HERITAGE IMPACT ASSESSMENT

(REQUIRED UNDER SECTION 38(8) OF THE NHRA (No. 25 OF 1999)

FOR THE PROPOSED RICHARDS BAY COMBINED CYCLE POWER PLANT (CCPP) AND ASSOCIATED INFRASTRUCTURE ON A SITE NEAR RICHARDS BAY, KWAZULU-NATAL PROVINCE

Type of development:

CCPP

Client:

Savannah Environmental (Pty) Ltd

Sharon Meyer

Developer:

Eskom Holdings SoC Ltd

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Project Reference:

218102

Report date:

January 2018

Revised February 2019

APPROVAL PAGE

Project Name	**Richards Bay CCPP: 3000MW**
Report Title	Heritage Impact Assessment Richards Bay CCPP: 3000MW
Authority Reference Number	TBC
Report Status	Draft Report
Applicant Name	Eskom Holdings SOC Ltd

	Name	**Signature**	**Qualifications and Certifications**	**Date**
Field work and Document Compilation	Jaco van der Walt		MA Archaeology ASAPA #159	January 2018 Revised February 2019

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Amendments on Document

Date	Report Reference Number	Description of Amendment
22 February 2019	21802	Addressed Comments from Savannah Environmental (Pty) Ltd and Eskom Holdings SOC

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REPORT OUTLINE

Appendix 6 of the GNR 326 EIA Regulations published on 7 April 2017 provides the requirements for specialist reports undertaken as part of the environmental authorisation process. In line with this, Table 1 provides an overview of Appendix 6 together with information on how these requirements have been met.

Table 1. Specialist Report Requirements.

Requirement from Appendix 6 of GN 326 EIA Regulation 2017	Chapter
(a) Details of - (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Section a Section 12
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	*Declaration of Independence*
(c) Indication of the scope of, and the purpose for which, the report was prepared	Section 1
(cA)an indication of the quality and age of base data used for the specialist report	Section 3.4 and 7.1.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	9
(d) Duration, Date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3.4
(e) Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 9
(h) Map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Section 8
(I) Description of any assumptions made and any uncertainties or gaps in knowledge	Section 3.7
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity **including identified alternatives on the environment** or activities;	Section 9
(k) Mitigation measures for inclusion in the EMPr	Section 9 and 10
(I) Conditions for inclusion in the environmental authorisation	Section 9 and 10
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 9 and 10
(n) Reasoned opinion - (i) as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 10.2
(o) Description of any consultation process that was undertaken during the course of preparing the specialist report	Section 6
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to EIA report
(q) Any other information requested by the competent authority	Section 10

Executive Summary

HCAC was appointed to conduct a Heritage Impact Assessment of the proposed Richards Bay Combined Cycle Power Plant (CCPP) 3000MW project to determine the presence of cultural heritage sites and the impact of the proposed development on these non-renewable resources. The study area was assessed both on desktop level and by a field survey. The field survey was conducted as a non-intrusive pedestrian survey to cover the extent of the development footprint.

In terms of Section 35 of the NHRA no archaeological sites were identified and an independent palaeontological assessment (Butler 2017) recommended no further paleontological studies. No further mitigation prior to construction is recommended in terms of Section 35 of the NHRA and Section 36 of the KZN Heritage Act for the proposed development to proceed.

In terms of the built environment of the area (Section 34 of the NHRA and Section 33 of the KZN Heritage Act) no standing structures older than 60 years occur within the study area. In terms of Section 36 of the NHRA and Section 34 and 35 of the KZN Heritage Act no burial sites were recorded. If any graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation. No public monuments are located within or close to the study area. The study area is located in an industrial area away from main tourist routes and the proposed development will not impact negatively on significant viewscapes. During the public participation process conducted for the project no heritage concerns was raised.

The impact of the proposed project on heritage resources is considered low and it is recommended that the proposed project can commence provided that the recommendations below are adhered to and based on approval from SAHRA and AMAFA.

- Implementation of a chance find procedure as part of the EMPr.

Declaration of Independence

Specialist Name	Jaco van der Walt
Declaration of Independence	I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 108 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations, that I: • I act as the independent specialist in this application; • I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant; • I declare that there are no circumstances that may compromise my objectivity in performing such work; • I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity; • I will comply with the Act, Regulations and all other applicable legislation; • I have no, and will not engage in, conflicting interests in the undertaking of the activity; • I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; • All the particulars furnished by me in this form are true and correct; and • I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.
Signature	
Date	22 February 2019

a) Expertise of the specialist

Jaco van der Walt has been practising as a CRM archaeologist for 15 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focussing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focussing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is an accredited member of ASAPA (#159) and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as he Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC Zambia and Tanzania. Through this he has a sound understanding of the IFC Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.

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ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
BIA: Basic Impact Assessment
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DEA: Department of Environmental Affairs
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMP: Environmental Management Programme
ESA: Early Stone Age
ESIA: Environmental and Social Impact Assessment
GIS Geographical Information System
GPS: Global Positioning System
GRP Grave Relocation Plan
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act
MSA: Middle Stone Age
NEMA National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID Notification of Intent to Develop
NoK Next-of-Kin
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological site (remains of human activity over 100 years old)
Early Stone Age (~ 2.6 million to 250 000 years ago)
Middle Stone Age (~ 250 000 to 40-25 000 years ago)
Later Stone Age (~ 40-25 000, to recently, 100 years ago)
The Iron Age (~ AD 400 to 1840)
Historic (~ AD 1840 to 1950)
Historic building (over 60 years old)

1 Introduction and Terms of Reference:

Heritage Contracts and Archaeological Consulting CC (HCAC) has been contracted by Savannah Environmental (Pty) Ltd to conduct a heritage impact assessment of the proposed development footprint. The report forms part of the Environmental Impact Assessment (EIA) and Environmental Management Programme Report (EMPR) for the Richards Bay Combined Cycle Power Plant (CCPP).

The aim of the study is to survey the proposed development footprint to identify cultural heritage sites, document, and assess their importance within local, provincial and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999). The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, review of relevant literature; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey no heritage sites were recorded. General site conditions and features on sites were recorded by means of photographs, GPS locations, and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report. SAHRA as a commenting authority under section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) require all environmental documents, complied in support of an Environmental Authorisation application as defined by NEMA EIA Regs section 40 (1) and (2), to be submitted to SAHRA. As such the EIA report and its appendices must be submitted to the case as well as the EMPr, once completed by the Environmental Assessment Practitioner (EAP).

1.1 Terms of Reference

Field study
Conduct a field study to: (a) locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development.

Reporting
Report on the identification of anticipated and cumulative impacts that the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation, SAHRA minimum standards and the code of ethics and guidelines of ASAPA.
To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999).

Table 2: Project Description

Size of farm and portions	The proposed facility is located in an area measuring 71 hectares with a development footprint of approximately 71ha
Magisterial District	uMhlathuze Local Municipality
1: 50 000 map sheet number	2831DD.
Central co-ordinate of the development	28° 46' 09.4114" S, 31° 59' 06.6212" E

Table 3: Infrastructure and project activities

Type of development	CCPP Development
Project size	CCPP Development footprint approximately 71 ha
Project Components	The main infrastructure associated with the facility includes the following: » Gas turbines for the generation of electricity through the use of natural gas or diesel (back-up resource). » Heat recovery steam generators (HRSG) to capture heat from high temperature exhaust gases to produce high temperature and high-pressure dry steam to be utilised in the steam turbines. » Steam turbines for the generation of additional electricity through the use of dry steam generated by the HRSG. » Bypass stacks associated with each gas turbine. » Dirty Water Retention Dams. » Exhaust stacks for the discharge of combustion gases into the atmosphere. » A water treatment plant for the treatment of potable water and the production of demineralised water (for steam generation). » Water pipelines and water tanks to transport and store water of both industrial quality and potable quality (to be supplied by the Local Municipality). » Dry-cooled system consisting of air-cooled condenser fans situated in fan banks. » Closed Fin-fan coolers to cool lubrication oil for the gas and steam turbines. » A gas pipeline and a gas pipeline supply conditioning process facility for the conditioning and measuring of the natural gas prior to being supplied to the gas turbines. It must be noted however that the environmental permitting processes for the gas pipeline construction and operation will be undertaken under a separate EIA Process » Diesel off-loading facility and storage tanks. » Ancillary infrastructure including access roads, warehousing, buildings, access control facilities and workshop area, storage facilities, emergency back-up generators, firefighting systems, laydown areas and 132kV and 400kV switchyards. » A power line to connect the Richards Bay CCPP to the national grid for the evacuation of the generated electricity. It must be noted however that the due environmental permitting processes for the development of the power line component are being undertaken under a separate EIA Process. »

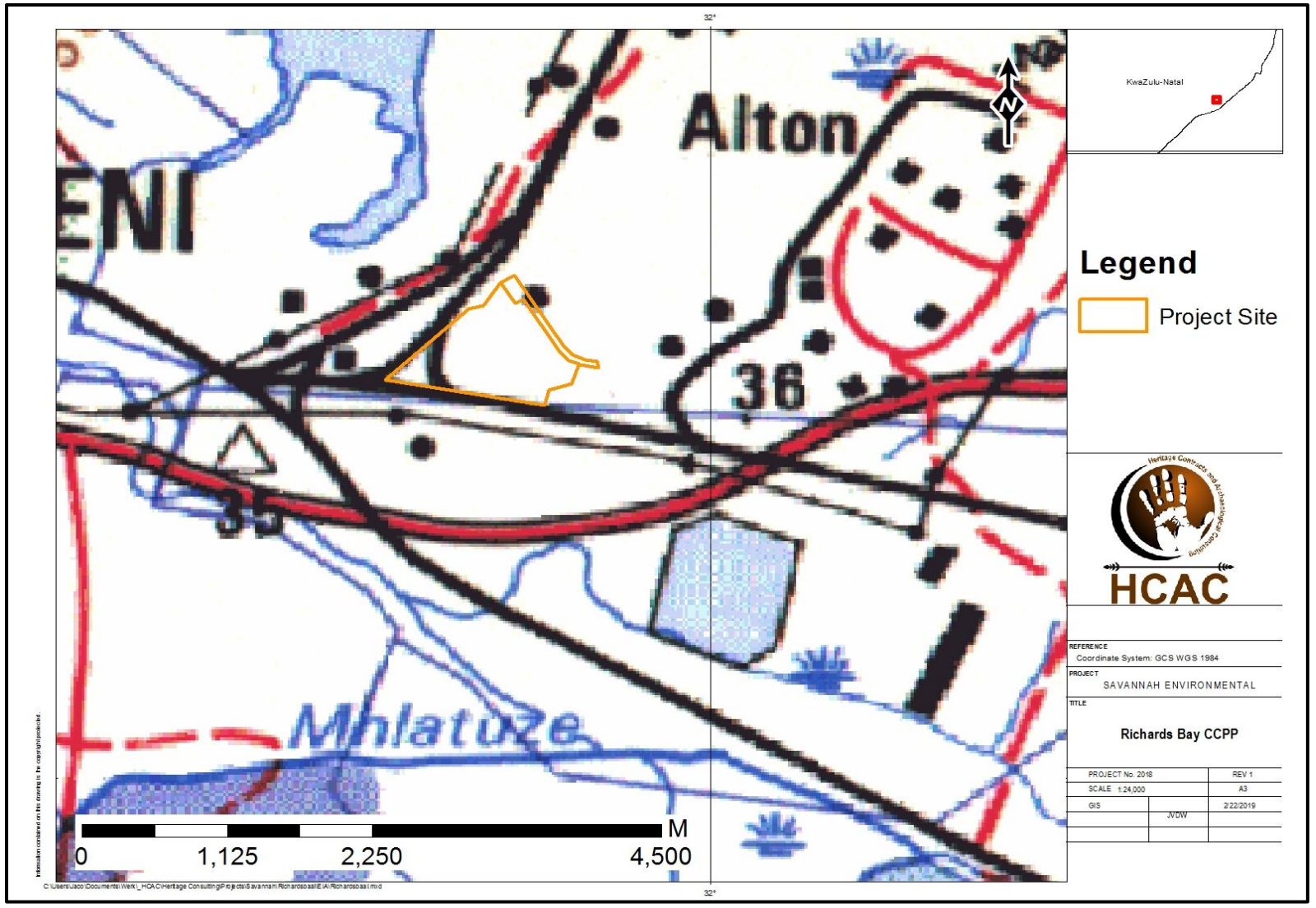


Figure 1. Provincial locality map (1: 250 000 topographical map)

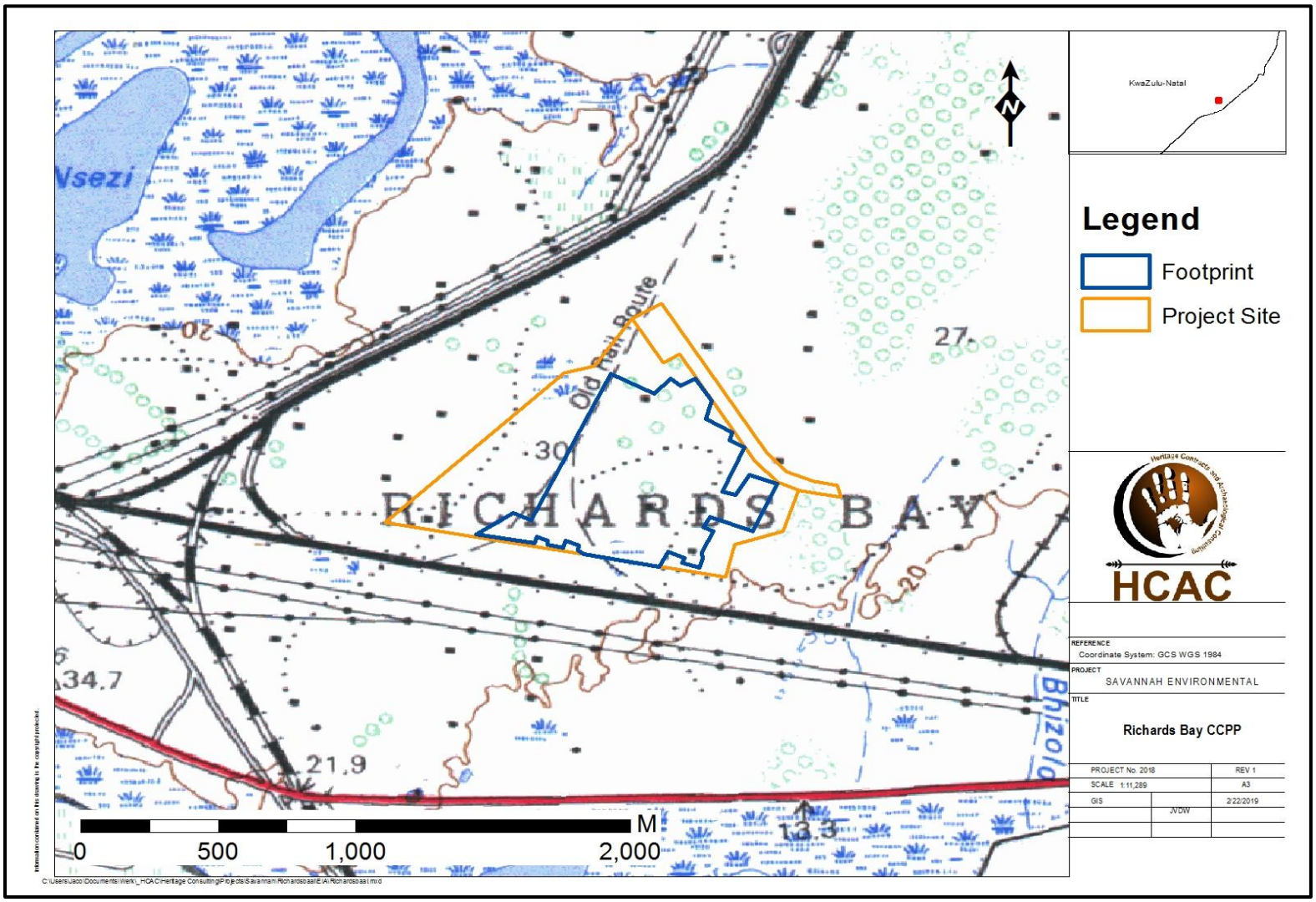


Figure 2: Regional locality map (1:50 000 topographical map).

Figure 3. Satellite image indicating the study area and layout (Google Earth 2018).

2 LEGISLATIVE REQUIREMENTS

The HIA, as a specialist sub-section of the EIA, is required under the following legislation:

- National Heritage Resources Act (NHRA), Act No. 25 of 1999)
- National Environmental Management Act (NEMA), Act No. 107 of 1998 - Section 23(2)(b)
- Mineral and Petroleum Resources Development Act (MPRDA), Act No. 28 of 2002 - Section 39(3)(b)(iii)
- The Kwazulu-Natal Heritage Act, No. 4 of 2008

A Phase 1 HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of heritage specialist input is to:

- Identify any heritage resources, which may be affected;
- Assess the nature and degree of significance of such resources;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- Assess the negative and positive impact of the development on these resources; and
- Make recommendations for the appropriate heritage management of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMPr, to the PHRA if established in the province or to SAHRA. SAHRA will ultimately be responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the impact assessment report and/or EMPr, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level). Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 AIA's are primarily concerned with the location and identification of heritage sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA and AMAFA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision-making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and include (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for with SAHRA by the applicant before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare. Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

3 METHODOLOGY

3.1 Literature Review

A brief survey of available literature was conducted to extract data and information on the area in question to provide general heritage context into which the development would be set. This literature search included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS).

3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located; these locations were marked and visited during the field work phase. The database of the Genealogical Society was consulted to collect data on any known graves in the area.

3.3 Public Consultation and Stakeholder Engagement

Stakeholder engagement is a key component of any BAR process, it involves stakeholders interested in, or affected by the proposed development. Stakeholders are provided with an opportunity to raise issues of concern (for the purposes of this report only heritage related issues will be included). The aim of the public consultation process was to capture and address any issues raised by community members and other stakeholders during key stakeholder and public meetings. The process involved:

- Placement of advertisements and site notices
- Stakeholder notification (through the dissemination of information and meeting invitations);
- Stakeholder meetings undertaken with I&APs;
- Authority Consultation
- The compilation of a Basic Assessment Report (BAR).
- The compilation of a Comments and Response Report (CRR).

3.4 Site Investigation

Conduct a field study to: a) systematically survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Recorded heritage features were given numerical site numbers. GPS readings are taken roughly in the middle of each identified heritage site. Sites/heritage features were located during the physical walkthrough for the project that occurred over a period of 1 days conducted by an archaeologist. All the sites were mapped and georeferenced on 1:50 000 maps or aerial imagery of the area. Site locations were recorded with a GPS Montana handheld device and coordinates were taken when an accuracy reading of less than 4 meters were obtained.

Table 4: Site Investigation Details

	Site Investigation
Date	20 December 2017
Season	Summer - vegetation cover in the study area is low (less than 400 mm high) with good archaeological visibility. The study area was sufficiently covered (Figure 4) to adequately record the presence of heritage resources.

It is not expected that the heritage character of the area would have changed from December 2017 when the assessment was done until February 2019 and the findings of this report are still valid.

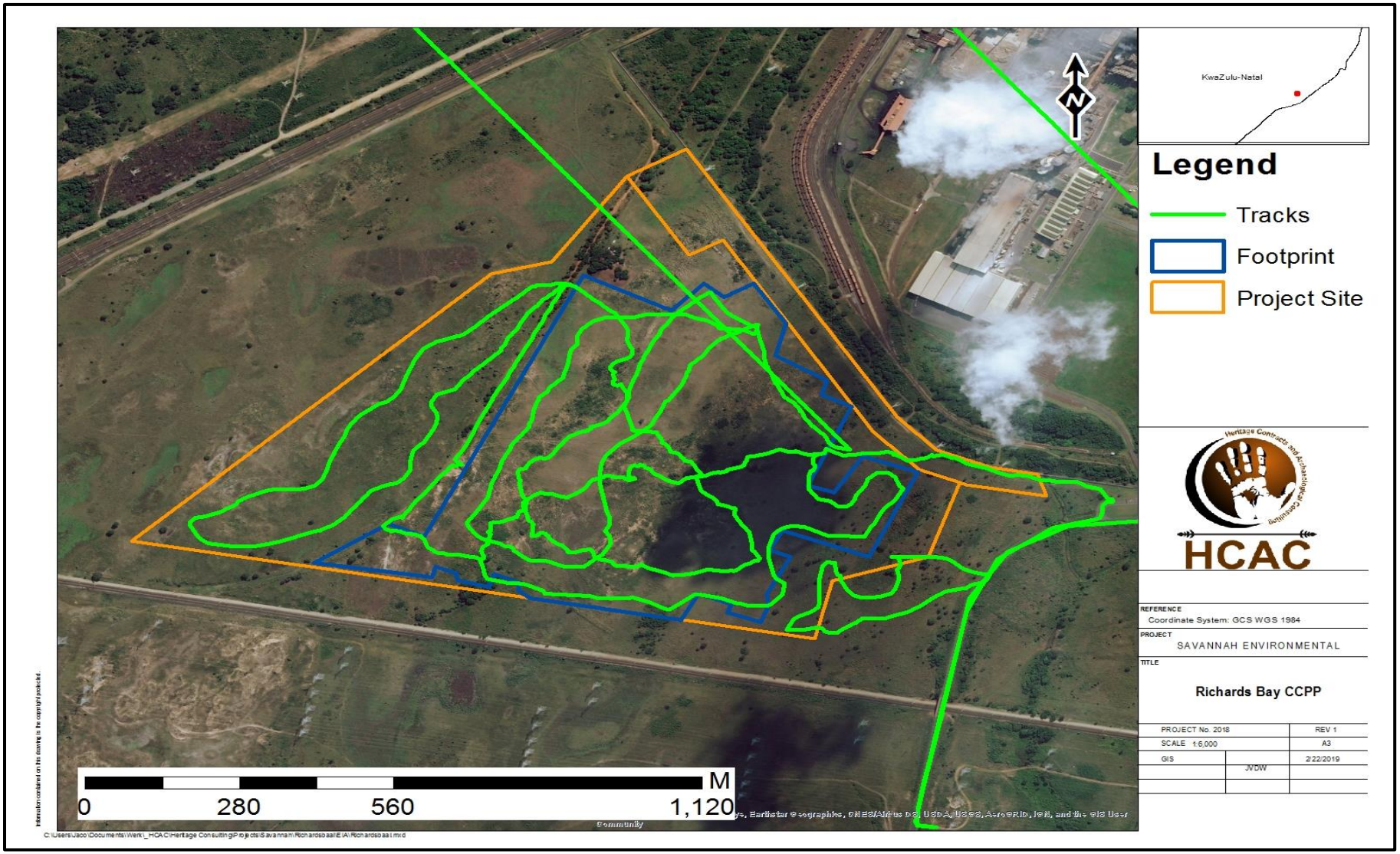


Figure 4: Track logs of the survey in green.

3.5 Site Significance and Field Rating

Section 3 of the NHRA distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

- Its importance in/to the community, or pattern of South Africa's history;
- Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- Sites of significance relating to the history of slavery in South Africa.
- The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed project the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface. This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance with cognisance of Section 3 of the NHRA:
    - The unique nature of a site;
    - The integrity of the archaeological/cultural heritage deposits;
    - 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/is known);
    - The preservation condition of the sites; and
    - Potential to answer present research questions.
- In addition to this criteria field ratings prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 10 of this report.

FIELD RATING	*GRADE*	*SIGNIFICANCE*	*RECOMMENDED 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

3.6 Impact Assessment Methodology

The criteria below are used to establish the impact rating on sites:

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

The **significance** is calculated by combining the criteria in the following formula:
S=(E+D+M)P
S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

3.7 Limitations and Constraints of the study

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the subsurface nature of archaeological artefacts, the possibility exists that some features or artefacts may not have been discovered/recorded during the survey and the possible occurrence of unmarked graves and other cultural material cannot be excluded. Similarly, the depth of the deposit of heritage sites cannot be accurately determined due its subsurface nature. Although the entire project area was assessed in both the screening and scoping phases, field work focused on the development footprint. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

4 DESCRIPTION OF SOCIO ECONOMIC ENVIRONMENTAL

The Uthungulu District Municipality: Integrated Development Plan 2016/2017 provides the following information:

"*The district is characterized by low levels of urbanization; approximately 80% of the people live in the rural areas. More than 50% of the population is younger than 19 years. The female population is significantly higher than the male population – a phenomenon that can be attributed to migration patterns associated with the province in general.*

The vast majority of economic performance (41.8%) in the district is vested in uMhlathuze Local Municipality with its primary urban centres being Richards Bay and Empangeni. This area is the third most important in the province of KwaZulu-Natal in terms of economic production and contributes 9.1% of the total GGP and 8.5% of the total employment (formal and informal) in 2010. Between 1996 and 2009 the GDP average annual growth rate for uThungulu region was 2.8% - lower than the province at 3.2% and the national rate of 3.2% per annum. In 1997, the GDP average annual growth rate was approximately 7, 0%. The district is characterized by large infrastructure backlogs, particularly in respect of water and sanitation mainly in the rural areas. The implementation of the 2009 uThungulu WSDP (Water Services Development Plan) has reduced the rural backlogs for water supply to RDP standard from 81% in 2001/02 to 29.4% in 2015/16. The backlogs in rural sanitation to RDP standards have been reduced from 80% to 12% over the same period.

uThungulu district's transportation infrastructure is under pressure. The road network connects the major nodes, like Richards Bay and Empangeni to the national network, however the heavy vehicles servicing the Port of Richards Bay and the adjoining industrial areas are placing considerable strain on the infrastructure. Rail is a declining transport sector, with no major commuter networks in place and limited industrial linkages (with the exception of the coal link from Mpumalanga to the Richards Bay Coal Terminal at the Port of Richards Bay)."

5 DESCRIPTION OF THE PHYSICAL ENVIRONMENT:

The development of the Richards Bay CCPP: 3000MW is situated approximately 6 km south west of Richards Bay Central. The study area is located in the uMhlathuze Local Municipality within the Kwa Zulu Natal Province.

The prevailing vegetation type and landscape features of the area form part of the Maputuland Coastal Belt. It is described as a flat coastal plain with Quaternary sediments of marine origin characterised by low shrubs (Mucina & Rutherford, 2006). The proposed development site is situated adjacent and on the southern side of the Richards Bay Mondi Plant. Currently the study area is fallow and used for grazing.

To the south the study area is bordered by an existing operational railway line and by open veld to the east and the west. In addition to the construction of the railway lines the study area is further impacted on by illegal sand mining, a water pipeline and transmission line. To the north and east of the study area consist of a densely developed industrial zone with farming activities to the south and the east.

Figure 5. Industrial developments bordering the study area

Figure 6. Railway line and power lines in the area

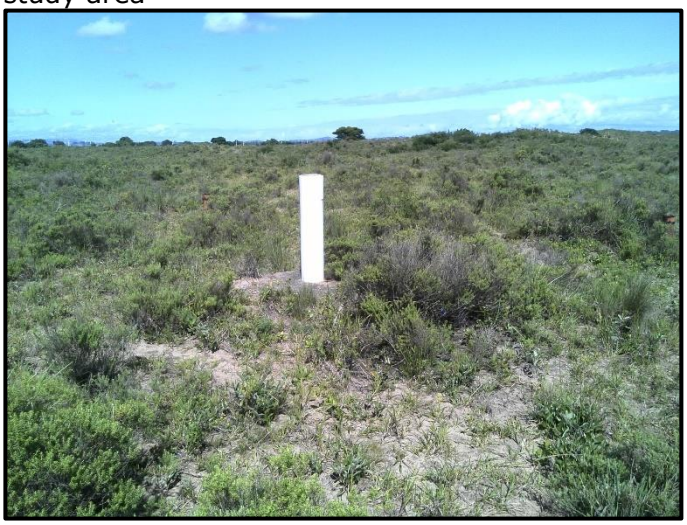


Figure 7. Low pressure water pipeline

Figure 8. Sand mining

6 RESULTS OF PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT:

Adjacent landowners and the public at large were informed of the proposed activity as part of the EIA process. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process.

7 LITERATURE / BACKGROUND STUDY:

7.1 Literature Review

Several previous heritage studies were conducted in the general study area (SAHRIS) and were consulted for the purposes of this report:

- Anderson, G. & Anderson, L. 2008. Archaeological Survey of The Proposed John Ross Interchange Development. Two Iron Age sites were recorded.
- Anderson, G. & Anderson, L. 2009. Heritage Survey of the Proposed Expansion to the Transnet National Ports Authority, Richards Bay - A total of nine sites was recorded during the course of the survey. These sites date from the Cretaceous to the Late Iron Age.
- Anderson, G. & Anderson, L. 2010. Heritage Survey of the Proposed Richards Bay Central Industrial Area for Coastal & Environmental Services. The survey did not locate any heritage sites.
- Galimberti, M. 2015. Heritage Screener. The proposed gas to power plant within the Richards Bay IDZ, KZN. No known sites were found that require mitigation or management.
- Prins, F. 2015. Cultural Heritage Impact Assessment Of Phase If Of The Richards Bay Industrial Development Zone (IDZ). No sites were recorded.

7.1.1 Genealogical Society and Google Earth Monuments

No known grave sites are indicated close to the study area.

7.2 General History of the area

7.2.1 Archaeology of the area

The archaeology of KwaZulu-Natal can be divided in three main periods namely the Stone Age, Iron Age and Historical period.

Stone Age
South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For Cultural Resources Management (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases.

Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable (Lombard 2011). The three main phases can be divided as follows;

- Later Stone Age; associated with Khoi and San societies and their immediate predecessors. - Recently to ~30 thousand years ago.
- Middle Stone Age; associated with Homo sapiens and archaic modern human - . 30-300 thousand years ago.
- Earlier Stone Age; associated with early Homo groups such as Homo habilis and Homo erectus. - 400 000-> 2 million years ago.

The LSA is well represented in KwaZulu-Natal with an abundance of rock art, like the rock paintings at Giants Castle and Kamberg in the Drakensburg Mountains (Vinnicombe, 1976). Rock art sites have been also been documented in the areas around Estcourt, Mooi River and Dundee. Several caves in KZN contain significant archaeological deposits like the well-known MSA site of Sibudu Cave on the coast of KwaZulu-Natal, which shows evidence for early forms of cognitive human behavioural patterns (Wadley, 2005). Another well-known cave called Border Cave is situated some 40 kilometres to the north east of the study area at the Ingodini Border Cave Museum Complex. The site was first investigated by Raymond Dart in 1934; here excavations exposed a thick deposit of archaeological material dating from the Iron Age overlaying MSA artefacts. Later excavations, by Beaumont in the early 1970's, revealed a complete MSA sequence succeeded by Early and Later Iron Age deposits (Klein 1977). Close to the study area, a single Stone Age site is on record (van Schalkwyk 2013). This site has a field rating of 3B as per the Pietermaritzburg Museum database.

Iron Age and historical period

Bantu-speaking people moved into Eastern and Southern Africa about 2,000 years ago (Mitchell, 2002). These people cultivated sorghum and millets, herded cattle and small stock and manufactured iron tools and copper ornaments. Because metalworking represents a new technology, archaeologists call this period the Iron Age. Characteristic ceramic styles help archaeologists to separate the sites into different groups and time periods. The Iron Age as a whole represents the spread of Bantu speaking people and includes both the Pre-Historic and Historic periods. It can be divided into three distinct periods:

- The Early Iron Age: Most of the first millennium AD.
- The Middle Iron Age: 10th to 13th centuries AD.
- The Late Iron Age: 14th century to colonial period.

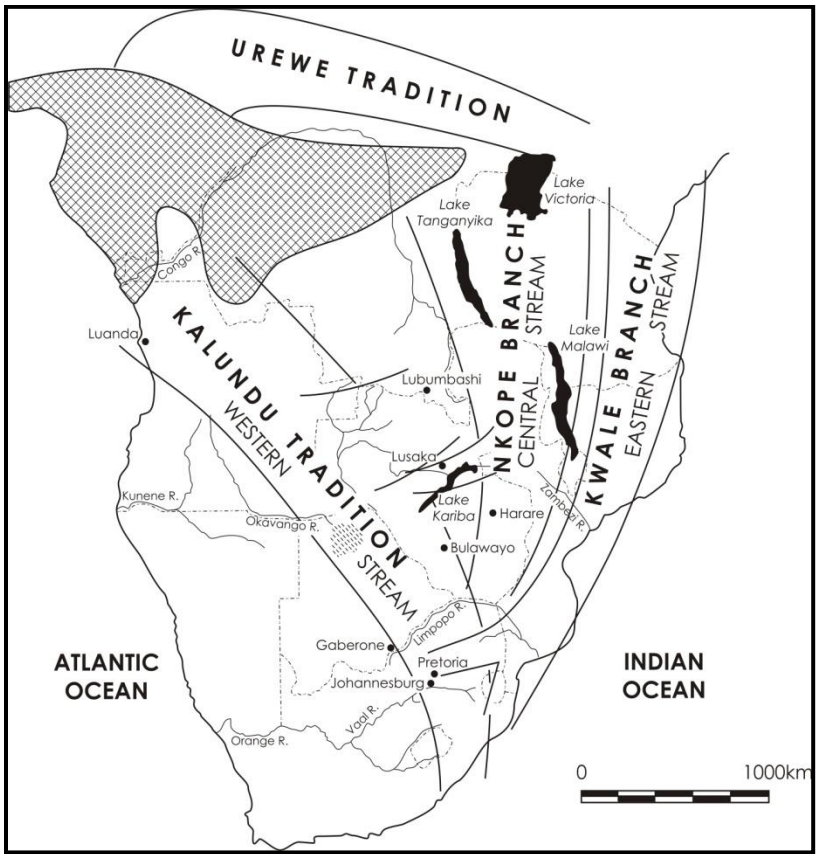


Figure 9: Movement of Bantu speaking farmers (Huffman 2007).

The first 1,000 years is called the Early Iron Age. Early Iron Age people made a living by mixed farming. They had the technology to work metals like iron. Existing evidence dates the Iron Age in southern Africa to the first millennium AD (Huffman, 2007). The site of Mzonjani, 15 km from Durban, is the oldest known Iron Age site in KwaZulu-Natal, dating to the 3rd Millennium AD (Huffman, 2007).

The area that was occupied by the Nguni speaking group of the Eastern Bantu language stream is characterised by settlement patterns defined as the Central Cattle Pattern (CCP) (Huffman, 2007). The Nguni ceramic sequence consists of the *Blackburn* (AD 1050-1500), *Moor Park* (AD 1350-1700) and, *Nqabeni* (AD 1700-1850), although excavated pottery is seldom decorated and therefore complicates archaeological interpretation (Huffman 2007: 441, 443).

Blackburn pottery is on record along the north and south coasts of KwaZulu-Natal, often in shell middens (Huffman 2007: 443). The available radiocarbon dates place *Blackburn* between about AD 1100 and perhaps 1500.

The earliest known type of stonewalling that characterises this settlement pattern (CCP) in the region is the Moor Park site, which dates from the 14th to 16th Centuries AD (Huffman, 2007). This type of stonewalling can be found in defensive positions on hilltops in the Midlands of KZN (Huffman, 2007). Archaeologists have concluded that the function of these structures was to serve mainly as defensive purposes (Huffman, 2007). Archaeologically, the Natal area was occupied by the Zulu people by AD 1050 (Huffman, 2007).

In the late 1400's, a Nguni group under the leadership of Dlamini settled in the Delagoa Bay area. By the late 1700's, the Dlamini clan moved into land settling on the banks of the Pongola River where it cuts through the Lebombo Mountains. An attempt was also made to occupy the area between the Pongola River and Magudu Hills (at that stage the area was under Ndwandwe rule), but they had to retreat back across the Pongola River (Bonner 2002; Fourie 2013).

Serious rivalry between the Ndwandwe under Zwide and the Ngwane (Swazi) under Sobhuza created a period of unrest and confrontation in the early 1800's. An attempt from Zwide to annex the grain fields on the south side of the Pongola River almost destroyed the Ngwane. These successive Ndwandwe attacks lead to the fleeing of the Ngwane to the far north (Bonner, 2002).

The Late Iron Age economy was based on agriculture and livestock. Both components were inextricably linked to cultural practices and even contributed to the evolution of other institutions. In the Nguni groups, economic activities were divided along gender lines; men were closely associated with cattle and women with farming. It is believed that maize was introduced to northern KwaZulu-Natal via the Delagoa Bay trade network and the crop soon became widely cultivated. According to oral tradition, the Mthethwa first produced maize in the late 18th century (Huffman 2007: 453, 457).

Along with cattle and trade beads, (both used as currency for bride wealth); metal objects also became markers of wealth, status and power. Iron and copper ornaments (bangles, neck-and earrings) were worn to indicate social position and were also used in trade (Wylie 2006: 58, 59). Other metal artefacts which may appear in the archaeological record are iron spear points and hoes used for agriculture (very few have been found in context). It is interesting that the deliberate burial of numerous metal objects (mostly spearheads and hoes) seems to have been a common practice in Late Iron Age KwaZulu-Natal (Maggs 1991). This phenomenon is probably connected to the period of instability leading up to the Mfecane.

The Difaqane (Sotho), or Mfekane/Imfecane ("the crushing" in Nguni) was a time of bloody upheavals in Natal and on the Highveld, which occurred around the early 1820's until the late 1830's (Berg 1999: 109-115). It came about in response to heightened competition for land and trade, and caused population groups like gun-carrying Griquas and Shaka's Zulus to attack other tribes (Berg 1999: 14; 116-119). In KwaZulu-Natal, this commenced in the early 1800's when the amaZulu were still under Senzangakona (Omer-Cooper, 1993).

The Mthethwa confederacy also arose in the 18th century as a consolidation of clans that formed part of the greater northern Nguni-speaking cultural group in southern Africa. Their ruling lineage (the Nyambose) originally settled between the Mfolozi and Mhlatuse rivers (Wylie 2006: 49).

Indian Ocean trade contributed to changes in the socio-political structures of many groups, including that of the Mthethwa: imported beads became part of bride-wealth/lobola currency, increased demand for meat and grain from east coast ships necessitated more control of agricultural labour, cattle-raids etc., and even influenced the evolution of the amabutho (age-set regiments) system. Ivory, hides, slaves, grain, and metal hoes were exchanged for incoming commodities such as beads and cloth (Mitchell & Whitelaw 2005: 228; Huffman 2007: 77-80). It was amid the ensuing power struggles between politically complex chiefdoms that the Mthethwa, Ndwandwe in the north and the Qwabe in the south emerged as prominent role-players.

7.2.2 History and Cultural Landscape of the area

It was necessary to use a range of sources in order to give an account of the history of the area under investigation. Sources included maps, online sources and archival documents. Owing to the constraints in time and resources, this study should be viewed as an introduction to the history of the property under investigation.

It should also be noted that a number of the relevant sources relating to the history of Richards Bay are held at the Pietermaritzburg Archives Repository in Natal, and could not be used for the purpose of this study. A list of these sources is provided.

7.2.2.1 Maps Of The Area Under Investigation

Figure 10. 1921 Map of Natal. Richards Bay would later be established at the Umhlanthuze River. This area formed part of the Lower Umfolozi District. One can see the location of the Empangeni Station and Umhlanthuze Station on the railway line that ran along the coast. (NASA *Maps: 2/12*)

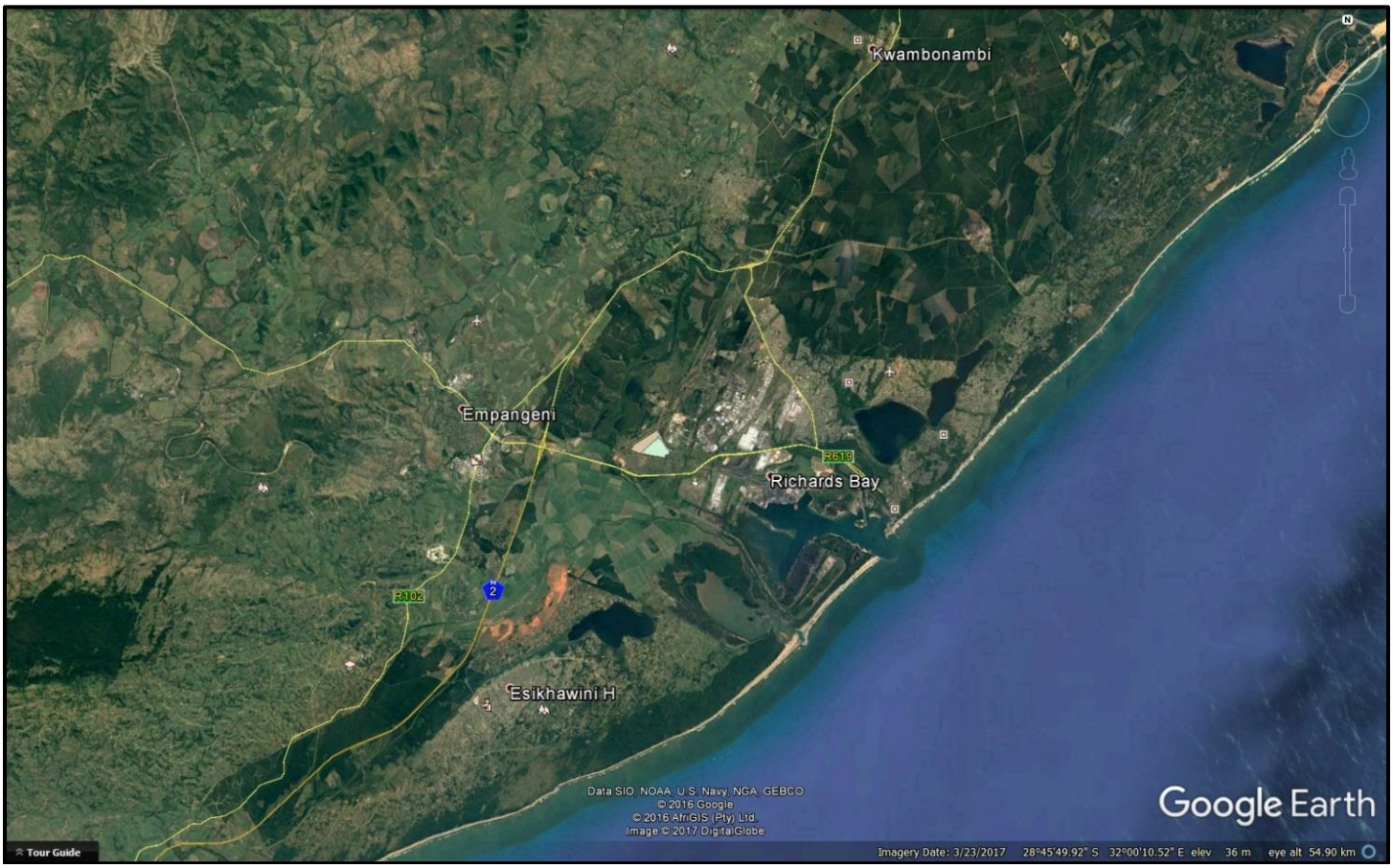


Figure 11. Google Earth image showing the location of the study area in relation to Richards Bay and Empangeni. (Google Earth 2017).

7.2.2.2 Historical Overview Of The Ownership And Development Of The Study Area

Due to the limited available information regarding the portion under investigation, general searches had to be done on Richards Bay and historical railways in the area. For this reason, no specific history of land ownership could be provided. The information found at the national archives deals rather with the history of the development of the town as a whole, than focusing on the specific portion under investigation.

<u>History of land use</u>

Richards Bay is named after one Frederick William Richard, who with three British ships surveyed the South African East Coast to find suitable landing spots for stores to replenish the supplies of Lord Chelmsford, campaigning in the Zulu war of 1879. Richard was the Commodore in command of the West African Station of the Royal Navy. At the time surveys were done at the mouth of the Umhlathuze River, with the view of possibly developing a harbour. In 1902 one Cathcart Methuen surveyed the area and noted that Richards Bay would in all likeliness have made a better harbour than Durban. (NASA *SAB, GMO: 1/661 22*)

Development of a sort first took place in the area in 1907 when George Higgs pioneered the first wagon track from Empangeni to Richards Bay. In 1932, S. F. M. Hibberd, the owner of the first store and hotel at the bay, constructed the first official road in the area, following the path of Higgs' wagon track. In the previous year Richards Bay had once again been recommended as a potential port by a consulting engineer. (NASA *SAB, GMO: 1/661 22*)

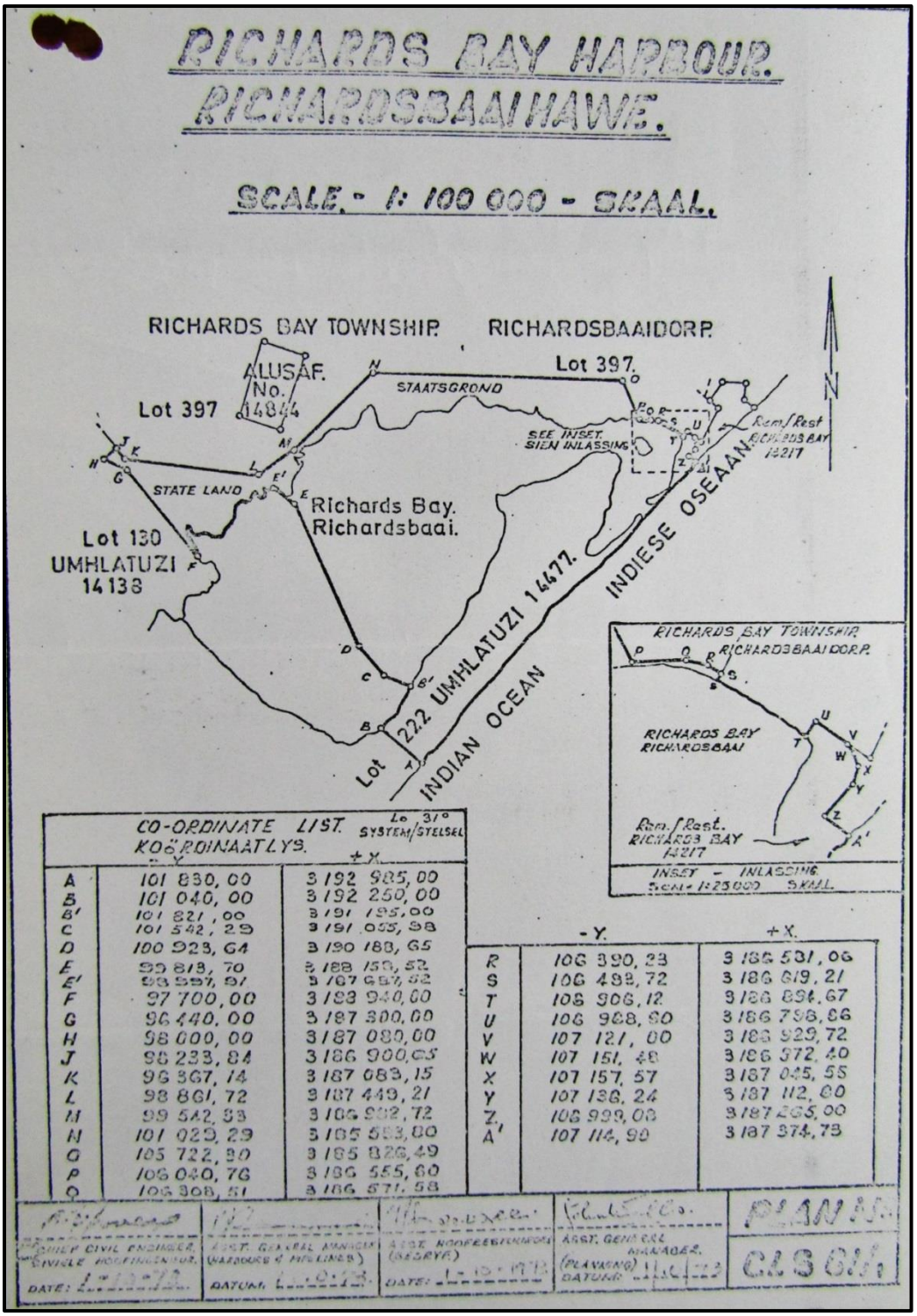
It was however only on 16 April 1965 that Ben Schoeman, the Minister of Transport, announced that he had decided to use Richards Bay as South Africa's second largest port on the Natal coast. In August 1966 Schoeman made an announcement in the House of Assembly that the construction of a multi-million rand port at Richards Bay would begin in 1968. The Richards Bay housing scheme consequently started in January 1970. An advantage of Richards Bay was that the surrounding countryside offered a greater area for development than was available at the Durban-Pinetown complex. (NASA *SAB, GMO: 1/661 22*)
In the middle of 1965, the Minister of Railways issued a proclamation that Richards Bay would be arranged in such a way as to manage mass traffic. He proclaimed that a second main railway would be developed from the Transvaal to Durban via Vryheid and Empangeni. The existing railway line stretched between Johannesburg and Durban via Ladysmith. The initial plan was to complete the Transvaal-Vryheid-Empangeni line by 1969, but it came to light that it would take longer to complete the project. (NASA *SAB, DCD: 1896 25/4/3*)

The harbour town's growth was bolstered by the opening of the Alusaf and Alcor aluminium producers, as well as the Trek petroleum refinery. Construction for Alusaf started in May 1968 and in September 1970 it entered its production stage. Initially raw materials were transported by rail from Durban. Apart from these developments, large areas were also set aside for general industry, as well as petro-chemical expansion. Land was also set aside for an industrial area adjoining the harbour. The city centre was planned to lie between the harbour, the industrial areas and the residential area. Areas set aside for residence purposes were located to the north of the bay. (NASA *SAB, DCD: 1896 25/4/3;* NASA *SAB, DCD: 1896 25/4/3*)

On 3 May 1968, it was approved by the government that, in terms of the Railway Construction Act of 1968 (Act No. 38 of 1968), the railway line from the junction at Empangeni on the railway line between Durban and Golela would be extended to a terminal point at Richard's Bay. (NASA *SAB, URU: 5491 781*)

In March 1971 there was a governmental discussion regarding the transport of black workers by means of a railway line between Port Durnford and Richards Bay. The railway would be constructed in the form of a loop around the central and industrial areas. It was believed that 350 000 black persons would be housed in black suburbs to the south west of the Richards Bay area. It was therefore calculated that about 95 000 passengers would use the commuter rail during peak hours. It was proposed that a station would be established each 2.5 km along the railway line and that it would be necessary to construct a double railway line. It was proposed that enough land would be reserved to further extend the railway in future.

It was hoped that the construction of this railway would render the construction of a direct freeway link with the black residential area unnecessary. (NASA *SAB, BAO: 32 A1/11/1571;* NASA *SAB, GMO: 1/661 22*)



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E	99 818, 70	3 188 159, 52
E'	99 557, 91	3 187 694, 62
F	97 700, 00	3 188 940, 00
G	96 440, 00	3 187 300, 00
H	98 000, 00	3 187 080, 00
J	98 233, 84	3 186 900, 65
K	98 367, 14	3 187 083, 15
L	98 861, 72	3 187 449, 21
M	99 542, 33	3 186 982, 72
N	101 029, 29	3 185 583, 80
O	105 722, 90	3 185 826, 49
P	106 040, 76	3 186 555, 60
Q	106 308, 51	3 186 571, 58
R	106 390, 23	3 186 531, 06
S	106 482, 72	3 186 619, 21
T	105 906, 12	3 186 894, 67
U	106 908, 80	3 186 798, 86
V	107 121, 00	3 186 929, 72
W	107 151, 48	3 186 972, 40
X	107 157, 57	3 187 045, 55
Y	107 136, 24	3 187 112, 80
Z	106 999, 08	3 187 265, 00
A'	107 114, 99	3 187 374, 73

CHIEF CIVIL ENGINEER, CIVIELE HOOFINGENIEUR. DATE: 1-10-72
ASST. GENERAL MANAGER (HARBOURS & PIPELINES) DATUM: 1-10-72
ASST. HOOFBESTUURDER (RESERWE) DATE: 1-10-72
ASST. GENERAL MANAGER (PLANNING) DATUM: 11-10-72
PLAN No. C.L.S 611.

Figure 12. 1973 Map of the Richards Bay harbour. (NASA *SAB, GMO: 2/417 18/3*)

In May 1972 it was officially recommended by government that a commercial harbour would be constructed and equipped at Richards Bay in the Natal province. (NASA *SAB, URU: 6164 644*)

The first suburb to be developed in Richards Bay was called Meerensee, and was situated between Lake Msingazi and the sea. By 1974, 300 houses had been erected in Meerensee. It was planned that the second suburb, Arboretum, would lie to the west of Msingazi and would accommodate 8500 persons. (NASA *SAB, GMO: 1/661 22*)

By 1973 the construction of the harbour was well underway. The harbour area was defined and proclaimed in 1976, and fell under the jurisdiction of the South African Railways and Harbours Administration. (NASA *SAB, GMO: 2/417 18/3*)

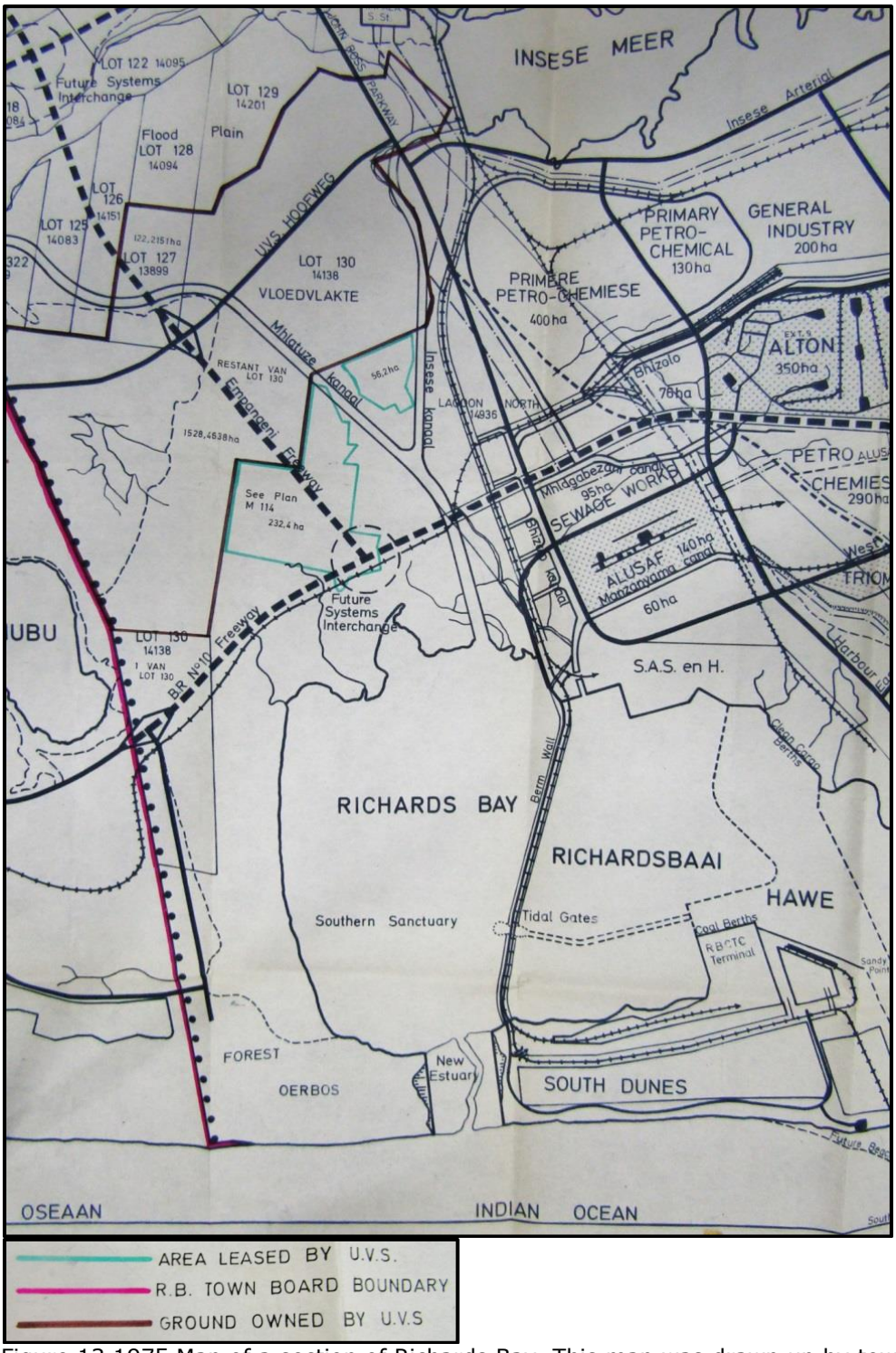

Figure 13.1975 Map of a section of Richards Bay. This map was drawn up by town and regional planning consultants and showed the proposed layout of the town. (NASA *SAB, GMO: 1/657 3*)

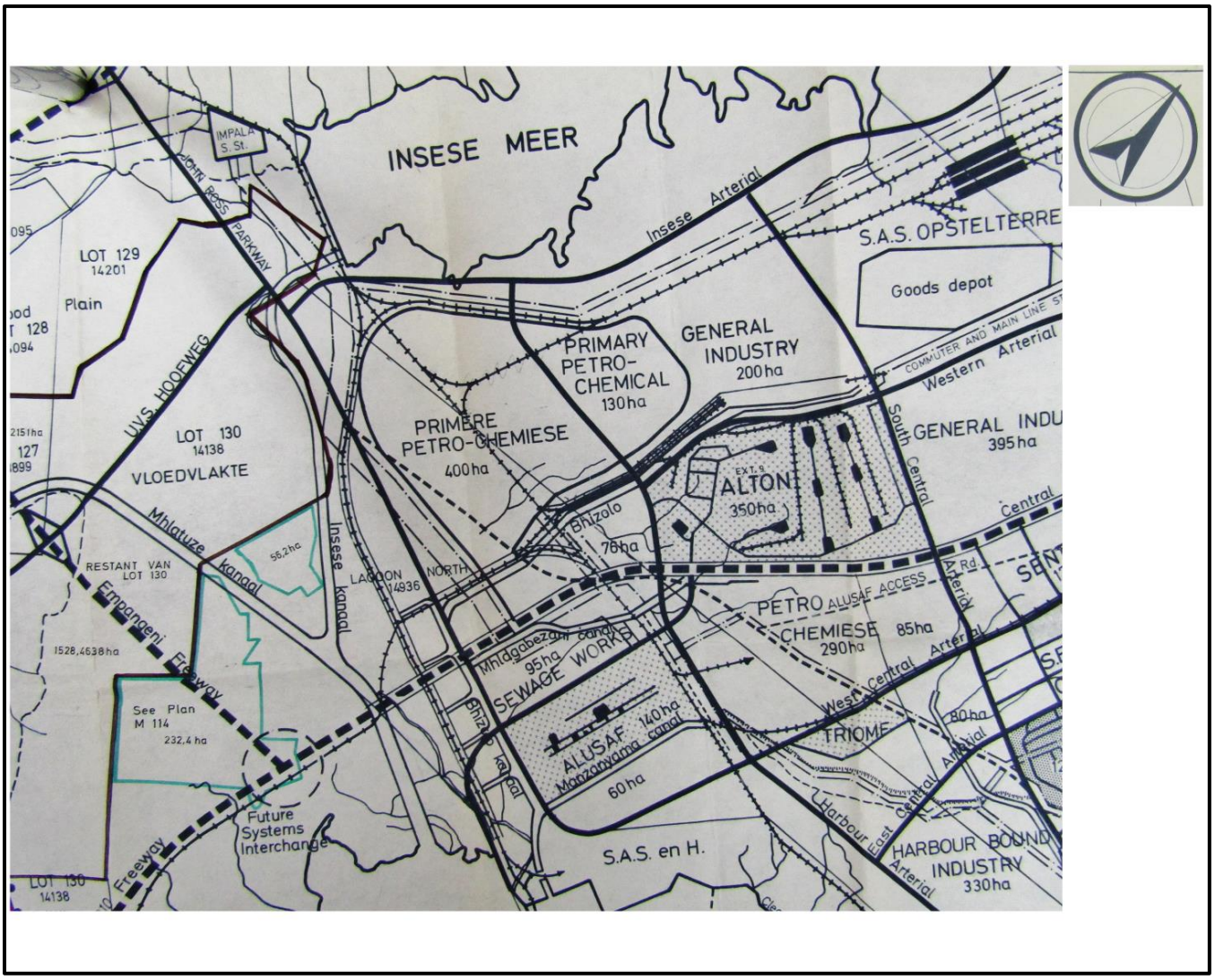

Figure 14. 1975 map of the section under investigation. The area of interest is located to the west of Alton and north west of the Bhizolo Railway Station. (NASA *SAB, GMO: 1/657 3*)

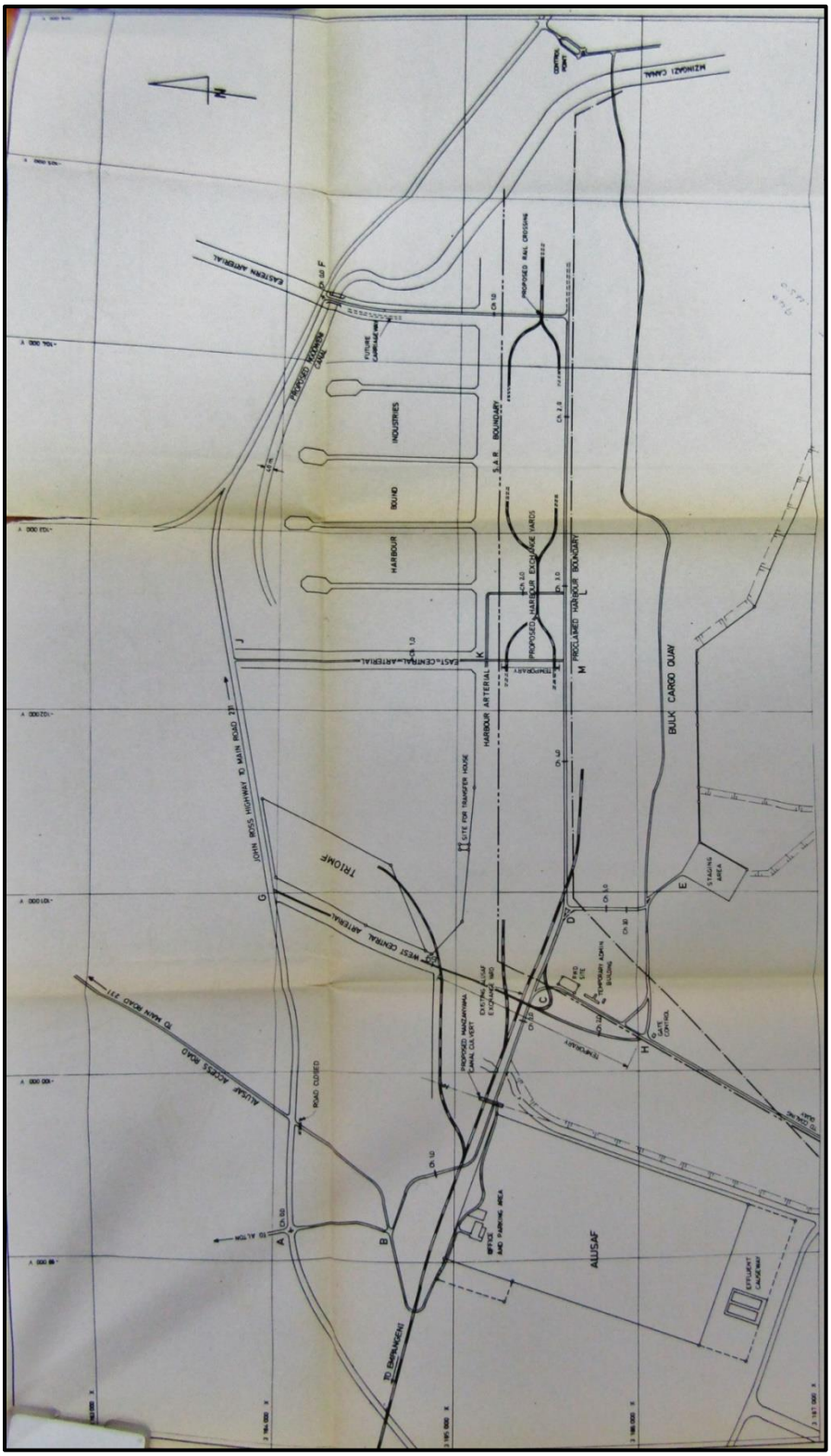

Figure 15. 1976 Map of various alternative routes to the Richards Bay harbour. (NASA *SAB, GMO: 1/659 18*)

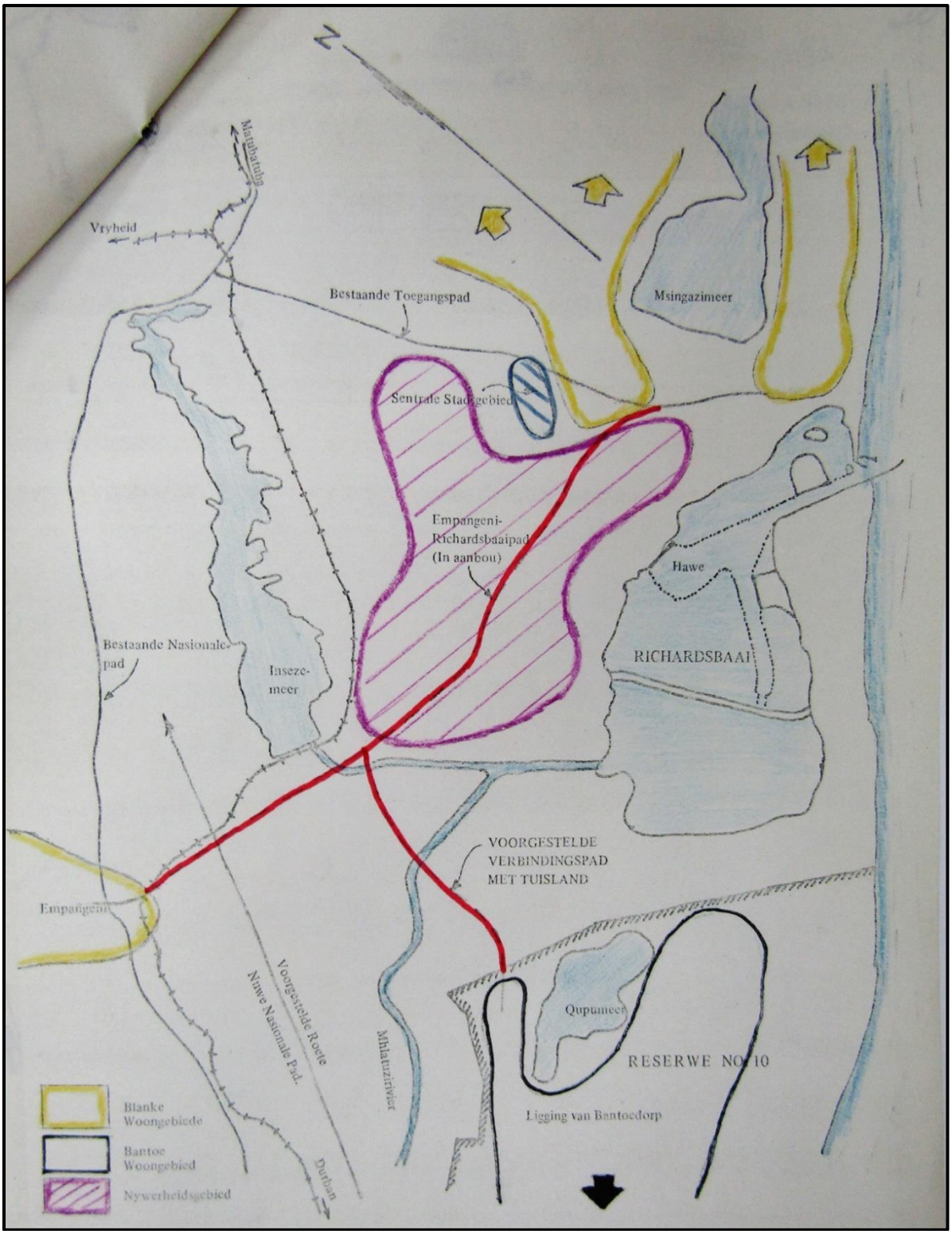

Figure 16. 1977 Map of Richards Bay. (NASA *SAB, DCD: 1896 25/4/3*)

8 FINDINGS OF THE SURVEY

Large parts of the study area were previously impacted on by illegal sand mining activities and was waterlogged during the survey (Figure 17). A contemporary cattle post is (Figure 18) located on the north-western periphery of the impact area but outside of the study area. Copper theft in the area is marked by the remains of plastic casings scattered across the study area (Figure 19). A disused railway line occurs in the western portion of the project area outside of the development footprint and is discussed in section 7.2.2.2.

As a result of the sand mining and the development of infrastructure like power lines, water pipelines and railway lines, the property is disturbed or damaged from a heritage point of view and a single undiagnostic potsherd (Figure 20) was the only cultural find observed during the survey. In terms of the national estate as defined by the NHRA no sites of significance were found during the survey as described below.

Figure 17. Existing site conditions – water logged areas

Figure 18. Cattle post.

Figure 19. Plastic casings of copper wires.

Figure 20. Single, undecorated pot sherd.

9 DESCRIPTION OF IDENTIFIED HERITAGE RESOURCES (NHRA SECTION 34 -36):

9.1.1 Built Environment (Section 34 of the NHRA)

No standing structures older than 60 years occur in the study area.

9.1.2 Archaeological resources (Section 35 of the NHRA)

A single isolated undiagnostic ceramic sherd was recorded during the survey at S28.77026° E31.98542°. At this location, no other artefacts or anthropogenic deposit was noted. No other archaeological features or artefacts were noted in the study area and the ceramic sherd does not constitute a site but rather a find spot and is of no significance apart from recording its presence in this report. No further mitigation is recommended in terms of Section 35 for the proposed development to proceed.

9.1.3 Burial Grounds and Graves (Section 36 of the NHRA)

In terms of Section 36 of the Act no burial sites were recorded. If any graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation.

9.1.4 Cultural Landscapes, Intangible and Living Heritage.

The cultural landscape of the greater study area is characterised by industrial developments and the project will not impact on significant viewscapes.

9.1.5 Paleontological Resources

The paleontological component was assessed in an independent study by Butler (2017). The study concluded: "*During a field survey of the proposed development footprint, no fossiliferous outcrops were found. For this reason, a low palaeontological sensitivity is allocated to the development footprint. Regardless of the sparse and sporadic occurrence of fossils in this biozone a single fossil can have a huge scientific importance as many fossil taxa are known from a single fossil. The scarcity of fossil heritage at the proposed development footprint indicate that the impact of the Richards Bay Combined Cycle Power Plant (CCPP) will be of a low significance in palaeontological terms. It is therefore considered that the construction and operation of the development footprint and associated infrastructure is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. Thus, the construction and operation of the facility may be authorised as the whole extent of the development footprint is not considered sensitive in terms of palaeontological resources. No further study is required*."

9.1.6 Battlefields and Concentration Camps

No Battlefield sites were identified in the study area.

9.2 Potential Impact

The impact on heritage sites by the proposed development is considered low. Any direct impacts that may occur would be during the construction phase only, limited to the construction footprint and would be of very low significance. Cumulative impacts occur from the combination of effects of various impacts on heritage resources. The importance of identifying and assessing cumulative impacts is that the whole is greater than the sum of its parts. This and other projects in the area could have an indirect impact on the heritage landscape.

9.2.1 Pre-Construction phase:

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure needed for the construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

9.2.2 Construction Phase

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources.

9.2.3 Operation Phase:

No impact is envisaged for the recorded heritage resources during this phase.

Table 5. Impact table – Archaeological heritage resources.

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological material or objects.		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (2)	Low (2)
Probability	Not probable (2)	Not probable (2)
Significance	**16 (Low)**	**16 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	No resources were recorded	No resources were recorded.
Can impacts be mitigated?	Yes, a chance find procedure should be implemented.	Yes
Mitigation: A Chance Find Procedure should be implemented for the project should any sites be identified during the construction process.		
Residual Impacts: If sites are destroyed this results in the depletion of archaeological record of the area. However, if sites are recorded and preserved or mitigated this adds to the record of the area.		

10 RECOMMENDATIONS AND CONCLUSION

The development footprint of approximately 71 hectares was assessed both on desktop level and by a field survey. Large parts of the study area were previously impacted on by illegal sand mining activities and was waterlogged during the survey. As a result of the sand mining and the development of infrastructure like power lines, water pipelines and railway lines within the study area, the property is disturbed or damaged from a heritage point of view and in terms of the national estate as defined by the NHRA no sites of significance were found during the survey as described below

In terms of Section 35 of the NHRA no archaeological sites were identified and an independent palaeontological assessment (Butler 2017) concluded that the study area is of low palaeontological sensitivity. In terms of Section 35 of the NHRA no archaeological sites were identified and an independent palaeontological assessment (Butler 2017) recommended no further paleontological studies. No further mitigation prior to construction is recommended in terms of Section 35 of the NHRA and Section 36 of the KZN Heritage Act for the proposed development to proceed.

In terms of the built environment of the area (Section 34 of the NHRA and Section 33 of the KZN Heritage Act) no standing structures older than 60 years occur within the study area. In terms of Section 36 of the NHRA and Section 34 and 35 of the KZN Heritage Act no burial sites were recorded. If any graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation. No public monuments are located within or close to the study area. The study area is located in an industrial area away from main tourist routes and the proposed development will not impact negatively on significant viewscapes. During the public participation process conducted for the project no heritage concerns was raised.

The impact of the proposed project on heritage resources is considered low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMPr and based on approval from SAHRA and AMAFA.

- Implementation of a chance find procedure as outlined below.

10.1 Chance Find Procedures

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

10.2 Reasoned Opinion

The impact of the proposed project on heritage resources is considered low and no further pre-construction mitigation in terms of archaeological resources is required based on approval from SAHRA and AMAFA. Furthermore, the socio-economic benefits also outweigh the possible impacts of the development with the correct mitigation measures (i.e. chance find procedure and avoidance of sites) implemented for the project.

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12 APPENDICES:

Curriculum Vitae of Specialist

Jaco van der Walt
Archaeologist

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Education:

Particulars of degrees/diplomas and/or other qualifications:

Name of University or Institution:		University of Pretoria
Degree obtained	**:**	BA Heritage Tourism & Archaeology
Year of graduation	**:**	2001
Name of University or Institution:		University of the Witwatersrand
Degree obtained	**:**	BA Hons Archaeology
Year of graduation	**:**	2002
Name of University or Institution	**:**	University of the Witwatersrand
Degree Obtained	**:**	MA (Archaeology)
Year of Graduation	:	2012
Name of University or Institution:		University of Johannesburg
Degree	**:**	PhD
Year	:	Currently Enrolled

EMPLOYMENT HISTORY:

2011 – Present: **Owner – HCAC (Heritage Contracts and Archaeological Consulting CC)**.
2007 – 2010 : **CRM Archaeologist,** Managed the Heritage Contracts Unit at the University of the Witwatersrand.
2005 - 2007: **CRM Archaeologist**, Director of Matakoma Heritage Consultants
2004: **Technical Assistant**, Department of Anatomy University of Pretoria
2003: **Archaeologist**, Mapungubwe World Heritage Site
2001 - 2002: **CRM Archaeologists,** For R & R Cultural Resource Consultants, Polokwane
2000: **Museum Assistant**, Fort Klapperkop.

Countries of work experience include:

Republic of South Africa, Botswana, Zimbabwe, Mozambique, Tanzania, The Democratic Republic of the Congo, Lesotho and Zambia.

SELECTED PROJECTS INCLUDE:

Archaeological Impact Assessments (Phase 1)

Heritage Impact Assessment Proposed Discharge Of Treated Mine Water Via The Wonderfontein Spruit Receiving Water Body Specialist as part of team conducting an Archaeological Assessment for the Mmamabula mining project and power supply, Botswana
Archaeological Impact Assessment Mmamethlake Landfill
Archaeological Impact Assessment Libangeni Landfill

Linear Developments

Archaeological Impact Assessment Link Northern Waterline Project At The Suikerbosrand Nature Reserve
Archaeological Impact Assessment Medupi – Spitskop Power Line,
Archaeological Impact Assessment Nelspruit Road Development

Renewable Energy developments

Archaeological Impact Assessment Karoshoek Solar Project

Grave Relocation Projects

Relocation of graves and site monitoring at Chloorkop as well as permit application and liaison with local authorities and social processes with local stakeholders, Gauteng Province.
Relocation of the grave of Rifle Man Maritz as well as permit application and liaison with local authorities and social processes with local stakeholders, Ndumo, Kwa Zulu Natal.
Relocation of the Magolwane graves for the office of the premier, Kwa Zulu Natal
Relocation of the OSuthu Royal Graves office of the premier, Kwa Zulu Natal

Phase 2 Mitigation Projects

Field Director for the Archaeological Mitigation For Booysendal Platinum Mine, Steelpoort, Limpopo Province. Principle investigator Prof. T. Huffman
Monitoring of heritage sites affected by the ARUP Transnet Multipurpose Pipeline under directorship of Gavin Anderson.
Field Director for the Phase 2 mapping of a late Iron Age site located on the farm Kameelbult, Zeerust, North West Province. Under directorship of Prof T. Huffman.
Field Director for the Phase 2 surface sampling of Stone Age sites effected by the Medupi – Spitskop Power Line, Limpopo Province

Heritage management projects

Platreef Mitigation project – mitigation of heritage sites and compilation of conservation management plan.

MEMBERSHIP OF PROFESSIONAL ASSOCIATIONS:

- Association of Southern African Professional Archaeologists. Member number 159

  Accreditation:
  - Field Director Iron Age Archaeology
  - Field Supervisor Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation
- Accredited CRM Archaeologist with SAHRA
- Accredited CRM Archaeologist with AMAFA
- Co-opted council member for the CRM Section of the Association of Southern African Association Professional Archaeologists (2011 – 2012)

PUBLICATIONS AND PRESENTATIONS

- A Culture Historical Interpretation, Aimed at Site Visitors, of the Exposed Eastern Profile of K8 on the Southern terrace at Mapungubwe.
  - J van der Walt, A Meyer, WC Nienaber
  - Poster presented at Faculty day, Faculty of Medicine University of Pretoria 2003
- 'n Reddingsondersoek na Anglo-Boereoorlog-ammunisie, gevind by Ifafi, Noordwes-Provinsie. South-African Journal for Cultural History 16(1) June 2002, with A. van Vollenhoven as co-writer.
- Fieldwork Report: Mapungubwe Stabilization Project.
  - WC Nienaber, M Hutten, S Gaigher, J van der Walt
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2004
- A War Uncovered: Human Remains from Thabantšho Hill (South Africa), 10 May 1864.
  - M. Steyn, WS Boshoff, WC Nienaber, J van der Walt
  - Paper read at the 12th Congress of the Pan-African Archaeological Association for Prehistory and Related Studies 2005
- Field Report on the mitigation measures conducted on the farm Bokfontein, Brits, North West Province .
  - J van der Walt, P Birkholtz, W. Fourie
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2007
- Field report on the mitigation measures employed at Early Farmer sites threatened by development in the Greater Sekhukhune area, Limpopo Province. J van der Walt
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2008
- Ceramic analysis of an Early Iron Age Site with vitrified dung, Limpopo Province South Africa.

  - J van der Walt. Poster presented at SAFA, Frankfurt Germany 2008

- Bantu Speaker Rock Engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga (*In Prep)*
  - J van der Walt and J.P Celliers
- Sterkspruit: Micro-layout of late Iron Age stone walling, Lydenburg, Mpumalanga. W. Fourie and J van der Walt. A Poster presented at the Southern African Association of Archaeologists Biennial Conference 2011
- Detailed mapping of LIA stone-walled settlements' in Lydenburg, Mpumalanga. J van der Walt and J.P Celliers
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
- Bantu-Speaker Rock engravings in the Schoemanskloof Valley, Lydenburg District, Mpumalanga. J.P Celliers and J van der Walt
  - Paper read at the Southern African Association of Archaeologists Biennial Conference 2011
- Pleistocene hominin land use on the western trans-Vaal Highveld ecoregion, South Africa, Jaco van der Walt.
  - J van der Walt. Poster presented at SAFA, Toulouse, France. Biennial Conference 2016

REFERENCES:

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   University of the Witwatersrand
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