



Archaetnos Culture & Cultural
Resource Consultants
BK 98 09854/23

**A REPORT ON AHERITAGE IMPACT ASSESSMENT FOR THE
EXPANSION OF THE MODDER EAST TAILINGS STORAGE FACILITY
(TSF) EXPANSION, IN SPRINGS, GAUTENG PROVINCE**

For:

PRIME RESOURCES
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REPORT NO.: AE02213V

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14 April 2022

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SUBMISSION OF REPORT

Please note that the South African Heritage Resources Agency (SAHRA) or one of its subsidiary bodies needs to comment on this report.

It is the client's responsibility to do the submission via the SAHRIS System on the SAHRA website.

Clients are advised not to proceed with any action before receiving the necessary comments from SAHRA.

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EXECUTIVE SUMMARY

Archaetnos cc was requested by Prime Resources to conduct a Heritage Impact Assessment (HIA) for the proposed Modder East Tailings Storage Facility (TSF) expansion. This is located on the Remainder of the farm Cloverfield 75 IR and the Remainder of Portion 22 of the farm Cloverfield 75 IR. This is close to Springs in the Ekurhuleni Metropolitan Municipality. This is in the Gauteng Province.

The project is in a pre-scoping phase and is done on behalf of the New Kleinfontein Gold Mine. Two sites are proposed for the development, namely the TSF Expansion West and the TSF Expansion North and the development is proposed on both sites.

The methodology for the study includes a survey of literature and a field survey. The latter was conducted according to generally accepted HIA practices and was aimed at locating all possible objects, sites and features of cultural significance in the area of proposed development.

If required, the location/position of any site was determined by means of a Global Positioning System (GPS), while photographs were also taken where needed. The survey was undertaken by doing a physical survey via off-road vehicle and on foot and covered as much as possible of the area to be studied. Certain factors, such as accessibility, density of vegetation, etc. may however influence the coverage.

All sites, objects, features and structures identified were documented according to the general minimum standards accepted by the archaeological profession. Co-ordinates of individual localities were determined by means of the Global Positioning System (GPS). The information was added to the description in order to facilitate the identification of each locality.

The survey of the indicated area was completed successfully. Three sites were identified as well as a grave site (site 4) from a previous report.

The following is recommended:

- The cultural significance of sites 1, 2 and 3 is Low. The development will have an impact on all three of these sites, but the description in this Phase 1 heritage report is seen as sufficient recording and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subject to the granting of Environmental Authorisation.
- The risk assessment for Environmental impact of sites 1, 2 and 3 are:
 - Magnitude is rated as Low (4), because all three of the sites that will be destroyed by the development have low heritage significance.
 - Scale is rated as Site (0) as the three sites are located within the footprint of the development area.
 - Duration is rated as Permanent (5), because the nature of development will permanently alter the area the sites are located at.

- Probability is rated as Definite (5), the sites cannot move, and the development will be taken up the space where these three sites are located at.

SIGNIFICANCE = (MAGNITUDE + DURATION + SCALE) X PROBABILITY

$S = (4+0+5) \times 5$

$S = 9 \times 5$

$S = 45$

The significance of this risk assessment is calculated at a value of 45 and thus Medium environmental significance.

- The cultural significance of the Graves that have been identified in a previous report is High and should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodge with the relevant heritage authority. There are two ways of dealing with graves.
 - The first option would be to fence the graves in and have a management plan drafted for the sustainable preservation thereof. This should be written by a heritage expert. This usually is done when the graves are in no danger of being damaged, but where there will be a secondary impact due to the activities of the mine.
 - The second option is to exhume and relocate the mortal remains. This usually is done when the graves are in the area to be directly affected by the mining activities. For this a specific procedure should be followed which includes social consultation. For graves younger than 60 years only, an undertaker is needed. For those older than 60 years and unknown graves an undertaker and archaeologist are needed. Permits should be obtained from the Burial Grounds and Graves unit of SAHRA. This procedure is quite lengthy. Since the graveyard is outside of the area of direct development, and already fence in, it should remain as such

The proximity of the Graves to the mine, and new proposed development in the east will be about 330 m at its closest point to the gravesite. Option 1 is thus recommended for the grave site as there undoubtedly will be a secondary impact.

- The risk assessment for Environmental impact of site 4 is:
 - Magnitude is rated as Moderate (6), even though the development will not affect site 4 directly, secondary impact will be presented in the form of dust, and the movement of heavy vehicles past the site that could have impact on the graves and headstones.
 - Scale is rated as Local (2) the site is located within approximately 2,5 km of the activity.
 - Duration is rated as Medium (3), with a proper heritage management plan the secondary impact could be lessened or stopped.
 - Probability is rated as Expected (4), due to the nature of the development secondary impact is expected.

SIGNIFICANCE = (MAGNITUDE + DURATION + SCALE) X PROBABILITY

$$S = (6+2+3) \times 4$$

$$S = 11 \times 4$$

$$S = 44$$

The significance of this risk assessment is calculated at a value of 44 and thus Medium environmental significance.

Risk assessment after mitigation –

- Magnitude is rated as Moderate (6), as secondary impact such as dust, and the movement of heavy vehicles past the site that could have impact on the graves and headstones.
- Scale is rated as Local (2) the site is located within approximately 330 m of the activity.
- Duration is rated as Medium (3), as it can be reversed with sufficient management
- Probability is rated as Expected (4), due to the nature of the development secondary impact is expected.

SIGNIFICANCE = (MAGNITUDE + DURATION + SCALE) X PROBABILITY

$$S = (6+2+3) \times 4$$

$$S = 11 \times 4$$

$$S = 44$$

The significance of this risk assessment is calculated at a value of 44 and thus Medium environmental significance.

- It should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. Due to the density of vegetation, it also is possible that some sites may only become known later on. Operating controls and monitoring should therefore be aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.
- In this regard the following 'Chance Find Procedure' should be followed:
 - Upon finding any archaeological or historical material all work at the affected area must cease.
 - The area should be demarcated in order to prevent any further work there until an investigation has been completed.
 - An archaeologist should be contacted immediately to provide advice on the matter.
 - Should it be a minor issue, the archaeologist will decide on future action, which could include adapting the HIA or not. Depending on the nature of the find, it may include a site visit.
 - SAHRA's Archaeology Palaeontology and Meteorites Unit may also be notified.
 - If needed, the necessary permit will be applied for with SAHRA. This will

- be done in conjunction with the appointed archaeologist.
- The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter.
 - Work on site will only continue after removal of the archaeological/historical material was done.

It is also important to take cognizance that it is the client's responsibility to do the submission of this report via the SAHRIS System on the SAHRA website. No work on site may commence before receiving the necessary comments from SAHRA.

CURRICULUM VITAE
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TERTIARY EDUCATION

- BA 1986, University of Pretoria
- BA (HONS) Archaeology 1988 (cum laude), University of Pretoria
- MA Archaeology 1992, University of Pretoria
- Post-Graduate Diploma in Museology 1993 (cum laude), University of Pretoria
- Diploma Tertiary Education 1993, University of Pretoria
- DPhil Archaeology 2001, University of Pretoria.
- MA Cultural History 1998 (cum laude), University of Stellenbosch
- Management Diploma 2007 (cum laude), Tshwane University of Technology
- DPhil History 2010, University of Stellenbosch

EMPLOYMENT HISTORY

Current:

- *Since 2012:* Archaeologist and heritage official, Department of Environment and Agriculture, City of Tshwane
- *Since 2015:* Extraordinary Professor of History at the North-West University

Previous:

- *1988-1991:* Fort Klapperkop Military Museum - Researcher
- *1991-1999:* National Cultural History Museum. Work as Archaeologist, as well as Curator/Manager of Pioneer Museum (1994-1997)
- *1999-2002:* City Council of Pretoria. Work as Curator: Fort Klapperkop Heritage Site and Acting Deputy Manager Museums and Heritage.
- *2002-2007:* City of Tshwane Metropolitan Municipality. Work as Deputy Manager Museums and Heritage.
- *August 2007 – present –* Managing Director for Archaetnos Archaeologists.
- *1988-2003:* Part-time lecturer in Archaeology at the University of Pretoria and a part-time lecturer on Cultural Resources Management in the Department of History at the University of Pretoria.
- *2014-2015:* Part-time lecturer for the Honours degree in Museum Sciences in the Department of History and Heritage Studies at the University of Pretoria

OTHER

- NRF C2 Research rating.
- Has published 40 peer-reviewed and 51 popular articles.
- Has written 13 books/book contributions/conference proceedings .

- Has been the author and co-author of over 1076 unpublished reports on cultural resources surveys and archaeological work.
- Has delivered more than 80 papers and lectures at national and international conferences.
- Member of SAHRA Council for 2003 – 2006.
- Member of the South African Academy for Science and Art.
- Member of Association for South African Professional Archaeologists.
- Member of the South African Society for Cultural History (Chairperson 2006-2008; 2012-2014; 2018-2021).
- Has been editor for the SA Journal of Cultural History 2002-2004.
- Editorial member of various scientific journals.
- Member of the Provincial Heritage Resources Agency, Gauteng’s Council.
- Member of Provincial Heritage Resources Agency, Gauteng’s HIA adjudication committee (Chairperson 2012-2024).

A list of reports can be viewed on www.archaetnos.co.za.

DECLARATION OF INDEPENDENCE

I, Anton Carl van Vollenhoven from Archaetnos, hereby declare that I am an independent specialist within the field of heritage management.

Signed:



Date: 14 April 2022

LIST OF ACRONYMS:

AIA – Archaeological Impact Assessment
 CMP – Cultural Management Plan
 EAP – Environmental Assessment Practitioner
 EIA – Environmental Impact Assessment
 HIA – Heritage Impact Assessment
 PIA – Palaeontological Impact Assessment
 SAHRA –South African Heritage Resources Agency

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1. INTRODUCTION

Archaetnos cc was requested by Prime Resources to conduct a Heritage Impact Assessment (HIA) for the proposed Modder East Tailings Storage Facility (TSF) expansion. This is located on the Remainder of the farm Cloverfield 75 IR and the Remainder of Portion 22 of the farm Cloverfield 75 IR. This is close to Springs in the Ekurhuleni Metropolitan Municipality. This is in the Gauteng Province (Figure 1 - 2).

The project is in a pre-scoping phase and is done on behalf of the New Kleinfontein Gold Mine. Two sites are proposed for the development, and both will be utilized for this purpose. These are called the TSF Expansion West and the TSF Expansion North respectively (Figure 3).

The 1: 50 000 topographic map of the site is 2628 AB. Central location for the two sites are – TSF Expansion West 26°11'24.04"S, 28°26'29.52"E; TSF Expansion North 26°11'10.07"S, 28°27'10.12"E.

The developer indicated the area to be surveyed and it was investigated via foot and off-road vehicle.

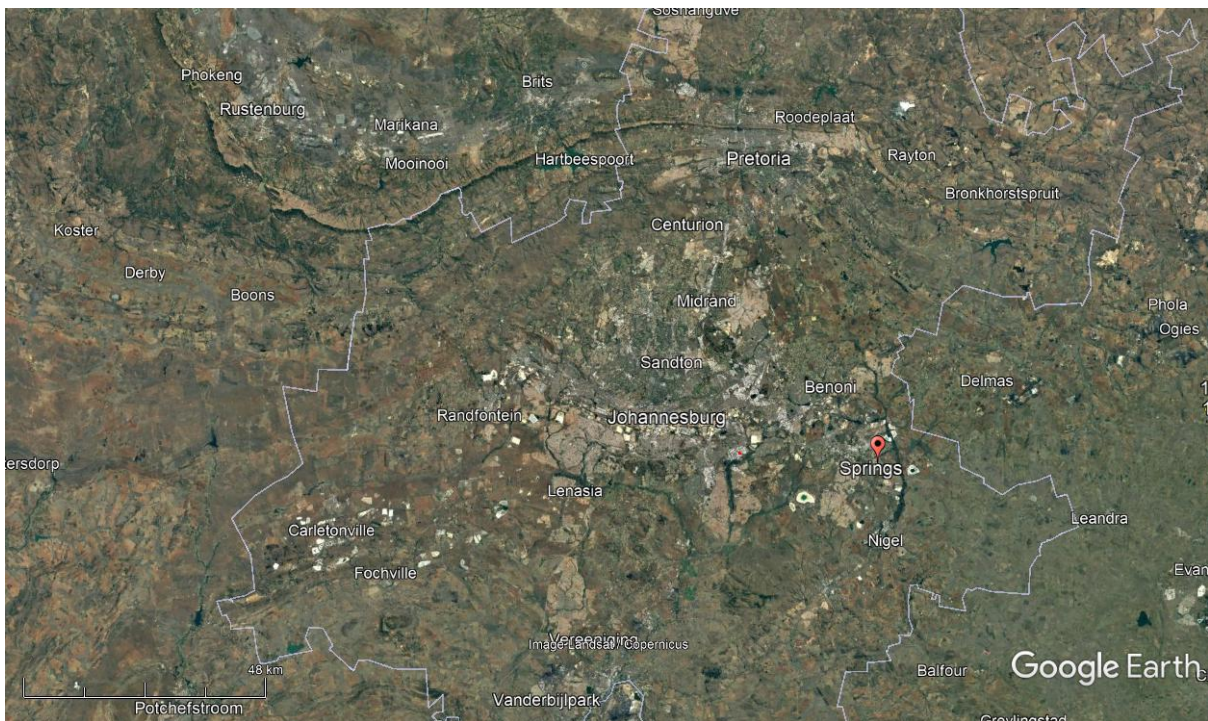


FIGURE 1: LOCATION OF SPRINGS IN THE GAUTENG PROVINCE.

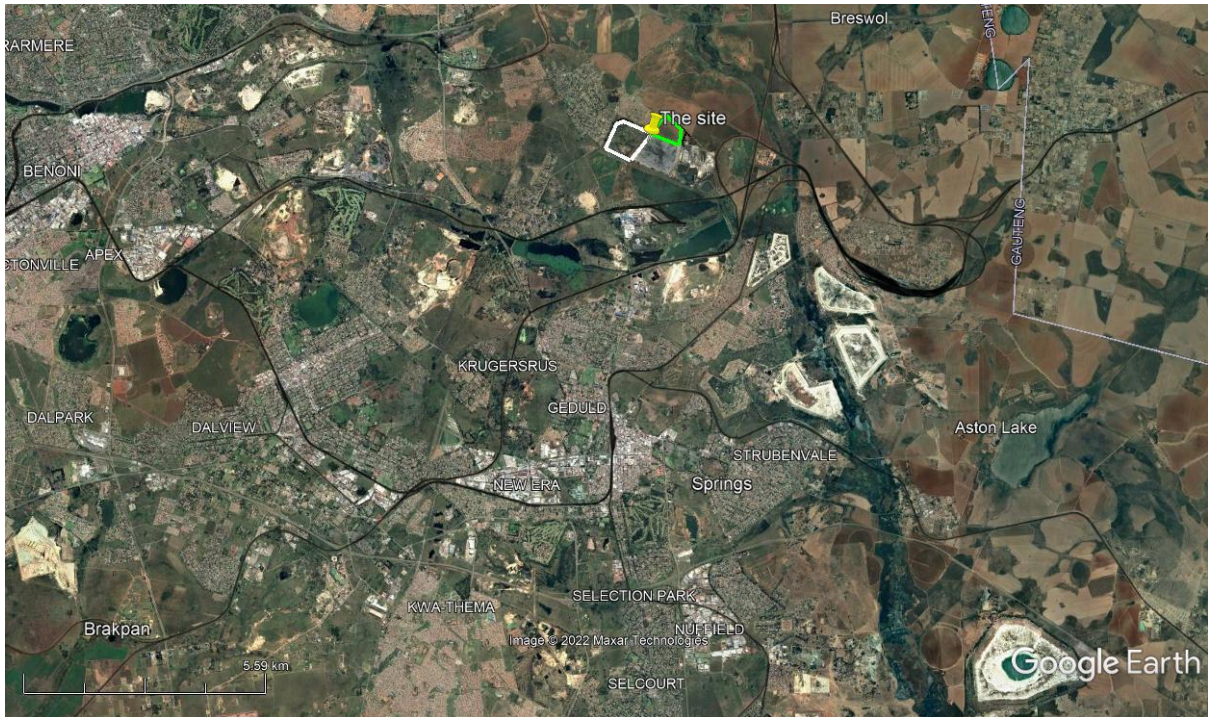


FIGURE 2: LOCATION OF THE PROJECT SITE IN RELATION TO SPRINGS.



FIGURE 3: PROPOSED SITES FOR THE DEVELOPMENT. THE TSF EXPANSION WEST IS IN THE WHITE BORDER AND THE TSF EXPANSION NORTH IN THE GREEN BORDER.

2. TERMS OF REFERENCE

The Terms of Reference for the survey were to:

1. Identify objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the property (see Appendix A).
2. Document the found cultural heritage sites according to best practice standards for heritage related studies.
3. Study background information on the project area.
4. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value (see Appendix B).
5. Describe the possible impact of the proposed project changes on these cultural remains, according to a standard set of conventions.
6. Recommend suitable mitigation measures to minimize possible negative impacts on the cultural resources by the proposed development.
7. Review applicable legislative requirements.

3. LEGISLATIVE REQUIREMENTS

Aspects concerning the conservation of cultural resources are dealt with mainly in two acts. The first of these are the National Heritage Resources Act (Act 25 of 1999) which deals with the cultural heritage of the Republic of South Africa. The second is the National Environmental Management Act (Act 107 of 1998) which inter alia deals with cultural heritage as part of the Environmental Impact Assessment process.

3.1 The National Heritage Resources Act

According to the above-mentioned act the following is protected as cultural heritage resources:

- a. Archaeological artifacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. Grave yards and graves older than 60 years
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

The national estate (see Appendix D) includes the following:

- 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 features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Archaeological and paleontological importance
- g. Graves and burial grounds
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g. archaeological, paleontological, meteorites, geological specimens, military, ethnographic, books etc.)

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon. An Archaeological Impact Assessment (AIA) only looks at archaeological resources.

The different phases during the HIA/AIA process are described in Appendix E. It must be done under the following circumstances:

- a. The construction of a linear development (road, wall, power line canal etc.) exceeding 300m in length
- b. The construction of a bridge or similar structure exceeding 50m in length
- c. Any development or other activity that will change the character of a site and exceed 5 000m² or involve three or more existing erven or subdivisions thereof
- d. Re-zoning of a site exceeding 10 000 m²
- e. Any other category provided for in the regulations of SAHRA or a provincial heritage authority

Structures

Section 34 (1) of the mentioned act states that no person may demolish any structure or part thereof which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

A structure means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

Alter means any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or the decoration or any other means.

Archaeology, palaeontology and meteorites

Section 35(4) of this act deals with archaeology, palaeontology and meteorites. The act states that no person may, without a permit issued by the responsible heritage resources authority (national or provincial):

- a. destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite;
- b. destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite;
- c. trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or paleontological material or object, or any meteorite; or
- d. bring onto or use at an archaeological or paleontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and paleontological material or objects or use such equipment for the recovery of meteorites.
- e. alter or demolish any structure or part of a structure which is older than 60 years as protected.

The above mentioned may only be disturbed or moved by an archaeologist, after receiving a permit from the South African Heritage Resources Agency (SAHRA). In order to demolish such a site or structure, a destruction permit from SAHRA will also be needed.

Human remains

Graves and burial grounds are divided into the following:

- a. ancestral graves
- b. royal graves and graves of traditional leaders
- c. graves of victims of conflict
- d. graves designated by the Minister
- e. historical graves and cemeteries
- f. human remains

In terms of Section 36(3) of the National Heritage Resources Act, no person may, without a permit issued by the relevant heritage resources authority:

- a. destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- b. destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

- c. bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

Unidentified/unknown graves are also handled as older than 60 until proven otherwise.

Human remains that are less than 60 years old are subject to provisions of the Human Tissue Act (Act 65 of 1983) and to local regulations. Exhumation of graves must conform to the standards set out in the **Ordinance on Excavations (Ordinance no. 12 of 1980)** (replacing the old Transvaal Ordinance no. 7 of 1925).

Permission must also be gained from the descendants (where known), the National Department of Health, Provincial Department of Health, Premier of the Province and local police. Furthermore, permission must also be gained from the various landowners (i.e., where the graves are located and where they are to be relocated) before exhumation can take place. Human remains can only be handled by a registered undertaker or an institution declared under the **National Health Act (Act 61 of 2003)**.

3.2 The National Environmental Management Act

This act (Act 107 of 1998) states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof made.

Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

3.3 The International Finance Corporations' performance standard for cultural heritage

This standard recognizes the importance of cultural heritage for current and future generations. It aims to ensure that clients protect cultural heritage in the course of their project activities.

This is done by clients abiding to the law and having heritage surveys done in order to identify and protect cultural heritage resources via field studies and the documentation of such resources. These need to be done by competent professionals (e.g. archaeologists and cultural historians). Any possible chance finds, encountered during the project development, also needs to be managed by not disturbing it and by having it assessed by professionals.

Impacts on the cultural heritage should be minimized. This includes the possible maintenance of such sites in situ, or when not possible, the restoration of the functionality of the cultural heritage in a different location. When cultural historical and

archaeological artifacts and structures need to be removed, this should be done by professionals and by abiding to the applicable legislation. The removal of cultural heritage resources may, however, only be considered if there are no technically or financially feasible alternatives. In considering the removal of cultural resources, it should be outweighed by the benefits of the overall project to the affected communities. Again, professionals should carry out the work and adhere to the best available techniques.

Consultation with affected communities should be conducted. This entails that such communities should be granted access to their cultural heritage if this is applicable. Compensation for the loss of cultural heritage should only be given in extra-ordinary circumstances.

Critical cultural heritage may not be impacted on. Professionals should be used to advise on the assessment and protection thereof. Utilization of cultural heritage resources should always be done in consultation with the affected communities in order to be consistent with their customs and traditions and to come to agreements with relation to possible equitable sharing of benefits from commercialization.

4. METHODOLOGY

4.1 Survey of literature

A survey of literature was undertaken in order to obtain background information regarding the area. Sources consulted in this regard are indicated in the bibliography.

4.2 Reference to other specialist studies

On the existing SAHRA Database (SAHRIS) a number of heritage reports around the area were noted. Also, such reports were done in the wider area by Archaetnos (Archaetnos database). A report on the palaeontology have also been commissioned.

Some historical sites are also known from the surveys done in the surrounding area. Two grave sites are known from the surveys done in the wider geographical area (Huffman 2009: 4; Van Vollenhoven et.al. 2020: 26-29). Another one have been identified adjacent to the North-eastern site (Huffman 2006: n.p.). One historical site in the surrounding area is also known. This site is associated with farming activities, e.g., historical house remains (Coetzee 2015: 18-19). All of these are discussed below. On the adjacent site, where the current tailings dam is, no heritage sites were identified during a survey done in 2012 (Van Vollenhoven 2012).

4.3 Public consultation and stakeholder engagement

General public consultation will be done by Prime Resources. The various specialist reports will be utilized for this purpose.

4.4 Physical field survey

The survey was conducted according to generally accepted HIA practices and was aimed at locating all possible objects, sites and features of cultural significance in the area of proposed development. One regularly looks a bit wider than the demarcated area, as the surrounding context needs to be taken into consideration.

If required, the location/position of any site was determined by means of a Global Positioning System (GPS)¹, while photographs were also taken where needed. The survey was undertaken by doing a physical survey via off-road vehicle and on foot and covered as much as possible of the area to be studied (Figure 4).

Certain factors, such as accessibility, density of vegetation, etc. may however influence the coverage. In this instance the area was found to be largely disturbed, due to agriculture and former infrastructure. The vegetation cover was mostly between medium to high in height and with dense under footing. The horizontal archaeological visibility was therefore fair and the vertical archaeological visibility poor. The area is relatively flat.

The size of the TSF Expansion West site is 53,3 Ha and that of the TSF Expansion North site 26,1 Ha. The survey took 6 hours to complete.

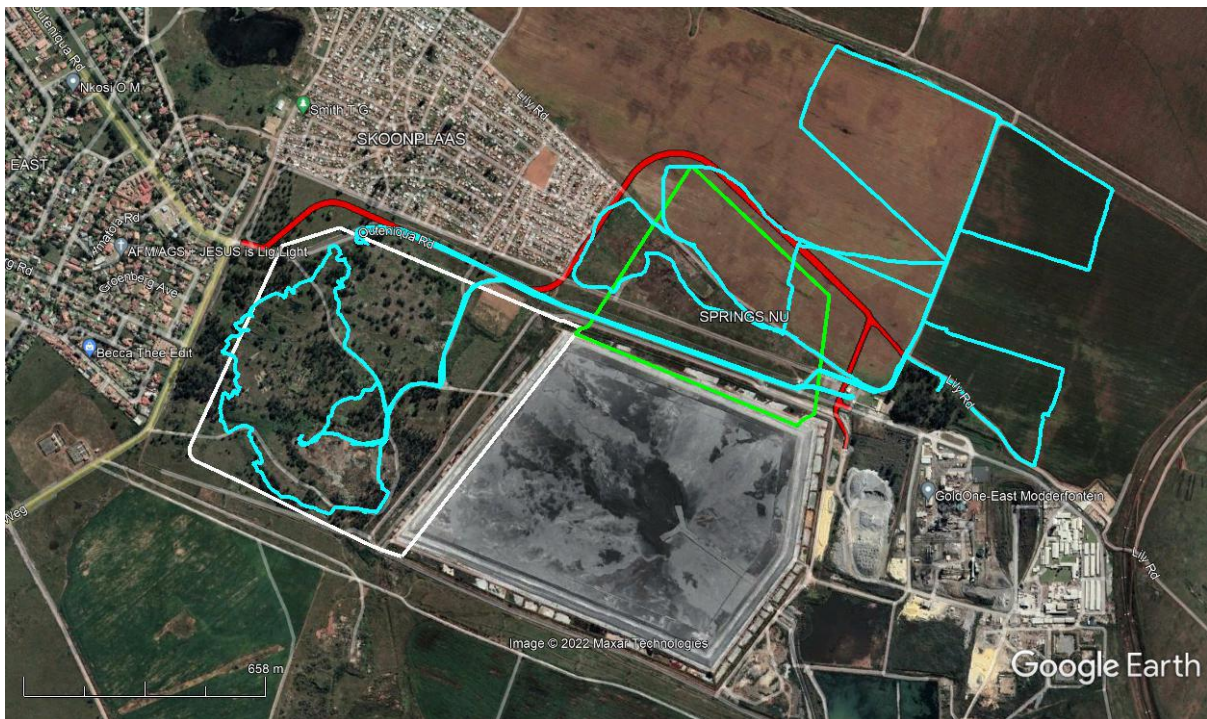


FIGURE 4: GPS TRACK OF THE SURVEY.

¹ A Garmin Oregon 550 with an accuracy factor of a few meters.

4.5 Documentation

All sites, objects, features and structures identified were documented according to the general minimum standards accepted by the archaeological profession. Co-ordinates of individual localities were determined by means of the GPS. The information was added to the description in order to facilitate the identification of each locality.

4.6 Evaluation of Heritage sites

The evaluation of heritage sites is done by giving a field rating of each (see Appendix C) using the following criteria:

- The unique nature of a site
- The integrity of the archaeological deposit
- The wider historic, archaeological and geographic context of the site
- The location of the site in relation to other similar sites or features
- The depth of the archaeological deposit (when it can be determined or is known)
- The preservation condition of the site
- Uniqueness of the site and
- Potential to answer present research questions.

5. CONDITIONS AND ASSUMPTIONS

The following conditions and assumptions have a direct bearing on the survey and the resulting report:

1. Cultural Resources are all non-physical and physical man-made occurrences, as well as natural occurrences associated with human activity (Appendix A). These include all sites, structures and artifacts of importance, either individually or in groups, in the history, architecture and archaeology of human (cultural) development. Graves and cemeteries are included in this.
2. The significance of the sites, structures and artifacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. The various aspects are not mutually exclusive, and the evaluation of any site is done with reference to any number of these aspects.
3. Cultural significance is site-specific and relates to the content and context of the site. Sites regarded as having low cultural significance have already been recorded in full and require no further mitigation. Sites with medium cultural significance may or may not require mitigation depending on other factors such as the significance of impact on the site. Sites with a high cultural significance require further mitigation (see Appendix C).
4. All recommendations are made with full cognizance of the relevant legislation.

5. It has to be mentioned that it is almost impossible to locate all the cultural resources in a given area, as it will be very time consuming. Developers should however note that the report should make it clear how to handle any other finds that might occur.
6. Large sections of the surveyed area have been disturbed by recent human interventions consisting largely of agricultural activities at the TSF Expansion North site, and mining activities at the TSF Expansion West site. These areas are thus regarded as low risk areas to reveal heritage sites.
7. The vegetation cover in certain areas was medium to high and consisting mostly of agricultural fields to the northeastern area and alien vegetation in the western study area. The under footing was dense. These factors both effected the archaeological visibility negatively. Horizontal archaeological visibility was fair, and the vertical archaeological visibility was poor. However, due to the disturbance the project area is regarded as being a low risk area for containing cultural sites.

6. DESCRIPTION OF THE PHYSICAL ENVIRONMENT

The surveyed area is largely disturbed by agricultural activities in the north-eastern area and old mining infrastructure in the western study area (Figure 5 - 6). Active mining is taking place in the northwest of the latter (Figure 7).



FIGURE 5: AGRICULTURAL ACTIVITIES AT THE TSF EXPANSION NORTH.



FIGURE 6: OLD MINING INFRASTRUCTURE AT THE TSF EXPANSION WEST.



FIGURE 7: MINING INFRASTRUCTURE AT THE TSF EXPANSION NORTH.

The TSF Expansion West site is largely overgrown with tall grasses, pioneer vegetation and trees (Figure 8). The vegetation is medium to high and dense. At the TSF Expansion North site vegetation consists of soya fields and maize fields (Figure 9 - 10). The southern section thereof is completely overgrown with pioneer plant species, indicating major disturbance (Figure 11). This was probably caused by former agricultural fields. Some informal housing were also noted here.

The topography of both of the surveyed sites are reasonably flat. The soil is loosely compacted and sandy in the TSF Expansion North site and more compacted in the TSF Expansion West site.



FIGURE 8: GENERAL VIEW OF VEGETATION GROWTH IN THE TSF EXPANSION WEST SITE.



FIGURE 9: SOYA FIELD IN THE TSF EXPANSION NORTH SITE.



FIGURE 10: MAIZE FIELD IN THE TSF EXPANSION NORTH SITE.



FIGURE 11: OLD AGRICULTURAL FIELDS IN THE TSF EXPANSION NORTH SITE.

7. HISTORICAL CONTEXT

Four sites of cultural heritage significance were located during the survey. Some background information is given in order to place the surveyed area in a broad

historical and geographical context and to contextualize possible finds that could be unearthed during construction activities.

A number of heritage reports have been done in the wider Ekurhuleni area. Out of these reports only three recorded sites of significance. These are two cemeteries (Huffman 2006; Huffman 2009: 4) and a stone structure (Coetzee 2015: 18-19). The third report identified no heritage sites (Van Schalkwyk 2011: 11). These relate to the historical age and gives an indication of what could be expected during the current survey. One grave site was also identified in the Brakpan-Vlakplaats area (Van Vollenhoven et al 2020: 26-29).

7.1 Stone Age

The Stone Age is the period in human history when lithic material was mainly used to produce tools (Coertze & Coertze 1996: 293). In South Africa the Stone Age can be divided in three periods. It is, however, important to note that dates are relative and only provide a broad framework for interpretation. The division for the Stone Age according to Korsman & Meyer (1999: 93-94) is as follows:

- Early Stone Age (ESA) 2 million – 150 000 years ago;
- Middle Stone Age (MSA) 150 000 – 30 000 years ago; and
- Late Stone Age (LSA) 40 000 years ago – 1850 - A.D.

No Stone Age sites were identified out of the of heritage reports have been done in the wider geographical area. A few Stone Age sites are known from research done in the larger area. This includes Middle and Late Stone Age sites in and around Johannesburg (Bergh 1999:4). Rock art is usually also associated with LSA people. The closest to the surveyed area are rock engravings that have been found around Krugersdorp on the West Rand (Bergh 1999: 5).

Although no natural shelter was identified during the survey, the close proximity to a wetland/river makes the area very suitable for human habitation. The area probably provided good grazing and therefore it is possible that Stone Age people may have utilized the site for hunting purposes. One may therefore find Stone Age material lying around in the area.

7.2 Iron Age

The Iron Age is the name given to the period of human history when metal was mainly used to produce metal artefacts (Coertze & Coertze 1996: 346). In South Africa it can be divided in two separate phases according to Van der Ryst & Meyer (1999: 96-98), namely:

- Early Iron Age (EIA) 200 – 1000 A.D; and
- Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however, indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:

- Early Iron Age (EIA) 250 – 900 A.D.;
- Middle Iron Age (MIA) 900 – 1300 A.D.; and
- Late Iron Age (LIA) 1300 – 1840 A.D.

Previous research indicates 794 Iron Age sites in an area to the south of Johannesburg and the East Rand (Bergh 1999: 7). These date to the Late Iron Age. These would however be closer to hills and areas where building material is found.

No Iron Age sites were identified out of the of heritage reports that have been done in the wider Ekurhuleni area. Again, the presence of water and natural grass cover may have contributed to people settling in the surveyed area during the Iron Age. It is indicated that a Tswana group, the Khudu, inhabited the area to the south of the surveyed area previously as well as during the 19th century. It does not seem as if someone settled closer to the surveyed area, but one has to take into consideration that the entire area may not have been researched yet (Bergh 1999: 10).

The subterranean presence of archaeological material is something that should however always be kept in mind. It also should be realized that the area may not have been surveyed before and therefore the possibility of finding new sites, or at least features, is always a reality.

7.3 Historical Age

The historical age began with the first recorded oral histories in the area. It includes the moving into the area of people that were literate. This era is often referred to as the colonial era or the recent past. Due to factors such as population growth and a decrease in mortality rates, more people inhabited the country during the recent historical past. Therefore, much more cultural heritage resources from this era have been left on the landscape.

It however is important to note that all cultural resources older than 60 years are potentially regarded as part of the heritage and that detailed studies are required in order to determine whether these indeed have cultural significance. Factors to be considered include aesthetic, scientific, cultural and religious value of such resources.

During the Difaquane, in this case ca. 1827, the Ndebele of Mzilikazi did move through the larger geographical area where the study area is located (Bergh 1999: 11). The first white people to move through this area were the travellers Moffat and Archbell in 1829 (Bergh 1999: 12). Later other travellers also visited the area, being Harris in 1836 and Livingstone in 1847 (Bergh 1999: 13). The first white people to settle here were Voortrekkers during the 1839 and 1840 (Bergh 1999: 14-15).

As have been indicated above, three cemetery sites and one historical site had been identified in the vicinity of the project site before (Figure 12). One of these are adjacent to the areas that was now surveyed. Some other historical remains, related to old mining activities and water infrastructure was noted in the TSF Expansion West site (see below).

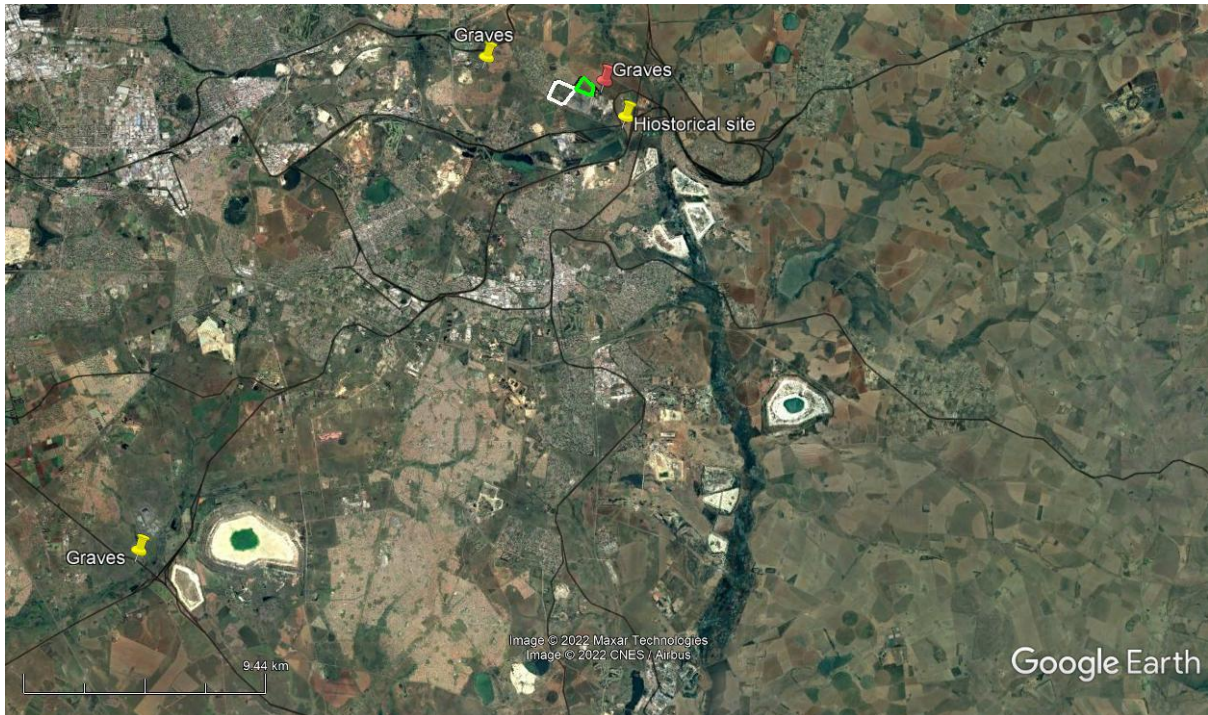


FIGURE 12: KNOWN HISTORIC SITES IN THE SURROUNDING AREA OF THE SURVEYED SITE. THIS IS ONE HISTORICAL AND THREE GRAVE SITES. THE GRAVE SITE MARKED IN RED WAS IDENTIFIED ONCE MORE AND IS ASSESSED BELOW.

8. DISCUSSION OF SITES IDENTIFIED DURING THE SURVEY

Four sites of cultural heritage significance were identified in the surveyed area. A number of remains of old buildings and structures were however noted. These are merely ruins and floor levels remaining and thus have no heritage significance (Figure 13-14).

One of the sites (graves – site 4) were found just outside of the surveyed area of the TSF Expansion North site and three inside of the TSF Expansion West site. Site 1 is identified as an old office complex and sites 2 and 3 are identified as mining infrastructure and site 4 is a graveyard.



FIGURE 13: REMAINS OF AN OLD BUILDING YOUNGER THAN 60 YEARS.



FIGURE 14: REMAINS OF YET ANOTHER BUILDING.

8.1 Site 1 – Office complex

Site 1 looks to be an old office complex. The building remains on the site is mostly old foundations and collapsed concrete and brick buildings (Figure 15 - 16). The site is approximately 200 m wide and 200 m long. Some of the buildings are older than 60 years, but more recent structures are also identified, like a stone pavilion (Figure 17).

GPS: 26°11'11.66"S 28°26'26.05"E

Most of the site lies within the TSF Expansion West site, with a small portion thereof, just outside thereof.



Figure 15: STRUCTURE OLDER THAN 60 YEARS OF AGE AT SITE 1.



Figure 16: REMAINS OF FOUNDATIONS AT SITE 1.



Figure 17: OUTSIDE VIEW OF A PAVILION YOUNGER AS 60 YEARS OF AGE AT SITE 1.

8.2 Site 2 – Mining infrastructure

Site 2 largely consists of large concrete foundation blocks ranging between 2 m to 3 m in sizes, and an old dam 25 m long and 17 m wide (Figure 18 - 20). The site is about 172 m long and 140 m wide. The structures located at this site are mostly 60 years or older with one wall possibly younger (Figure 21).

GPS: 26°11'15.75"S 28°26'18.10"E

Most of the site lies just outside of the TSF Expansion West site, with a portion thereof on the inside.



FIGURE 18: REMAINS OF AN OLD MINING INFRASTRUCTURE.



FIGURE 19: REMAINS OF CONCRETE FOUNDATION BLOCKS AT SITE 2.



FIGURE 20: OLD DAM LOCATED AT SITE 2.



FIGURE 21: WALL YOUNGER THAN 60 YEARS AT SITE 2.

8.3 Site 3 – Mining infrastructure

Site 3 seems to part of old mining industry infrastructure and waterworks. It consists of deep concrete channels and underground tunnels, walling, tall concrete structures

and pillars ranging between 1,5 m to 6 m in size (Figure 22 - 23). The site is approximately 175 m long and 103 m wide. These structures are 60 years and older.

GPS: 26°11'22.01"S 28°26'19.93"E



FIGURE 22: REMAINS OF CONCRETE CHANNELS AT SITE 3.



FIGURE 23: LARGE CONCRETE STRUCTURES LOCATED AT SITE 3.

Cultural significance Table: Site 1 – Office complex, 2 – Mining infrastructure and 3 – Mining infrastructure

<p>A place is considered to be part of the national estate if it has cultural significance because of -</p>	<p>Applicable or not</p>	<p>Rating: 1 - Negligible/ 2 -Low/ 3 - Low-Medium/ 4 - Medium/ 5 - Medium-High/ 6 - High/ 7 - Very High</p>
<p>Its importance in the community or pattern of South Africa's history</p>	<p>Y</p>	<p>Low</p>
<p>Its possession of uncommon, rare, or endangered aspects of South Africa's natural or cultural history</p>	<p>N</p>	
<p>Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage</p>	<p>Y</p>	<p>Low</p>
<p>Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects</p>	<p>N</p>	
<p>Its importance in exhibiting particular aesthetic characteristics valued by a community cultural group</p>	<p>N</p>	
<p>Its importance in demonstrating a high degree of creative or technical achievement at a particular period</p>	<p>Y</p>	<p>Low-Medium</p>
<p>Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons</p>	<p>Y</p>	<p>Low</p>
<p>Its strong or special association with the life or work of a person, group or organization of</p>	<p>N</p>	

importance in the history of South Africa		
Sites of significance relating to the history of slavery in South Africa	N	
Reasoned assessment of significance using appropriate indicators outlined above:		Low

Integrity scale:

- 1 – Bad state of preservation, but no contextual information
- 2 – Bad state of preservation and includes contextual information
- 3 – Reasonable state of preservation, but no contextual information
- 4 – Reasonable state of preservation and includes contextual information
- 5 – Good state of preservation, but no contextual information
- 6 - Good state of preservation and includes contextual information
- 7 – Excellent state of preservation, but no contextual information
- 8 – Excellent state of preservation and includes contextual information

Field-rating = Cultural significance x Integrity

= **Low** (2) x 2

= 4

Sites 1, 2 and 3 therefore receives a field rating of Local Grade IIIC. The description in the phase 1 heritage report is seen as sufficient recording (low significance) and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation.

8.4 Site 4 – Graves

Site 4 is a graveyard of about 170 m long and 150m wide located in a thicket of trees to the west of the north-eastern surveyed area. An old fence surrounds the graveyard but parts of thereof has collapsed and is missing (Figure 24). The graveyard itself is overgrown and it is not possible to determine the exact number of graves within (Figure 25). All of the graves that were identified are unmarked.

GPS: 26°11'21.95"S 28°27'23.85"E

This is the same site referred to earlier, identified by Huffman (2006).



FIGURE 24: FENCE SURROUNDING GRAVEYARD AT SITE 4.



FIGURE 25: VIEW OF GRAVES AND VEGETATION GROWTH AT SITE 4.

Cultural significance Table: Site 4 - Graves

<p>A place is considered to be part of the national estate if it has cultural significance because of -</p>	<p>Applicable or not</p>	<p>Rating: 1 - Negligible/ 2 -Low/ 3 - Low-Medium/ 4 - Medium/ 5 - Medium-High/ 6 - High/ 7 - Very High</p>
<p>Its importance in the community or pattern of South Africa's history</p>	<p>Y</p>	<p>High</p>
<p>Its possession of uncommon, rare, or endangered aspects of South Africa's natural or cultural history</p>	<p>Y</p>	<p>High</p>
<p>Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage</p>	<p>Y</p>	<p>Medium</p>
<p>Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects</p>	<p>Y</p>	<p>High</p>
<p>Its importance in exhibiting particular aesthetic characteristics valued by a community cultural group</p>	<p>N</p>	
<p>Its importance in demonstrating a high degree of creative or technical achievement at a particular period</p>	<p>N</p>	
<p>Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons</p>	<p>Y</p>	<p>High</p>
<p>Its strong or special association with the life or work of a person, group or organization of</p>	<p>N</p>	

importance in the history of South Africa		
Sites of significance relating to the history of slavery in South Africa	N	
Reasoned assessment of significance using appropriate indicators outlined above:		High

Integrity scale:

- 1 – Bad state of preservation, but no contextual information
- 2 – Bad state of preservation and includes contextual information
- 3 – Reasonable state of preservation, but no contextual information
- 4 – Reasonable state of preservation and includes contextual information
- 5 – Good state of preservation, but no contextual information
- 6 - Good state of preservation and includes contextual information
- 7 – Excellent state of preservation, but no contextual information
- 8 – Excellent state of preservation and includes contextual information

Field-rating = Cultural significance x Integrity

= **High** (6)x 4
= 24

Sites 4 therefore receives a field rating of Local Grade IIIB: The site should be included in the heritage register and may be mitigated (high significance). Mitigation is subject to a permit application lodged with the relevant heritage authority.

Usually there are two options when dealing with graves. The first option would be to fence the graves in and have a management plan drafted for the sustainable preservation thereof. This should be written by a heritage expert. This usually is done when the graves are in no danger of being damaged, but where there will be a secondary impact due to the activities of the development.

The second option is to exhume the mortal remains and then to have it relocated. This usually is done when the graves are in the area to be directly affected by the development activities. For this a specific procedure should be followed which includes social consultation. For graves younger than 60 years only an undertaker is needed. For those older than 60 years and unknown graves an undertaker and archaeologist is needed. Permits should be obtained from the Burial Grounds and Graves unit of SAHRA. This procedure is quite lengthy and involves social consultation.

9. CONCLUSION AND RECOMMENDATIONS

The survey of the proposed development area was completed successfully. Four sites of heritage significance were identified. Three of these were at the TSF Expansion

West site. One grave site of heritage significance was identified just outside of the TSF Expansion North site (Figure 26).

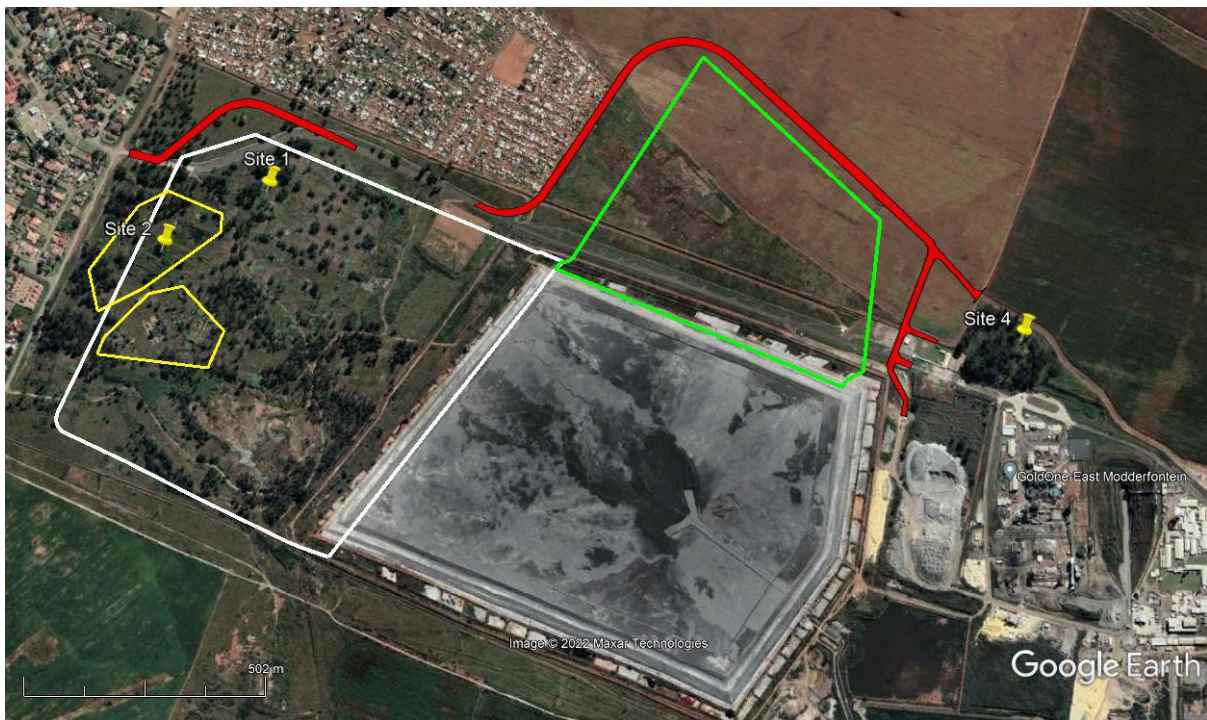


FIGURE 26: SITES IDENTIFIED IN OR CLOSE TO THE PROJECT AREAS.

The following is recommended:

- The cultural significance of sites 1, 2 and 3 is Low. The development will have an impact on all three of these sites, but the description in this Phase 1 heritage report is seen as sufficient recording and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subject to the granting of Environmental Authorisation.
- The risk assessment for Environmental impact of sites 1, 2 and 3 are:
 - Magnitude is rated as Low (4), because all three of the sites that will be destroyed by the development have low heritage significance.
 - Scale is rated as Site (0) as the three sites are located within the footprint of the development area.
 - Duration is rated as Permanent (5), because the nature of development will permanently alter the area the sites are located at.
 - Probability is rated as Definite (5), the sites cannot move, and the development will be taken up the space where these three sites are located at.

SIGNIFICANCE = (MAGNITUDE + DURATION + SCALE) X PROBABILITY

S = (4+0+5) x 5

S = 9 x 5

S = 45

The significance of this risk assessment is calculated at a value of 45 and thus Medium environmental significance.

- The cultural significance of the Graves that have been identified in a previous report is High and should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodge with the relevant heritage authority. There are two ways of dealing with graves.
 - The first option would be to fence the graves in and have a management plan drafted for the sustainable preservation thereof. This should be written by a heritage expert. This usually is done when the graves are in no danger of being damaged, but where there will be a secondary impact due to the activities of the mine.
 - The second option is to exhume and relocate the mortal remains. This usually is done when the graves are in the area to be directly affected by the mining activities. For this a specific procedure should be followed which includes social consultation. For graves younger than 60 years only, an undertaker is needed. For those older than 60 years and unknown graves an undertaker and archaeologist are needed. Permits should be obtained from the Burial Grounds and Graves unit of SAHRA. This procedure is quite lengthy. Since the graveyard is outside of the area of direct development, and already fence in, it should remain as such

The proximity of the Graves to the mine, and new proposed development in the east will be about 330 m at its closest point to the gravesite. Option 1 is thus recommended for the grave site as there undoubtedly will be a secondary impact.

- The risk assessment for Environmental impact of site 4 is:
 - Magnitude is rated as Moderate (6), even though the development will not affect site 4 directly, secondary impact will be presented in the form of dust, and the movement of heavy vehicles past the site that could have impact on the graves and headstones.
 - Scale is rated as Local (2) the site is located within approximately 2,5 km of the activity.
 - Duration is rated as Medium (3), with a proper heritage management plan the secondary impact could be lessened or stopped.
 - Probability is rated as Expected (4), due to the nature of the development secondary impact is expected.

SIGNIFICANCE = (MAGNITUDE + DURATION + SCALE) X PROBABILITY

S = (6+2+3) x 4

S = 11 x 4

S = 44

The significance of this risk assessment is calculated at a value of 44 and thus Medium environmental significance.

Risk assessment after mitigation –

- Magnitude is rated as Moderate (6), as secondary impact such as dust, and the movement of heavy vehicles past the site that could have impact on the graves and headstones.
- Scale is rated as Local (2) the site is located within approximately 330 m of the activity.
- Duration is rated as Medium (3), as it can be reversed with sufficient management
- Probability is rated as Expected (4), due to the nature of the development secondary impact is expected.

SIGNIFICANCE = (MAGNITUDE + DURATION + SCALE) X PROBABILITY

$$S = (6+2+3) \times 4$$

$$S = 11 \times 4$$

$$S = 44$$

The significance of this risk assessment is calculated at a value of 44 and thus Medium environmental significance.

- It should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. Due to the density of vegetation, it also is possible that some sites may only become known later on. Operating controls and monitoring should therefore be aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.
- In this regard the following 'Chance Find Procedure' should be followed:
 - Upon finding any archaeological or historical material all work at the affected area must cease.
 - The area should be demarcated in order to prevent any further work there until an investigation has been completed.
 - An archaeologist should be contacted immediately to provide advice on the matter.
 - Should it be a minor issue, the archaeologist will decide on future action, which could include adapting the HIA or not. Depending on the nature of the find, it may include a site visit.
 - SAHRA's Archaeology Palaeontology and Meteorites Unit may also be notified.
 - If needed, the necessary permit will be applied for with SAHRA. This will be done in conjunction with the appointed archaeologist.
 - The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter.
 - Work on site will only continue after removal of the archaeological/historical material was done.

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APPENDIX A

DEFINITION OF TERMS:

Site: A large place with extensive structures and related cultural objects. It can also be a large assemblage of cultural artifacts, found on a single location.

Structure: A permanent building found in isolation, or which forms a site in conjunction with other structures.

Feature: A coincidental find of movable cultural objects.

Object: Artifact (cultural object).

(Also see Knudson 1978: 20).

APPENDIX B

DEFINITION/ STATEMENT OF HERITAGE SIGNIFICANCE:

- Historic value: Important in the community or pattern of history or has an association with the life or work of a person, group or organization of importance in history.
- Aesthetic value: Important in exhibiting particular aesthetic characteristics valued by a community or cultural group.
- Scientific value: Potential to yield information that will contribute to an understanding of natural or cultural history or is important in demonstrating a high degree of creative or technical achievement of a particular period
- Social value: Have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.
- Rarity: Does it possess uncommon, rare or endangered aspects of natural or cultural heritage.
- Representivity: Important in demonstrating the principal characteristics of a particular class of natural or cultural places or object or a range of landscapes or environments characteristic of its class or of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province region or locality.

APPENDIX C

SIGNIFICANCE AND FIELD RATING:

Cultural significance:

- Negligible – The site has no heritage significance, although it may be older than 60 years.
- Low - A cultural object being found out of context, not being part of a site or without any related feature/structure in its surroundings. A site with minimal importance which is decreased by its bad state of decay.
- Low-Medium - A site of lesser importance, which is increased by a good state of preservation and contextual importance (e.g. a specific community).
- Medium - Any site, structure or feature being regarded less important due to a number of factors, such as date and frequency. Also, any important object found out of context.
- Medium-High - A site that has high importance due to its age or uniqueness, but which decreases due to its bad state of decay.
- High - Any site, structure or feature regarded as important because of its age or uniqueness. Also, any important object found within a specific context.
- Very High - A site of exceptional importance due to its age, uniqueness and good state of preservation.

Heritage significance:

- Grade I Heritage resources with exceptional qualities to the extent that they are of national significance
- Grade II Heritage resources with qualities giving it provincial or regional importance although it may form part of the national estate
- Grade III Other heritage resources of local importance and therefore worthy of conservation

Field ratings:

National Grade I significance: The site should be managed as part of the national estate, should be nominated as Grad I site, should be maintained in situ with a protected buffer zone and a CMP must be recommended. Score above 50.

Provincial Grade II significance: The site should be managed as part of the provincial estate, should be nominated as Grade II site, should be maintained in situ with a protected buffer zone and a CMP must be recommended. Score between 41 and 50.

Local Grade IIIA: The site should be included in the heritage register and not be mitigated (high significance), should be maintained in situ with a protected buffer zone and a CMP must be recommended. Score between 31 and 40.

Local Grade IIIB: The site should be included in the heritage register and may be mitigated (high/ medium significance). Mitigation is subject to a permit application lodged with the relevant heritage authority. Score between 6 and 30.

Local Grade IIIC: The description in the phase 1 heritage report is seen as sufficient recording (low significance) and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation. Score below 5.

APPENDIX D

PROTECTION OF HERITAGE RESOURCES:

Formal protection:

National heritage sites and Provincial heritage sites – grade I and II

Protected areas - an area surrounding a heritage site

Provisional protection – for a maximum period of two years

Heritage registers – listing grades II and III

Heritage areas – areas with more than one heritage site included

Heritage objects – e.g. archaeological, palaeontological, meteorites, geological specimens, visual art, military, numismatic, books, etc.

General protection:

Objects protected by the laws of foreign states

Structures – older than 60 years

Archaeology, palaeontology and meteorites

Burial grounds and graves

Public monuments and memorials

APPENDIX E

HERITAGE/ARCHAEOLOGICAL IMPACT ASSESSMENT PHASES

1. Pre-assessment or scoping phase – establishment of the scope of the project and terms of reference.
2. Baseline assessment – establishment of a broad framework of the potential heritage of an area.
3. Phase I impact assessment – identifying sites, assess their significance, make comments on the impact of the development and makes recommendations for mitigation or conservation.
4. Letter of recommendation for exemption – if there is no likelihood that any sites will be impacted.
5. Phase II mitigation or rescue – planning for the protection of significant sites or sampling through excavation or collection (after receiving a permit) of sites that may be lost.
6. Phase III management plan – for rare cases where sites are so important that development cannot be allowed.