposed ECWTP.

## 5. FINDINGS

The feedback and photographs received from the EAP indicated that no heritage resources are expected to be found on the proposed site as the entire site is severely disturbed by the construction of the existing towers and associated infrastructure, especially alternative 4 which has underground infrastructure.

### 5.1 Potential findings

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No findings are anticipated on site.

## 6. SITE SIGNIFICANCE

The level of significance of the site and the cultural resources varies between social, historical, spiritual, scientific and aesthetic value.

**Social value** is when a place has become a focus of spiritual, political, national, or other cultural sentiments to a majority or minority group. This may be because the site is accessible and well known, rather than particularly well preserved or scientifically important (SAHRA Regulations). The study area appears to have no social value. There was also no physical evidence of religious activities such as well-used areas where people worship; white-washed stones that designate areas of worship, etc.

**Historical value** refers to areas where historical events took place, and such events have high significance either locally, regionally, provincially or nationally. The area showed no historical significance on the proposed site.

**Scientific value** refers to the importance of the study area for research purposes. The study area seemed to have no scientific value.

**Aesthetic value** refers to the unique beauty of the site. The study area showed no structures of aesthetic value.

Based on the above conclusions, the site has no heritage significance or value, therefore no heritage resources will be impacted by the proposed site.

## **APPENDICES:**

Appendix A – List of legislation applicable to the site

Appendix B – Letter of Exemption Application

## 7. APPENDIX A - LEGISLATION

National Heritage Resources Act 25 of 1999

### 7.1 Section 3 of NHRA 25 of 1999

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According to Section 3 under National Estate of the National Heritage Act 25 of 1999 the heritage resources in South Africa includes the following:

“(1) For the purposes of this Act, those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate and fall within the sphere of operations of heritage resources authorities.

(2) Without limiting the generality of subsection (1), the national estate may include –

(a) places, buildings, structures and equipment of cultural significance;

(b) places to which oral traditions are attached or which are associated with living heritage; (c) historical settlements and townscapes;

(d) landscapes and natural features of cultural significance;

(e) geological sites of scientific or cultural importance;

(f) archaeological and paleontological sites;

(g) graves and burial grounds, including—

(i) ancestral graves;

(ii) royal graves and graves of traditional leaders;

(iii) graves of victims of conflict;

(iv) graves of individuals designated by the Minister by notice in the Gazette;

(v) historical graves and cemeteries; and

(vi) other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);

(h) sites of significance relating to the history of slavery in South Africa;

(i) movable objects, including:

(i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;

- (ii) objects to which oral traditions are attached or which are associated with living heritage;
  - (iii) ethnographic art and objects;
  - (iv) military objects;
  - (v) objects of decorative or fine art;
  - (vi) objects of scientific or technological interest; and
  - (vii) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).
- (3) Without limiting the generality of subsections (1) and (2), a place or object is to be considered part of the national estate if it has cultural significance or other special value because of –
- (a) its importance in the community, or pattern of South Africa's history;
  - (b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
  - (c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
  - (d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
  - (e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
  - (f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
  - (g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
  - (h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
  - (i) sites of significance relating to the history of slavery in South Africa".

## **7.2 Section 38 of NHRA 25 of 1999**

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According to Section 38 under Heritage resources management of the National Heritage Act 25 of 1999 the heritage resources in South Africa should be managed in the following:

“(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 m<sup>2</sup> 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 m<sup>2</sup> 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.

## 8. APPENDIX B: LETTER OF EXEMPTION

Corner Sunstone & Brookhill Road

C: 083 256 1292

Stone Arch 131 Village 3

F: 086 661 1191

Germiston

E: fvungandze@gmail.co.za

1401

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### Request for Heritage Impact Assessment Exemption

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#### **Free State Provincial Heritage Resources Authority**

Department of Sport, Arts, Culture and Recreation

Private Bag X20606

Bloemfontein

9300

**Our Reference: VP17**

**09 March 2016**

**Attention: Ntando PZ Mbatha**

**Re: Application for Heritage Impact Assessment Exemption for the proposed East Water Cooling Tower Treatment**

#### **Project Background**

Vungandze Projects was appointed by Senkosi Consulting to undertake a desktop heritage study on the proposed Lethabo Power Station East Cooling Water Treatment Plant. The Lethabo power station, which is situated in the Northern Free State Province, is currently serviced by one Cooling Water Treatment Plant (CWTP) which is located on the western side of the station.

The proposed CWTP will be built within the footprint of the power station. The plant will remove dissolved and suspended solids using lime softening and reverse osmosis with pre-treatment from a fraction of the cooling water to reduce blow down and ensure compliance of the cooling

water chemistry with cooling water standards. The required footprint of CWTP is between 6400m<sup>2</sup> & 10000m<sup>2</sup>.

A maximum of 17MI/day of water shall be extracted for lime softening treatment from the cooling water circulating system. A maximum of 10MI/day of clarified water will be sent through to ultrafiltration with the remainder sent to cooling tower ponds on the eastern side of the power station. The ultra-filtered water will then be fed to the reverse osmosis section and permeate generated will be removed to the cooling tower ponds. The desalination plant is designed for a total permeate flow of 7.5 MI/day at a recovery rate of 75-80%. The effluent from this process will be sent via pipeline to the existing ash conditioning system where the effluent will be mixed with the ash generated by the power station in order to dampen the ash before it is disposed of at the ash disposal site.

This study serves to identify any cultural heritage resources that may occur on site which may be impacted upon by the proposed construction. If any resources are found, mitigation measures and recommendations of such resources will be provided. This letter will be submitted to the Provincial Heritage Resources Authority of Free State Province (FSPHRA) for comments as per the National Heritage Resources Act (Act No 25 of 1999).

### **Locality**

The Lethabo Power Station was built in the 1980s in the Northern Free State Province. It is situated on portion 1814 of Farm Bankfontein within the Metsimaholo Local Municipality which forms part of the Fezile Dabi District Municipality. The power station is located east of Viljoensdrif and south-east of Vereeniging and is situated close to the Vaal River at the following co-ordinates S26°44'24.94" and E27°58'29.89"; SG Code: F01600000000181400000. See Figures 1 and 2 below.

### **Recommendations**

The proposed development triggers a Heritage Impact Assessment (HIA) according to Section 38 (1) (c)(i) of the National Heritage Resources Act 1999 (Act No 25 of 1999). However, due to the nature of the study area, the site has been previously disturbed due to structures existing on site, a desktop HIA was undertaken. As such no heritage resources are expected to be found within the proposed sites, and it is therefore recommended that:

- Alternative site 4 is the most preferred in terms of heritage with underground infrastructure already existing. This minimizes any chance of finding unearthed burial grounds and graves;
- During the construction phase, the contractor should keep within the proposed development footprint;
- The contractor should induct the employees on the importance of heritage sites and that they should not be impacted in any way. This is in case any heritage resources are found during the construction phase they would know how to respond;
- The possibility of uncovering unearthed burial grounds and graves during excavation should not be ruled out. Should potential human remains and any heritage resources be found on site, the contractor should cease construction immediately and inform the South African Police Service and the applicant. A heritage expert should be called on site to assess the significance, the impacts and provide mitigation measures.

## **Conclusion**

The research background of the area, feedback and photographs from the EAP confirmed that no heritage resources will be found on site given that the site has been severely disturbed.

We hereby request an exemption from Section 38 of the National Heritage Resources Act 25 of 1999 which states that:

“(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-

- (c) any development or other activity which will change the character of a site—
  - (i) exceeding 5 000 m<sup>2</sup> in extent...”

It is concluded that construction may proceed. The final report will be submitted to FSPHRA for review. Based on the findings we recommend that FSPHRA grant the applicant the approval to proceed with the proposed East Water Cooling Tower Treatment in terms of the Heritage Resources Act (Act No.25 of 1999) by granting them an Exemption.

For any further information please do not hesitate to contact me

Yours Sincerely

A handwritten signature in black ink, appearing to read 'M. M. Mngomezulu', written in a cursive style.

Makhosazana Mngomezulu

**Principal Archaeologist & Heritage Consultant**