HERITAGE IMPACT ASSESSMENT

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

WANSLEY QUARRY, NORTH OF EAST LONDON IN THE EASTERN CAPE PROVINCE

Type of development:

Mining

Client:

Greenmined Environmental

Client info:

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E – mail:

Developer:

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Project Reference:

HCAC Project number 2055

Report date:

October 2020

APPROVAL PAGE

Project Name	**Wansley Quarries**
Report Title	Heritage Impact Assessment for Wansley Quarry, north of East London in the Eastern Cape Province
Authority Reference Number	TBC
Report Status	Draft Report
Applicant Name	Greenmined Environmental

	Name	Qualifications and Certifications	Date
Archaeologist	Jaco van der Walt	MA Archaeology ASAPA #159 APHP #114	October 2020
Palaeontologist	Prof Marion Bamford	PhD Paleo Botany	October 2020

DOCUMENT PROGRESS

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Date	Report Reference Number	Document Distribution	Number of Copies
30 October 2020	2055	Greenmined Environmental	Electronic Copy

Amendments on Document

Date	Report Reference Number	Description of Amendment

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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 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 BA report
(q) Any other information requested by the competent authority	Section 11

Executive Summary

HCAC was appointed to conduct a Heritage Impact Assessment for the proposed extension of the existing Wansley quarry from 5 hectares to ±37.8575 ha. 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 proposed extension. The proposed expansion area is situated adjacent to the existing quarrying activities that have creeped in to the new area that is located within an old pineapple plantation. These activities would have impacted on surface indicators of heritage resources if any were present.

The site was found to be undulating and covered in grass and small bushes. Finds were limited to a single undecorated ceramic fragment and stone cairns associated with the agricultural activities in the study area, these are of low cultural significance. In terms of the palaeontological component, the area is indicated as from insignificant to very high palaeontological sensitivity and an independent study was conducted by Prof Marion Bamford. The study concluded that the proposed site lies mainly on the non-fossiliferous Jurassic dolerite dyke but the margins are on potentially fossiliferous Adelaide Subgroup (Beaufort Group, Karoo Supergroup) but no fossils were found during the field assessment. No burial sites or graves were recorded. However, if any graves are identified in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation.

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:

Recommendations:

- Implementation of a chance find procedure for both the archaeological and paleontological components
- The presence of graves in the study area must be confirmed through the social consultation process.

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	27/10/2020

a) Expertise of the specialist

Jaco van der Walt has been practising as a CRM archaeologist for 19 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:

HCAC is contracted by Greenmined Environmental to conduct a heritage impact assessment of the proposed expansion of Wansley Quarry, East London. Eastern Cape Province (Figure 1-1 – 1-3). The report forms part of the Section 102 ("S102") amendment application, in terms of the MPRDA, 2002, to the DMR.

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 resources of significance were identified. 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, compiled in support of an Environmental Authorisation application as defined by NEMA EIA Regulations section 40 (1) and (2), to be submitted to SAHRA. As such the S102 report and its appendices must be submitted to the case as well as the EMPr, 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 of 1999 (Act No 25 of 1999).

1.2 Project Description

The project comprises a mining right expansion application as indicated in Table 2 and 3.

Table 2: Project Description

Size of farm and portions	37.8575 ha on Portion 1 of Farm No 652.
Magisterial District	East London magisterial district of the Eastern Cape Province
Central co-ordinate of the development	32°54'45.15"S 27°55'31.05"E

Table 3: Infrastructure and project activities

Type of development	Mining right extension
Size of development	37.8575 hectares
Project background and details	Wansley Quarries has been a trusted supplier of weathered dolerite in the greater East London area for the past 19 years. A mining licence was issued to David Peter Coetzer (trading as Wansley Quarries) that was converted to a new order mining right in 2016. In 2020, the mining right was ceded, in terms of Section 11 of the MPRDA, 2002, to Wansley Siyakhula (Pty) Ltd that is the current mining right holder (hereinafter referred to as the "MR Holder"). The mining right is valid until 16 June 2026, with an approved footprint of 5.2149 ha over an area of Portion 1 of Farm No 652, in the East London magisterial district of the Eastern Cape Province. To date the mining method entailed removal of the weathered dolerite through direct extraction with an excavator. Mining focused on the soft material as blasting was not approved for the mining right. Upon excavation of the gravel, a limited stockpile was established as most material was directly loaded onto haul trucks that transported it to the clients. A crushing and screening plant were established to process material when needed. The MR Holder intends submitting a S102 amendment application, in terms of the MPRDA, 2002, to the DMR to: • align the mining documentation with the above-mentioned Section 11 approval; • comply with the latest department and legislative requirements; • add blasting and processing of material to the EMPR; and • expand the mining footprint to 37.8575 ha.

1.3 Alternatives

No alternatives were provided.

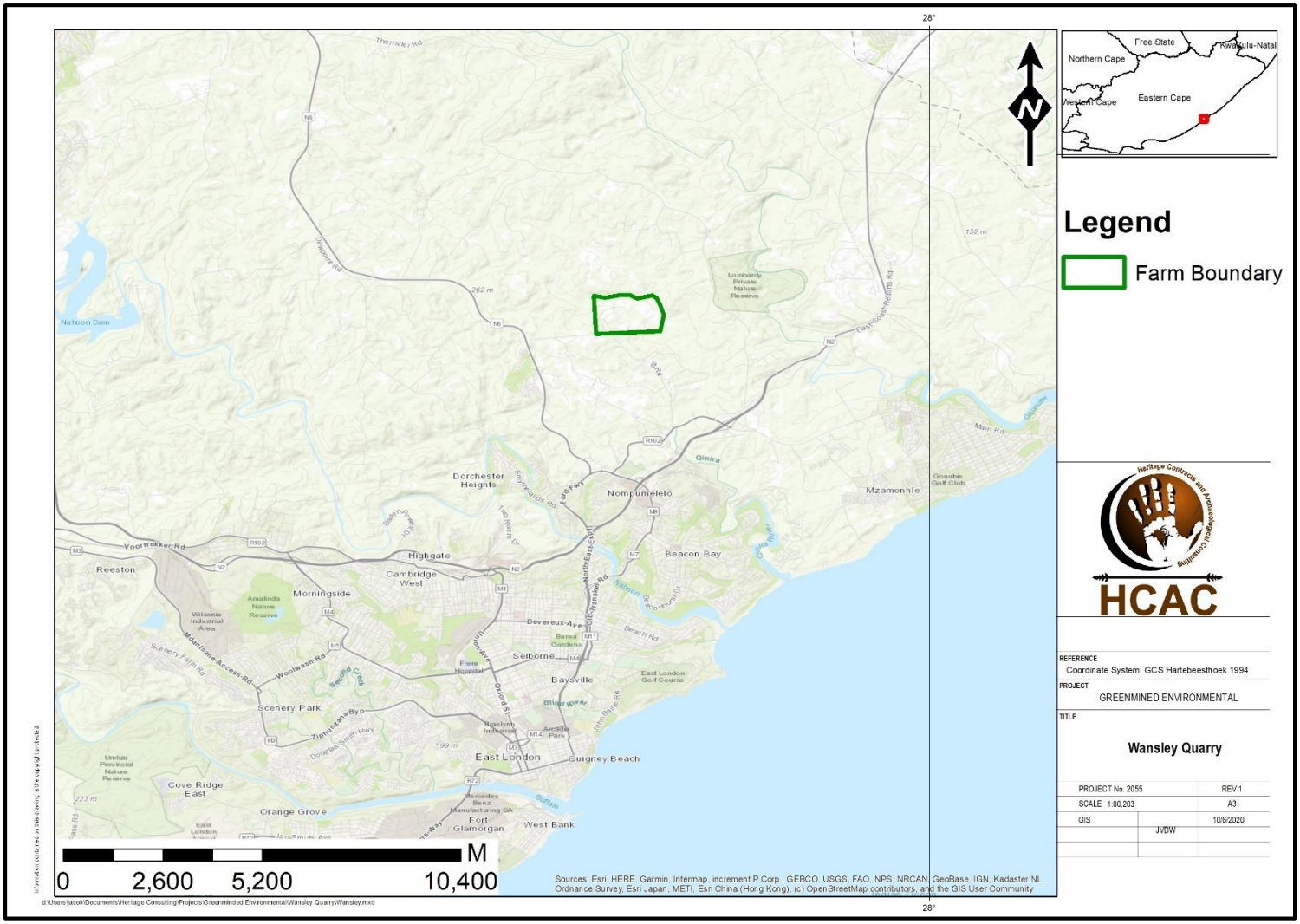

Figure 1-1. Regional setting.

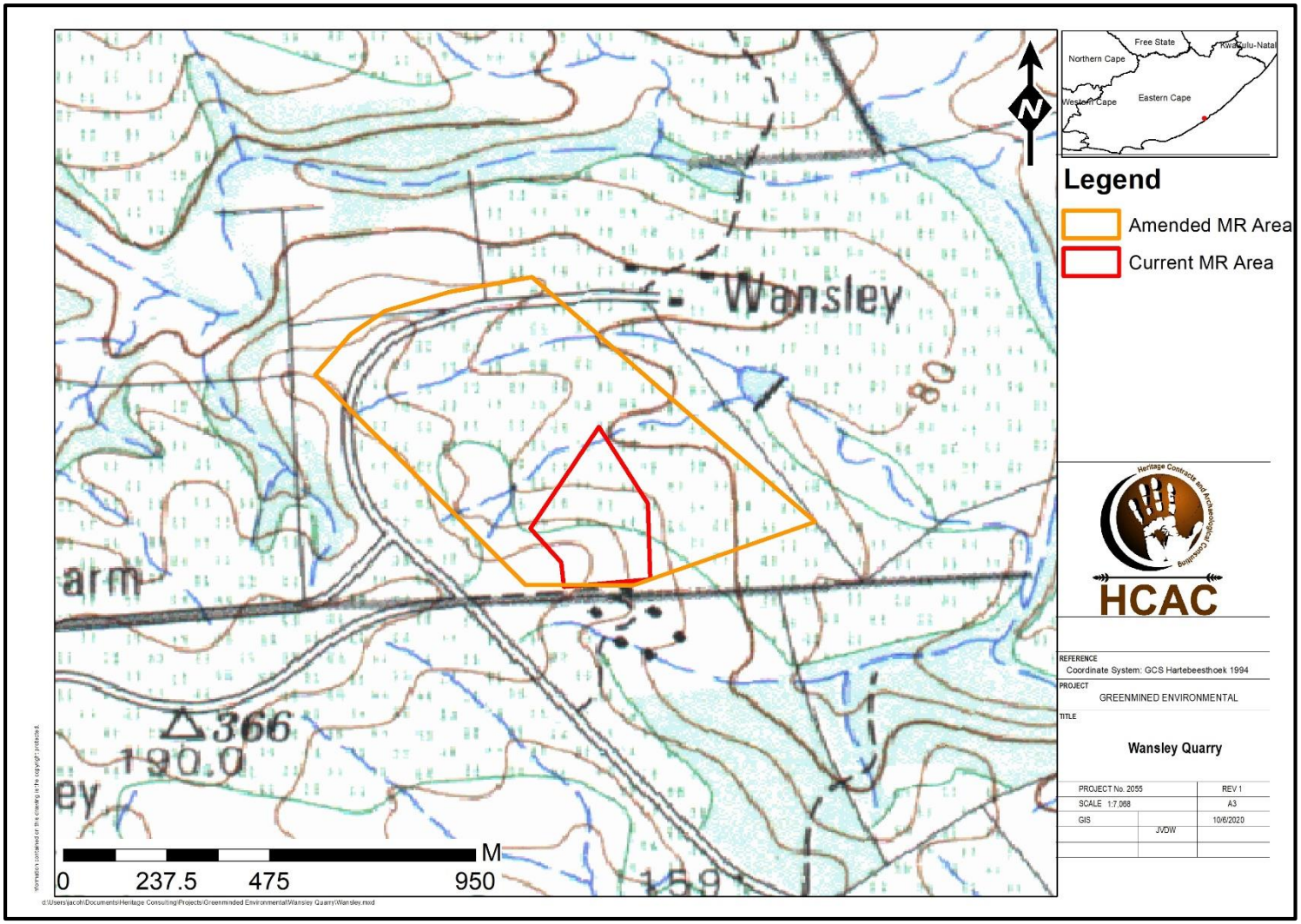

Figure 1-2: Local setting (1:50 000 topographical map).

Figure 1-3. Satellite image of the proposed impact area (Google Earth 2020).

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)

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.

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 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 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 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 Report.

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.

Table 4: Site Investigation Details

	Site Investigation
Date	30 September 2020
Season	Summer- Vegetation is high limiting archaeological visibility. The area was however sufficiently covered to determine the heritage character of the area (Figure 3-1).

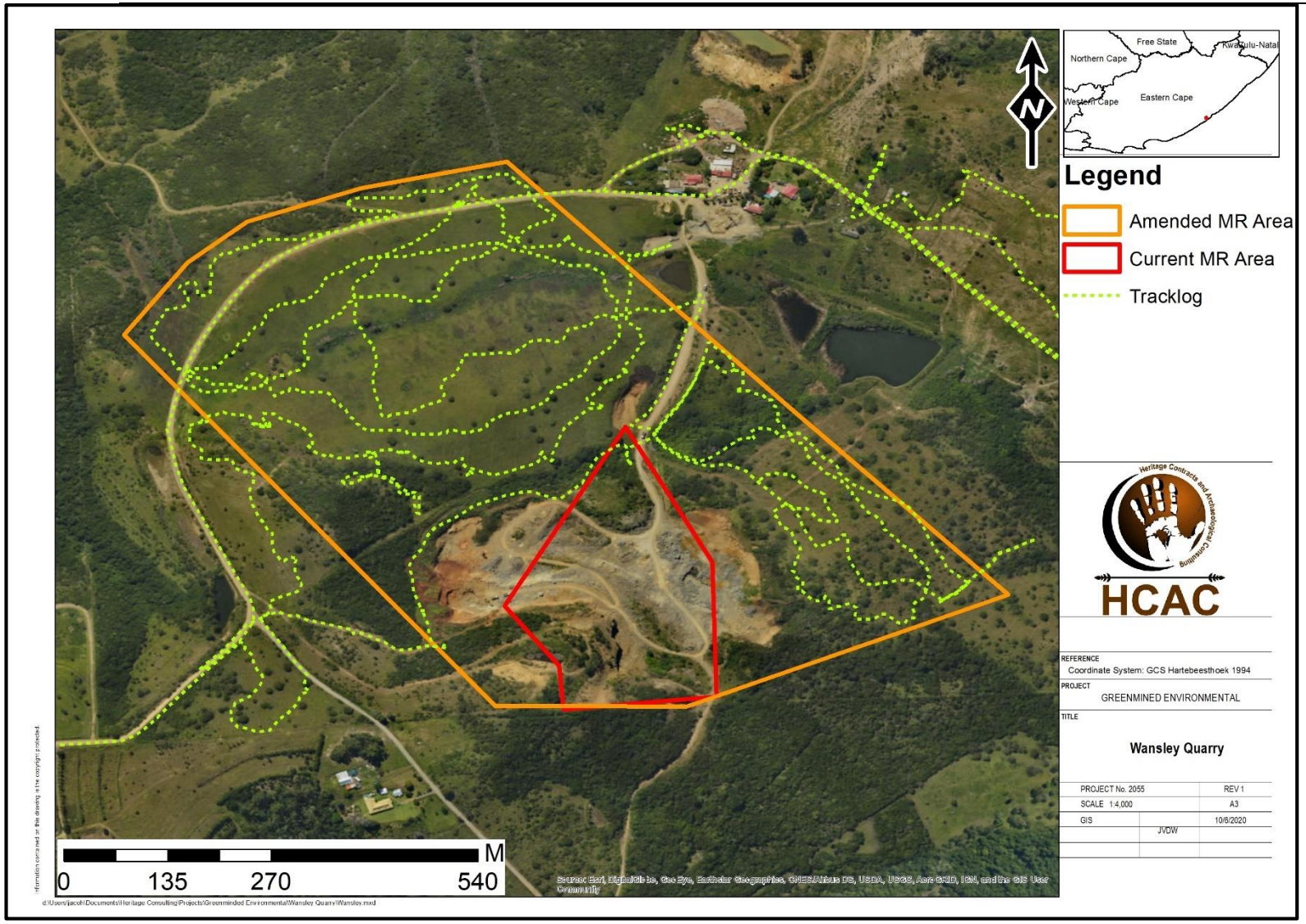

Figure 3-1: Track log of the survey in green.

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.

Table 5. Heritage significance and field ratings

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 nature of heritage resources, 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. 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 Environmental

According to Stats SA whites make up 7,7% of the population, 6% are coloureds, and other race groups comprise the remaining 1,2%. Of those aged 20 years and older, 5,2% have completed primary school, 37,9% have some secondary education, 27,2% have completed matric and 13,9% have some form of higher education. Buffalo City Metropolitan Municipality has a strong manufacturing base, with a prominent automobile industry. In terms of the labour market for the municipality as a whole,35,1% of the 285 223 economically active individuals (i.e., those who are employed or unemployed but looking for work) are unemployed. Of the 135 753 economically active youth (15–35 years) in the municipality.

5 Results of Public Consultation and Stakeholder Engagement:

5.1.1 Stakeholder Identification

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

6 Literature / Background Study:

6.1 Literature Review (SAHRIS)

Few studies are on record in the immediate vicinity of the study area but the following Cultural Resource Management reports were consulted for this study:

Author	Year	Project	Findings
Binneman, J.	2002	Archaeological Heritage Sensitivity Survey of the Proposed N2	Stone cairns, Iron Age sites and shelters. These sites are located well away from the study area.
Mahlalela, M. and Minkely, G.	2006	Heritage Impact Report of the proposed Gqunube Valley Eco Golf resort.	Graves.
Van Schalkwyk, L.	2008	Heritage Impact Assessment of The Proposed N2 Wild Coast Toll Highway	Historical structures and graves as well as stone cairns. These sites are located well away from the study area.
Van Ryneveld, K.	2008a	Phase 1 Archaeological Impact Assessment Riverleigh Township Development, Farm 817/53, East London, Eastern Cape, South Africa	No sites
Van Ryneveld, K.	2008b	Phase 1 Archaeological Impact Assessment Residential Development, Portions 3, 4&18 Of Farm 807 Quenera East London, Eastern Cape, South Africa	No sites
Van Ryneveld, K.	2015	Phase 1 Archaeological Impact Assessment –Residential Development, Farm RE/1234, Gonubie, East London, BCMM, Eastern Cape	No sites
Van der Walt, J.	2020	Heritage Impact Assessment Gonubie Mining Permit, Eastern Cape	No sites

6.1.1 Genealogical Society and Google Earth Monuments

No known grave sites are indicated in the study area.

6.2 Background to the general area

6.2.1 Archaeology of the greater study area

The archaeological record for the greater study area consists of the Stone Age and Iron Age.

7.1.1. 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 humans. 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 Early Stone Age has not been well documented in the area although some isolated ESA material was recorded (Van Ryneveld 2010a) together with MSA artefacts from the Needs Camp / Potsdam area (Van Ryneveld 2014c). At Ikwezi Anderson (2011) documented both MSA and LSA artefact scatters and similar sites can be expected.

Two important sites in the larger area are the Nahoon footprints site, where hominin / human footprints dating to 200,000BP have been discovered (Deacon 1966). The site is situated to the west of Gonubie and to the northeast of East London. Another important site is the Klasies River Site (Singer and Wymer, 1982; Deacon, 1989, 1995) where the earliest Homo Sapien Sapien, or modern human remains, dating to 125,000BP was recorded.

The area contains numerous sites relating to the LSA. Deflated coastal shell middens was reported on by Binneman & Webley (1996). Anderson (2009) identified seven LSA shell midden sites at the East London IDZ. In addition, an ephemeral shell scatter situated approximately 2.5-3km inland, on the banks of the Buffalo River, was reported on (Van Ryneveld 2010b). The 5-km strip from the coast inland is considered a ‘sensitive’ zone where shell middens may be expected to occur as well as a sensitive environment where the prehistoric presence and use of fresh water resources may be still be evidenced.

7.1.2. The Iron Age (AD 400 to 1840)

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 first 1,000 years is called the Early Iron Age.

As mixed farmers, Iron Age people usually lived in semi-permanent settlements consisting of pole-and-daga (mud mixed with dung) houses and grain bins arranged around a central area for cattle (Huffman, 1982). Usually, these settlements with the 'Central Cattle Pattern' (CCP) were sited near water and good soils that could be cultivated with an iron hoe. For the project area, archaeological sites such as these are unlikely to occur except along river terraces.

Several Iron Age sites occur in the area and the following Iron Age ceramic *facies* are known to occur:

- Msuluzi Facies AD 650 -750 (Binneman 1996, Huffman 2007)
- Ndondwane AD 750 – 950 (Binneman et al 1992)

Canasta Place, an Iron Age Site, situated approximately 15-20km west of East London and outside of the study area constitutes the southernmost known EIA site in South Africa (Nongwasa 1994). Another EIA site, the site of Kulubele (Binneman 1996) dating to AD 800 is found along the Great Kei River.

From the late 1500's / early 1600's increasing numbers of LIA Nguni people moved south, into the Eastern Cape, as a result of Zulu tribal warfare and the resultant Mfecane. These people largely displaced resident KhoiSan groups (Mitchell 2002).

Another site worth mentioning is the Cove Rock Late Iron Age site, situated south of the Buffalo River (Coetzee 2008, Van Ryneveld 2008a and b). The site is closely tied with the history of Nongqawuse, the young Xhosa prophetess who in 1856 prophesized the 'Cattle Killing' (1856-1857) to ensure expulsion of the white man from Xhosa territory.

7.1.3. Historical Information

Numerous known Colonial Period Resources dating back to the 1840's occurs in the study area mostly in the vicinity of the East London harbour (Van Ryneveld 2007, 2010a, 2014a, 2014b) and Webley & Vernon (2008).

The study area is also known for many shipwrecks that are recorded along the East London coastline, roughly from the Kei River mouth in the north to Kaysers' Beach in the south (Van Ryneveld 2015) including, amongst others the wrecks of Agnes (1948), Albert Edward Prince of Wales (1882), Albert Juhl (1876), Alfred (1866), Alma (1878), Amatola (1852), Andreas (1928), Ann Staniland (1876), Ann Hutchinson (1942), Annie S (1875), Antonie (1864), Asphodel (1878), Atbara (1902) and the Aurora (1902).

6.2.2 Cultural Landscape

The site under investigation is located in a rural area in the Eastern Cape characterised by agriculture and mining of the existing quarry. Aerial images indicate that the area was mostly cultivated from the 1960's onwards (Figure 6-3) with mining activities commencing by 2009 (Figure 6-5). These activities would have impacted on heritage resources if any were present.

Figure 6-1. 1938 aerial image of the proposed study area. Mining and agricultural activities are not indicated yet.

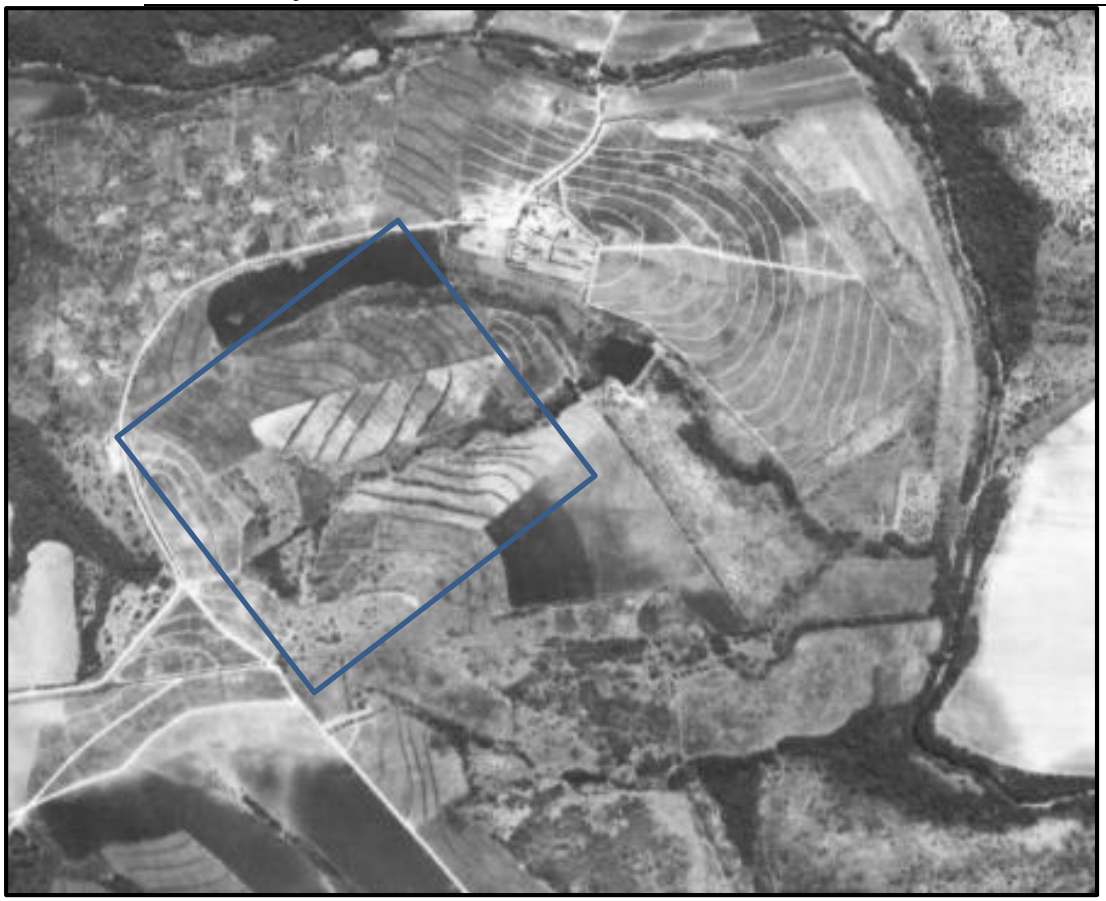

Figure 6-2. 1966 aerial image of the study area. Extensive pineapple plantations are visible but no mining activities.

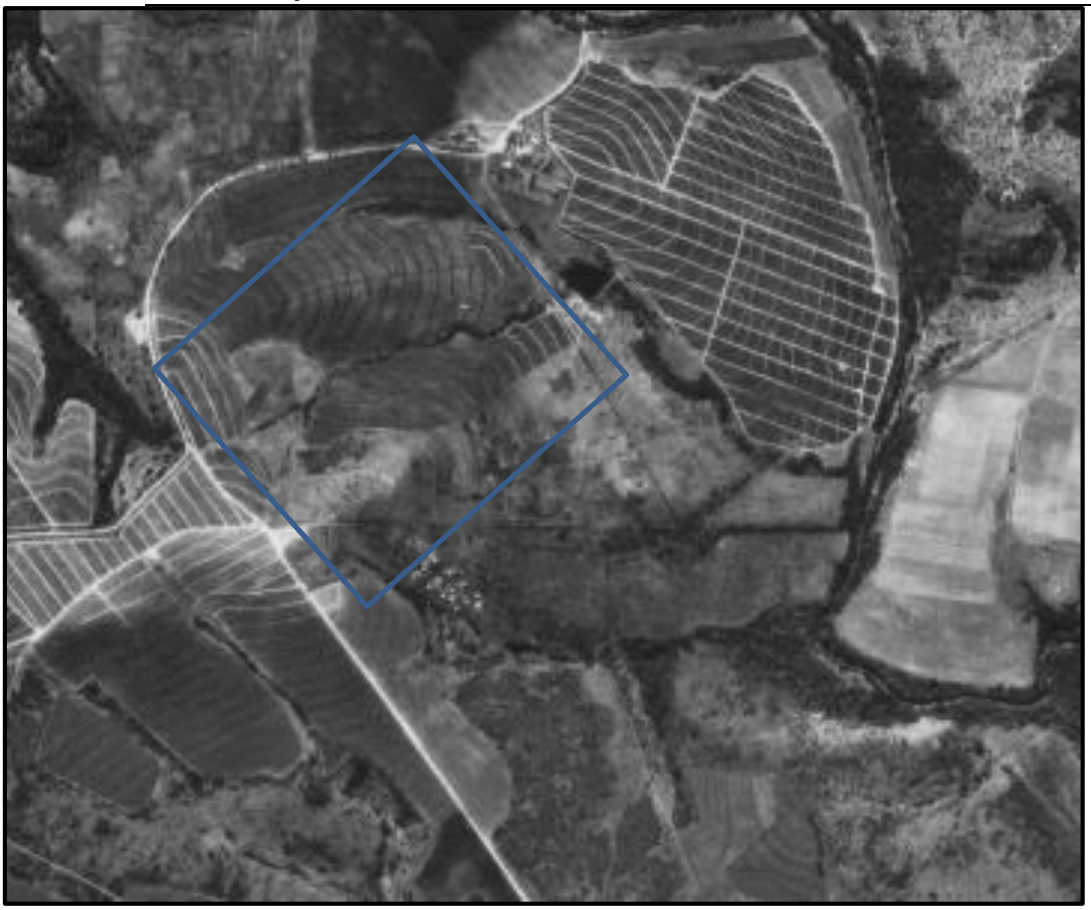

Figure 6-3. 1970 aerial image of the study area. Extensive pineapple plantations are visible but no mining.

Figure 6-4. 2009 aerial image of the study area. Agricultural activities ceased but mining commenced.

7 Description of the Physical Environment

The project area is located in the Buffalo City Metropolitan Municipality, with East London being the nearest town. East London is the second largest industrial centre in the province. The land use of the earmarked property mainly comprises of fallow land, with dolerite mining (Figure 7-1 – 7-3). The surrounding properties are mainly used for a variety of mixed agricultural purposes. The proposed expansion area was selected over an area that was historically used for pineapple cultivation extending towards the north-west of the current mining area. According to Mucina and Rutherford (2012) the expansion area extends over the vegetation type known as the Albany Coastal Belt (AT 9). The Albany Coastal Belt is classified as Least Threatened. According to the Eastern Cape Biodiversity Conservation Plan (as shown in the figure below), the Eastern Cape Biodiversity Conservation Plan (ECBCP) – Terrestrial Critical Biodiversity Area (CBA) extends across the earmarked area.

Figure 7-1. Study area viewed from the north.

Figure 7-2. Shallow soils in the southern portion of the study area.

Figure 7-3. Existing mining activities.

8 Findings of the Survey

It is important to note that the survey covered the entire study area and was conducted over one day. It should be noted that clusters of dense vegetation occur in the study area where access was not possible (Figure 8-1). Previous disturbances relating to mining and agricultural developments (Figure 6-1 – 6-8) are clearly visible in this area (Figure 8-2). These developments would have impacted on heritage resources if any occurred in the study area and the field survey confirmed that no structures occur in the study area (Figure 8-3) and no archaeological material of significance was noted. A single undecorated ceramic was recorded at S32° 54.787' E27° 55.407' (Figure 8-3) but this is an isolated find without any other cultural material or features and are of no significance. Stone cairns were also noted and these are associated with the agricultural activities in the study area. No burial sites were recorded, however, if any graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation. This should also be confirmed during social consultation.

Figure 8-1. General site conditions.

Figure 8-2. Existing mining operations.

Figure 8-3. General site conditions.

Figure 8-4. Single undecorated pot sherd.

Based on the SAHRA Paleontological sensitivity map the area is of insignificant to very high paleontological sensitivity (Figure 8-5) and an independent study was conducted by Prof Marion Bamford for this aspect. Based on the site visit and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the shales around the quarry site, and certainly not in the dolorites. Although no fossils were seen during the site visit, there is a very small chance that

fossils may occur in the unexposed shales of the Adelaide Subgroup. Therefore, a Fossil Chance Find Protocol should be added to the EMPr: if fossils are found once mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.

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 8-5. Paleontological sensitivity of the area as indicated on SAHRIS.

The proposed development is in line with the current land use will have a low impact on the surrounding cultural landscape. Visual impacts to scenic routes and sense of place are also considered to be low due to the current mining character of the site and other developments in the area.

9 Potential Impact

The chances of impacting unknown archaeological sites in the study area is considered to be negligible. Any direct impacts that did occur would be during the construction phase only and would be of very low significance.

9.1.1 Pre-mining phase

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation. These activities can have a negative and irreversible impact on heritage sites. Impacts include destruction or partial destruction of non-renewable heritage resources, if any occur.

9.1.2 Mining

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

9.1.3 Operation Phase:

No impact is envisaged for the project during this phase.

Table 6. Impact Assessment table.

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	Yes
Mitigation: A chance find procedure must be incorporated for the project.		
Cumulative impacts: The study area is characterised by mining and previous agricultural activities also impacted on the site. The proposed expansion of the mining area will not impact negatively on significant heritage resources and therefore the cumulative impact is low.		
Residual Impacts: Although surface sites can be avoided or mitigated, there is a chance that completely buried sites would still be impacted on but this cannot be quantified.		

10 Conclusion and recommendations

The proposed expansion area comprises 37.8575 ha on Portion 1 of Farm No 652, in the East London magisterial district of the Eastern Cape Province. Aerial images indicate that the study area was cultivated from the 1960's onwards (Figure 6-3) with mining activities commencing by 2009. Disturbances relating to the mining and cultivation activities is clearly visible in the study area and would have impacted on heritage resources if any occurred in the study.

The field survey confirmed that no structures occur in the study area and no archaeological material of significance was recorded. In terms of Section 36 of the Act no burial sites were recorded, however, if any graves are located in future they should ideally be preserved in-situ or alternatively relocated according to existing legislation.

Based on the SAHRIS Paleontological Sensitivity Map, the area is indicated as of insignificant to very high palaeontological sensitivity and an independent study was conducted (Bamford 2020) The study concluded that the proposed site lies mainly on the non-fossiliferous Jurassic dolerite dyke but the margins are on potentially fossiliferous Adelaide Subgroup (Beaufort Group, Karoo Supergroup). No fossils were found during the survey, nonetheless, a Fossil Chance Find Protocol should be added to the EMPr.

The study area is surrounded by mining as well as road infrastructure developments and the proposed expansion will not impact negatively on significant cultural landscapes or viewscapes. During the public participation process conducted for the project no heritage concerns were raised.

Due to the lack of significant heritage resources in the study area the impact of the proposed project on heritage resources is considered low and impacts can be mitigated to an acceptable level. It is therefore 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 both heritage and paleontological resources as outlined below.
- The presence of graves in the study area must be confirmed through the social consultation process.

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, any indication of burial sites 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.

Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (stromatolites, plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

10.2. Reasoned Opinion

The impact of the proposed project on heritage resources is low and any impact to accidental finds can be mitigated to an acceptable level and no further pre-construction mitigation is required based on approval from SAHRA. Furthermore, the socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures (i.e. chance find procedure) are implemented for the project.

10.3. Potential risk

Potential risks to the proposed project are the occurrence of unrecorded or unmarked graves of which surface indicators have been destroyed. These risks can be managed by monitoring the area during construction and the implementation of a chance find procedure as outlined in Section 10.1. The presence of graves should also be confirmed during social consultation for the project.

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12 Appendices:

Appendix A
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
-]'jnanalysis 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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