HERITAGE IMPACT ASSESSMENT

(REQUIRED UNDER SECTION 38(8) OF THE NHRA (No. 25 OF 1999) AND THE KZN HERITAGE ACT)

FOR THE PROPOSED NSELENI INDEPENDENT FLOATING POWER PLANT (NIFPP) AND ASSOCIATED INFRASTRUCTURE, PORT OF RICHARDS BAY, KWAZULU-NATAL

Type of development:

Electrical

Client:

SE Solutions

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Project Reference:
2031
Report date:
February 2021

APPROVAL PAGE

Project Name	Nseleni Independent Floating Power Plant (NIFPP)
Report Title	Heritage Impact Assessment for the the proposed Nseleni Independent Floating Power Plant (NIFPP) and associated infrastructure, Port of Richards Bay, Kwazulu-Natal
Authority Reference Number	Nseleni Power Corporation (Pty) Ltd (DEFF Ref No. 14/12/16/3/3/2/2032) AND Anchor Energy (Pty) Ltd (DEFF Ref No. 14/12/16/3/3/2/2033)
Report Status	Draft Report
Applicant Name	Nseleni Power Corporation (Pty) Ltd AND Anchor Energy (Pty) Ltd

	Name	**Qualifications and Certifications**	**Date**
Archaeologist	Jaco van der Walt	MA Archaeology ASAPA #159	January 2021

DOCUMENT PROGRESS

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Amendments on Document

Date	Report Reference Number	Description of Amendment
11 Feb 2021	2031	Addressed technical review comments and updated mapping

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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 site plan identifying site alternatives;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 8 and 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 1 and 9
(k) Mitigation measures for inclusion in the EMPr	Section 10
(l) Conditions for inclusion in the environmental authorisation	Section 10
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 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 Environmental Assessment report
(q) Any other information requested by the competent authority	Section 11

Executive Summary

SE Solutions was appointed to conduct an Environmental Authorisation (EA) application process for the proposed Nseleni Independent Floating Power Plant (NIFPP) and associated infrastructure located in the Port of Richards Bay, KwaZulu-Natal. The project consists of two components (briefly outlined below) assessed by a single S&EIR application process.

- **Nseleni Independent Floating Power Plant (NFIPP)**: a floating gas powered power station made up of floating Combined Cycle Gas Turbine (CCGT) power plants within the Port of Richards Bay.
- **Liquid Natural Gas (LNG) facility**: receiving and storage facility and associated physical infrastructure to support the NIFPP.

HCAC was appointed to conduct a Heritage Impact Assessment for the project and key findings of the assessment include:

- The Port area comprises former swampland that is not suitable for human settlement or activities and is considered to be of low heritage significance, corroborating the findings of Anderson & Anderson (2009) and Van Schalkwyk & Wahl (2013), who both assessed the proposed Port expansion that included the current development footprint;
- Radical transformation of the greater Richards Bay environment began in the 1970's with the Port development, transforming the area through activities that includes dredging, wharf construction, infilling, mouth widening and stabilisation, breakwater construction and terrestrial infrastructure;
- Two heritage sites are on record for the study area. Site RBP 03 is a low density of shell and lithics of low heritage significance and was recorded during a Heritage Impact Assessment (Anderson & Anderson 2009) for the study area. The second site (Bhizele Halt - 2823CC 001), on record at the Pietermaritzburg Museum Archaeological Database, is another low-density scatter of lithics recorded in 1974. The location description of the site and co-ordinates derived from 1:50 000 maps in 1974 do not correlate and it could be that the current location is not exactly where the site was recorded. Based on the co-ordinates the site is destroyed by a Gypsum Dump after the feature was recorded and no surface indicators of the site were noted;
- Dense vegetation and marshes limited the survey especially in the Port area,
- The study area is of moderate paleontological sensitivity and an independent desktop based paleontological study was conducted (Bamford 2020) and concluded that there would be no impact on the fossil heritage and the project can proceed without further work during the impact assessment phase.

The impact of the project on heritage resources is considered to be 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:

- Implementation of a chance find procedure for the project.
- As the exact location of the Bhizele Halt - 2823 CC 001 site is not certain this area should be monitored during construction to ensure that no subsurface features are impacted on.
- If site RBP 03 is impacted on the area must be monitored by an archaeologist during construction to ensure that subsurface heritage resources are not impacted on.

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	02/02/2021

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, Guinea and Tanzania. Through this, he has a sound understanding of the IFC Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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:

HCAC is contracted by SE Solutions to conduct a HIA for the proposed NIFPP Project and associated infrastructure (Table 2 and 3). The NIFPP Project falls within the Port of Richards Bay within the uMhlathuze Local Municipality and King Cetshwayo District Municipality (Figure 1-1 to 1-3).

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, 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 of significance 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. 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, compiled in support of an Environmental Authorisation application as defined by NEMA EIA Regulations section 40 (1) and (2), to be submitted to SAHRA and AMAFA. As such, the Environmental Impact Assessment (EIA) report and its appendices (including the EMPr) must be submitted to the case officer, once it's 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 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, 1999 (Act No. 25 of 1999) and The Kwazulu-Natal Heritage Act, No. 4 of 2008.

1.2 Project description

The project consists of two components, the Nseleni Independent Floating Power Plant (NFIPP): and a Liquid Natural Gas (LNG) facility, located within the Richards Bay Port (Table 2 and 3).

Table 2: Project Location

Farm and portions	The project will be located in the port of Richards Bay on Remainder Farm 16230: N0GV00000001623000000; Portion 1 of Farm 6230: N0GV00000001623000001; and Portion 45 of Erf 5333: N0GV04210000533300045), while the associated land-based infrastructure will be located on Remainder Erf 5333 (N0GV04210000533300000).
Magisterial District	uMhlathuze Local Municipality and King Cetshwayo District Municipality.
1: 50 000 map sheet number	2138DD
Central co-ordinate of the development	28°47'30.47"S 32° 1'20.45"E

Table 3: Infrastructure and project activities

Type of development	Floating gas-powered power station and LNG facility
Project size	Approximately 250 hectares
Project Components	The proposed NIFPP and associated infrastructure to be located (predominantly) within the Port of Richards Bay. The NIFPP will make use of Combined Cycle Gas Turbine (CCGT) technology fuelled by Liquid Natural Gas (LNG). The project would be made up of a series of individual floating power plants/ barges each of which would be capable of generating a nominal 700MW. It is proposed to phase the project, gradually bringing in the power plants/ barges to create a combined Phase 1 generation capacity of 2 800MW. Subsequent phases may take the combined power generation to 8 400MW. A substation and transmission switching yard is proposed to be located at the NIFPP CCGT Power Station Facility (located on the Power Barge Terminal/ Quay) housing the step-up transformer, circuit breaker arrangements, protection and control equipment (i.e. voltage and current transformers, relays and SCADA systems). The new on-land transmission substation (proposed to be located to the north-west of the Bayside site) would also feature voltage control/ power factor correction devices such as capacitors, reactors or static volt-ampere reactive compensators and equipment, such as phase shifting transformers to control power flow between the two adjoining power systems, as may be required, to convert the power generated at Medium Voltage (MV) for transmission to High Voltage (HV).

1.3 Alternatives

Alternatives were considered in terms of technology as well as layouts for infrastructure and transmission lines. All additional areas were assessed and from a heritage point of view all are acceptable.

Figure 1-1. Regional setting of the project (1: 250 000 topographical map).

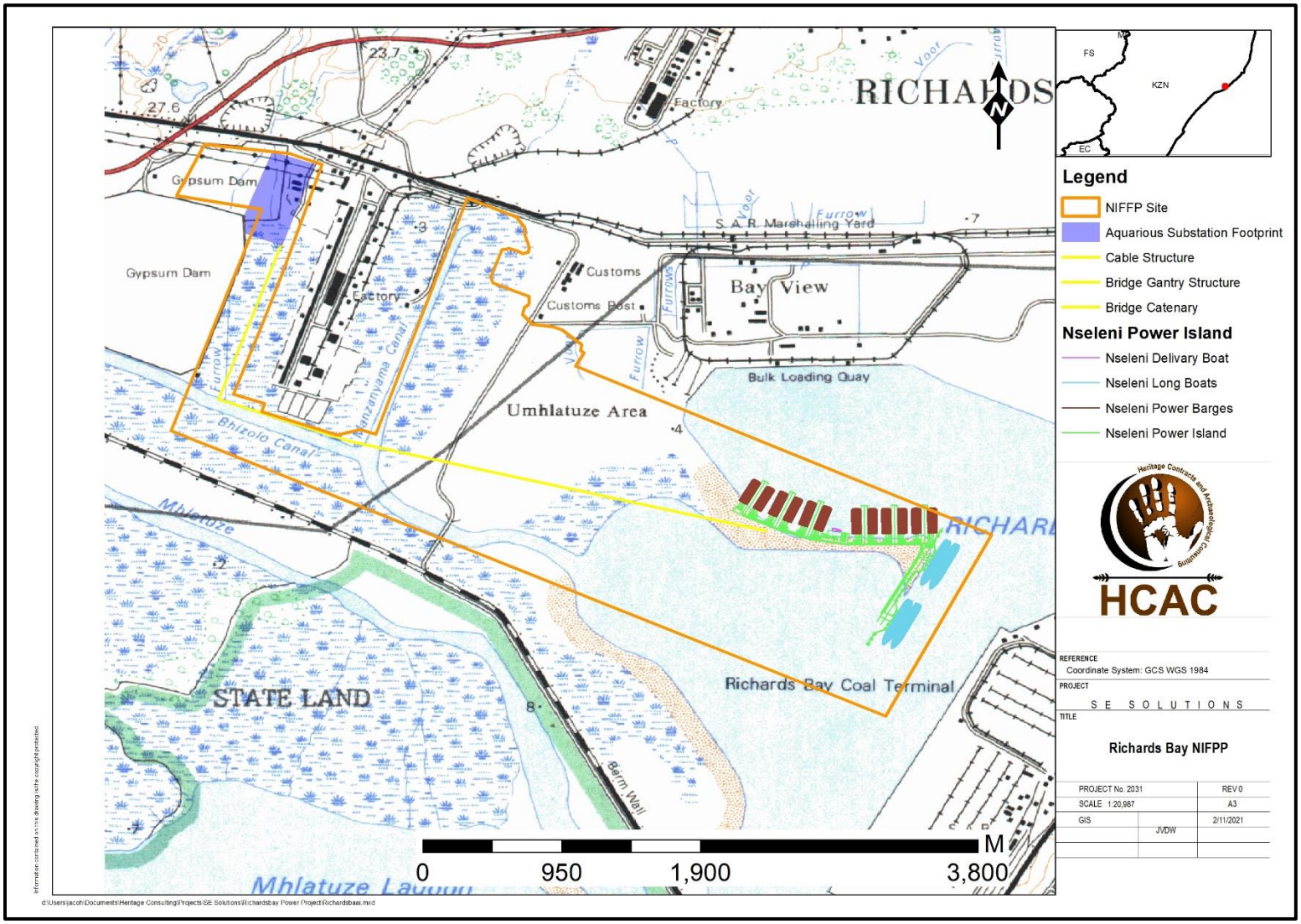


Figure 1-2: Local setting of the project (1:50 000 topographical map).

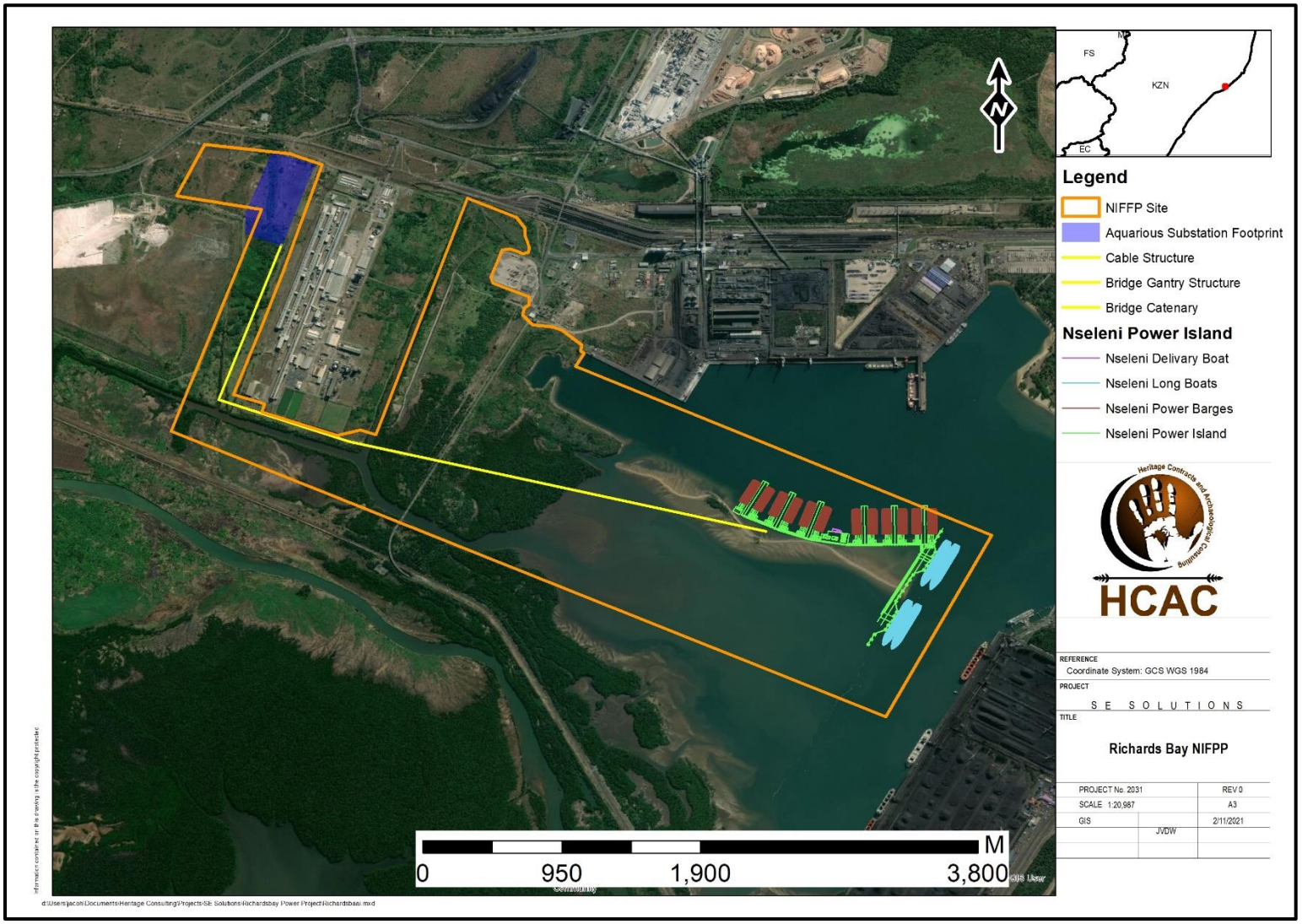


Figure 1-3. Aerial image of the proposed project.

2 Legislative Requirements

Section 34 of the NHRA and Section 33 of the KZN Heritage Act deal with structures that are older than 60 years. Section 35(4) of the NHRA deals with archaeology, palaeontology and meteorites as does Section 36 of the KZN Heritage Act. Section 36 of the NHRA and Section 34 and 35 of the KZN Heritage Act, deal with human remains older than 60 years. Unidentified/unknown graves are also handled as older than 60 years until proven otherwise.

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 HIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 HIA reports and additional development information, as per the impact assessment report and/or EMPr, to be submitted to SAHRA and AMAFA after completion of the study. SAHRA accepts Phase 1 HIA 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 HIA'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 includes (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 NHRA, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of NHRA, as well as the Human Tissues Act, 1983 (Act No. 65 of 1983) and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5] of NHRA) 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, 1983 (Act No. 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 the Human Tissues Act, 1983 (Act No. 65 of 1983).

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 proposed 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 fieldwork 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 EIA 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; and,
- The compilation of a Report.

Please refer to Section 6 for more detail.

3.4 Site Investigation

The aim of the site survey was to:
a) 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.

Table 4: Site Investigation Details

	Site Investigation
Date	February 2021
Season & accessibility	Summer – the area is covered in dense vegetation and marshes limiting survey accessibility and coverage (Figure 3-1). Access was further limited within the port due to Health and Safety protocols.

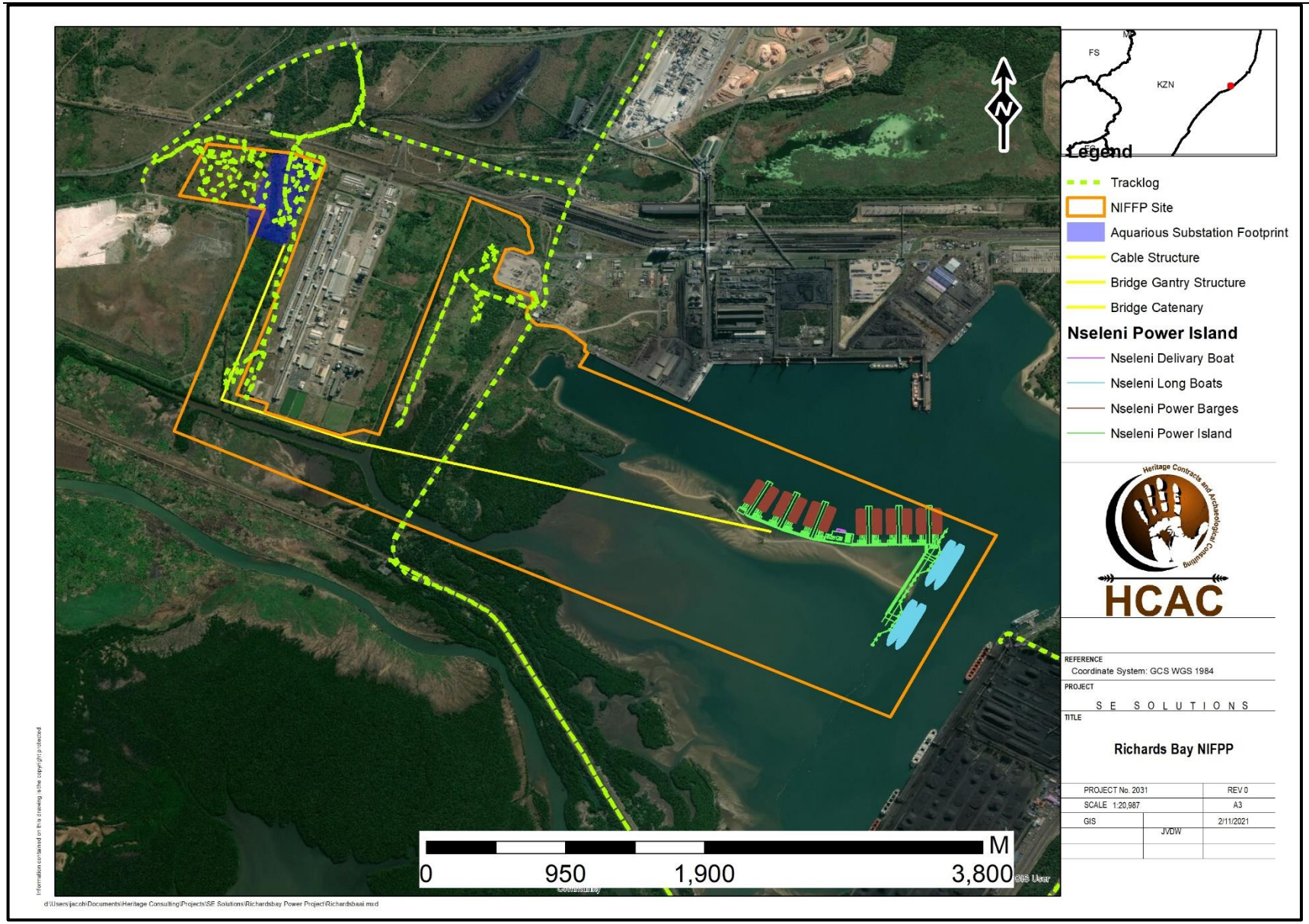


Figure 3-1: Tracklog of the survey in green.

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; and,
- 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 methodology used is laid out below as described by SE Solution (2020). They have provided the following background information to the approach to be used:

3.6.1 Approach to Ascribing Significance for Decision-Making

The best way of expressing the cost-benefit implications for decision-making is to present them as risks. Risk is defined as the consequence (implication) of an event multiplied by the probability (likelihood) of that event. Many risks are accepted or tolerated on a daily basis, because even if the consequence of the event is serious, the likelihood that the event will occur is low. A practical example is the consequence of a parachute not opening, which is potentially death, but the likelihood of such an event happening is so low that parachutists are prepared to take that risk. The risk is low because the likelihood of the consequence is low even if the consequence is potentially severe.

It is also necessary to distinguish between the event itself (as the cause) and the consequence. Again, using the parachute example, the consequence of concern in the event that the parachute does not open is serious injury or death, but it does not necessarily follow that if a parachute does not open that the parachutist will die. Various contingencies are provided to minimise the likelihood of the consequence (serious injury or death) in the event of the parachute not opening, such as a reserve parachute. In risk terms, this means distinguishing between the **inherent risk** (the risk that a parachutist will die if the parachute does not open) and the **residual risk** (the risk that the parachutist will die if the parachute does not open, but with the contingency of a reserve parachute) i.e. the risk before and after mitigation.

3.6.2 Consequence

The ascription of significance for decision-making becomes then relatively simple. It requires the consequences to be ranked (Table 5) and a likelihood to be defined of that consequence occurring. It should be noted that there is no equivalent ‘high’ score in respect of benefits as there is for the costs. This high negative score serves to give expression to the potential for a fatal flaw where a fatal flaw would be defined as an impact that cannot be mitigated effectively and where the associated risk is accordingly untenable. Stated differently, the high score on the costs, which is not matched on the benefits side, highlights that such a fatal flaw cannot be ‘traded off’ by a benefit and would render the proposed project to be unacceptable. Note that the EAP has defined the consequence descriptors, specialists are required to select the appropriate descriptor when ascribing significance to various impacts. This will allow for efficient comparison of significance across specialist assessments to allow for an integrated assessment of the project as a whole.

Table 5. Ranking of Consequence.

Environmental Costs	**Inherent Risk**
Human health – morbidity/mortality. Loss of species	High
Reduced faunal populations, loss of livelihoods, individual economic loss	Moderate-high
Reduction in environmental quality – air, soil, water. Loss of habitat, loss of heritage, amenity	Moderate
Nuisance	Moderate-low
Negative change – with no other consequences	Low
Environmental Benefits	**Inherent Benefit**
Net improvement in human welfare	Moderate-high
Improved environmental quality – air, soil, water. Improved individual livelihoods	Moderate
Economic development	Moderate-low
Positive change – with no other consequences	Low

3.6.3 Likelihood

Although the principle is one of probability, the term 'likelihood' is used to give expression to a qualitative rather than quantitative assessment, because the term 'probability' tends to denote a mathematical/empirical expression. A key point here is that likelihood of the consequence occurring must *de facto* take into account the good international industry best-practice that is 'intrinsically built-in' to activities or methods. For example: an electricity transformer will never be constructed without bunding and stones to contain any oil spills due to potential failure of the transformer. To highlight bunding as a specific mitigation measure to reduce the consequence of a spill is simply inappropriate. Likelihood descriptors that can be used to characterise the likelihood of the costs and benefits occurring are presented in the Table 6.

3.6.4 Residual Risk

The residual risk is then determined as a function of the consequence together with the likelihood of that consequence. The residual risk categories are shown in Table 7 where consequence scoring is shown in the rows and likelihood in the columns. The implications for decision-making of the different residual risk categories are shown in Table 8. Additional mitigation to manage (and potentially further reduce) and monitor the residual risk may also be defined. All mitigation is then prescribed in the Environmental Management Programme (EMPr). What is important is that the residual risk is what decision-makers must accept if they decide to authorise the proposed activity even if that residual risk is 'high'. The residual risk cannot and will not be artificially reduced within the assessment to 'low' to facilitate decision-making.

Table 6. Likelihood Descriptors and Definitions.

Likelihood Descriptors	Definition
Highly unlikely	The possibility of the consequence occurring is negligible.
Unlikely but possible	The possibility of the consequence occurring is low but cannot be discounted entirely.
Likely	The consequence may not occur, but a balance of probability suggests it will.
Highly likely	The consequence may still not occur, but it is most likely that it will.
Definite	The consequence will definitely occur.

Table 7. Residual risk categories.

		Residual risk				
Consequence	High	Moderate	High	High	Fatally flawed	
	Moderate – high	Low	Moderate	High	High	High
	Moderate	Low	Moderate	Moderate	Moderate	Moderate
	Moderate – low	Low	Low	Low	Low	Moderate
	Low	Low	Low	Low	Low	Low
		Highly unlikely	Unlikely but possible	Likely	Highly likely	Definite
		Likelihood				

Table 8. Implications for decision-making of the different residual risk categories shown in Table 7.

Rating	Nature of implication for Decision – Making
Low	Project can be authorised with low risk of environmental degradation
Moderate	Project can be authorised but with conditions and routine inspections
High	Project can be authorised but with strict conditions and high levels of compliance and enforcement
Fatally Flawed	The project cannot be authorised

3.6.5 A Note on Cumulative Impacts

Impacts cannot be assessed in isolation and an integrated approach requires that cumulative impacts will be included in the assessment of individual impacts. The nature of the impact will be described in such a way as to detail the potential cumulative impact of the activity, if there is indeed a cumulative impact. For example, dust and air emissions cannot be assessed in isolation of the potential cumulative impact of increased emissions into the atmosphere. Similarly, if water quality is improved within the immediate surroundings of the proposed activities, this will most certainly have a ripple effect/ cumulative impact on the greater water quality in the area.

Once all the impacts have been assessed and significance ratings allocated, the EAP will assess the project on a holistic basis to determine the overall project impact on the receiving environment. This will be a function of the individual impacts as well as the cumulative nature of combining all those impacts within a single context/project.

3.6.6 Describing the Impact

The EIA Regulations also require, in addition to consequence, likelihood and significance (as described above), that the nature, extent, duration, reversibility and irreplaceable loss of a resource also be highlighted for identified impacts. These additional impact attributes are defined as follows:

3.6.6.1 Nature of the Impact

The nature of an impact refers to a description of the inherent features, characteristics and/or qualities of the impact.

3.6.6.2 Scale/extent of the impact

Extent refers to the impact footprint or stated differently, the spatial area over which the impact would manifest (Table 9). Note that if a species were to be lost then the extent would be global because that species would be lost to the world.

3.6.6.3 Duration of the Impact

Duration (Table 10) is the period of time for which the impact would be manifest. Importantly the concept of reversibility is reflected in the duration scoring. In other words, the longer the impact endures the less likely is the ***reversibility*** of the impact.

3.6.6.4 Irreplaceable loss of resources

Irreplaceable loss of resources (Table 11) refers to the degree to which the impact will result in the loss of a resource that is impossible to replace.

Table 9 Listing of descriptors and associated definitions to determine the extent of an impact.

Extent Descriptors	Definitions
Site	The impact footprint remains within the cadastral boundary of the site.
Local	The impact footprint extends beyond the cadastral boundary of the site, to include the immediately adjacent and surrounding areas.
Regional	The impact footprint includes the greater surrounding area within which the site is located.
National	The scale/ extent of the impact is applicable to the Republic of South Africa.
Global	The scale / extent of the impact is global (or world-wide).

Table 10 Listing of descriptors and associated definitions to determine the duration of an impact.

Duration Descriptors	Definitions
Construction period only	The impact endures for only as long as the construction period of the proposed activity. This implies the impact is fully reversible. Like noise and dust.
Short term	The impact continues to manifest for a period of between 3 – 10 years. The impact is reversible.
Medium term	The impact continues to manifest for a period of 10-30 years. The impact is reversible with relevant and applicable mitigation and management actions.
Long term	The impact continues for a period in excess of 30 years. However, the impact is still reversible with relevant and applicable mitigation and management actions.
Permanent	The impact will continue indefinitely and is irreversible.

Table 11 Listing of descriptors and associated definitions to determine the irreplaceable loss of resources due to an impact.

Extent Descriptors	Definitions
High	The impact is most likely to or will result in the irreplaceable loss of a resource/s.
Medium	The impact may result in the irreplaceable loss of a resource/s, however applicable mitigation or management interventions may prevent complete loss or provide a suitable substitute/"offset".
Low	The impact will not result in the irreplaceable loss of a resource/s.

3.6.6.5 Impact significance before mitigation

Environmental impacts identified will be evaluated according to the above-mentioned criteria.

3.6.6.6 Impact significance after mitigation

In order to reduce the significant of negative impacts and increase the significance of positive impacts, mitigation measures will be identified and discussed for each impact. The degree to which the impact can be mitigated (if negative) or enhanced (if positive) will be a function of whether the mitigation changes the intensity/severity and/or the likelihood of the impact. Thus, once the mitigation measure/s have been described, a new significance rating will be determined by following the same steps detailed above, however taking the mitigation and controls into account.

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 nature of heritage resources and pedestrian surveys in an area characterised by very dense vegetation, the possibility exists that some features or artefacts may not have been discovered/recorded during the survey and the possible occurrence of 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. It is assumed that the spatial data available to the author for known sites are accurate and up to date. This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys. 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 Environment

The following information was obtained from StatsSA.gov.za : "*According to the 2011 census, uMhlathuze Local Municipality has a total population of 334 459. 87,7% of the people in the municipality are African Black, 7,3% are White, with the other population groups making up the rest.*
Of those aged 20 years and older, 4,2% have completed primary school, 23,5% have some secondary education, 21,2% have completed matric and 4,8% have some form of higher education. 7,5% of those aged 20 years and older have no form of schooling.
Two aluminium smelters, Hillside Aluminium and Bayside Aluminium, are operated by BHP Billiton. A fertilizer plant operated by Foskor has been erected at the harbour. Iron ore, rutile (titanium oxide) and zircon are mined from the sand dunes close to the lagoon by Richards Bay Minerals. Local exports include coal, aluminium, titanium and other heavy minerals, granite, ferrochrome, paper pulp, woodchips and phosphoric acid (Wikipedia). Although the municipality is rich in minerals, it is faced with the challenge of an unemployment rate of 31%. Youth unemployment is at 40,8%."

5 Description of the Physical Environment:

Radical transformation of the greater Richards Bay environment began in the 1970's with port development, splitting the original bay into north and south sections and the redirection of the uMhlathuze River into the southern Sanctuary area as it was initially known. This included all the activities associated with normal port development in the northern section including i.e. dredging, wharf construction, infilling, mouth widening and stabilisation, breakwater construction and terrestrial infrastructure, all of which have resulted in an environment different from that which existed previously (SE Solutions 2020).

The secondary effects of the establishment of the port resulted in an increase in marshes in the area, and much of the original area was flooded. Furthermore, the harbour created a larger area than the original lake and thus removed much of the original land (Anderson & Anderson 2009). Large drainage canals have also been built, some being part of the original rivers. Two canals (Manzamnyama and Bhizolo Canals) that were established to drain the area used for the Bayside Aluminium smelter exist on the eastern and southern boundaries of Bayside.

The Port of Richards Bay is managed by the Transnet National Ports Authority (TNPA) and is characterised by dense vegetation, mangrove forests and marches (Figure 5-1, 5-2, 5-4 and 5-5). This area is also industrialised and is marked by roads, railway lines and buildings (Figure 5-3). On land, Remainder Erf 5333 is largely vacant with a stream feeding into the canals and marked by Powerline servitudes (Figure 5-6) and owned by the City of uMhlathuze Local Municipality. Historically this area was disturbed by a Gypsum Dump.

The Port of Richards Bay, itself, contains a dry bulk terminal, a multi-purpose terminal and the privately-operated coal terminal. Other private operators within the Port include several wood chip export terminals and a bulk liquid terminal. The Port has extensive rail and conveyor belt systems servicing the berths from nearby factories and plants.

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).

Figure 5-1. Dense vegetation in the Port area.

Figure 5-2. Dense vegetation in the Port area

Figure 5-3. Railway lines and roads in the Port area.

Figure 5-4. Marshes in the Port Area.

Figure 5-5. Marshes in the Port area.

Figure 5-6. Existing electrical infrastructure.

6 Results of Public Consultation and Stakeholder Engagement:

6.1.1 Stakeholder Identification

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 (I&APs) were placed at strategic points and in local newspapers as part of the process.
No comments and/or concerns were raised in terms of heritage resources within the study area.

7 Literature / Background Study:

7.1 Literature Review (SAHRIS)

Several CRM assessments have been conducted in the general area and reports consulted for this report are outlined in Table 9. Known sites are illustrated in Figure 7-1.

Table 9. CRM reports consulted for this study:

Author	Year	Project	Findings
Anderson, G. & Anderson, L.	2008	Archaeological Survey of The Proposed Alton Sewer Pipe Upgrade.	No sites were recorded.
Anderson, G.	2008	Archaeological Survey of The Proposed New Infrastructure at The Arrival Yard at The Richards Bay Coal Terminal	No 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 were 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.	No sites were recorded.
Van Schalkwyk, L. & Wahl, E.	2013	Baseline Heritage Study: Proposed Richards Bay Port Expansion, uMhlatuze Local Municipality, uThungulu District, KwaZulu-Natal	Grave sites are on record
Van Schalkwyk, L. & Wahl, E.	2014	Application for Exemption from a Phase 1 Heritage Impact Assessment of Proposed Decommissioning of the Legacy Landfills at The Bayside Aluminium Smelter, Richards Bay, KwaZulu-Natal, South Africa	No sites were recorded.
Galimberti, M.	2015	Proposed gas to power plant within Zone F in the IDZ of Richardsbay, KZN.	No sites were recorded.
Van der Walt, J.	2016	Proposed Hillside Desalination Plant to be established at the Hillside Aluminium smelter site, Richards Bay, KwaZulu-Natal	No sites were recorded.
Van Schalkwyk, L.	2018	Application for HIA Exemption RBCT Repeater Mast Port of Richards Bay, Umhlathuze LM, King Cetshwayo DM, KwaZulu-Natal	No sites were recorded.
Lavin, J and Van Schalkwyk, L.	2019	Proposed development of an edible oil pipeline and Wilmar SA (Pty) Ltd from berth 706/707/708 to RB IDZ Phase 1 A, Richardsbay, KZN.	No sites were recorded (although sites in the surrounding area are indicated in the report).

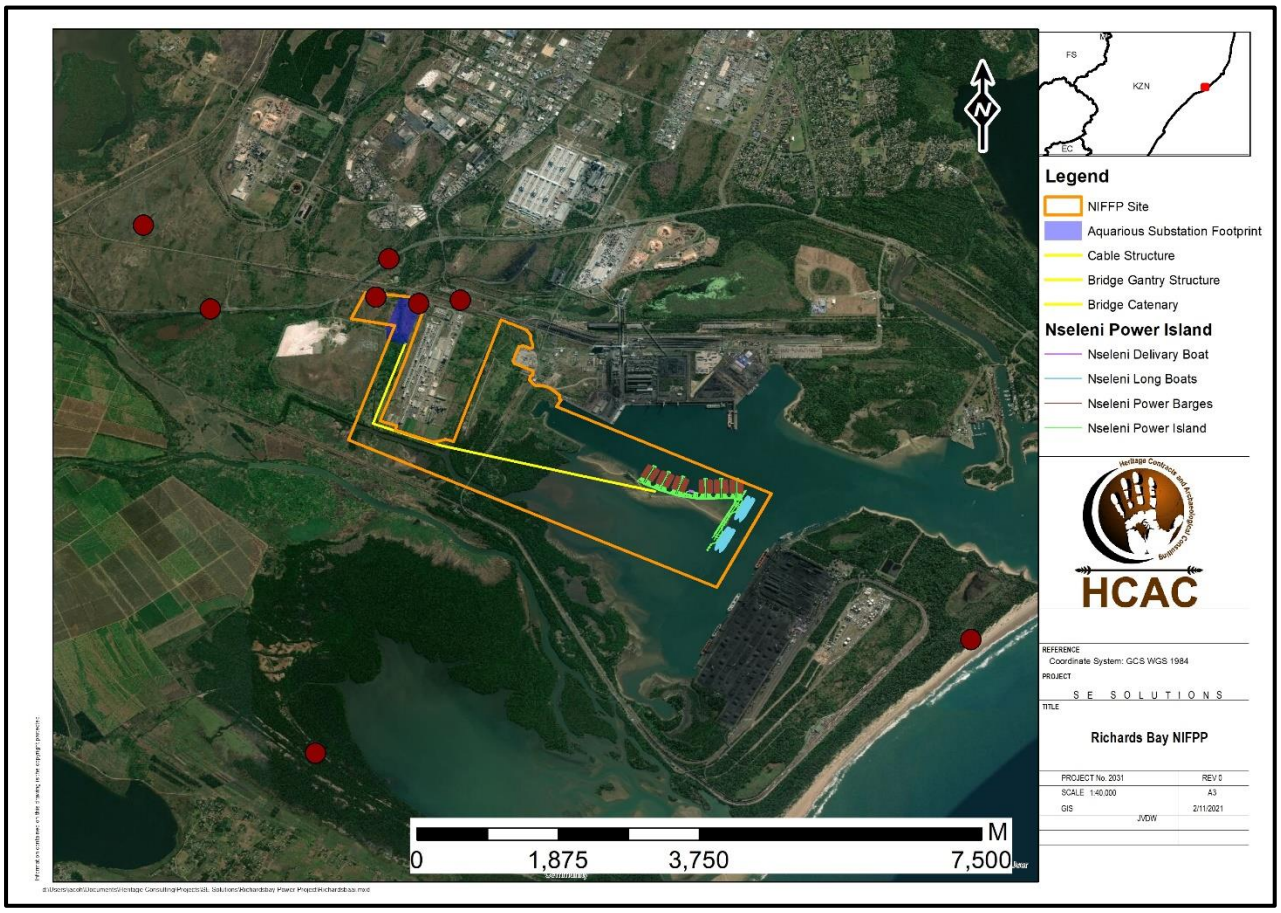


Figure 7-1. Known sites in relation to the project.

The current area under investigation was assessed as part of the 2009 study conducted by Anderson and Anderson and again in 2013 by Van Schalkwyk & Wahl (Table 5). The Van Schalkwyk & Wahl (2013) study was a desktop only and did not record any sites. The 2009 study included a survey that recorded nine sites dating from the Cretaceous (paleontological) to the Late Iron Age as well as Stone Age scatters. One of these sites fall within the current study area – RBP 03 and another site is on record at the Pietermaritzburg Museum Archaeological Database (Bhizele Halt - 2823CC 001), originally also located within the study area (Figure 7-2).

RBP 03 is described as follows "*RBP03 occurs on the same hill system as RBP02 and it also overlooks the wetlands. The site consists of MSA and LSA stone tools and may even be considered to be part of the same general site. The stone tools are flakes of various sizes made from shale or dolerite (they are very weathered) and quartz. The stone tools are located on the surface in an area that appears to be disturbed. The site was mainly recorded outside of the development boundary but extends into the development node. Significance: The site is of low significance.*
Mitigation: No further mitigation is required." (Anderson & Anderson 2009)

The second site (2823CC 001) known as Bhizele Halt was recorded by O. Davies from the Natal Museum in December of 1974. The location is described as "*where the railway to the aluminium smelter (previously Alusaf, now Bayside) crosses under the new main road Richards Bay-Empangeni Station. The artefacts collected included 1 pyramidical core; 5 flakes, all but one much sand-blasted and some may have been trimmed*". The location description of the site and co-ordinates derived from a 1:50 000 map in 1974 do not correlate and it could be that the current location is not exactly where the site was recorded.

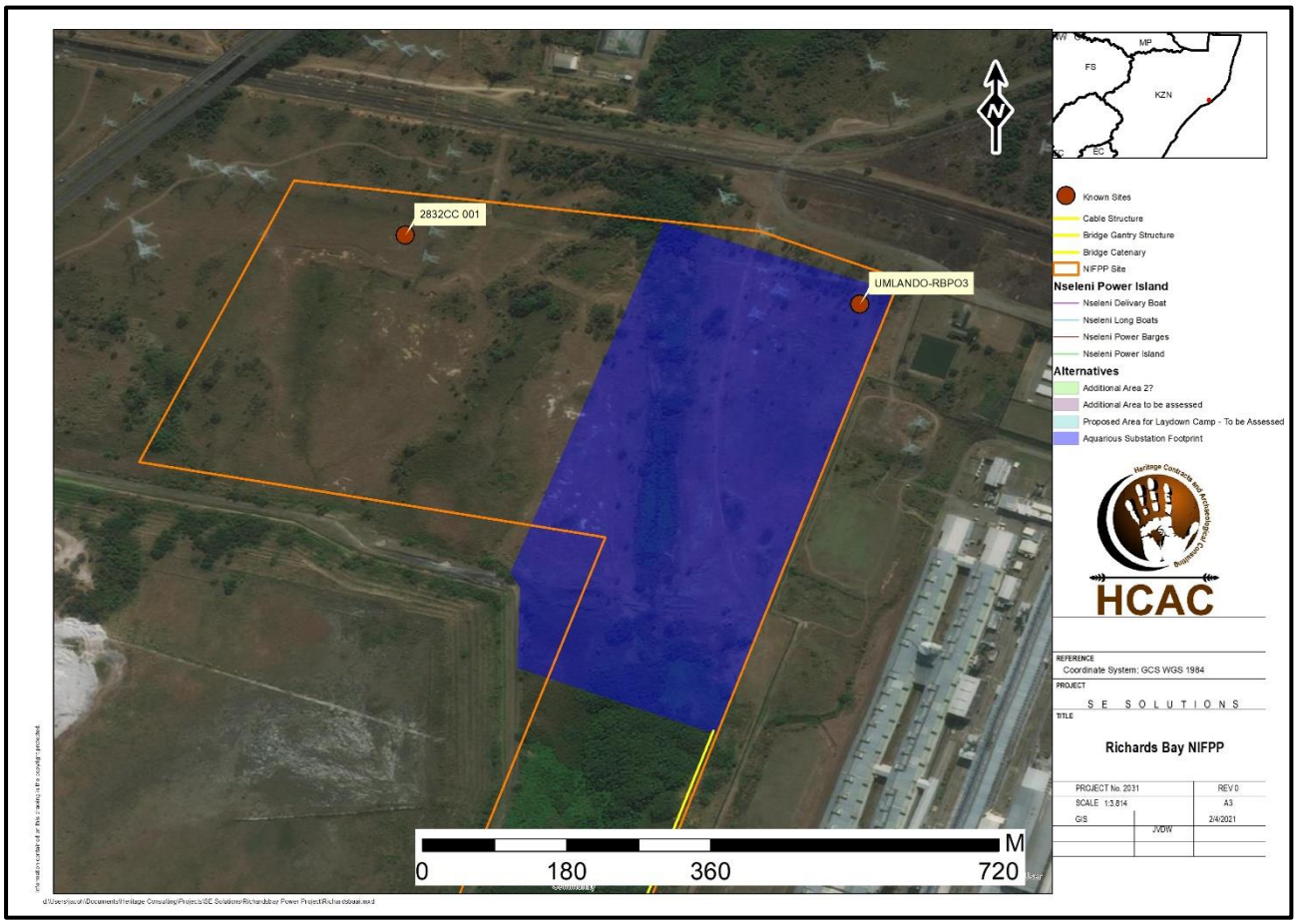


Figure 7-2. Known sites in the study area. Both are located next to the Bayside smelter.

7.1.1 Genealogical Society and Google Earth Monuments

No known grave sites are indicated in 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.

7.2.1.1 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 site 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).

7.2.1.2 . 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.

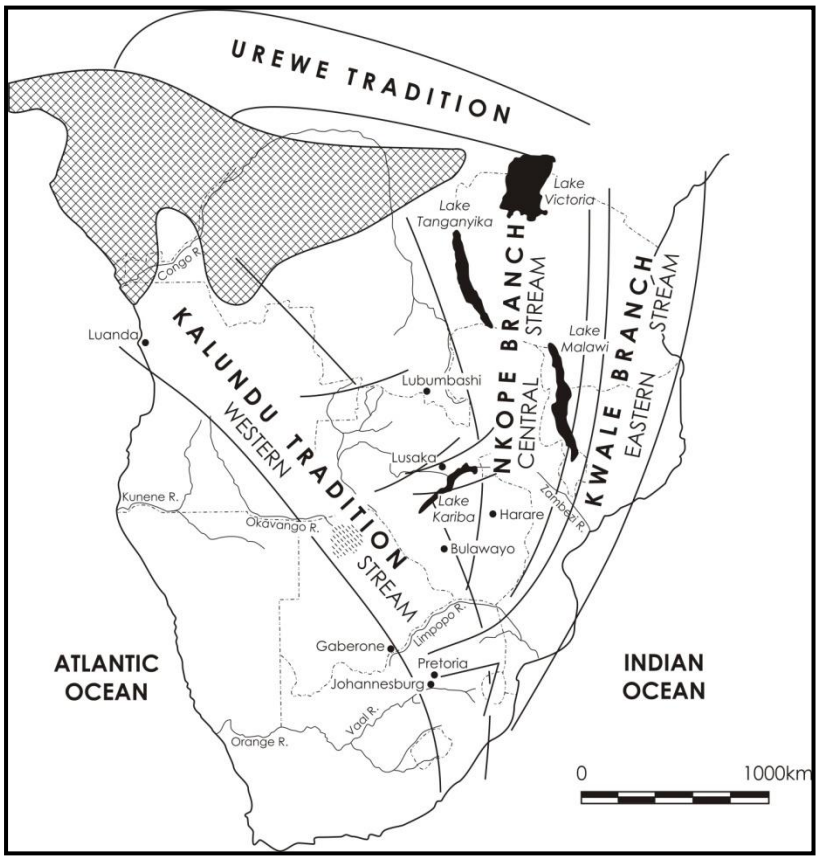


Figure 7-3: Movement of Bantu speaking farmers (Huffman 2007).

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 Cultural Landscape

The greater study area around the Richards Bay Port was covered by extensive Phragmitis swamplands, mangrove and swamp forests associated with the Mhlatuze estuary. This would not have been a focal point for occupation in antiquity (Lavin and Van Schalkwyk 2019).

The area still includes some mangrove plantations and the red mangrove, *Rhizophora mucronata* is restricted to a small stand northeast of the coal terminal in an area that is "formally protected", located at -28.804974, 32.068036 (Figure 7-4) . The site is located well away from the project and will not be impacted on.

Figure 7-4. Google image (2020) of the Natural Heritage site marked by a red arrow in relation to the project footprint.

7.2.3 Historical Information

An underwater HIA was conducted in the Port of Richards Bay (Maitland 2017) 3 km to the east at the mouth to the Richards Bay Port. This study indicated that numerous shipwrecks have been lost along the Natal Coast and the following known shipwrecks occur in the area of the Richards Bay Harbour (Table 10). These are all located well away from the proposed project and will not be impacted on.

Table 10. Known shipwrecks in the area (adapted from Maitland 2017)

Name	Nationality	Date	Description
São Jeronymo	Portuguese	1552	This galleon departed Cochin for Lisbon in company with the São João on 3 February 1552. The two vessels came in sight of the African coast in mid-April and as they neared the Cape a month later, they encountered a savage west-north-west gale. The São Jeronymo wrecked to the north of the Mhlathuze River and there were no survivors. Most of the databases record this wreck north of Richards Bay.
Penguin	British	1904	This vessel sailed from Durban on 13 August 1904. She met with gales off the Mhlathuze River and sank 13 km off the coast. Eleven men died in the wreck, but survivors reached the coast by boats after 40 hours.
S.S. Newark Castle	British	1908	This iron, Union Castle Line extra steamer, 5 093 tons which was built by Barclay Corle, Glasgow in 1902. On a voyage from London to Mauritius she was grounded and then abandoned and three people lost their lives. After being abandoned, she drifted for 11 km before finally coming to rest in the mouth of the Mhlathuze River. The wreck was found in the Richards Bay channel in the 1970s, during construction of the harbour.

7.2.4 Graves and Burial Sites

Graves and cemeteries are widely distributed across the landscape and can be expected anywhere, but no known graves occur in the impact area. .

7.2.5 Known Battles in relation to the study area

No battles took place in the study area.

8 Findings of the Survey

8.1 General observations

The proposed development site has been subject to decades of severe environmental disturbance associated with the construction and operation of heavy industries. The port area comprises former swampland that would never have been chosen for human settlement or activities and is considered to be of low heritage significance corroborating the findings of Anderson & Anderson (2009); Van Schalkwyk & Wahl (2013) and Lavin and Van Schalkwyk (2019). There are, however, two known sites on record for the project area but due to the extensive disturbance in the study area no significant heritage resources were recorded and the observations (Figure 8-1) from the survey are briefly described below (Table 11).

The locations of the two known heritage sites were visited. The first site recorded in 1974, Bhizele Halt - 2832CC 001 is located where the Gypsum dam was in 1983 (Figure 8-2 and 8-3) that was subsequently excavated and would have destroyed the site. No surface remains of the site were noted. An ephemeral shell scatter (Figure 8-4) was noticed in this area where excavations have taken place. From surface observations it is not found in a stratified context and was in all probability brought into the area together with construction material.

The other site (RBP 03 recorded by Anderson & Anderson 2009) is in a powerline servitude in an area disturbed by roads and earth works. The area is characterised by dense vegetation. The site was recorded as a low significant site in 2009 and erosion and subsequent disturbance of the area has resulted that the ephemeral surface remains are no longer visible.

The remains of modern cement slabs were noted in the Aquarius substation footprint (Figure 8-5), these are of no heritage significance.

Table 11. Features in the study area

Site	Significance	Coordinates
Umlando RBP03 (Weathered MSA and LSA stone tools)	Low Significance	28°46'46.79"S 32° 0'44.39"E
2832CC 001 Bhizele Halt (Artefacts)	Unknown	28°46'44.00"S 32° 0'26.00"E
Shell scatter	No heritage significance	28° 46' 45.5663" S, 32° 00' 27.3312" E
Cement Slabs	No heritage significance	28° 46' 49.5925" S, 32° 00' 41.6323" E

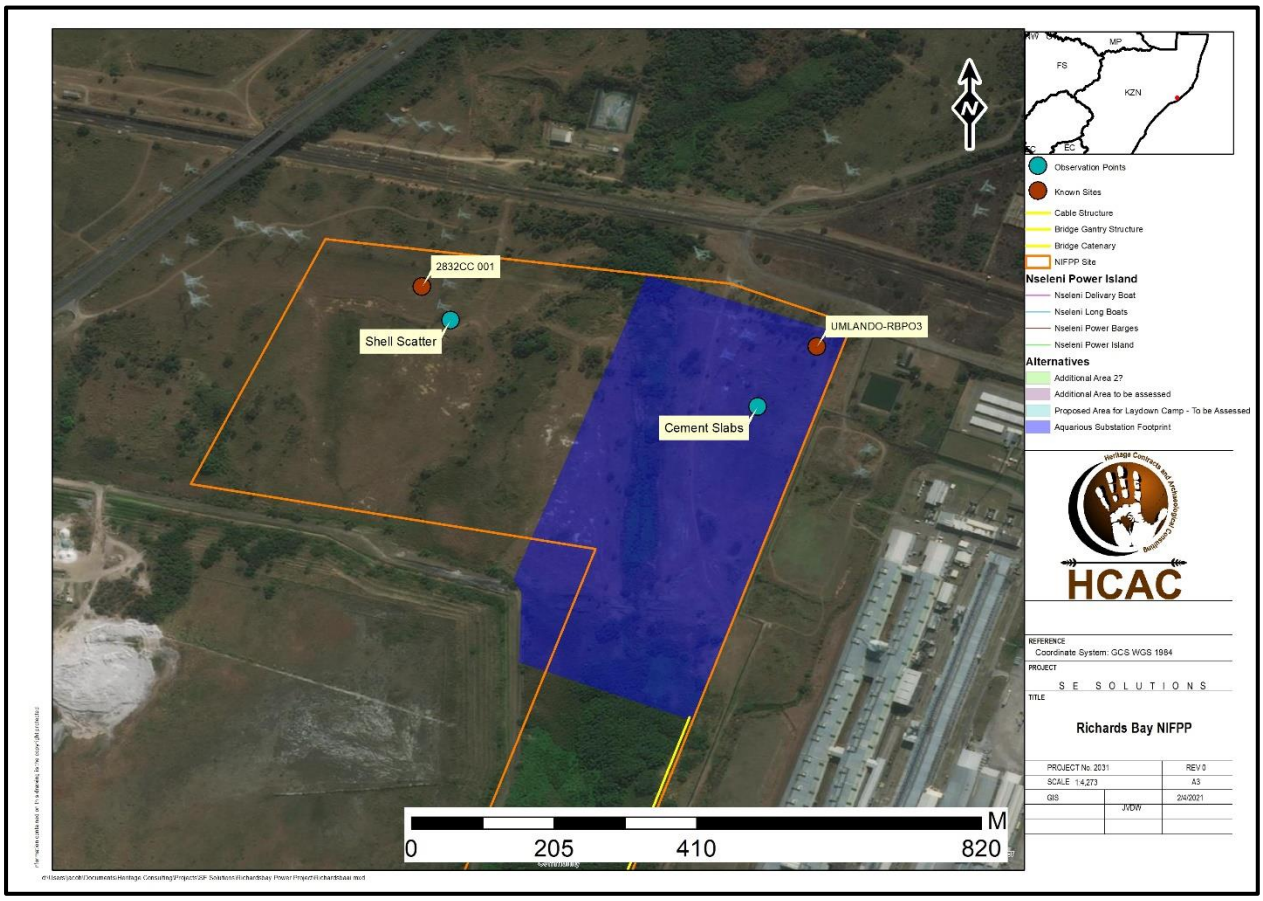


Figure 8-1. Recorded observations.

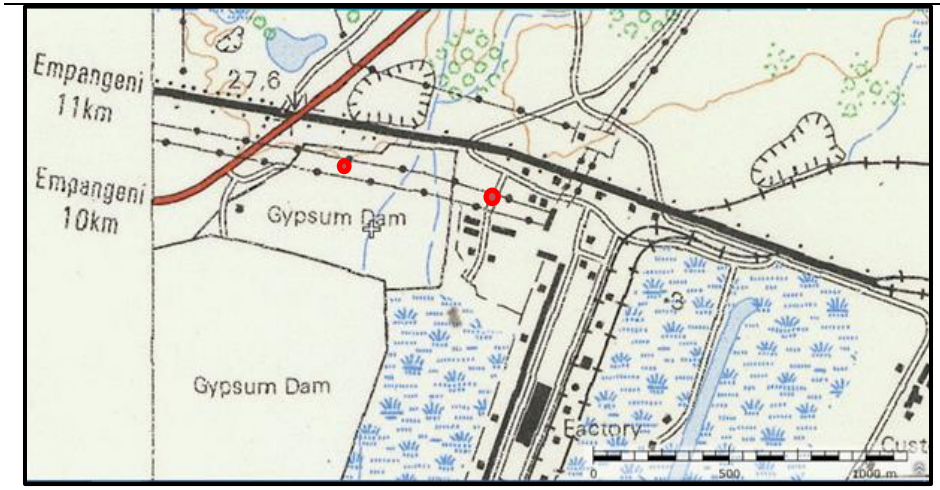


Figure 8-2. Extract of the 1983 topographical map indicating the location of a Gypsum dam were the Bizhele Halt site (red dot on the left) were located.

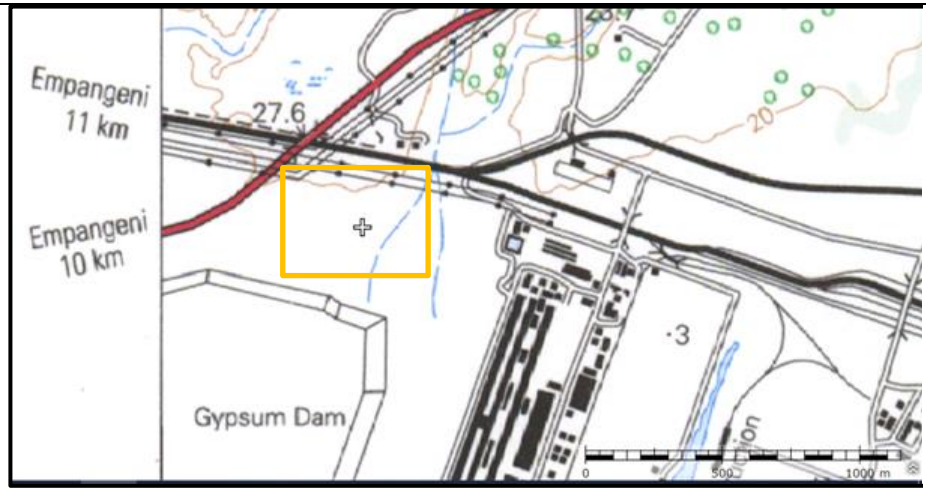


Figure 8-3. Extract of the 1997 topographical map showing that the Gypsum dam (orange polygon) does not exist anymore.

Figure 8-4. Ephemeral shell scatter.

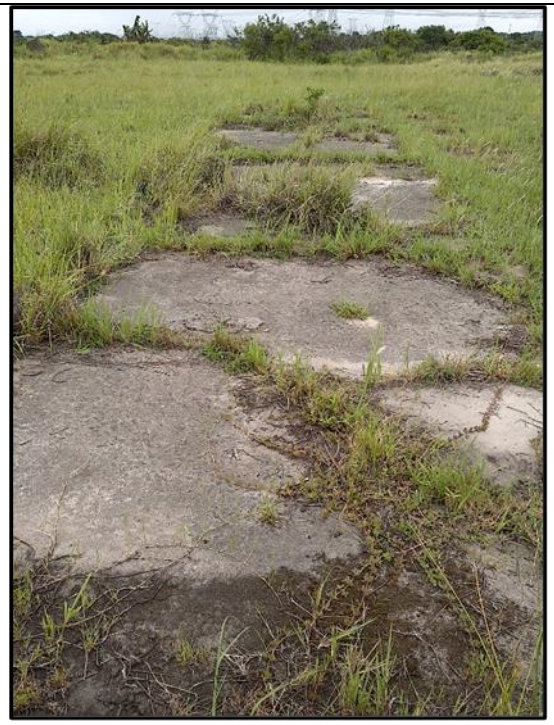
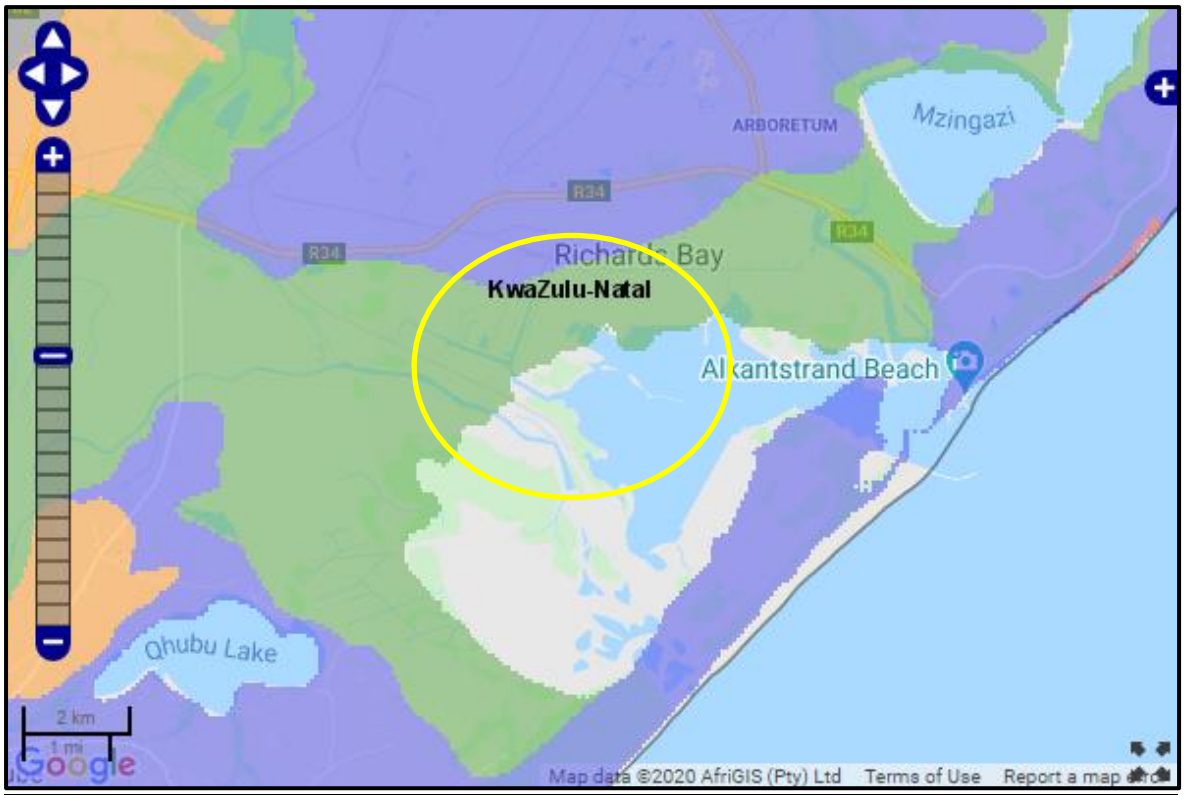


Figure 8-5. Figure 8-6:Cement slabs.

8.2 Paleontological Significance

Paleontological sensitivity of the study area based on the SAHRA Paleontological map (Figure 8-6).



Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map

Figure 8-7. The approximate study area as indicated on the SAHRA paleontological sensitivity map.

Due to the moderate palaeontological sensitivity of the area, an independent desktop assessment was conducted (Bamford 2020). The study concluded that it is extremely unlikely that any fossils would be preserved in the Holocene aged Sibayi Formation sands. The sands are wind and water transported so the particles have been very well sorted and, even if fossils fragments have been incorporated into the sands, they would not be recognizable and concluded that there is no chance that fossils may occur in the dune sands of the estuary.

8.3 Cultural Landscape

The landscape is characterised by an industrial area and was significantly altered after 1970, prior to this the area consisted of natural vegetation with little human interference (Figure 8-7). After the construction of the Port in the 1970's the study area was radically transformed and would have impacted on surface evidence of heritage resources (Figure 8-8 & 8-9). Areas not developed are now covered by marshes and mangroves with dense vegetation because of the altered character of the area. The long-term impact on the cultural landscape is considered to be low as the proposed project is in line with the surrounding land use. Visual impacts to scenic routes and sense of place are also considered to be low.

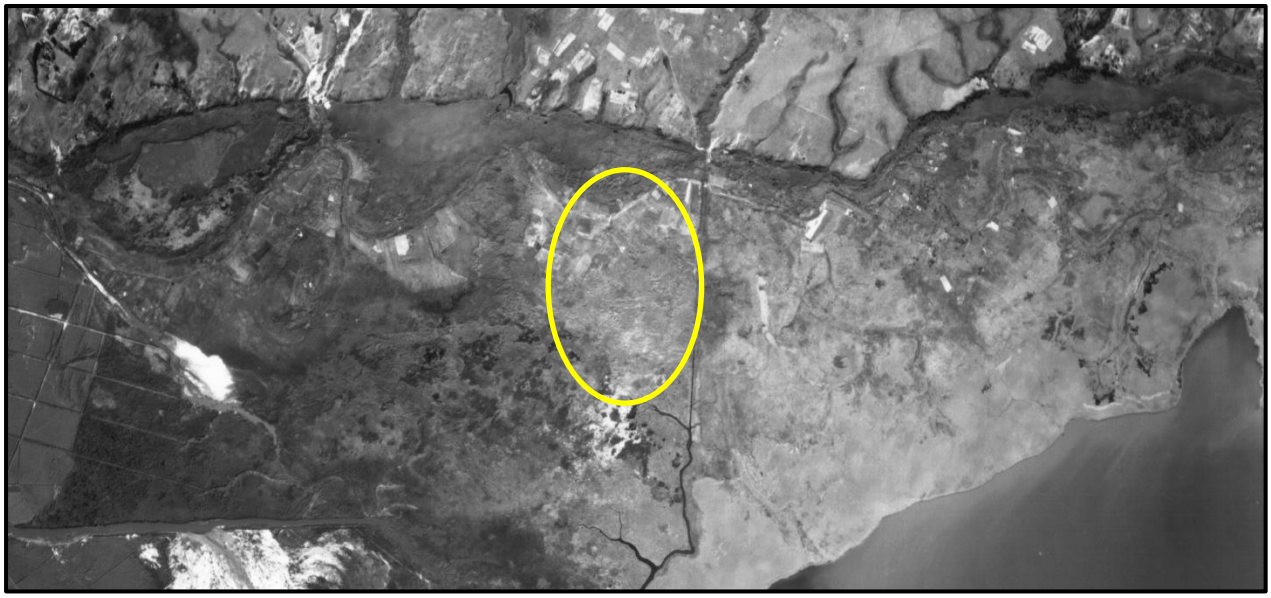


Figure 8-8. 1957 orthophoto of the approximate study area (yellow polygon) prior to the construction of the Port.

Figure 8-9. 1977 orthophoto of the approximate study area (yellow polygon). Note the existence of the Gypsum dam in the north western portion of the study area and extensive transformation of the landscape to the east.

Figure 8-10: 1997 orthophoto of the approximate study area (yellow polygon). Note the extensive transformation of the landscape surrounding the port.

9 Potential Impact

The potential impact to significant heritage resources is low and the project will not adversely affect the cultural resources of the area (Table 7). Most of the area has been completely transformed from the 1970's onwards and any surface indicators of heritage resources would have been completely destroyed. The sites recorded by previous studies (Davies 1974 and Anderson 2009) comprised scatters of artefacts that are in areas that have since been transformed and no evidence of these features were noted during the field survey.

Cumulative impacts considered as an effect caused by the proposed action that results from the incremental impact of an action when added to other past, present, or reasonably foreseeable future actions. (Cornell Law School Information Institute, 2020). 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. In the case of this project, the lack of significant sites in the study area results in a very low cumulative impact on cultural resources.

Table 12. Impact assessment of the project on heritage resources

Activity	Construction of project infrastructure
Environmental/ Social Aspect	Heritage resources
CONSTRUCTION PHASE	
Nature of the Impact	Construction phase activities could result in disturbance of surfaces and/or sub-surfaces and may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.
Scale / Extent of the Impact	Local
Duration & Reversibility of the Impact	Long Term Irreversible
Irreplaceable Loss of Resource	Medium
Consequence/ Inherent Risk	Moderate low , although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on
Causes of Impact	**Likelihood of Causes**
Accidental destruction of heritage resources .	**Unlikely but possible**
Residual risk	Low
Extrinsic / Additional Mitigation Measures	• Implementation of a chance find procedure for the project. • As the exact location of the Bhizele Halt - 2823 CC 001 site is not certain this area should be monitored during construction to ensure that no subsurface features are impacted on. • If site RBP 03 is impacted on the area must be monitored by an archaeologist during construction to ensure that subsurface heritage resources are not impacted on.
Residual risk after mitigation	Low

Cumulative impacts:

Other authorised projects (e.g., industrial developments) in the area could have a cumulative impact on the heritage landscape. The added impact of the project is seen as low as the developments are in line with surrounding land use, therefore minimising additional impacts on the cultural landscape and no impact on known heritage resources of significance.

10 Conclusion and recommendations

The project consists of two components, the Nseleni Independent Floating Power Plant (NFIPP): and a Liquid Natural Gas (LNG) facility, located within the Richards Bay Port. In terms of the national estate as defined by the NHRA the following key findings apply:

- In terms of the built environment of the area (Section 34 of the NHRA Act 25 of 1999), no standing structures older than 60 years occur within the project area;
- Regarding the archaeological component of Section 35 two previously recorded features were visited. At both features surface indicators have been destroyed by developments and erosion in the area. Due to the nature of cultural remains the depth of archaeological deposit cannot be determined on surface observations alone and some mitigation will be required at these sites if impacted on;
- During the survey two observations were made – an ephemeral shell scatter and the modern remains of cement slabs. Neither of the features are of heritage significance;
- The study area is of moderate paleontological sensitivity and an independent desk based paleontological study was conducted (Bamford 2020) and concluded that there would be no impact on the fossil heritage and the project can proceed without further work during the impact assessment phase;
- In terms of Section 36 of the Act no formal burial sites were recorded;
- During the public participation process conducted for the project no heritage concerns were raised.

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 AMAFA:

- Implementation of a chance find procedure for the project as outlined under Section 10.1;
- As the exact location of the Bhizele Halt - 2823 CC 001 site is not certain this area should be monitored during construction to ensure that no subsurface features are impacted on.
- If site RBP 03 is impacted on the area must be monitored by an archaeologist during construction to ensure that subsurface heritage resources are not impacted on. Monitoring requirements are outlined under Section 10.5.

10.1 Chance Find Procedures - Heritage Resources

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 therefore chance find procedures should be put in place as part of the EMPr. 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. And AMAFA.

10.2 Reasoned Opinion

The potential impact of the proposed project on heritage resources can be mitigated to an acceptable level based on approval from SAHRA and AMAFA. Furthermore, the socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

10.3 Potential risk

Potential risks to the proposed project are the occurrence of unknown and unmarked graves. These risks can be mitigated to an acceptable level with monitoring and the implementation of a chance find procedure as outlined in Section 10.1 & 10.5.

10.4 Management Measures for inclusion in the EMPr

Table 13. Heritage Management Plan for EMPr implementation

Area and site no.	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Monitoring Party (frequency)	Target	Performance indicators (monitoring tool)
General project area	Implement chance find procedures in case where possible heritage finds are uncovered	Ground clearance, excavations	Throughout the project	Applicant EAP	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA as well as the KZN Heritage Act of 2008.	ECO Monthly Checklist/Report
RB03 and Bhizele Halt - 2823CC 001	Monitor during construction	Construction phase	Construction phase	Applicant EAP	Archaeologist - once off during construction	Monitor the area for the presence of archaeological artefacts. Ensuring compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA as well as the KZN Heritage Act of 2008.	ECO Monthly Checklist/Repor

10.5 Monitoring requirements

Ideally, site monitoring should be conducted by an experienced archaeologist or heritage specialist. Day to day monitoring can be conducted by the Environmental Control Officer (ECO). The ECO or other responsible persons should be trained along the following lines:

- *Induction training:* Responsible staff identified by the developer should attend a short course on heritage management and identification of heritage resources.
- *Site monitoring and watching brief*: As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are the initial soil removal and subsequent earthworks during construction. The ECO should monitor all such activities daily. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

Finally, a heritage specialist should assess any material change to the conceptual layout plan. Monitoring requirements for the project are outlined in Table 14.

Table 14. Monitoring requirements for the project.

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
Clearing activities and Excavations	Project area	ECO	Weekly – during construction phase	Proactively	• If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented: 1. Cease all works immediately; 2. Report incident to the manager; 3. Contact an archaeologist to inspect the site; 4. Report incident to the competent authority; and 5. Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities. • Only recommence operations once impacts have been mitigated.
Construction phases	RB03 and Bhizele Halt - 2823CC 001	Archaeologist	Construction phases	Proactively	• If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented: 1. Cease all works immediately; 2. Report incident to the manager; 3. Report incident to the competent authority; and 4. Employ reasonable mitigation measures in accordance with the

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
					requirements of the relevant authorities. • Only recommence operations once impacts have been mitigated.

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12 Appendices:

Curriculum Vitae of Specialist

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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 ananalysis 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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