Nkomati Anthracite Mine

Heritage Impact Assessment for the Nkomati Anthracite Mine, Nkomazi Local Municipality, in the Ehlanzeni District Municipality, Mpumalanga Province

Heritage Impact Assessment

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Declaration of Independence

- I, Jennifer Kitto, declare that –
- General declaration:
- I act as the independent heritage practitioner 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 heritage impact assessments, 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 will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application;
- 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;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct;
- I will perform all other obligations as expected from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

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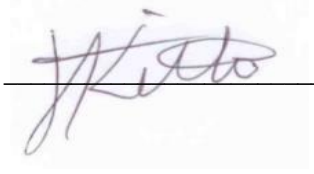
SIGNATURE: 

ACKNOWLEDGEMENT OF RECEIPT

Report Title	***Heritage Impact Assessment for the Nkomati Anthracite Mine, Nkomazi Local Municipality, in the Ehlanzeni District Municipality,*** M***pumalanga Province***		
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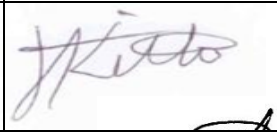
Author	**J Kitto**		**Heritage Specialist – PGS Heritage**
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CLIENT: N'komati Anthracite (Pty) Ltd
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SIGNATURE: 

The heritage statement report has been compiled taking into account the NEMA Appendix 6 requirements for specialist reports as indicated in the table below.

REQUIREMENT	STATUS
1. A specialist report prepared in terms of these Regulations must contain—	
(a) details of—	
(i) the specialist who prepared the report; and	Page iii and Appendix B
(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 1.2 and Appendix B
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page ii
(c) an 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 6
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Sections 4 & 7
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 3
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	No alternatives
(g) an identification of any areas to be avoided, including buffers;	Section 8
(h) a 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 6 and Appendix
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 7
(k) any mitigation measures for inclusion in the EMPr;	Sections 8
(l) any conditions for inclusion in the environmental authorisation;	Sections 8
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Sections 8
(n) a reasoned opinion—	
(i) whether the proposed activity, activities or portions thereof should be authorised;	Section 8
(iA) regarding the acceptability of the proposed activity or activities; and	Section 8
(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 8

REQUIREMENT	STATUS
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Not applicable
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not applicable
(q) any other information requested by the competent authority.	Not applicable
2. Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	-

EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd was appointed by N'komati Anthracite to conduct the Heritage Impact Assessment (HIA) for the proposed Madadeni Opencast Northern Extension at the N'komati Anthracite Mine, located between Komatipoort and Barberton in the Mpumalanga Province.

It should be noted that concurrently with the HIA study for the proposed Northern Extension, an ongoing Stakeholder Engagement process is being undertaken with the local communities (since 2018) for the graves identified in 2011 (Von Vollenhoven and Radford) and 2018 (Von Vollenhoven), as well as for any additional graves as identified by these communities. This is with a view to the potential relocation of graves that would be affected adversely by the proposed Opencast Northern Extension or other mining activities within the N'komati Anthracite Mine property.

The desktop research for this HIA study revealed that the current study area and surrounding region do contain various heritage resources, including archaeological resources (Stone Age and Iron Age), and historical resources such as old structure sand graves.

During the HIA survey, six heritage sites were located within the study area. The sites comprised archaeological resources (one Stone Age site/findspot), three grave or possible grave sites and the foundations of a recent/modern structure. In addition, five sites that had been recorded in a previous HIA study (Van Vollenhoven & Radford 2011) as part of an extensive multi-phase site (Iron Age and Historical to recent) were revisited and confirmed to form part of one large site containing several phases. During the recent field survey some artefacts were identified at this site that are likely to belong to the Later Iron Age and Historical period. This report also contains information on the graves/possible graves identified by the next-of-kin and community members during the ongoing grave relocation process.

Impact assessment of identified sites

Archaeological Resources

The one site/findspot containing LSA lithics is a very low-density scatter. The heritage significance rating of this site is Very Low and the impact assessment of the proposed opencast extension on this site is rated as Low.

Multi-phase site

The multi-phase site (NKM-A-005a to NKM-A-005e) that contains several components of different periods (Site 2 in Van Vollenhoven & Radford 2011) has a heritage significance rating of Medium and the impact assessment of the proposed opencast extension on the site/s is rated as Moderate.

Graves and Burial Grounds

All of the grave sites identified on the property during the previous HIA (2011) and CMP (2018) (Sites 01 (1-1), 02 (3-1), 03 (3-2), 04 (3-3), 05 (4-1), 06 (5-1), 07 (8-1), 08 (10-1), 09 (11-1), 010 (12-1), 011 (13-1), 012 (7)), as well as those identified by the local community during the stakeholder engagement as containing graves (Sites 186 to 227, 266; see **Appendix B**), together with the three possible grave sites (NKM-A 003, NKM-A 004 and NKM-A 006) identified within the study area are rated as having a High heritage significance and the impact assessment of the proposed opencast extension on these sites is rated as Moderate.

Palaeontology

The Palaeontological sensitivity of the geology underlying the study area, which is Undifferentiated Karoo formations, is rated as being Very High. However, the field survey did not identify any visible evidence of fossiliferous outcrops, which indicates that the impact of the proposed opencast extension will be of a Moderate significance in palaeontological terms.

Recent/modern foundations

The foundations of the recent/modern building (depicted as a shop on the 1960 topographical map) are rated as being Medium due to the possibility of the structure being 60 years or older and the possible presence of infant graves (if the structure was used as a house). The impact assessment rating therefore is Moderate.

Recommendations

Based on the Impact Assessment ratings, the following recommendations are made:

Archaeological Resources

Stone Age site/findspot (NKM-A 001)

Since the significance and impact assessment of the one Stone Age site/findspot identified is rated as Low negative, no further mitigation is required. However, all archaeological sites require an application to SAHRA for a destruction permit before destruction, according to SAHRA requirements.

In addition, should any stone artefacts, especially concentrations of stone artefacts, be identified during the course of vegetation clearance and subsequent earth-moving or construction activities, the archaeologist / heritage specialist would need to be contacted to advise on the appropriate mitigation measures to be followed.

Multi-phase site (NKM-A-005a to NKM-A-005e)

This site comprises several multi-phase components (Van Vollenhoven's Site 2) and has a heritage rating of Medium and an Impact rating of Moderate. The following mitigation measures are recommended:

- Vegetation clearing in the areas to be excavated (see below). An archaeologist should be on site at all times during vegetation clearing. Once vegetation is cleared it should be possible to further define areas to be excavated and recorded.
- Van Vollenhoven & Radford (2011) recommended that the site/s be excavated and mapped. This recommendation is supported.

Note: Section 17.6(a) of the Mine Health and Safety Act Regulations[1] requires the employer to ensure that no mining operations are carried out under or within a horizontal distance of 100m from buildings, roads, railways, reserves, boundaries, any structure whatsoever or any surface which it may be necessary to protect. Reduction of this distance can only be approved by the DMR.

Graves and Burial Grounds

The HIA field survey identified three possible graves sites *(NKM-A 003, NKM-A 004 and NKM-A 006)* within the proposed Madadeni Opencast Northern Extension footprint, in addition to the graves identified previously by the HIA study in 2011, the CMP in 2018 (Sites 01 (1-1), 02 (3-1), 03 (3-2), 04 (3-3), 05 (4-1), 06 (5-1), 07 (8-1), 08 (10-1), 09 (11-1), 010 (12-1), 011 (13-1), 012 (7)) and the current grave relocation process. It should be noted that during the current stakeholder engagement process, additional areas have been identified by the local community as containing graves (Sites 186 to 227, 266; see **Appendix B**).

It is anticipated that as the current stakeholder engagement process continues, clarity on the actual number and location of graves and burial grounds will be obtained. The same recommendations will apply to all the graves identified on the Nkomati Anthracite property:

The preferred option is to allow for the *in situ* preservation of these sites. However, should it not be possible to preserve these sites *in situ*, a grave relocation process must be undertaken. Such a grave relocation process must adhere to the following:

- A detailed social consultation process, at least 60 days in length, comprising the attempted identification of the next-of-kin in order to obtain their consent for the relocation;
- Bilingual site and newspaper notices indicating the intent of the relocation;
- Permits from all the relevant and legally required authorities;
- An exhumation process that keeps the dignity of the remains and family intact;

[1] Mine Health and Safety Act Regulations (Government Notice R93 in Government Gazette 17725,15 January 1997

- An exhumation process that safeguards the legal rights of the families as well as that of the mining company; and
- The process must be done by a reputable company well versed in the mitigation of graves.

Note: Section 17.6(a) of the Mine Health and Safety Act Regulations[2] requires the employer to ensure that no mining operations are carried out under or within a horizontal distance of 100m from buildings, roads, railways, reserves, boundaries, any structure whatsoever or any surface which it may be necessary to protect. Reduction of this distance can only be approved by the DMR.

Palaeontology

The PIA study found that the proposed N'komati Anthracite Madedeni Opencast Northern Extension is underlain by sandstones and shales of the undifferentiated Permian-Triassic Karoo Supergroup. According to the PalaeoMap on the SAHRIS database the Palaeontological Sensitivity of the Undifferentiated Karoo is Very High. However, the field survey of the Madedeni Opencast Northern Extension footprint did not identify any visible evidence of fossiliferous outcrops. The scarcity of fossil heritage at the proposed extension footprint indicates that the impact of the anthracite mine extension will be of a moderate significance in palaeontological terms. It is therefore considered that the proposed extension is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area.

Therefore, the following recommendation is made:

1. If fossil remains are discovered during any phase of construction or operation, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments. These discoveries should be protected (if possible, *in situ*) and the ECO must report to SAHRA.

Modern/recent foundations (Site NKM-A 002)

Since this site contains the foundation remains of a recent/modern structure that could be 53-60 years old as it is depicted in the same location as a shop on the 1967 topographical map. This could however not be verified. The heritage significance is rated as being Medium. If the structure was used as a house, there is a possibility of the presence of infant graves. This possibility should be addressed during the stakeholder engagement process and if confirmed will require mitigation measures, including test excavations and a permit.

[2] Mine Health and Safety Act Regulations (Government Notice R93 in Government Gazette 17725,15 January 1997

General

It is the combined considered opinion of the heritage specialists that the overall impact of the proposed Madadeni Opencast Northern Extension on heritage resources is seen as acceptably low and impacts can be mitigated to acceptable levels, provided that all the recommendations for mitigation in this HIA report are implemented.

1. In the event of any unmarked human burials, burial pits, potsherds, lithics or other heritage resources being uncovered during earthworks or construction/mining activities, these must be reported immediately to the South African Heritage Resources Agency (021 462-4502).

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TERMINOLOGY AND ABBREVIATIONS

Archaeological resources

This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Early Stone Age

The archaeology of the Stone Age between 700 000 and 2 500 000 years ago.

Fossil

Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage

That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999).

Heritage resources

This means any place or object of cultural significance and can include (but not limited to) as stated under Section 3 of the NHRA,

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, and
- sites of significance relating to the history of slavery in South Africa;

Holocene

The most recent geological time period which commenced 10 000 years ago.

Late Stone Age

The archaeology of the last 30 000 years associated with fully modern people.

Late Iron Age (Early Farming Communities)

The archaeology of the last 1000 years up to the 1800's, associated with iron-working and farming activities such as herding and agriculture.

Middle Stone Age

The archaeology of the Stone Age between 30 000-300 000 years ago, associated with early modern humans.

Palaeontology

Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Abbreviations/ Acronyms	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
ECO	Environmental Control Officer
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
MHSA Regs	Mine Health and Safety Act Regulations (Government Notice R93 in Government Gazette 17725 dated 15 January 1997.)
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

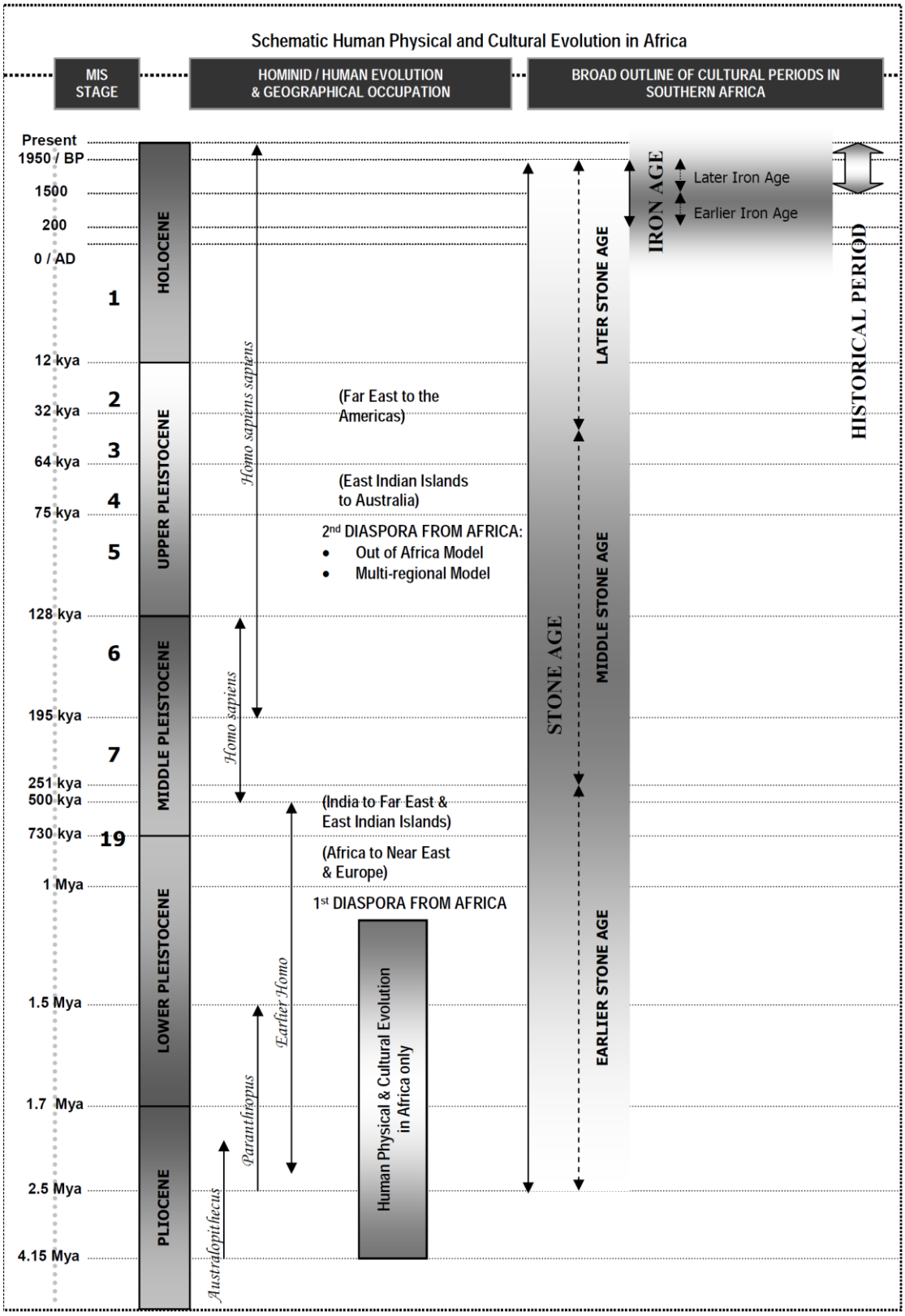

Figure 1 – Human and Cultural Timeline in Africa (Morris, 2008)

1 INTRODUCTION

PGS Heritage (Pty) Ltd was appointed to conduct the Heritage Impact Assessment (HIA) for the proposed Madadeni Opencast Northern Extension at the N'komati Anthracite Mine, located between Komatipoort and Barberton in the Mpumalanga Province.

1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in the footprint of the proposed Madadeni Opencast Northern Extension area. The Heritage Impact Assessment aims to inform the EIA to assist the landowner in managing the discovered heritage resources in a responsible manner, in order to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999) (NHRA).

It should be noted that the findings in this report is the result of the HIA study which utilised both desktop research and a field survey to identify visible heritage resources within the footprint and a grave relocation process that is currently underway (that includes social engagement with the local community), where community members have identified certain areas as containing community graves. The SE process is ongoing, and the areas identified as containing graves should be regarded as tentative.

1.2 Specialist Qualifications

This HIA Report was compiled by PGS Heritage (PGS).

The staff at PGS has a combined experience of nearly 80 years in the heritage consulting industry. PGS and its staff have extensive experience in managing HIA processes. PGS will only undertake heritage assessment work where they have the relevant expertise and experience to undertake that work competently.

Henk Steyn, the Project Coordinator and Co-author is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Principal Investigator.

Jennifer Kitto, the Author, has 22 years' experience in the heritage sector, a large part of which involved working for a government department responsible for administering the National Heritage Resources Act, No 25 of 1999. She is therefore well-versed in the legislative requirements of heritage management. She holds a BA in Archaeology and Social Anthropology and a BA (Hons) in Social Anthropology.

See Appendix A for the curriculums vitae of the specialist team.

1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the existing very dense vegetation in some areas, specifically in the southern parts of the site. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must be contacted immediately. It should also be noted that large areas of the study area has previously been cultivated, restricting the view of the historic and prehistoric surface.

Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. In the event that any graves or burial places are located during the development, the procedures and requirements pertaining to graves and burials will apply as set out below.

1.4 Legislative Context

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

i. National Environmental Management Act (NEMA), Act 107 of 1998
ii. National Heritage Resources Act (NHRA), Act 25 of 1999
iii. Mineral and Petroleum Resources Development Act (MPRDA), Act 28 of 2002

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

i. GNR 982 of 2014, as amended 2017 (Government Gazette 38282) promulgated under the (NEMA):
    a. Basic Assessment Report (BAR) – Regulations 19 and 23
    b. Environmental Scoping Report (ESR) – Regulation 21
    c. Environmental Impacts Report (EIR) – Regulation 23
    d. Environmental Management Programme (EMPr) – Regulations 19 and 23
ii. NHRA:
    a. Protection of Heritage Resources – Sections 34 to 36; and

b. Heritage Resources Management – Section 38

iii. MPRDA Regulations of 2014:
   a. Environmental reports to be compiled for application of mining right – Regulation 48
   b. Contents of scoping report– Regulation 49
   c. Contents of environmental impact assessment report – Regulation 50
   d. Environmental management programme – Regulations 51
   e. Environmental management plan – Regulation 52

iv. The Regulations relating to the Management of Human Remains (GNR 363 of 2013 in Government Gazette 36473) promulgated under the National Health Act (Act No. 61 of 2003)
   a. Exhumation and Reburial of Human Remains - Regulations 26, 27 and 28

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority, and that an HIA will be required if a development triggers any of the development types listed in section 38 of the NHRA. Sections 34-36 further stipulate the protections afforded to structures older than 60 years, archaeological and palaeontological sites and material and meteorites, and graves and burial grounds, as well as the process to be followed if these resources need to be disturbed.

NEMA states that an integrated EMP should, (23 -2 (b)) "…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage". In addition, the NEMA (No 107 of 1998) and the GNR 982 (Government Gazette 38282, 14 December 2014) state that, "the objective of an environmental impact assessment process is to, … identify the location of the development footprint within the preferred site … focussing on the geographical, physical, biological, social, economic, cultural and heritage aspects of the environment" (GNR 982, Appendix 3(2)(c), emphasis added). In accordance with legislative requirements and EIA rating criteria, the regulations of SAHRA and ASAPA have also been incorporated to ensure that a comprehensive legally compatible HIA report is compiled.

2 DETAILS OF THE PROJECT

2.1 Project Locality

The Nkomati Anthracite Mine ("the Mine") is situated in the Kangwane coalfield in the far east of the Mpumalanga province of South Africa, approximately 50km south of Komatipoort and 75km east of Barberton.

The Mine can be accessed via the R571 road which runs south–north through the property and intersects the N4 highway at Komatipoort. The mine is also traversed by a number of secondary and tarred roads that provide reasonable access from Komatipoort and Malelane, with reasonable gravel roads to the mine. A railway line from Swaziland to Komatipoort traverses the mine lease area from south to north, to the east of the current operations.

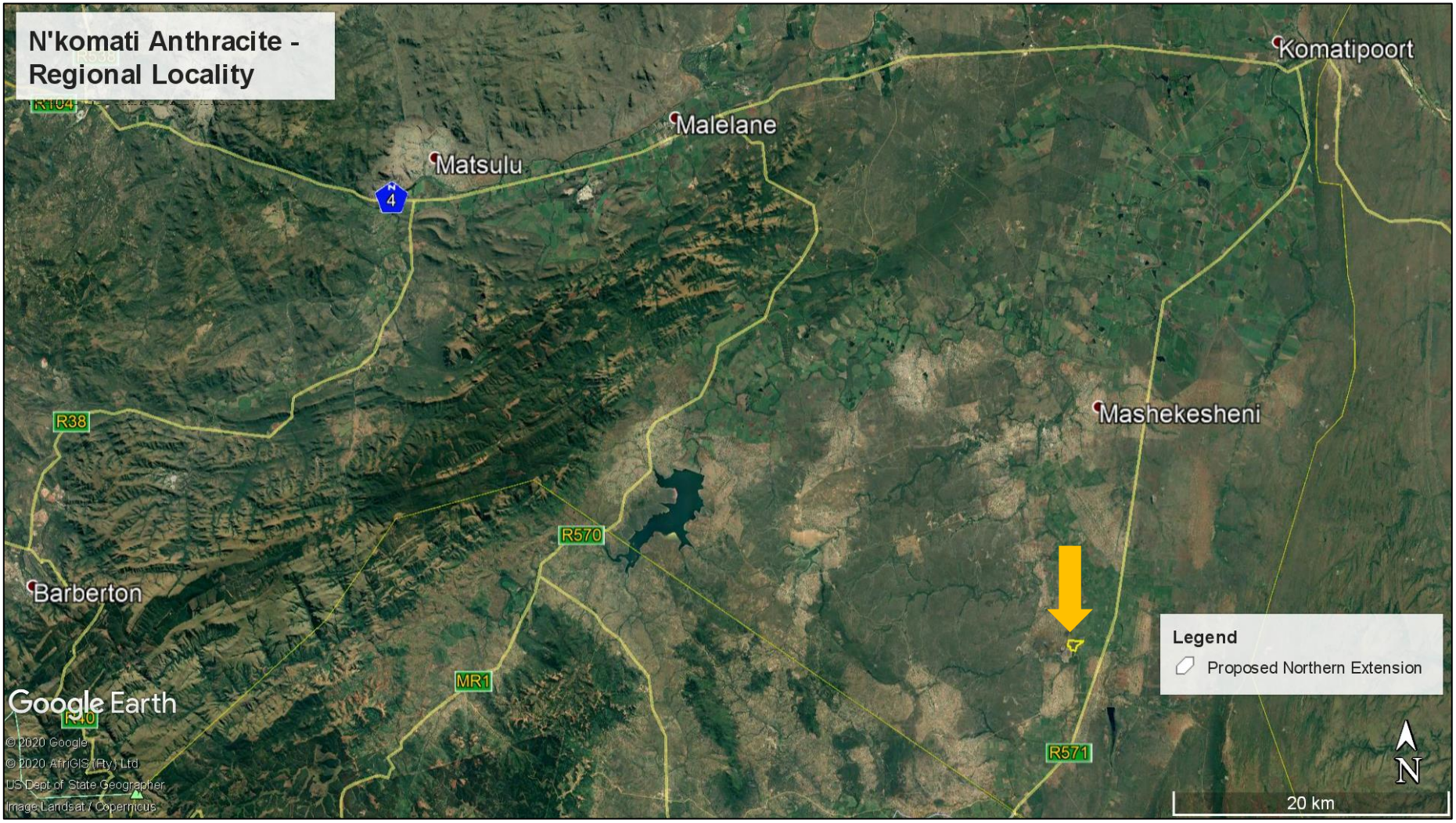

Figure 2 – Regional Locality Map showing the proposed Madadeni Opencast Northern Extension study area (Google Earth image)

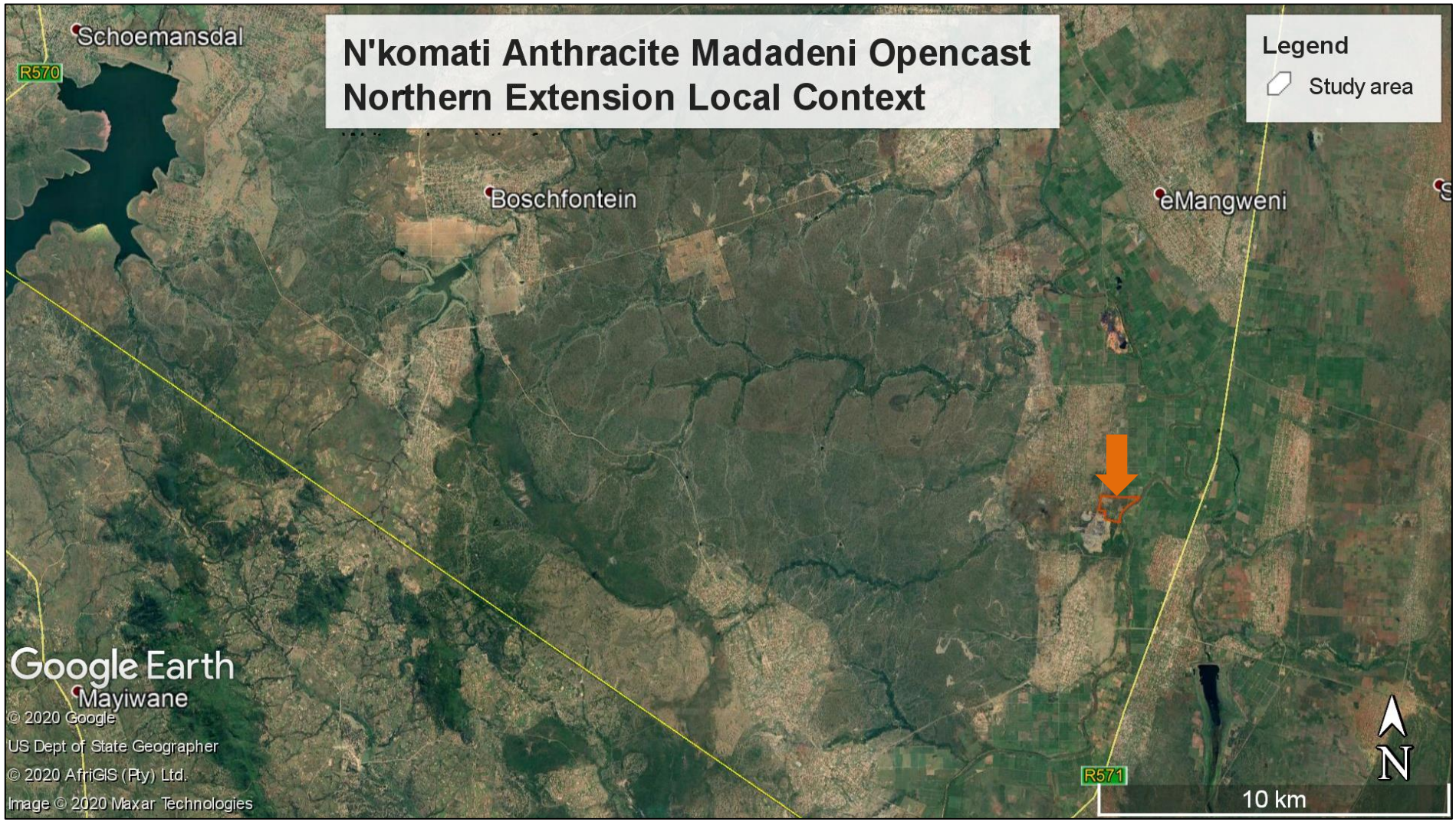

Figure 3 – Google Earth image showing the local context of the proposed Madadeni Opencast Northern Extension study area (orange polygon)

2.2 Project Description

The following project description for the project has been supplied by N'komati Anthracite:

N'komati Anthracite is an existing anthracite mine in the Komatipoort area of the Mpumalanga Province. The Madadeni area of the mine currently abstracts anthracite by means of opencast mining from where the run of mine ore is trucked to the processing plant via a haul road before it is processed and sold.

With the current Madadeni Opencast operation nearing the end of its economic life, N'komati Anthracite have undertaken numerous studies to evaluate the mineable reserves within its mining right that will ensure a sustainable extension of the operation. One such opportunity was identified through the proposed extension of the current Madadeni Operation in a North Easterly direction. This extension will allow N'komati Anthracite access to an additional anthracite reserve that will ensure the operation's life for a period of approximately 5 years from its inception[1].

Opencast mining will be undertaken using the current mining method being applied at Madadeni Opencast, which utilises a truck and shovel operation to expose and extract the underlying reserve. The mine will be implementing concurrent rehabilitation of stockpiles through the strategic placement of overburden as it is removed from the pit. The overburden will be placed around existing stockpiles, battered and shaped to slope the said stockpiles to 1:3 in order to facilitate slope stabilisation and rehabilitation[3]. See **Figure** ***4*****,** below).

The mine site and beneficiation area as well as all mined-out areas are held in terms of a right to occupy (RTO) in respect of 40ha of unsurveyed state land, entered into with the Matsamo Tribal Authority during 1994.The Madadeni opencast area is held in terms of a RTO entered into with the Mawewe Royal Family Trust and the Mawewe Community Trust in May 2010. The Mangweni opencast and underground area, approximately 21ha in extent, is held in terms of an RTO granted by the Legudlane Tribal Authority in 2008.

[3] [1]Information provided by N'komati Anthracite

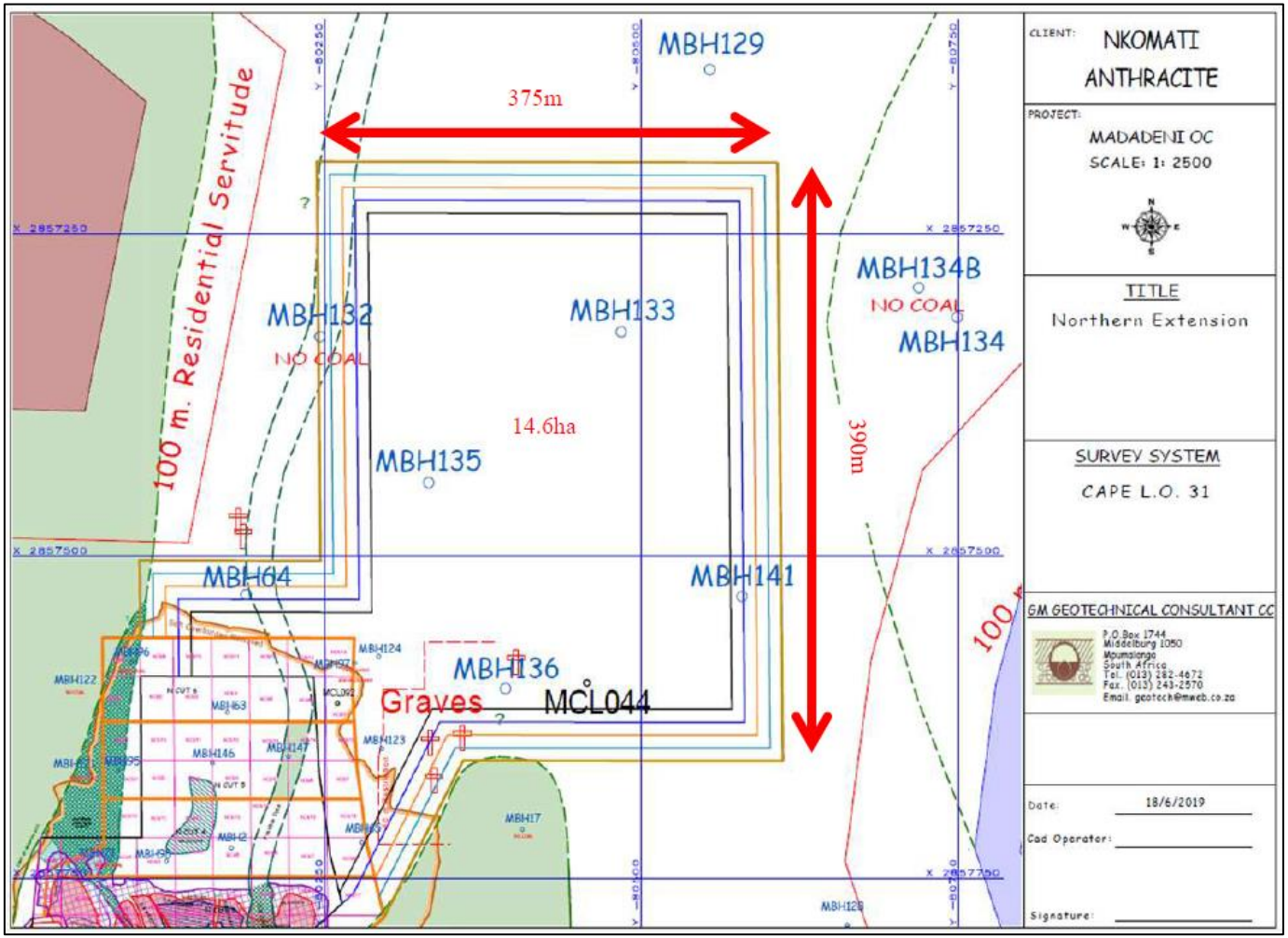

Figure 4: Proposed Madadeni Opencast Northern Extension (provided by N'komati Anthracite)

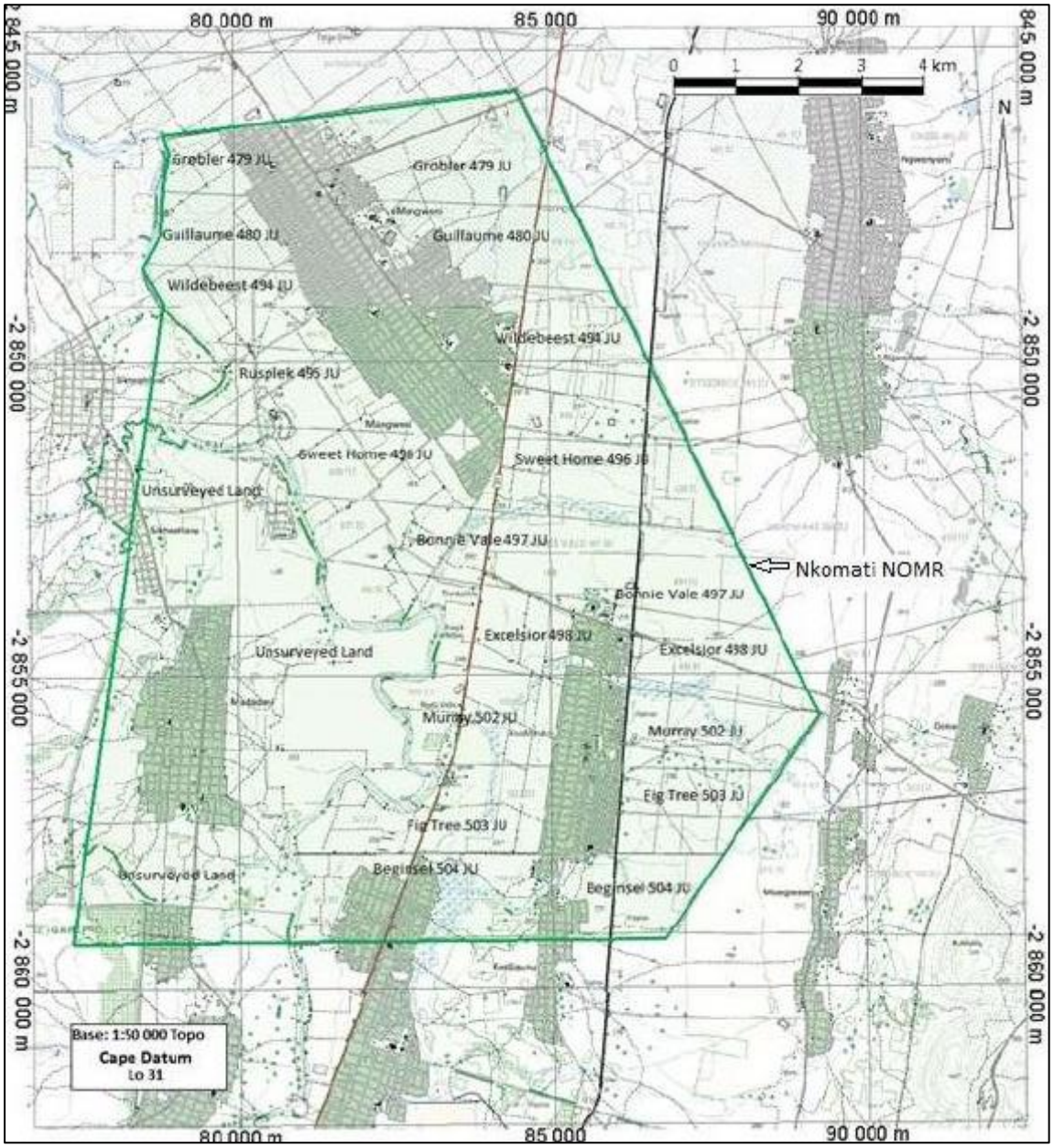

Figure 5 – Diagram showing the N'komati Anthracite New Order Mining Rights area (GM Geotech 2018)

3 ASSESSMENT METHODOLOGY

The section below outlines the assessment methodologies utilised in the study.

3.1 Methodology for Assessing Heritage Site significance

This HIA report was compiled by PGS for the proposed KEP. The applicable maps, tables and figures, are included as stipulated in the NHRA (no 25 of 1999), the NEMA (no 107 of 1998). The HIA process consisted of three steps:

Step I – Literature Review: The background information to the field survey relies greatly on the Heritage Background Research.

Step II – Physical Survey: A combination of drive-through and pedestrian survey was conducted through the proposed project area by a qualified archaeologist (**13 August 2020**), aimed at locating and documenting sites falling within and adjacent to the proposed study area. Note that a separate ongoing stakeholder engagement process has resulted in certain areas within and surrounding the study area being identified by the local community as containing graves.

Step III – The final step involved the recording and documentation of relevant archaeological resources, the assessment of resources in terms of the HIA criteria and report writing, as well as mapping and constructive recommendations.

The significance of heritage sites was based on four main criteria:

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, lithics and enclosures),
- Density of scatter (dispersed scatter)
    - Low - <10/50m2
    - Medium - 10-50/50m2
    - High - >50/50m2
- Uniqueness; and
- Potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

A - No further action necessary;

B - Mapping of the site and controlled sampling required;

C - No-go or relocate development activity position;

D - Preserve site, or extensive data collection and mapping of the site; and

E - Preserve site.

Impacts on these sites by the development will be evaluated as follows:

3.1.1 Site Significance

Site significance classification standards use is based on the heritage classification of s3 in the NHRA and developed for implementation keeping in mind the grading system approved by SAHRA for archaeological impact assessments. The update classification and rating system as developed by Heritage Western Cape (2016) is implemented in this report

Site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 1** and
Table *2*).

Table 1: Rating system for archaeological resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Langebaanweg (West Coast Fossil Park), Cradle of Humankind	May be declared as a National Heritage Site managed by SAHRA. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Highest Significance
II	Heritage resources with special qualities which make them significant, but do not fulfil the criteria for Grade I status. Current examples: Blombos, Paternoster Midden.	May be declared as a Provincial Heritage Site managed by the Provincial Heritage Resources Authority (PHRA). Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	Exceptionally High Significance
III	Heritage resources that contribute to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. Current examples: Varschedrift; Peers Cave; Brobartia Road Midden at Bettys Bay	Resource must be retained. Specific mitigation and scientific investigation can be permitted in certain circumstances with sufficient motivation.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.	Resource must be retained where possible; where not possible, it must be fully investigated and/or mitigated.	Medium Significance
IIIC	Such a resource is of contributing significance.	Resource must be satisfactorily studied before impact. If the recording already done (such as in an HIA or permit application) is not sufficient, further recording or even mitigation may be required.	Low Significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant or the consultant and approved by the authority.	No research potential or other cultural significance

Table 2: Rating system for built environment resources

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
I	Heritage resources with qualities so exceptional that they are of special national significance. Current examples: Robben Island	May be declared as a National Heritage Site managed by SAHRA.	Highest Significance
II	Heritage resources with special qualities which make them significant in the context of a province or region, but do not fulfil the criteria for Grade I status. Current examples: St George's Cathedral, Community House	May be declared as a Provincial Heritage Site managed by the PHRA.	Exceptionally High Significance
II	Such a resource contributes to the environmental quality or cultural significance of a larger area and fulfils one of the criteria set out in section 3(3) of the Act but that does not fulfil the criteria for Grade II status. Grade III sites may be formally protected by placement on the Heritage Register.		
IIIA	Such a resource must be an excellent example of its kind or must be sufficiently rare. These are heritage resources which are significant in the context of an area.	This grading is applied to buildings and sites that have sufficient intrinsic significance to be regarded as local heritage resources; and are significant enough to warrant that any alteration, both internal and external, is regulated. Such buildings and sites may be representative, being excellent examples of their kind, or may be rare. In either case, they should receive maximum protection at local level.	High Significance
IIIB	Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree. These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.	Like Grade IIIA buildings and sites, such buildings and sites may be representative, being excellent examples of their kind, or may be rare, but less so than Grade IIIA examples. They would receive less stringent protection than Grade IIIA buildings and sites at local level.	Medium Significance

Grading	Description of Resource	Examples of Possible Management Strategies	Heritage Significance
IIIC	Such a resource is of contributing significance to the environs These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.	This grading is applied to buildings and/or sites whose significance is contextual, i.e. in large part due to its contribution to the character or significance of the environs. These buildings and sites should, as a consequence, only be regulated if the significance of the environs is sufficient to warrant protective measures, regardless of whether the site falls within a Conservation or Heritage Area. Internal alterations should not necessarily be regulated.	Low Significance
NCW	A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.	No further actions under the NHRA are required. This must be motivated by the applicant and approved by the authority. Section 34 can even be lifted by HWC for structures in this category if they are older than 60 years.	No research potential or other cultural significance

4 CURRENT STATUS QUO

4.1 Site Description

The land within Nkomati's New Order Mining Right (NOMR) is held by the Matsamo, Mawewe and Legudlane tribal authorities. It comprises approximately 30% urban areas, approximately 67% is under agriculture (mostly sugar cane) or stock grazing and approximately 3% is occupied by water courses and wetlands (GM Geotech 2018).

The land to the south of the proposed expansion area is almost completely disturbed by the current Madadeni Opencast mining activities. The Komati River runs along the east boundary of the proposed Northern Extension area. This area contains natural vegetation, mainly acacia shrubs/trees, which is very dense and in large areas impenetrable. Certain areas along the river also have been disturbed by agriculture, mostly sugar cane. The north-west section of the area has been disturbed by old excavations. Large areas of the northern section of the study area have also been used for agriculture in the past (as noted on the topographical maps), which would account for the dense growth of acacia trees and shrubs.

Figure 6 – General view

Figure 7 – General view showing typical dense vegetation cover (acacia trees mostly).

Figure 8 – General view showing an abandoned quarry/excavations on the western side of the study area.

Figure 9 – General view showing typical dense growth of very thorny acacia trees

4.2 Desktop Study Findings

The desktop research focused on available information sources that were used to compile a background history of the study area and surrounds. This data then informed the possible heritage resources to be expected during field surveying.

4.2.1 South African Heritage Resources Information System (SAHRIS)

A scan of the SAHRIS database revealed only a few studies conducted in and around the study area of this report, two of which covered the existing Madadeni Opencast area and a small section of the proposed Northern Extension area (Van Vollenhoven and Radford 2011 and Van Vollenhoven 2018):

- ***Pistorius, JCC. 2008. A Phase 1 Heritage Impact Assessment (HIA) Study for a Proposed New 132kv Powerline running between the Nkomazi Substation and the Proposed New Figtree Substation in the Mpumalanga Province.*** No heritage resources were identified in the study area.

- ***Van Vollenhoven, AC and Radford. July 2011. A Report on a Heritage Impact Assessment for the Nkomati Anthracite Mine in the Magisterial District of Barberton, Mpumalanga Province.*** **For Sentula Mining. Archaetnos cc.** This HIA study covered only the opencast area on State Land at Madadeni. Seven sites of cultural heritage significance were located. Five of these sites were graves (varying from single to two or three together), one was an Iron Age site (possibly Early Iron Age) and one was a possible living heritage site (the Nkosi Dam).

- ***Van Vollenhoven, AC. November 2011. A Report on a Cultural Heritage Baseline Study for the Proposed Kangwane South Anthracite Mine, close to Komatipoort, Mpumalanga Province. Archaetnos cc. For Prime Resources (Pty) Ltd.*** The report was a cultural heritage baseline study for the proposed KaNgwane Anthracite Mine. The development was planned on the farms Naas 472 JU, Ronel 473 JU, Rags 474 JU, Tonga 475 JU, Walda 476 JU, Joyce 477 JU, Monson 478 JU and Wanhoop 485 JU. Three sites of cultural heritage significance were located in the study area. One contained the remains of farm buildings and infrastructure and the other two sites contained prehistoric artifacts, including both Middle and Late Stone Age tools as well as Iron Age pottery.

- ***Van Vollenhoven, AC. 2012. A Report on a Cultural Heritage Impact Assessment for the Proposed Kangwane Anthracite Mine, close to Komatipoort, Mpumalanga Province. Archaetnos cc. For Prime Resources (Pty) Ltd.*** This was a follow-up of a baseline study that was done in November 2011. No additional cultural heritage sites were identified during the follow-up survey.

- ***Celliers, JP. 2013. Phase 1 Archaeological Survey on Portions of the farms Guillaume 480 JU, Steenbok 493 JU and Wanhoop 485 near the town of Komatipoort, Nkomazi District, Mpumalanga Province***. **Kudzala Antiquity CC.** The study area comprised portions of the farms Guillaume 480 JU, Steenbok 493 JU and Wanhoop 485 located near the town of Komatipoort. No sites or features of historical or archaeological significance were located during the survey.

- ***Van Vollenhoven, AC. 2018. A Conservation Management Plan for the Grave Sites at The Nkomati Anthracite Mine in the Magisterial District of Barberton, Mpumalanga Province. Archaetnos cc. For Nkomati Anthracite Mine.*** This document comprises a Conservation Management Plan (CMP) for two areas with graves identified at the Nkomati Anthracite Mine. The mine is operated on State-owned land at Madadeni. All of the graves discussed in detail in this document were identified during an initial Phase I investigation done in July 2011 (Van Vollenhoven & Radford 2011) and updated in December 2018 (Van Vollenhoven 2018). A total of 10 individual graves were counted. Six graves are inside an area which is already fenced . Two graves are just outside of the fenced-in area. One grave was identified very close to the mining activities and reasonably far away from the others. The last site is a possible grave site underneath a mining berm.

4.3 Archaeological and Historical Overview

4.3.1 Stone Age

The South African Stone Age is the longest archaeologically-identified phase identified in human history and lasted for millions of years. Very little is known about the Stone Age archaeology of the study area and its immediate surroundings.

Early Stone Age

The Early Stone Age (ESA) dates to between 2.5 million and 250 000 years ago. It represents the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these technological phases is known as Oldowan, which is associated with crude flakes and hammer stones and dates to approximately two million years ago. The second technological phase in the Early Stone Age of Southern Africa is known as the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial handaxe. The Acheulian phase dates back to approximately 1.5 million years ago.

Price-Williams (1980) notes that handaxes and associated artefacts of the Early Stone Age (ESA) 'Acheulian Complex' (citing Sampson 1974) have been recorded in Swaziland, usually in a loose association with river gravels. In addition, ESA (Acheulian) handaxes and cleavers may have often been found in river valleys such as the Komati, the Mbuluzi and the Mkondvo. The site of Border Cave in Swaziland is noted by Van Vollenhoven and Radford (2011) as an Early and Middle Stone Age site in the vicinity.

Middle Stone Age

The Middle Stone Age (MSA) dates to between 250 000 to 40 000 years BP. MSA dates of around 250 000 BP originate from sites such as Leopards Kopje in Zambia, while the late Pleistocene (125 000 BP) yields a number of important dated sites associated with modern humans (Deacon & Deacon, 1999). The MSA is characterised by flake and blade industries, the first use of grindstones, wood and bone artefacts, personal ornaments, use of red ochre, circular hearths and a hunting and gathering lifestyle. The site of Border Cave referred to above also contains MSA material and Van Vollenhoven and Radford (2011) also refer to the MSA site of Lion Cavern located to the west of the current project.

Later Stone Age

The Later Stone Age (LSA) dates to the period between 40 000 years ago and the historic period. The Later Stone Age is the third phase identified in South Africa's Stone Age history. This phase in human history is associated with an abundance of very small stone artefacts or microliths as well as rock paintings and engravings.

A number of Later Stone Age (LSA) sites, including rock art sites, are known from the general surroundings of the current project area (Berg 1999). For example, an archaeological survey of the Bongani Nature Reserve revealed at least 100 rock art sites, which appear to be associated with granite outcrops and boulders characterising the surrounding landscape. The Bongani Nature Reserve is located roughly 65 km north-west of the present study area. Vollenhoven and Radford (2011) also note that one LSA site was found at Skukuza in the Kruger National Park, called SK4, and three sites are known in the vicinity of Barberton: Bormansdrif, Sweet Home and Kearnsney Estates, as well as two at Siphiso and Caimane in Swaziland. Price-Williams (1980) refers to two sites excavated by Beaumont in north-west Swaziland at Banda Cave and at Castle Quarry as well as other Late Stone Age occurrences in a shelter in the Motshane Valley and at Sibebe north of Mbabane.

It is therefore clear that the study area is located within a landscape where Later Stone Age and rock art sites are often located.

4.3.2 Iron Age

The arrival of early farming communities during the first millennium, heralded in the start of the Iron Age for South Africa. The Iron Age is that period in South Africa's archaeological history associated with pre-colonial farming communities who practiced cultivation and pastoralist farming activities, metal working, cultural customs such as lobola and whose settlement layouts show the tangible representation of the significance of cattle (known as the Central Cattle Pattern) (Huffman, 2007). The wider surrounding region of the study area is known for only two of the three phases identified within the Iron Age of southern Africa, namely the Early Iron Age and Later Iron Age. These will be discussed below.

Early Iron Age

In South Africa, the Early Iron Age (EIA) dates commenced in AD 200 (Huffman, 2007) and represents the first arrival and settlement of farming communities. The Early Iron Age in southern Africa is characterised by a number of attributes. These include semi-permanent settlements (Korsman & Van der Ryst, 1999). The subsistence economy seems to have been represented by agriculture and pastoralism, with hunting and gathering activities still playing an important supportive role (Korsman & Van der Ryst, 1999). A specific ceramic tradition can also be associated with the Early Iron Age (Korsman & Van der Ryst, 1999). Important, as well, is the ability to work with metals, whether it be smelting or smithing (Van der Merwe, 1980; Klapwijk & Huffman, 1996; Korsman & Van der Ryst, 1999). The mining of metal-bearing ore also took place during this period (Korsman & Van der Ryst, 1999).

In his comprehensive book on the Iron Age of South Africa, Professor Tom Huffman suggests that the study area is located within the known distribution area of only one Early Iron Age facies, namely

the Mzonjani facies of the Kwale Branch of the Urewe Tradition which is dated to between AD 450 and AD 750 (Huffman, 2007).

No Early Iron Age sites are known from within the current project area. The nearest sites within South Africa are located in Nelspruit (Evers, 1977; Huffman, 2007). According to Esterhuyzen & Smith (2007), there is evidence suggesting that the Early Iron Age continued in the Lowveld regions of Mpumalanga until the fifteenth century, however, on the escarpment and highveld it ended around AD 1100 (Esterhuyzen & Smith, 2007.). Price-Williams (1980) notes that a few possible Early Iron Age sites are located in Swaziland, one being the Castle Cavern excavation by Beaumont in the 1960's of debris which was dated to about A.D. 400, as well as a site at Mashila in the Mkondvo Valley in central Swaziland.

Late Iron Age

The Late Iron Age (LIA) commenced in AD 1300 and represents a phase in the Iron Age history of southern Africa that is closely associated with stonewalled settlements. Archaeologists used the onset of the Historic Period as the termination of the Late Iron Age. As a result, the LIA is often dated up to c. 1840.

Pelser (2018) notes Tom Huffman's maps (2007) show that EIA, MIA and LIA sites, features or material could be found in the area. This could possibly include the Silver Leaves facies of the Urewe Tradition dating to AD280-450, the Mzonjani facies of the same tradition (between AD450 and AD750 and possibly the Maguga facies of the Kalundu Tradition (dating to between AD1200 and AD1450).

More information is known about the latter stages of the LIA. For example, Bergh (1999) indicates that essentially two "Black "communities were resident in the wider vicinity of present-day Mbombela and the study area during the beginning of the 19th century. These groups comprised the Eastern Sotho (Pai and Pulana) as well as the Swazi. While the Pai and Pulana are shown to the north of the Crocodile River and Mbombela, the Swazi group is shown southeast of the study area. Birkholtz and Naude (2017) cite Myburgh's (1949) statement that all available oral traditions indicate that at one point the Crocodile River valley was occupied by Sotho-speakers including the Pai (Mbayi).

Vollenhoven 2011 notes that although no LIA sites are known from the immediate region of the current project area, it is known that during the Iron Age, iron was worked quite close and to the north-west of the surveyed area (citing Bergh 1999). There are also several known Iron Age sites in the south of the Kruger National Park (Van Vollenhoven 2011). Price-Williams (1980) noted that there is a Late Iron Age fortress at Balekane where the granite forms a series of steep-sided hills along the north side of the Komati Valley. On one of these hills the rock surface of the summit has been fortified with stone walls and that other sites of similar type are known to exist in the area.

4.3.3 Historical Period

The early Historical Period within the study area and surroundings was characterised by the first arrival of European people to this area. The first arrivals would almost certainly have been travellers, traders, missionaries, hunters and fortune seekers. However, with time, this initial trickle was replaced by a flood of white immigrants during the 1830s, when a mass migration of roughly 2 540 Afrikaner families (comprising approximately 12 000 individuals) from the frontier zone of the Cape Colony to the interior of Southern Africa took place. The people who took part in this Great Trek were later to be known as Voortrekkers (Visagie, 2011).

Van Vollenhoven notes that three of the early trade routes passed reasonably close to the general area. One went through Sabie Poort and one through the Komati Poort, both located to the north-east of the current project area. The third route ran to the south of the project area from Maputo to Barberton, through Swaziland (Bergh 1999). Van Vollenhoven (2011) also notes that at the beginning of the 19th century, the area to the north of current day Swaziland was inhabited by the Swazi. During the Difaquane (1823-1837) the Swazi moved further inland as a result of land becoming available (Bergh 1999).

The Great Trek

During 1836, the first Voortrekkers crossed over the Vaal River and established themselves in a largely central area north of the river, where in 1839 the town of Potchefstroom was established. During the winter of 1844, Voortrekker leader Andries Hendrik Potgieter travelled to Lourenço Marques to engage the Portuguese governor on possible Voortrekker settlement in present day Mpumalanga. An agreement was reached between the two parties, which stated that the Voortrekkers could establish themselves four days' travel from the east coast in an area between south latitudes 10° and 26°. Potgieter led his followers from the surroundings of Potchefstroom to this new area and established the first Voortrekker settlement in the eastern parts of the country at Andries-Ohrigstad on 30 July 1845 (Bergh, 1999).

Although some Voortrekker farms were established as far south as the Crocodile River, it is clear that the early Voortrekker settlements were established some distance away from the present project area. For example, the town of Andries-Ohrigstad was located approximately 170km to the north-west. However, the arrival of white farmers in the wider region brought them in direct contact, and conflict, with the Swazi further to the south-east. Over the ensuing decades a number of treaties were signed between the Voortrekkers and Swazi to define a boundary between the two nations, often with great detriment to the Swazi. The first of these was signed in July 1846, and designated the Crocodile River as the boundary between the two nations (Birkholtz and Naude 2017).

Expansion of the Swazi State

The Swazi expansion into the districts of Carolina and Barberton took place during the successive reigns of Swazi kings Sobhuza I (Somhlolo) (ca 1815 - 1839) and Mswati II (ca 1840 – 1868). During the early 1830s, Sobhuza had established a royal village at Ezulwini from where he

extended his sphere of influence to the Komati River in the north and the Dlomodlomo Mountains (north of Badplaas) in the west. When Mswati II succeeded to the Swazi throne, he continued with the expansionist programme of his father (Sobhuza I) into areas presently falling within the Carolina and Barberton districts. He encountered and defeated various Sotho groups. Mswati II eventually also managed to defeat the Pedi of Sekwati who were then forced to accept the Swazi king's authority. As a way of ensuring that they remained subjugated, and to provide protection against attack, Mswati II established three large military posts along the Little Crocodile River. These settlements were named Mekemeke, Mjindini and Mbhuleni and the king placed one of his wives (*inkhosikati*) as well as a *ndvuna* (governor) in each. Mekemeke was located between present-day Barberton and Komatipoort above the village of Louw's Creek, and Mswati II installed his *inkhosikati* Lanyandza as chieftainnes of the military post, with the first *indvuna* appointed at Mekemeke named Mhlahlo Vilakati. Vilakati was later replaced by Luhosho Ginindza (Matsebula, 1988). Birkholtz and Naude (2017) note that Myburgh (1956) agrees that all three military outposts outlined before existed, his research has shown that the Mbhuleni settlement was established shortly after the death of Sobhuza I in 1839 while the other two settlements were only established approximately 25 years later in c. 1864 (Birkholtz and Naude 2017).

The Expulsion of the Eastern Sotho

Birkholtz and Naude 2017 note that according to Makhura (2007), the so-called Eastern Sotho (including the Pai, Pulana and Kutswe) expanded from the 17th century onwards into large areas of western and northern Swaziland, as well as into the districts of Carolina, Barberton and Waterval Boven.

These three Sotho groups will be discussed briefly below.

- One oral history suggests that the Pai originated from what is presently known as Lesotho. From here, in or during the 17th century, they skirted around Swaziland and appear to have established themselves somewhere within modern Swaziland on a hill known as Mbayi. During the late 18th and early 19th centuries, the Pai were forced northward by the expansion of the Swazi state.
- The Pulana group appears to have originated from the Caledon River area, and moved into the wider surroundings at the same time as the Pai. The stone settlements of the Pulana in the present-day Carolina and Barberton districts were called Shakwaneng (near the present day towns of Waterval Boven and Badplaas) and Motšhiteng respectively.
- The Kutswe originated from the Kwena near modern Thaba 'Nchu during the late 16th and early 17th centuries. They travelled for some distance in a north-easterly direction and settled in what is today known as northern Swaziland. Here they came in contact with the Pai. The northward expansion of the Swazi state during the 19th century also pushed the Kutswe further north. They are known to have settled in the area between modern Mbombela and White River, with the river valley of the Kutswe (Gutshwa), a tributary of the Nsikazi River, a known settlement area during this time (Makhura, 2007). The closest point along this river to the present study area, is located 57.55 km to the north-west.

The continued northward expansion of the Swazi state under Mswati II into the areas occupied by the Pai, Pulana and Kutswe, led to conflict and had a very detrimental effect on the Eastern Sotho groups. The internal fragmentations of especially the Pai and Pulana further led to their deterioration. The Eastern Sotho groups also fought back against the Swazi onslaught, with the most noteworthy of these Sotho successes against the Swazi at the hills known as Three Sisters near Louw's Creek (Myburgh, 1949). Remembered as one of the last strongholds of the Pai, these hills saw a significant battle in c. 1860, during which the Pai defenders under Lesisi "…*rained down rocks and spears on their Swazi enemies*…" (Makhura, 2007:118). The battle resulted in a rare, though certainly not lasting, defeat for the Swazi, who returned later and destroyed the settlement (Makhura, 2007). The farm Three Sisters is located roughly 51 km north-west of the present study area (Birkholtz and Naude 2017).

Myburgh notes that the group known as the Mahlalela of Gija occupied the area in the vicinity of Figtree (the area approximately 5km north-east of the study area across the Nkomati River). He refers to three indvunas who were responsible for three different areas in this region: the crown land south of Figtree, the western part of the Trust land south of Figtree and the southern part of the Trust land South of Figtree (Myburgh 1949: 102).

The NZASM Eastern Line

In 1875, after the discovery of gold at Pilgrim's Rest and Barberton, President Burgers had appointed AH Nellmapius to construct a road between the goldfields and Lourenco Marques. President Burgers also attempted to develop a railway line between Lydenburg and Lourenco Marques but this was prevented due to lack of funds, a war with Sekhukhune and the annexation of the Transvaal by the British in 1877. After the First War of Independence in 1881 and the election of Paul Kruger in 1883, the railway line to Delagoa Bay gained prominence again (Pienaar et al 2012) . An important development toward the construction of the railway line was the establishment on 21 June 1887 of the *Nederlandsche Zuid-Afrikaansche Spoorweg Maatschappij* (NZASM.) (Birkholtz and Naude 2017). The establishment of the NZASM began the process of construction and commissioning of the Oosterlijn (Eastern Line) from Pretoria, through Middelburg, Waterval Boven, Waterval Onder, Nelspruit, Komatipoort and on to Lorenço Marques (now Maputo) harbour (Clarke, Fisher and Simelane 2016).

The survey work for the railway line began in 1888 and construction of the line between the Portuguese border and Crocodile Poort was completed in April 1894 (Birkholtz and Naude 2017; Clarke, Fisher and Simelane 2016). The official opening of the Eastern Line took place a few years later in July 1895. At its completion, the railway line had 24 railway stations. The closest station to the study area at the time was Komatipoort to the north (Birkholtz and Naude 2017).

Barberton

This town was founded by Mining Commissioner D.M. Wilson in 1884, after the discovery of a rich gold-bearing reef there in 1884 by Graham Hoare Barber (Myburgh 1949). According to Raper et al (2014) the town was named after Barber. It was administered by a Health Committee from 1902 and became a municipality in 1904 (Raper et al, 2014).
No battles or skirmishes are known from the general area around Barberton. A Boer concentration camp was established at Barberton during the Second South African War (Bergh 1999). It is unknown if there was also a camp for 'black' African refugees, as not enough research has been undertaken on the so-called 'black' concentration camps.

Komatipoort
This is the nearest town to the study area and according to Raper et al (2014) is named after the gorge (Afrikaans *poort*) 200 m deep which the Komati River has cut through the Lebombo Mountains. The word Komati is of Swazi origin and means 'river of cows', i.e. hippopotami. Another explanation, based on topographical proximity, is that Komati means 'elands river'. Several farms named after the eland contain tributaries of the Komati river (Raper et al 2014). When the railway line reached the Komati poort in 1891, a construction camp developed which later became the town of Komatipoort (Pienaar et al 2012). During the South African War, after the Boers had been defeated at the battle of Bergendal (Dalmanutha, 20–27 August 1900), they retreated to Komatipoort where approximately 1 000 Boers entered Portuguese territory, and were subsequently interned there (Wessels 2011). The town of Komatipoort was Initially incorporated in the Lydenburg District. Later, both Komatipoort and Barberton were located in the Barberton District, which was created in 1902 (Bergh 1999). The main road from Johannesburg to Komatipoort was opened in 1927 (Curror 2002).

4.4 Historical Topographic Maps

Topographic maps (1:50 000) for various years (1967 to 2010) were assessed to observe the development of the area, as well as the location of possible historical sites and burial grounds. The maps were also used to assess the possible age of structures located, to determine whether they could be considered as heritage sites. Structures and features that could possibly be older than 60 years or 100 years are protected under Section 34 and 35 of the NHRA. Map overlays were created showing the possible heritage sites identified within the study area, as can be seen below (**Figure 10** to **Figure 13**).

The following historical topographic maps were available for utilisation in the study:

- Topographical map 2531DD Figtree 1967 First Edition sheet. The map was compiled from aerial photography undertaken in 1963, surveyed in 1967 and drawn in 1968 by the Trigonometrical Survey Office. It was printed and published by the Government Printer in 1968.

- Topographical map 2531DD Figtree 1985 Second Edition sheet. This map was published by the Chief Directorate Surveys and Mapping and printed by the Government Printer in 1989.
- Topographical map 2531DD Figtree 2003 Third Edition sheet. Published and printed by the Chief Directorate Surveys and Mapping in 2008.
- Topographical map 2531DD Masibekela 2010 Fourth Edition sheet. Published and printed by the Chief Directorate: National Geo-spatial Information in 2014.

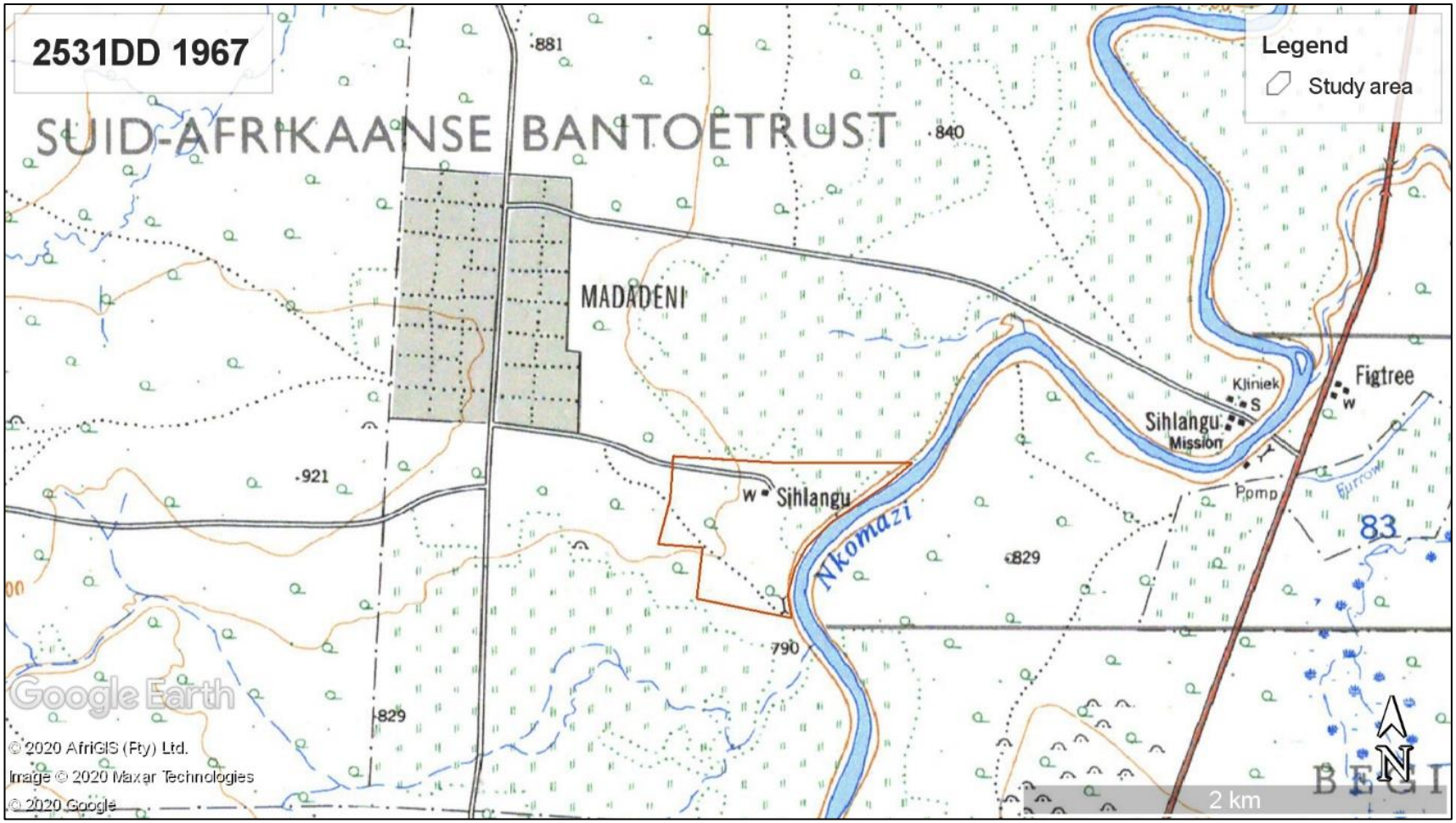

Figure 10 – Enlarged section of Ed 1 1967 sheet, depicting one structure within the study area (orange polygon). This structure is labelled W = winkel, as well as Sihlangu which is the name of the mission depicted a distance to the north-east of the study area. The remains of a structure (Site NKM-A 002) were identified in the same location during the fieldwork. The name "Sihlangu" also appears on one of the graves documented by van Vollenhoven and noted during the 2019/2020 social consultation.

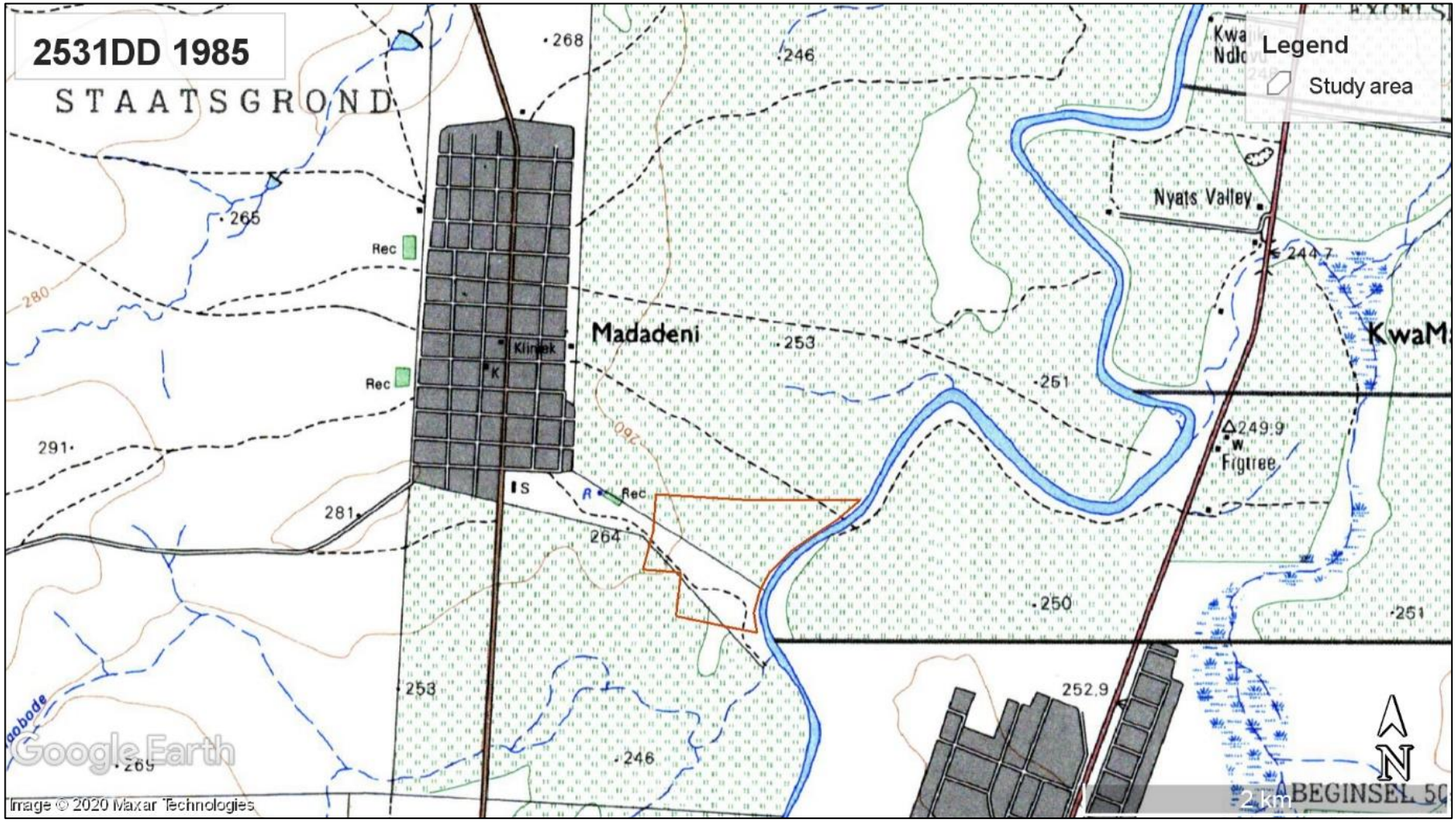

Figure 11 – Enlarged section of 2531DD Ed 2 1985 sheet, depicting no structures or heritage features in the study area. Note that the majority of the land in the study area has been used for agriculture.

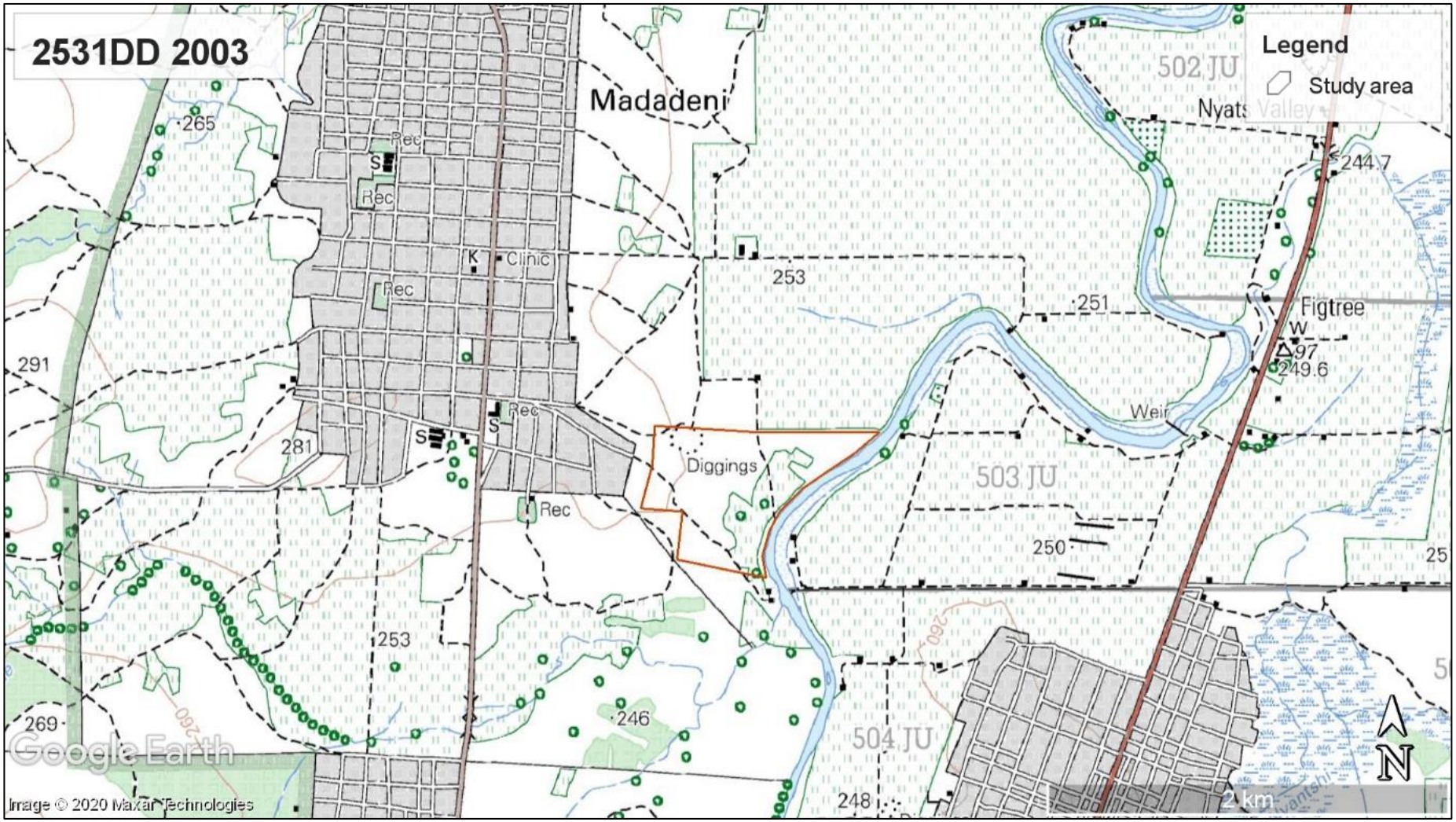

Figure 12 - Enlarged section of 2531DD Ed 3 2002 sheet, with the study area shown in orange. An area labelled 'diggings' is depicted inside the study area.

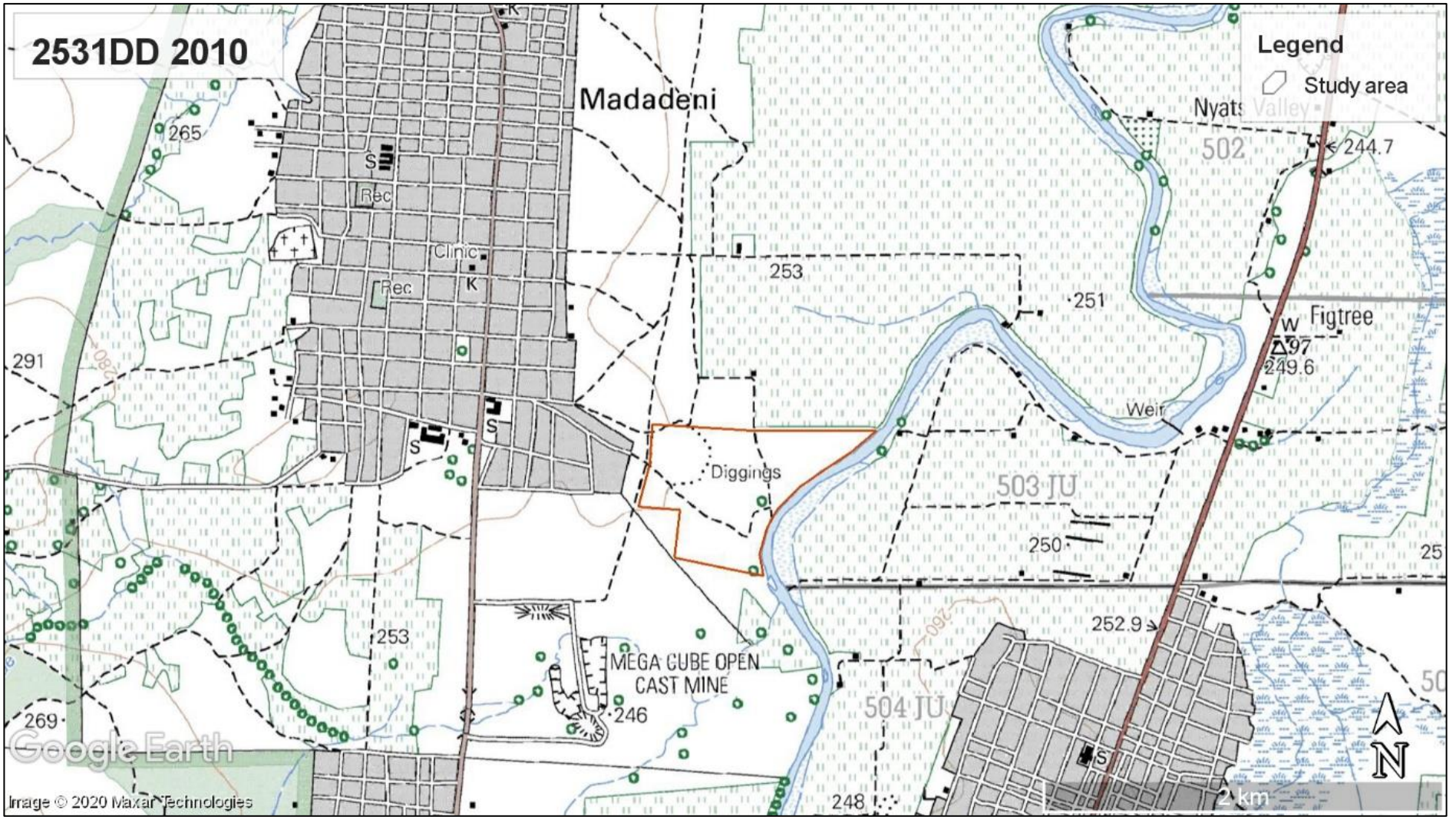

Figure 13 - Enlarged section of 2531DD Ed 4 2010 sheet, with the study area shown in orange. The area labelled 'diggings' is depicted as larger

4.5 Aspects of the area's history as revealed by the desktop study

Three of the previous heritage studies were conducted very close to the current study area and these identified several grave sites (van Vollenhoven and Radford 2011, Van Vollenhoven 2011, and 2018), a few Middle and Late Stone Age artefacts and the remains of a historical farmstead (van Vollenhoven 2011) and a dam identified as a possible living heritage site, as well as an Iron Age stone-walling site (van Vollenhoven and Radford 2011). The other two studies in the surrounding region did not record any heritage sites (Pistorius 2008 and Celliers 2013).

Only one structure labelled as W (winkel) is depicted on the 1967 topographic sheet in the location of the study area, this is also labelled with the name Sihlangu. Myburgh (1949) refers to a mission station of the Swedish Holiness Zulu Mission which was located at eSihlangu on the bank of the iNkomati opposite Figtree 444. He states that missionary work was started in the area in 1919. A mission station labelled Sihlangu is depicted a short distance to the north-east on the east bank of the Komati River. It is possible that the structure was associated with the mission station. It should be noted that the foundation remains of a structure were identified at the same location as the shop structure found during the fieldwork. An area labelled "diggings" is depicted in the north-west section of the study area on the two latest sheets (2003 and 2010). Also, of importance is the fact that the name "Sihlangu" appears on one of the graves identified by van Vollenhoven and during the social consultation for the grave relocation process. The grave belongs to the Masilela family and they view it to be of great importance to the family.

5 PALAEONTOLOGY

PGS Heritage appointed Banzai Environmental to undertake the Phase 1 Palaeontological Impact Assessment (PIA) for the proposed Madadeni Opencast Northern Extension. The findings of the PIA (Butler 2020) were the following:

The N'komati Anthracite Mine proposed Madadeni Opencast Northern Extension in Mpumalanga is situated in the Kangwane Coalfield. This Coalfield is approximately 210,000 ha in extent and extends from near Komatipoort in the north, to the Mananga Border Post (eSwatini border) in the south (Butler 2020).

The geology of the proposed N'komati Anthracite Madedeni Opencast Extension is underlain by sandstones and shales of the undifferentiated Permian-Triassic Karoo Supergroup (**Figure 14**).

According to the SAHRIS Palaeo Sensitivity map (**Figure 15**) the Palaeontological Sensitivity of the Undifferentiated Karoo is Very High and there is a high chance of finding fossils in this area (the red colour indicates Very High palaeontological sensitivity).

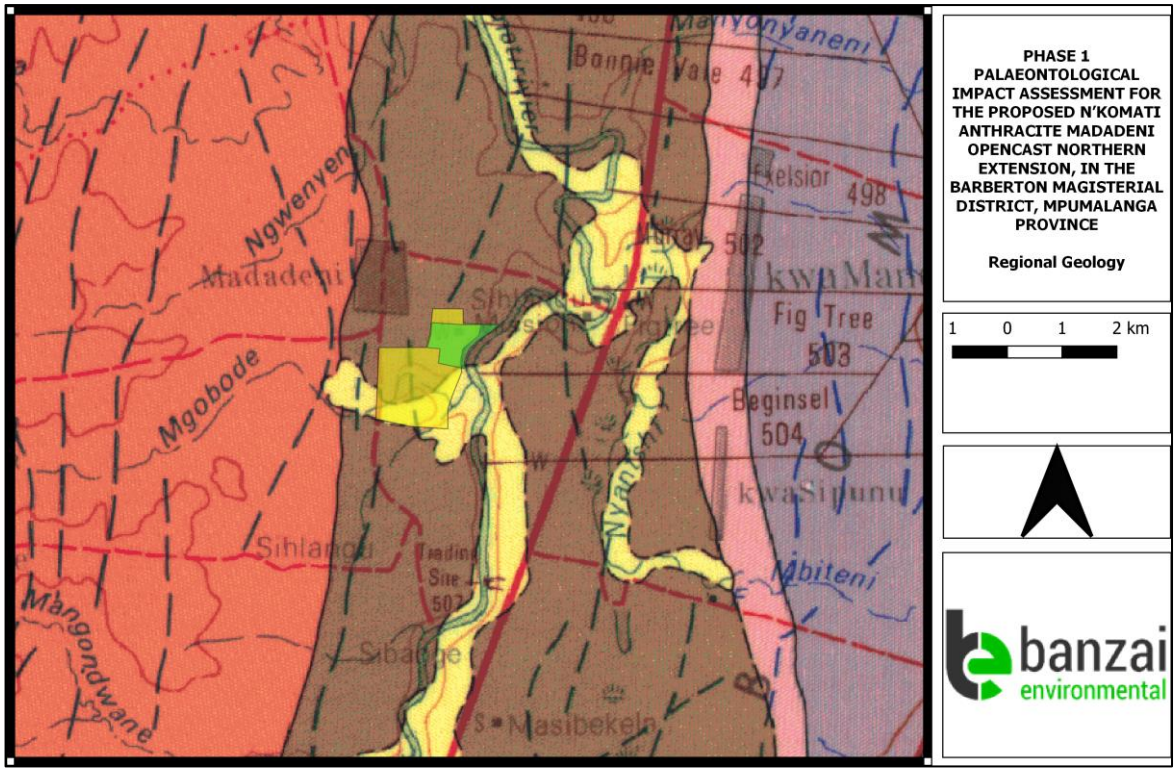

Figure 14: Extract of the 2530 Barberton Map (Council of Geoscience) indicating the surface geology of the N'komati Opencast Northern Extension area, in the Barberton Magisterial District, Mpumalanga Province. The proposed development is underlain by sandstones and shales of the undifferentiated Permian-Triassic Karoo Supergroup).

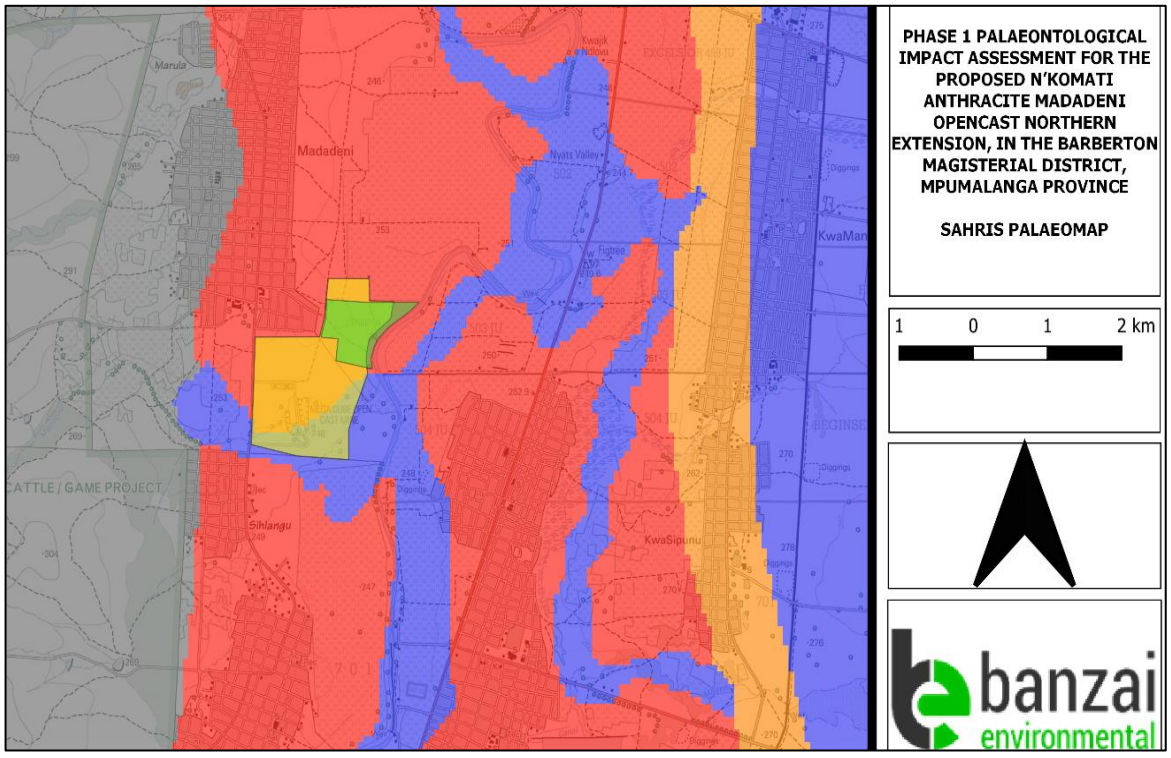

Figure 15: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the proposed development in green.

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 16 - SAHRIS Palaeosensitivity ratings table

Therefore, a one-day site specific field survey of the N'komati Anthracite Madadeni Opencast Northern Extension footprint was conducted on foot and by motor vehicle on 29 August 2020. No visible evidence of fossiliferous outcrops was identified during the survey. The scarcity of fossil heritage at the proposed extension footprint indicates that the impact of the anthracite mine extension will be of a moderate significance in palaeontological terms. It is therefore considered that the proposed extension is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area.

However, if fossil remains are discovered during any phase of construction or operation, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the ECO in charge of these developments.

6 FIELDWORK FINDINGS

A field visit was conducted on 13 August 2020 by an archaeologist from PGS. Six heritage resource sites were recorded in total, one of which had been recorded by Van Vollenhoven and Radford in 2011. The five newly recorded sites included one Stone Age site/findspot (NKM-A 001), three grave or possible grave sites (NKM-A 003, NKM-A 004 and NKM-A 006) and the foundations of a recent/modern structure (NKM-A 002). The archaeologist also revisited and identified five sites that had been recorded in the HIA study undertaken in 2011 by Van Vollenhoven and Radford as part of an extensive multi-phase site containing Iron Age and historical components (NKM-A 005a – NKM-A 005e). See **Figure 17** and **Figure 19** for the fieldwork tracklog and the identified heritage sites map of the proposed Northern Extension area.

Note: It should be noted that several sections of the study area were not surveyed: the north-west section of the study area contains an abandoned quarry and two areas in the south were not accessible due to extremely dense acacia bush vegetation (**Figure 18**).

Note: The graves identified previously by Van Vollenhoven and Radford (2011) and Van Vollenhoven (2018), as well as the grave sites identified during the ongoing stakeholder engagement process, have been included below the site description table.

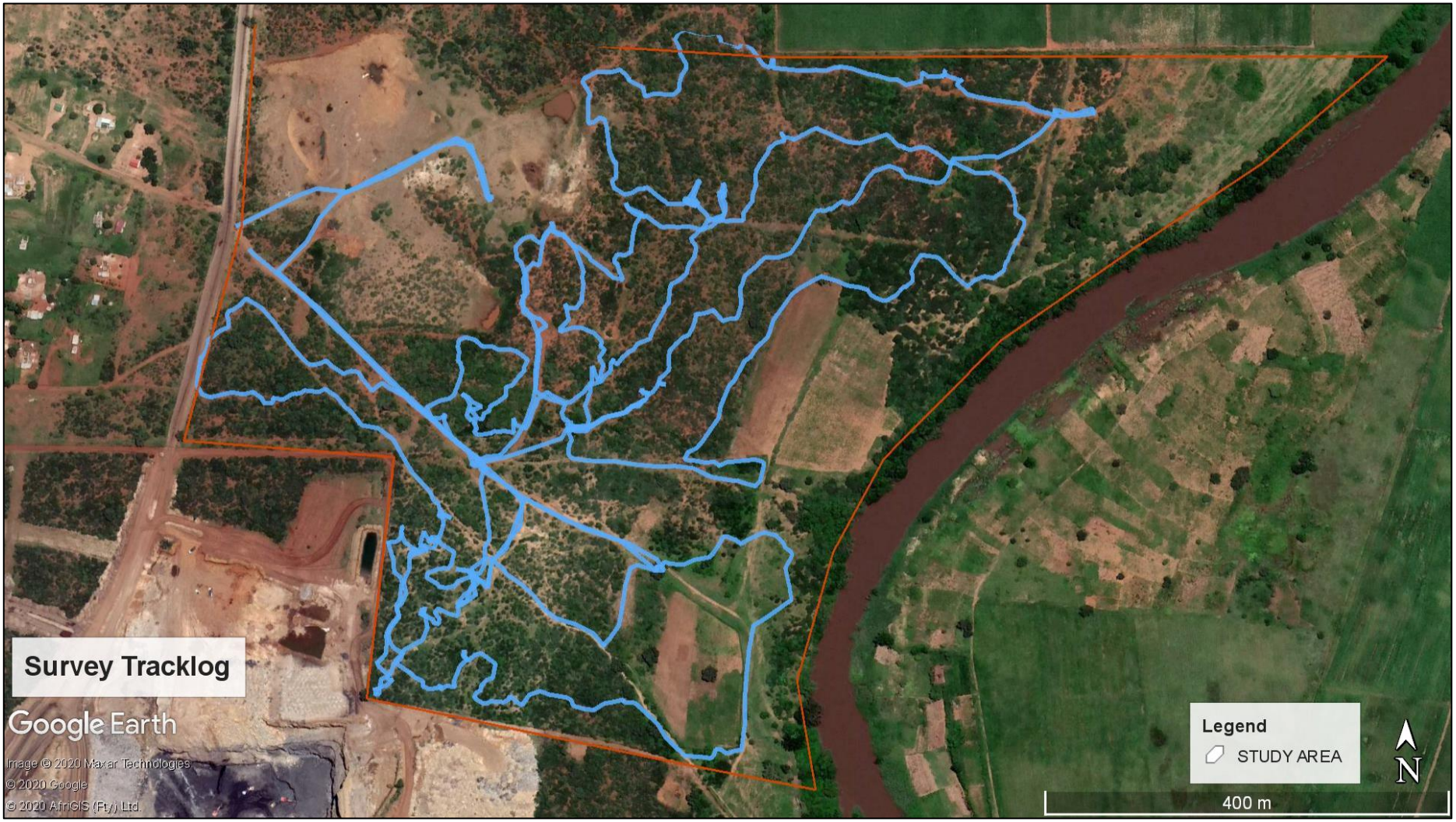

Figure 17 – Satellite Image showing the tracklog (blue line) of the field survey undertaken on 13 August 2020

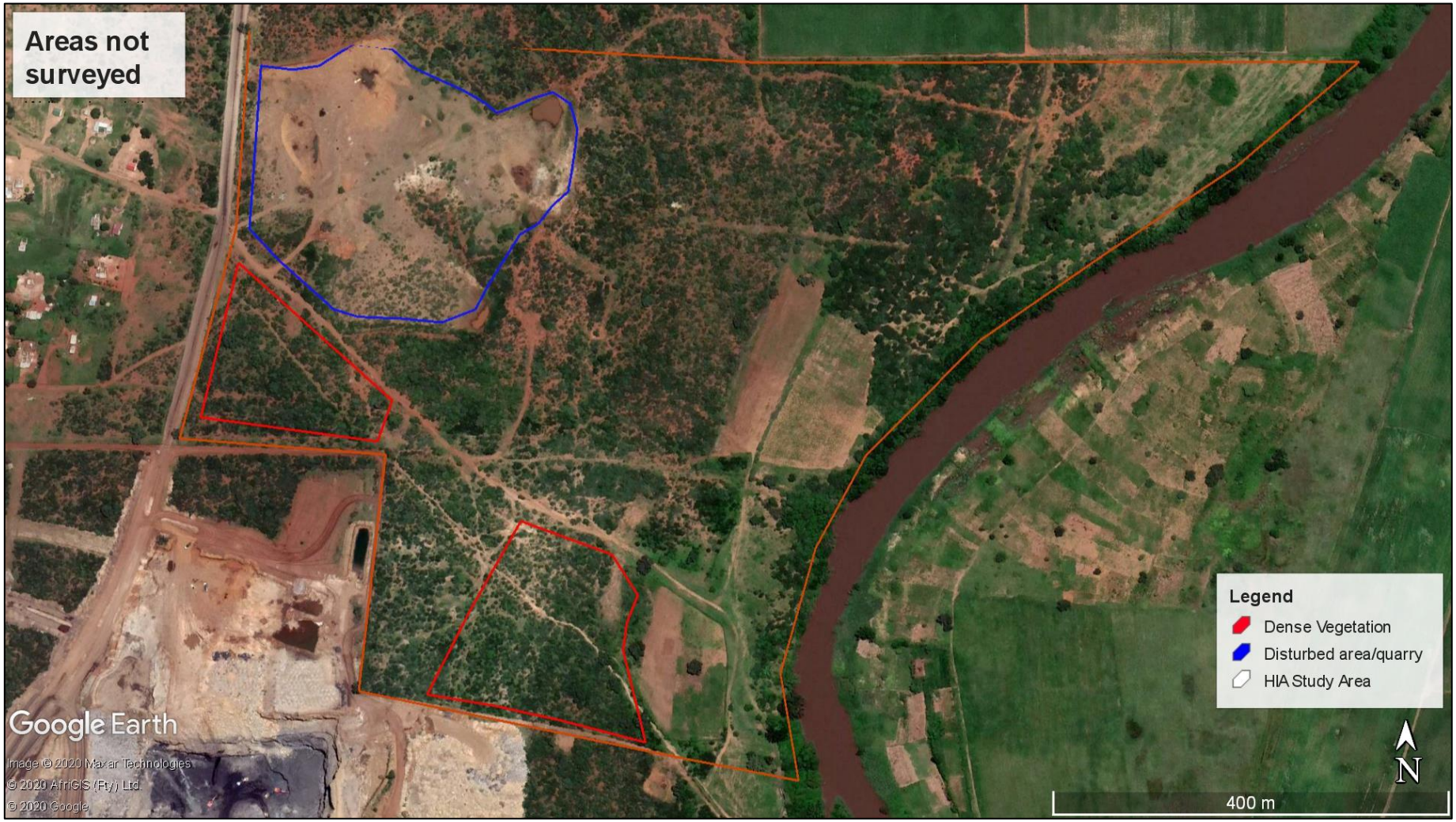

Figure 18 – Satellite image showing areas that were not surveyed due to being previously disturbed (quarry – blue polygon) or containing dense vegetation (red polygons)

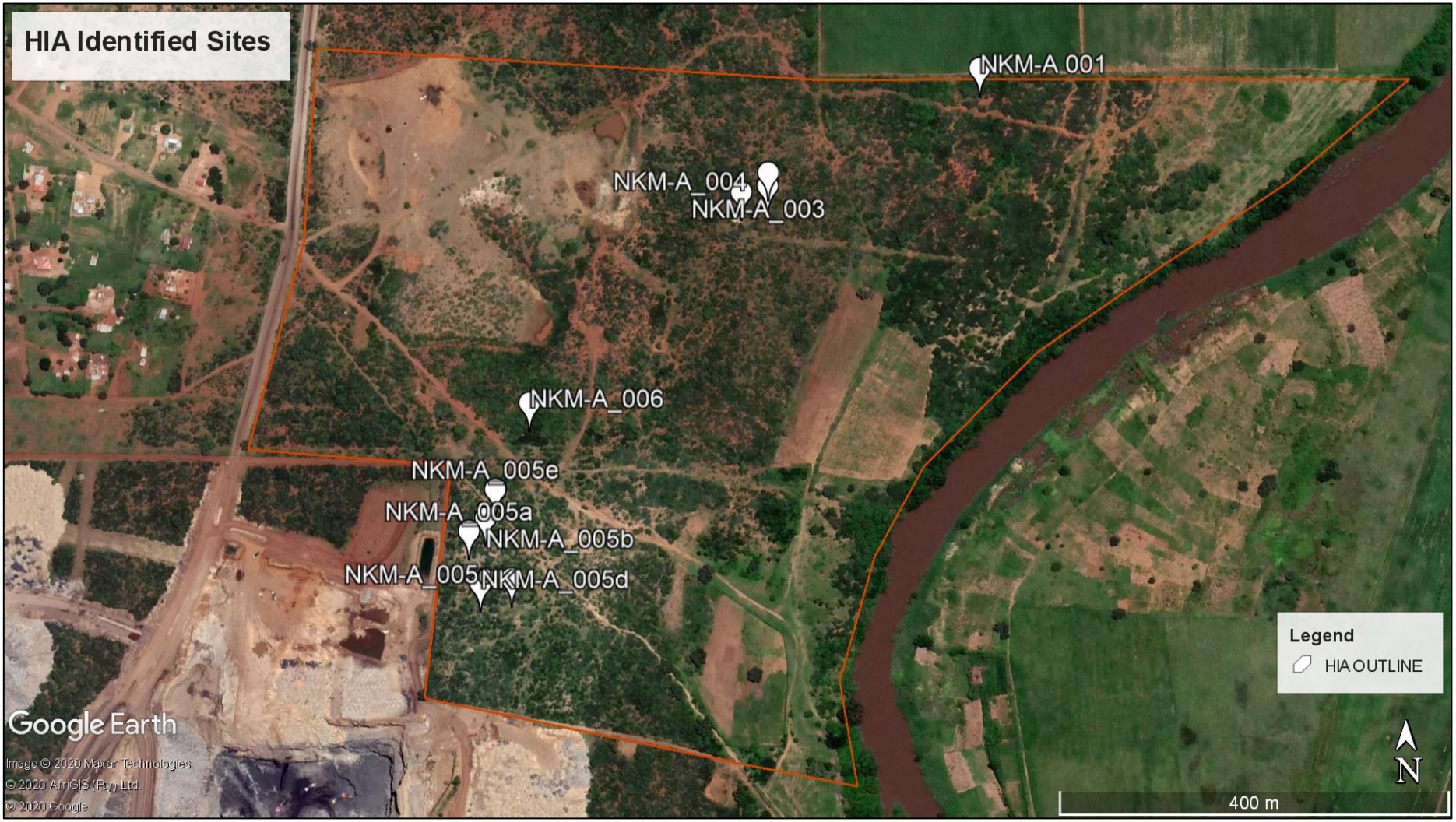

Figure 19 – Satellite image showing heritage sites identified (white icons) during the HIA field survey undertaken on 13 August 2020

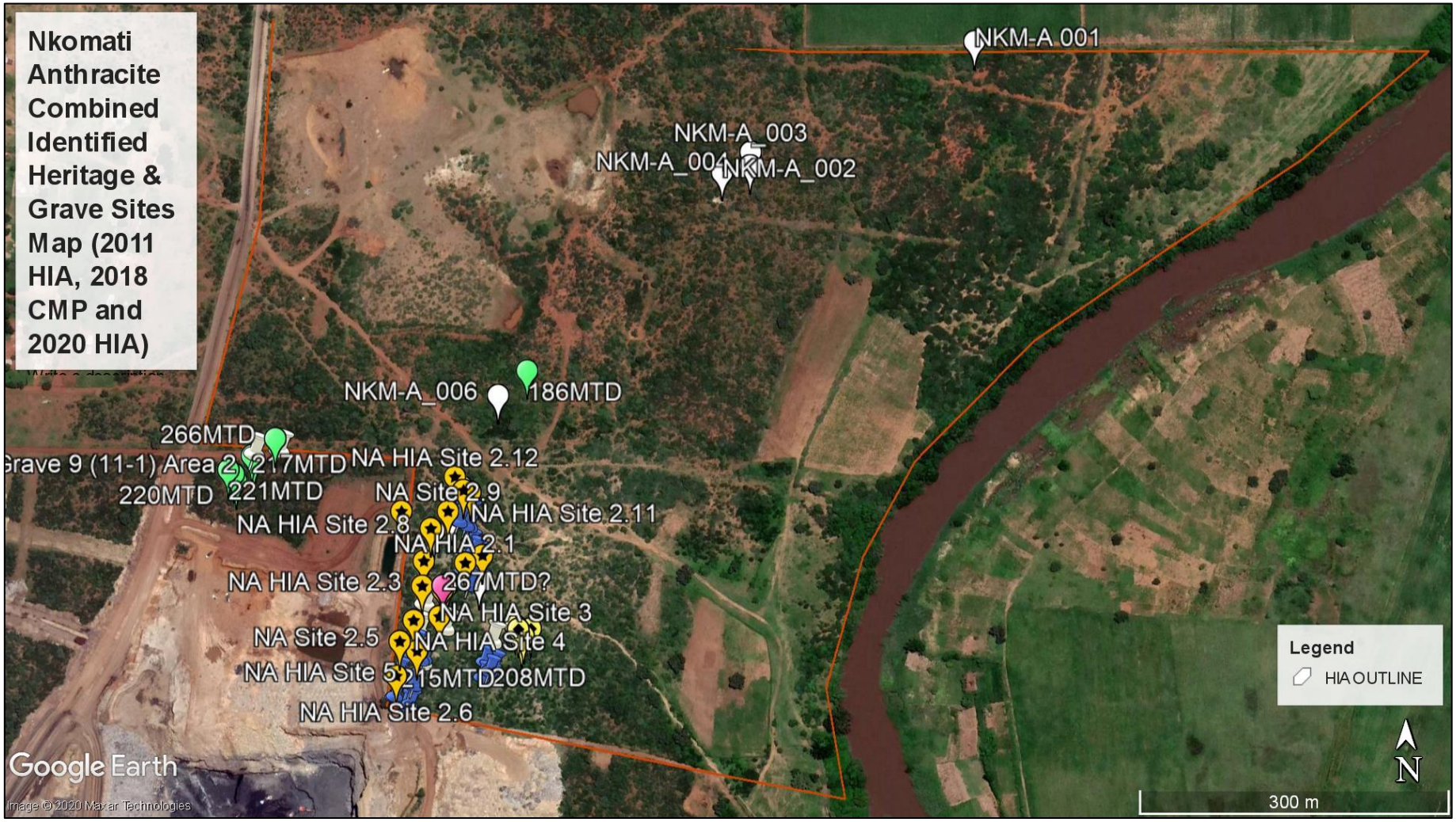

Figure 20 - Satellite image showing combined heritage sites identified by the 2020 HIA (white icons), 2011 HIA (yellow icons) as well as community graves (Multi-colour icons)

Heritage sites identified during field survey

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
NKM-A 001	S -25.822193°	E 31.806443°	This site consists of a low-density scatter of Late Stone Age lithics. A destruction permit will be required	Low	IIIC

Figure 21 – View of some of the lithics found at the site

Figure 22 –General view of the site

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
NKM-A 002	-25.823333°	31.804003°	This site contains the foundations of the floor of a building which seems to consist of three rooms. The foundations are constructed of brick and concrete. The age is unknown, but it is likely to be of Modern/recent date. The foundations are situated in almost the same location as the structure depicted on the 1967 topographical map as a shop, so the structure could be 53-60 years old. There is also a possibility of infant graves associated with the foundations, should this be the remains of a house. Some mitigation will be required, including test excavations for possible infant graves (depending on the current social consultation) and a destruction permit if the site is found to be older than 60 years. **Site extent**: approx. 14x7m	Medium	IIIB

Figure 23 – General view of the floor foundation

Figure 24 –Closer view of the foundation wall showing bricks and concrete

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
NKM-A 003	-25.823155°	31.804279°	This site is a possible grave. It is a soil mound in association with several aloe plants, located close to the building remains at Site NKM-A 002. According to the burial practice in the area, graves are often marked by aloes. The site will require mitigation in the form of stakeholder engagement and test excavations, if needed. **Site extent**: approx. 10x10m	High	IIIA

Figure 25 – View of the possible grave

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
NKM-A 004	-25.823274°	31.804273	The site is a cluster of possible graves. A number of soil mounds occur in association with a concentration of several aloe plants. This site might be associated with the building remains at Site NKM-A 002. According to the burial practice in the area, graves are often marked by aloes. The site will require mitigation in the form of stakeholder engagement and test excavations, if needed. **Site extent**: approx. 10x10m	High	IIIA

Figure 26 –View of the possible graves at NKM-A004

Figure 27 – One of the possible graves at NKM-A004

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
NKM-A-005a to NKM-A-005e			Sites NKM-A-005a – 005e form part of a larger site, originally identified by van Vollenhoven & Radford (2011). It comprised a site consisting of middens, pieces of pottery, faunal material, etc., and perhaps even some very low stone walling and hearths. Van Vollenhoven noted that only a few very small, decorated potsherds were identified. According to him, these may represent the Mzonjani facies of the Urewe tradition. The dates for this facies are AD 450 to 750 (Huffman 2007: 127-29). This could place certain areas of the site in the Early Iron Age (EIA). Van Vollenhoven also noted there could also be a later component to the site, as some of the sherds may be Tsonga pottery. As a result of the ongoing social consultation and the above findings, it is clear that the area where the sites are located was occupied until fairly recently. It is therefore possible that three layers of occupation are found here: 1. Early Iron Age (decorated and undecorated pottery) as identified by van Vollenhoven and Radford (2011) and confirmed during this HIA. 2. Later Iron Age (decorated and undecorated pottery, possible low stone walling and middens) as identified by van Vollenhoven and Radford (2011) and confirmed during this HIA. 3. Recent occupation (middens, pottery and recent iron artefacts) as identified by van Vollenhoven and Radford (2011) and confirmed by this	Medium	IIB

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
			HIA and the ongoing social consultation. Several graves (the veracity of which needs to be confirmed) were pointed out in this area by the community, supporting this occupation phase. Van Vollenhoven and Radford recommended that the site/s should be excavated and mapped. This recommendation is supported.		
Site number	**Lat**	**Lon**	**Description**	**Heritage Significance**	**Heritage Rating**
NKM-A 005a	-25.826454°	31.801216°	This site was identified by Van Vollenhoven & Radford (2011) and was marked as site 2.8. It is a midden with undecorated potsherds and the remains of a cast iron pot visible. **Site extent**: approx. 10x10m.	Medium	IIIB

Figure 28 – Two potsherds

Figure 29 – Piece of iron pot

Figure 30 – View of the midden

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
NKM-A 005b	-25.826332°	31.801386°	This site was identified by Van Vollenhoven & Radford (2011) and marked as site 2.9. It consists of a scatter of decorated and undecorated potsherds, probably associated with the Later Iron Age. **Site extent**: approx. 5x5m	Medium	IIIB

Figure 31 –View of several potsherds

Figure 32 – View of decorated potsherd

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
NKM-A 005c	-25.826891°	31.801654°	This site consists of a scatter of undecorated potsherds and a possible midden. **Site extent**: approx. 10x10m	Medium	IIIB

Figure 33 –View of the midden

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
NKM-A 005d	-25.826938°	31.801334°	This site was identified by Van Vollenhoven & Radford (2011) and was marked as Site 2.4. One undecorated potsherd was identified here. **Site extent**: approx. 1x1m.	Medium	IIIB

Figure 34 – View of single potsherd

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
NKM-A 005e	-25.826070°	31.801485°	This site was identified by Van Vollenhoven & Radford (2011) and was marked as site 2.11, It probably dates to the Early Iron Age as described above. **Site extent**: approx. 5mx5m.	Medium	IIIB

Figure 35- View of two potsherds

Figure 36 – View of several decorated potsherds

Figure 37 – Closer view of some of the decorated potsherds

Site number	Lat	Lon	Description	Heritage Significance	Heritage Rating
NKM-A 006	-25.825273°	31.801836°	This site comprises a soil mound, which could be a grave. The site will require mitigation in the form of stakeholder engagement and test excavations, if needed. **Site extent**: approx. 4x2m.	High	IIIA

Figure 38 –View of the feature

Figure 39 – Another view of the feature

Grave Sites Identified During Stakeholder Engagement Process and by Van Vollenhoven (2018)

Figure 40 – Closer view of the locations of the consolidated identified grave sites in relation to the current HIA study area (orange polygon). Note that the colours of the icons correlate with the colours of the grave sites listed in the Graves Register (see below)

Prelim Grave No	Family representative	Name of Deceased	Grave feature/ description	Grave GPS Co-ordinates	Comments
1(1-1)	Masilela Enjoy	Masilela Sihlangu	Large cement bordered grave - In loving memory of Masilela Sihlangu Rest in Peace		Same name appears next to the shop on the historic maps
187/188	Masilela Enjoy	Masilela unknown	Stones	-25.826110°; 31.801475° / -25.826114°; 31.801478°	Possible grave
189	Masilela Enjoy	Masilela unknown	Stones	-25.826142°; 31.801544°	Possible grave
190	Masilela Enjoy	Masilela unknown	Stones	-25.826151°; 31.801576°	Possible grave
191	Masilela Enjoy	Masilela unknown	Stones	-25.826050°; 31.801582°	Possible grave
192	Masilela Enjoy	Masilela unknown	Stones	-25.826005°; 31.801397°	Possible grave
193	Masilela Enjoy	Masilela unknown	Stones	-25.826086°; 31.801464°	Possible grave
194	Masilela Enjoy	Masilela unknown	Aloe	-25.826310°; 31.801584°	Possible grave
195	Masilela Enjoy	Masilela unknown	Aloe	-25.826378°; 31.801619°	Possible grave
196	Masilela Enjoy	Masilela unknown	Aloe	-25.826406°; 31.801645°	Possible grave
197	Masilela Enjoy	Masilela unknown	Aloe	-25.826465°; 31.801595°	
198/199	Masilela Enjoy	Masilela unknown	Aloe	-25.826579°; 31.801614° / -25.826565°; 31.801596°	Possible graves inside the kraal
200	Masilela Enjoy	Masilela unknown	Aloe	-25.826535°; 31.801510°	Possible grave
201	Masilela Enjoy	Masilela unknown	Aloe	-25.826663°; 31.801571°	Multiple possible graves next to the main grave. To be confirmed by the Masilela family.
202	Masilela Enjoy	Macwathi Masilela	Aloe	-25.827305°; 31.801134°	
203	Masilela Enjoy	Macwathi'wife	Aloe	-25.827313°; 31.801106°	
204	Masilela Enjoy	Ngonono Masilela	Aloe	-25.827270°; 31.800996°	Already numbered on the MP
205	Masilela Enjoy	Ngonono'wife	Aloe	-25.827193°; 31.801059°	
206	Masilela Enjoy	Ngonono'child	Rock feature	-25.827533°; 31.801037°	Large rock feature at the base of a tree

207	Masilela Enjoy	Mlunge Masilela	Stones and soil	-25.827467°; 31.801697°	
208	Masilela Enjoy	Mlunge'wife	Stones	-25.827413°; 31.801767°	
209	Masilela Enjoy	Mlunge'child	Stones	-25.827331°; 31.801719°	
210	Masilela Enjoy			-25.827369°; 31.801813°	

211	Singwane M.I	Nkunzi Mandla Singwane	One big rock	-25.827702°; 31.800995°	
212	Singwane M.I	Dlabantu Singwane	Stone and soil	-25.827716°; 31.800954°	
213	Singwane M.I	Singwane unknown	Stone and soil	-25.827633°; 31.800853°	
214	Singwane M.I	Singwane unknown	Small stones and soil	-25.827639°; 31.800842°	
215	Singwane M.I	Singwane unknown	Two big rocks{as headstone} and soil	-25.827428°; 31.800886°	
216	Singwane M.I	Singwane unknown	Possible graves five big rocks as headstone	-25.827476°; 31.800873°	
217	Singwane M.I	Singwane unknown	Soil dressing	-25.825798°; 31.799454°	
218	Singwane M.I	Singwane unknown	Soil dressing	-25.825839°; 31.799475°	
219	Singwane M.J	Teleni Singwane	Soil mound and tree on top	-25.826017°; 31.799303°	
220	Singwane M.I	Nozinduku Singwane	Soil mound with small thorn trees on top	-25.825959°; 31.799279°	
221	Singwane M.I	Singwane unknown	Possible graves, soil with dense vegetation	-25.825922°; 31.799226°	
222	Singwane M.I	Mngcobeni Singwane	Soil mound with single rock as the headstone	-25.826177°; 31.795586°	
266	Singwane M.I	Singwane unknown		-25.825650°; 31.799680°	Claimed by the Singwane family

223	Jabulile Ngomane	Ntshelo Ngomane	Aloe dressing	-25.827280°; 31.802003°	
224	Jabulile Ngomane	Mdoyobha Ngomane	Soil with some tress on top	-25.827309°; 31.802030°	
225	Jabulile Ngomane	Mdoyobha Ngomane	Aloe dressing	-25.827368°; 31.802081°	

226	Jabulile Ngomane	Mdoyobha Ngomane	Aloe dressing	-25.827403°; 31.802062°	
227	Jabulile Ngomane	Mbango Ngomane	Aloe, a tree and a stone as the headstone	-25.827305°; 31.802150°	

186	Matafeni Judas Nkosi	Lombume Nkosi		-25.825059°; 31.802116°	

	Graves Identified by van Vollenhoven				
01 (1-1)	Masilela and Sihlangu		Area 1, Double grave	-25.826667°; 31.801683°	Site 1 (Van Vollenhoven HIA 2011 and CMP 2018)
02 (3-1)	Unknown		Area 1, aloes on grave	-25.827200°; 31.801267°	Site 3 (Van Vollenhoven HIA 2011 and CMP 2018)
03 (3-2)	Unknown		Area 1, aloes on grave	-25.827200°; 31.801267°	Site 3 (Van Vollenhoven HIA 2011 and CMP 2018)
04 (3-3)	Unknown		Area 1, aloes on grave	-25.827200°; 31.801267°	Site 3 (Van Vollenhoven HIA 2011 and CMP 2018)
05 (4-1)	Unknown		Area 1, N-S oriented	-25.827233°; 31.801017°	Site 4 (Van Vollenhoven HIA 2011 and CMP 2018)
06 (5-1)	Unknown		Area 1	-25.827500°; 31.801050°	Site 5 (Van Vollenhoven HIA 2011 and CMP 2018)
07 (8-1)	Unknown		Area 1, aloes on grave	-25.826992°; 31.801078°	Site 8 (Van Vollenhoven HIA 2011 and CMP 2018)
08 (10-1)	Unknown		Area 1	-25.827314°; 31.801722°	Site 10 (Van Vollenhoven HIA 2011 and CMP 2018)
09 (11-1)	Unknown		Area 2, Metal drum fixed to tree	-25.825681°; 31.799428°	Site 11 (Van Vollenhoven HIA 2011 and CMP 2018)
010 (12-1)	Unknown		Area 2, aloes and enamel pot	-25.825653°; 31.799669°	Site 12 (Van Vollenhoven HIA 2011 and CMP 2018)
011 (13-1)	Unknown		Area 3, Uncovered by the mine, zinc sheet	-25.826244°; 31.795719°	Site 13 (Van Vollenhoven HIA 2011 and CMP 2018)
012 (7)	Unknown		Area 4, Two graves, under berm	-25.830433°; 31.791783°	Site 7 (Van Vollenhoven HIA 2011 and CMP 2018)

Photographs of the graves recorded by Van Vollenhoven in the CMP (2018)

Figure 41 – Site 01 (CMP 1-1). Grave of Sihlangu Masilela

Figure 42 – Site 02, 03 and 04 (CMP 3-1, 3-2, 3-3)

Figure 43 – Site 05 (CMP 4-1)

Figure 44 – Site 06 (CMP 5-1)

Figure 45 – Site 07 (CMP 8-1)

Figure 46 – Site 08 (CMP 10-1)

Figure 47 - Site 09 (CMP 11-1). The metal marks the area where the graves are situated. The actual graves are a few meters away from the tree.

Figure 48 – Site 10 (CMP 12-1)

Figure 49 - Site 11 (CMP 13-1)

7 IMPACT ASSESSMENT

The impact assessment rating is based on the methodology and rating scale set out below.

7.1 Impact Assessment Methodology

The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the management and approval process; secondly, it shows the primary impact characteristics, as defined above, used to evaluate impact significance.

The impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

Significance;
Spatial scale;
Temporal scale;
Probability; and
Degree of certainty.

A combined quantitative and qualitative methodology was used to describe impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria is given in **Table 3**.

Table 3: Quantitative rating and equivalent descriptors for the impact assessment criteria

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	Proposed site	Incidental
2	LOW	Study area	Short-term
3	MODERATE	Local	Medium/High-term
4	HIGH	Regional / Provincial	Long-term
5	VERY HIGH	Global / National	Permanent

A more detailed description of each of the assessment criteria is given in the following sections.

Significance Assessment

Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude, but does not always clearly define these since their importance in the rating scale is very relative. For example, the magnitude (i.e. the size) of area affected by atmospheric pollution may be extremely large (1 000 km2) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would

be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in Table 4 below.

Table 4: Description of the significance rating scale

RATING		DESCRIPTION
5	Very high	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	High	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	Moderate	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	Very low	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity are needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	No impact	There is no impact at all - not even a very low impact on a party or system.

Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table 5.**

Table 5: Description of the significance rating scale

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible, and will be felt at a regional scale (District Municipality to Provincial Level).
3	Local	The impact will affect an area up to 10 km from the proposed site.
2	Study Site	The impact will affect an area not exceeding the Eskom property.
1	Proposed site	The impact will affect an area no bigger than the ash disposal site.

Duration Scale

In order to accurately describe the impact, it is necessary to understand the duration and persistence of an impact in the environment. The temporal scale is rated according to criteria set out in **Table 6**.

Table 6: Description of the temporal rating scale

RATING		DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium/High term	The environmental impact identified will operate for the duration of life of facility.
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

Degree of Probability

Probability or likelihood of an impact occurring will be described as shown in **Table 7** below.

Table 7: Description of the degree of probability of an impact occurring

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very Likely
5	It's going to happen / has occurred

Degree of Certainty

As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard "degree of certainty" scale is used as discussed in **Table 8**. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.

Table 8: Description of the degree of certainty rating scale

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.
Don't know	The consultant cannot, or is unwilling, to make an assessment given available information.

Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus, the total value of the impact is described as the function of significance, spatial and temporal scale as described below:

$$\textbf{\textit{Impact Risk}} = \frac{(\text{SIGNIFICANCE} + \textit{Spatial} + \text{Temporal}) \times \text{Probability}}{3 \qquad\qquad 5}$$

An example of how this rating scale is applied is shown in **Table 9**.

Table 9: Example of Rating Scale

Impact	Significance	Spatial Scale	Temporal Scale	Probability	Rating
	LOW	Local	Medium/High-term	Could Happen	
Impact to heritage	2	3	3	3	1.6

Note: The significance, spatial and temporal scales are added to give a total of 8, that is divided by 3 to give a criteria rating of 2,67. The probability (3) is divided by 5 to give a probability rating of 0,6. The criteria rating of 2,67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to five classes as described in the **Table 10** below.

Table 10: Impact Risk Classes

RATING	IMPACT CLASS	DESCRIPTION
0.1 – 1.0	1	**Very Low**
1.1 – 2.0	2	**Low**
2.1 – 3.0	3	**Moderate**
3.1 – 4.0	4	**High**
4.1 – 5.0	5	**Very High**

Therefore, with reference to the example used for air quality above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.

An example of how this rating scale is applied is shown below in **Table 11**.

Table 11: Example of Rating Scale

IMPACT	IMPACT DIRECTION	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
Heritage	Negative	Very low	Proposed site	Incidental	Practically impossible	
	-	1	1	1	1	0,20

8 HERITAGE ASSESSMENT AND RECOMMENDATIONS

During the survey, six heritage sites were located within the study area. The sites comprised archaeological resources (one Stone Age site/findspot), three grave or possible grave sites and the foundations of a recent/modern structure. In addition, five sites that had been recorded in a previous HIA study (Van Vollenhoven & Radford 2011) as part of a possible extensive multi-phase site were revisited. During the recent field survey some artefacts were identified at this site that are likely to belong to the Later Iron Age or Historical period. Therefore, the site could contain phases from different periods. A large number of possible graves were also identified during the social consultation process for the current grave relocation process.

8.1 Impact assessment of identified sites

Archaeological Resources

Stone Age site/findspot

The one site/ findspot containing LSA lithics is a very low density scatter. The heritage significance rating of this site is Very Low and the impact assessment of the proposed opencast extension on this site is rated as Low.

IMPACT	IMPACT DIRECTION	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
Archaeology - Stone Age	Negative	VERY LOW	Isolated Sites / proposed site	Permanent	Very Likely	
	-	1	1	5	4	1,87

Multi-phase site

The five sites containing Iron Age pottery sherds and middens (*NKM-A-005a to NKM-A-005e*) which may be part of a large site containing multi-phase components (Site 2, Van Vollenhoven 2011) has a heritage significance rating of Medium and the impact assessment of the proposed opencast extension on the site/s is rated as Moderate.

IMPACT	IMPACT DIRECTION	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
Archaeology – Multi-phase site	Negative	MODERATE	Isolated Sites / proposed site	Permanent	Very Likely	
	-	3	1	5	4	2,40

Graves and Burial Grounds

All of the grave sites identified on the property during the previous HIA (2011) and CMP (2018) (Sites 01 (1-1), 02 (3-1), 03 (3-2), 04 (3-3), 05 (4-1), 06 (5-1), 07 (8-1), 08 (10-1), 09 (11-1), 010 (12-1), 011 (13-1), 012 (7)), as well as those identified by the local community during the stakeholder engagement as containing graves (Sites 186 to 227, 266; see **Appendix B)**, together with the three possible grave sites (NKM-A 003, NKM-A 004 and NKM-A 006) identified within the study area are rated as having a High heritage significance and the impact assessment of the proposed opencast extension on these sites is rated as Moderate.

IMPACT	IMPACT DIRECTION	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
Possible Graves	Negative	HIGH	Study Area	Permanent	Very Likely	
	-	4	2	5	4	2,93

Palaeontology

The Palaeontological sensitivity of the geology underlying the study area is Undifferentiated Karoo formation and is rated as being Very High. However, the field survey did not identify any visible evidence of fossiliferous outcrops which indicates that the impact of the proposed opencast extension will be of a Moderate significance in palaeontological terms.

IMPACT	IMPACT DIRECTION	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
Palaeontology	Negative	VERY HIGH	Study Area	Permanent	Could happen	
	-	5	2	5	3	2,40

Recent/modern foundations

The foundations of the recent/modern building are rated as being Medium due to the possibility of the structure being 60 years or older and the possible presence of infant graves (if the structure was used as a house). The impact assessment rating therefore is Moderate.

IMPACT	IMPACT DIRECTION	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
Structure & Possible Graves	Negative	MODERATE	Isolated Sites / proposed site	Permanent	Very Likely	
	-	5	1	5	4	2,40

8.2 Recommendations and Mitigation

Based on the Impact Assessment ratings, the following recommendations are made:

8.2.1 Archaeological Resources

Stone Age site/findspot (NKM-A 001)

Since the significance and impact assessment of the Stone Age site identified is rated as Low negative, no further mitigation is required. However, all archaeological sites require obtaining a destruction permit from SAHRA before they can be destroyed.

In addition, should any stone artefacts, especially concentrations of stone artefacts, be identified during the course of vegetation clearance and subsequent earth-moving or construction activities, the archaeologist / heritage specialist would need to be contacted to advise on the appropriate mitigation measures to be followed.

Multi-phase site (NKM-A-005a to NKM-A-005e)

The large multi-phase site (NKM-A-005a to NKM-A-005e) that contains several components of different periods (Site 2 in Van Vollenhoven & Radford 2011) has a heritage significance rating of Medium and the impact assessment of the proposed opencast extension on the site/s is rated as Moderate. The following mitigation measures are recommended:

- Vegetation clearing in the areas to be excavated. An archaeologist should be on site at all times during vegetation clearing. Once vegetation is cleared it should be possible to further define areas to be excavated and recorded.
- Van Vollenhoven & Radford (2011) recommended that the site/s be excavated and mapped. This recommendation is supported

Note: Section 17.6(a) of the Mine Health and Safety Act requires the employer to ensure that no mining operations are carried out under or within a horizontal distance of 100m from buildings, roads, railways, reserves, boundaries, any structure whatsoever or any surface which it may be necessary to protect. Reduction of this distance can only be approved by the DMR.

8.2.2 Graves and Burial Grounds

The field survey identified three possible grave sites (NKM-A 003, NKM-A 004 and NKM-A 006) within the proposed Madadeni Opencast Northern Extension footprint, in addition to the graves identified previously by Van Vollenhoven and Radford (2011) and Van Vollenhoven (2018) (Sites 01 (1-1), 02 (3-1), 03 (3-2), 04 (3-3), 05 (4-1), 06 (5-1), 07 (8-1), 08 (10-1), 09 (11-1), 010 (12-1), 011 (13-1), 012 (7)). It should be noted that during the stakeholder engagement process, several additional areas have been identified by the local community as containing graves (Sites 186 to 227, 266; see **Appendix B**).

It is anticipated that as the current stakeholder engagement process continues, clarity on the actual number and location of graves and burial grounds will be obtained. The same recommendations will apply to all the graves identified on the Nkomati Anthracite property:

The preferred option is to allow for the *in situ* preservation of these sites. However, should it not be possible to preserve these sites *in situ*, a grave relocation process must be undertaken. Such a grave relocation process must adhere to the following:

- A detailed social consultation process, at least 60 days in length, comprising the attempted identification of the next-of-kin in order to obtain their consent for the relocation;
- Bilingual site and newspaper notices indicating the intent of the relocation;
- Permits from all the relevant and legally required authorities;
- An exhumation process that keeps the dignity of the remains and family intact;
- An exhumation process that safeguards the legal rights of the families as well as that of the mining company; and
- The process must be done by a reputable company well versed in the mitigation of graves.

Note: Section 17.6(a) of the Mine Health and Safety Act requires the employer to ensure that no mining operations are carried out under or within a horizontal distance of 100m from buildings, roads, railways, reserves, boundaries, any structure whatsoever or any surface which it may be necessary to protect. Reduction of this distance can only be approved by the DMR.

8.2.3 Palaeontology

The PIA study found that the proposed N'komati Anthracite Madedeni Opencast Northern Extension is underlain by sandstones and shales of the undifferentiated Permian-Triassic Karoo Supergroup. According to the PalaeoMap on the SAHRIS database the Palaeontological Sensitivity of the Undifferentiated Karoo is Very High. However, the field survey of the Madedeni Opencast Northern Extension footprint did not identify any visible evidence of fossiliferous outcrops. The scarcity of fossil heritage at the proposed extension footprint indicates that the impact of the anthracite mine extension will be of a moderate significance in palaeontological terms. It is therefore considered that the proposed extension is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area.

Therefore, the following recommendation is made:

1. If fossil remains are discovered during any phase of construction or operation, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments. These discoveries should be protected (if possible, *in situ*) and the ECO must report to SAHRA.

8.2.4 Modern/recent foundations (Site NKM-A 002)

This site contains the foundation remains of a recent/modern structure that could be 53-60 years old, as it is depicted in the same location as a shop on the 1967 topographical map. This could however not be verified. The heritage significance is rated as being Medium; due to the possibility of the structure being 60 years or older and the possible presence of infant graves (if the structure was used as a house) . The presence of infant graves should be addressed during the stakeholder engagement process and if confirmed will require mitigation measures, including test excavations and a permit.

8.3 General

It is the combined considered opinion of the heritage specialists that the overall impact of the proposed Madadeni Opencast Northern Extension on heritage resources is seen as acceptably low and impacts can be mitigated to acceptable levels, provided that the recommendations for mitigation in this HIA are implemented.

1. In the event of any unmarked human burials, burial pits, potsherds, lithics or other heritage resources being uncovered during earthworks or construction/mining activities, these must be reported immediately to the South African Heritage Resources Agency (021 462-4502).

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APPENDIX A

PGS TEAM CVS

PROFESSIONAL CURRICULUM: JENNIFER KITTO

Professional Heritage Specialist – PGS Heritage

EDUCATION:

Name of University or Institution:	**:**Dorset Institute for Higher Education (now Bournemouth University), Poole, United Kingdom
Degree obtained:	**:**Higher National Diploma: Practical Archaeology
Year	**:**1989

Name of University or Institution	**:**University of the Witwatersrand
Degree obtained	**:**BA
Major subjects	**:**Archaeology and Social Anthropology
Year	**:**1993

Name of University or Institution	**:**University of the Witwatersrand
Degree obtained	**:**BA [Hons]
Major subjects	**:**Social Anthropology
Year	**:**1994

Professional Qualifications:

Member - Association of Southern African Professional Archaeologists – Technical Member No. 444

Languages:

English First Language

Afrikaans - Speaking (Fair) Reading (Fair), Writing (Fair**)**

KEY QUALIFICATIONS

Cultural Resource Management and Heritage Impact Assessment Management, Historical and Archival Research, Archaeology, Anthropology, Applicable survey methods, Fieldwork and Project Management.

SUMMARY OF EXPERIENCE

Specialised expertise in Cultural Resource Management and Heritage Impact Assessment Management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, including *inter alia* -

Involvement with various Heritage Impact Assessments, within South Africa, including -

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects

- Heritage Audits and subsequent Compilation of Heritage Management Policy for various projects

HERITAGE ASSESSMENT PROJECTS

Below a selected list of Heritage Impact Assessments (HIA) and Heritage Audit and Management Projects completed:

- Heritage Screening Reports for Various Road Routes: Bronkhorstspruit, Carletonville and Randfontein and Eikenhof-Vaal Dam regions, Gauteng Department of Roads and Transport, Gauteng Province
- Heritage Audit and Management Policy, Sibanye Gold, Beatrix Mining area, Lejweleputswa District Municipality, Free State Province
- Heritage Audit and Management Policy, Sibanye Gold, Kloof and Driefontein Mining areas, West Rand District Municipality, Gauteng Province
- HIA Report, Dolos-Giraffe Substation, Hopefield-Bultfontein, Free State Province
- HIA Report and Phase 2 Mitigation Report, AEL Mining Services, Decontamination of AEL Detonator Campus, Modderfontein Factory, Modderfontein, City of Johannesburg Metropolitan Municipality, Gauteng
- HIA Report, Old Rand Leases Hostel redevelopment, Fleurhof Ext 10, Roodepoort, City of Johannesburg Metropolitan Municipality, Gauteng
- HIA Report, Watershed Substation, North-West Province
- HIA Report, Solid Waste Landfill Facility, Rhodes Village, Eastern Cape
- HIA Report, Solid Waste Landfill Facility, Rossouw, Eastern Cape
- Phase 2 Mitigation Report, Cass Farmstead, Optimum Colliery, Mpumalanga
- HIA Report, Kusile Ash Disposal Facility, Witbank, Mpumalanga
- Report on Rand Steam Laundries Background History, City of Johannesburg Metropolitan Municipality, Gauteng
- New Cemetery, Barkly East, Senqu Municipality, Eastern Cape (desktop/archival research for HIA report)
- Lady Slipper Country Estates, Nelson Mandela Metro Municipality, Eastern Cape (desktop/archival research for HIA report)
- Exxaro Resources Paardeplaats Project, Belfast, Mpumalanga (field survey and archival research for HIA report)
- Copperleaf Mixed Use Development, Farm Knoppieslaagte 385/Knopjeslaagte 140, Centurion, Gauteng (field survey and archival research for HIA report)
- Isundu-Mbewu Transmission Line Project, Pietermaritzburg, Kwazulu Natal (Initial Heritage Scan (survey) for Corridor 3 Alternative 1)

GRAVE RELOCATION PROJECTS

Below, a selection of grave relocation projects involvement:

- Mitigation Report on previous Grave Relocation and Permit applications for Test Excavation of two possible graves, Nkomati Mine, Mpumalanga

- Relocation of two graves Olievenhoutbosch, Tshwane, Gauteng (applications to SAHRA, Gauteng Dept. of Health and Local Authorities for relevant permits)
- Relocation of graves HL Hall Family, Nelspruit, Mpumalanga (applications to SAHRA, Mpumalanga Department of Health and Local Authorities for relevant permits)
- Relocation of two possible graves Noordwyk Ext 63, Midrand, Johannesburg, Gauteng (applications to SAHRA, Gauteng Dept. of Health and Local Authorities for relevant permits)
- Relocation of informal cemetery (50+) and additional unknown graves (50+) at Fleurhof Extension 5, Roodepoort, Gauteng (desktop research and applications to SAHRA, Gauteng Health Department and Local Government for relevant permits in terms of the applicable legislation)
- Relocation of informal graves (9) at Tselentis Colliery, Breyten, Mpumalanga (applications to SAHRA, Mpumalanga Department of Health and Local Authorities for relevant permits)
- Relocation of various informal cemeteries at New Largo Mine, Balmoral, Mpumalanga (as above)
- Relocation of graves at Mookodi Power Station, Vryburg, North-West Province (initial social consultation)
- Relocation of graves at Hendrina Power Station, Hendrina, Mpumalanga (social consultation, permit applications, etc)

EMPLOYMENT SUMMARY:

Positions Held

- 2011 – to date: Heritage Specialist - PGS Heritage (Pty) Ltd
- 2008 – 2011: Cultural Heritage Officer (National), Burial Grounds and Graves Unit: South African Heritage Resources Agency (SAHRA)
- 1998 – 2008: Cultural Heritage Officer (Provincial), Provincial Office – Gauteng: SAHRA

HENK STEYN - PROFESSIONAL CURRICULUM VITAE

Managing Director & Professional Archaeologist– PGS Heritage

EDUCATION

Name of University or Institution	**:**	University of Pretoria
Degree obtained	**:**	BA
Major subjects	**:**	Archaeology, History & Cult. History
Year	**:**	1996

Name of University or Institution	**:**	University of Pretoria
Degree obtained	**:**	BA [Hons] (Cum laude)
Major subjects	**:**	Archaeology
Year	**:**	1997

Professional Qualifications:

Professional Archaeologist - Association of Southern African Professional Archaeologists - Professional Member

CRM Accreditation:

- Principal Investigator - Grave Relocations
- Field Director – Iron Age
- Field Supervisor – Colonial Period and Stone Age

Languages:

Afrikaans

English – Speaking (Good) Reading (Good), Writing (Good)

KEY QUALIFICATIONS

Grave Relocation Management, Cultural Resource Management and Heritage Impact Assessment Management, Archaeology, Business Management

Treasurer and Council member of ASAPA from 2011 - current

SELECTIVE EXPERIENCE

Heritage Assessments

As a heritage practitioner I have been involved with approximately 60 Heritage Impact Assessments including, but not limited to:

- Archaeological Walkdown, Hydra-Perseus Transmission line (260km), Northern Cape Province - Eskom
- Phase 2 Heritage Impact Assessment and EMP, Gamma-Omega Transmission line (550km), Western Cape Province - Nature Conservation Corporation

- Archaeological Walk Down and EMP, Eros- Neptune Transmission Line (380km), Transkei, Eastern Cape Province – Aurecon
- Phase 2 Heritage Impact Assessment in terms of the proposed Comet Ext. 8 Development, Ekurhuleni Metropolitan Municipality – Urban Dynamics
- Heritage Impact Assessment for the proposed development of Comet Ext. 14, Ekurhuleni Metropolitan Municipality, Marsh Environmental
- Nature Conservation Corporation, Phase 2 Heritage Impact Assessment and EMP, Hydra-Perseus Transmission line (260km – selected areas), Northern Cape Province
- Heritage Assessment, Friarsdale, Northern Cape – Afrimat
- Heritage Assessments for three SCP Projects (De Aar, Kimberley, Loeriesfontein) – SiVest
- Co-Author of a Cultural Resources Management Plan for Marakele National Park.
- Co-Author of a Cultural Resources Management Plan for Augrabies National Park.

Grave Relocations

As Managing Director of PGS, I have been involved in more than 55 grave relocation projects, including, but not limited to:

1. iMpunzi Division of Duiker Mining, Witbank, Relocation of 950 graves. Field Supervisor under WC Nienaber as PI
2. University of Pretoria, Nandoni Dam Grave Relocation Project, Thohoyandou, Limpopo Province. Relocation of approximately 1,000 graves. Field Supervisor under WC Nienaber as PI.
3. Alveda Park Development, NewHco. Relocation of 114 graves. Field Director, under WC Nienaber as PI
4. Tselentis Colliery, Duiker Mining. Relocation of 80 graves. Permit Holder with WC Nienaber as PI
5. Tselentic Colliery, Expansion of mining activities. Relocation of 15 graves. Permit Holder with WC Nienaber as PI.
6. Abland, Proposed development of Portion 41 of the farm Wonderboom 302-JR. Relocation of 17 graves. Permit Holder with WC Nienaber as PI
7. TCTA, VRESAP Development. Relocation of 56 graves. Permit Holder with WC Nienaber as PI.
8. Biscuit Trading, Proposed Development of Portion 97 of the farm Knopjeslaagte 385-JR. Relocation of 5 graves. Permit Holder with WC Nienaber as PI
9. Savannah Country Estates, Mamelodi, Pretoria, Gauteng Province. Relocation of 7 graves. Project Manager and Permit Holder with WC Nienaber as PI.
10. Atterbury Property Developments, Hartebeespoort Dam, Pretoria. Relocation of 11 graves. Project Manager and Permit Holder with WC Nienaber as PI.
11. The Outpost Estate, Bela-Bela, Limpopo Province. Relocation of 78 graves. Project Manager and Permit Holder with WC Nienaber as PI.

12. Nkomati Mine, Onverwacht grave relocation, near Badplaas, Mpumalanga. Relocation of 45 graves. Permit Holder with WC Nienaber as PI.
13. Nkomati Mine, Nkomati Mine grave relocation, near Badplaas, Mpumalanga. Relocation of 60 graves. Project Manager and Permit Holder with WC Nienaber as PI.
14. New Vaal Colliery, Mac West Project, Free State, Relocation of 650 graves. Project Manager and Permit Holder with WC Nienaber as PI.
15. Phokathaba Platinum, Smokey Hills Mine, Maandagshoek, Burgersfort, Limpopo Province. Relocation of 11 graves. Project Manager and Permit Holder with WC Nienaber as PI.
16. Martins Funerals (Randburg), Garstfontein road grave relocation, Pretoria, Gauteng Province. Relocation of 1 grave. Project Manager and Permit Holder with W.C. Nienaber as PI.
17. Bombela CJV, Graves affected by Gautrain Development, Midrand, Gauteng Province. Relocation of 26 graves. Project Manager and Permit Holder with WC Nienaber as PI.
18. Cranbrook Properties, Motaganeng Project, Burgersfort, Limpopo Province. Relocation of 60 graves. Project Manager & Permit Holder with WC Nienaber as PI.
19. Silver Glade Investments, Swavelpoort, Pretoria. Relocation of 45 graves. Project Manager and Permit Holder with WC Nienaber as PI.
20. Anglo Coal (Kleinkopje Colliery), Zondagsvlei, near Ogies, Mpumalanga Province. Relocation of 110 graves. Project Manager and Permit Holder with WC Nienaber as PI.
21. Anglo Coal (Kleinkopje Colliery), Kleinkopje Coppiery, Witbank, Mpumalanga Province. Relocation of 4 graves. Project Manager and Permit Holder with WC Nienaber as PI.
22. Africon. Rescue excavation of 1 grave near Silvertondale, Pretoria, Gauteng Province. Project Manager and Permit Holder with WC Nienaber as PI
23. Osizweni Plaza, Newcastle, KwaZulu-Natal. Relocation of 65 graves. Project Manager and Permit Holder with WC Nienaber as PI.
24. Anglo Coal, Farm Straffontein, Delmas, Mpumalanga. Relocation of 16 graves. Project Manager and Permit Holder under WC Nienaber as PI.
25. Beaurivage, Relocation of 3 graves, Hartebeestpoort, North West Province. Field Director, under WC Nienaber as PI.
26. EIMS, Rescue excavation of 2 graves, Watloo, Pretoria, Gauteng Province. Project Manager and Permit Holder with WC Nienaber as PI.
27. Xtsrata Coal, Phoenix Plant. Relocation of 1 grave. Field Director, under WC Nienaber as PI.
28. Xstrata Coal, ATCOM East, Relocation of 53 graves. Field Director, under WC Nienaber as PI.
29. AGES Environmental, Sephaku Fluoride Chemical Plant, Ekandustria, Bronkhorstspruit, Gauteng Province. Relocation of 4 graves. Project Manager. (Current)
30. Nkomati Mine, near Badplaas, Mpumalanga Province. Relocation of 32 graves. Project Manager.
31. Xstrata Coal - Relocation of 606 graves at Xstrata Coal (Tweefontein) – Current. Project Manager

32. Hatch Goba, Relocation of 34 graves from Coega, Eastern Cape. Project Manager
33. Nkomati Mine, Relocation of 8 graves near Badplaas, Mpumalanga. Project Manager
34. Worley Parsons, Relocation of 14 graves from Bloemfontein, Free State Province. Project Manager
35. Hatch- Goba, relocation of approximately 30 graves from the Coega IDZ, Port Elizabeth. Project Manager

EMPLOYMENT SUMMARY

Positions Held

1997-2000

Member – Archaeo-Info cc

2000 - 2010

Member – Archaeology Africa cc

2003-current

Managing Director – PGS Heritage (Pty) Ltd

2003 - current

Director - PGS Heritage (Pty) Ltd

Countries of work experience:

- South Africa
- Botswana

APPENDIX B

MAPS OF PREVIOUSLY IDENTIFIED HERITAGE SITES AND GRAVE SITES IDENTIFIED BY LOCAL COMMUNITY

Figure 50 - Satellite image showing the consolidated identified grave sites within the general Nkomati Anthracite Mine area

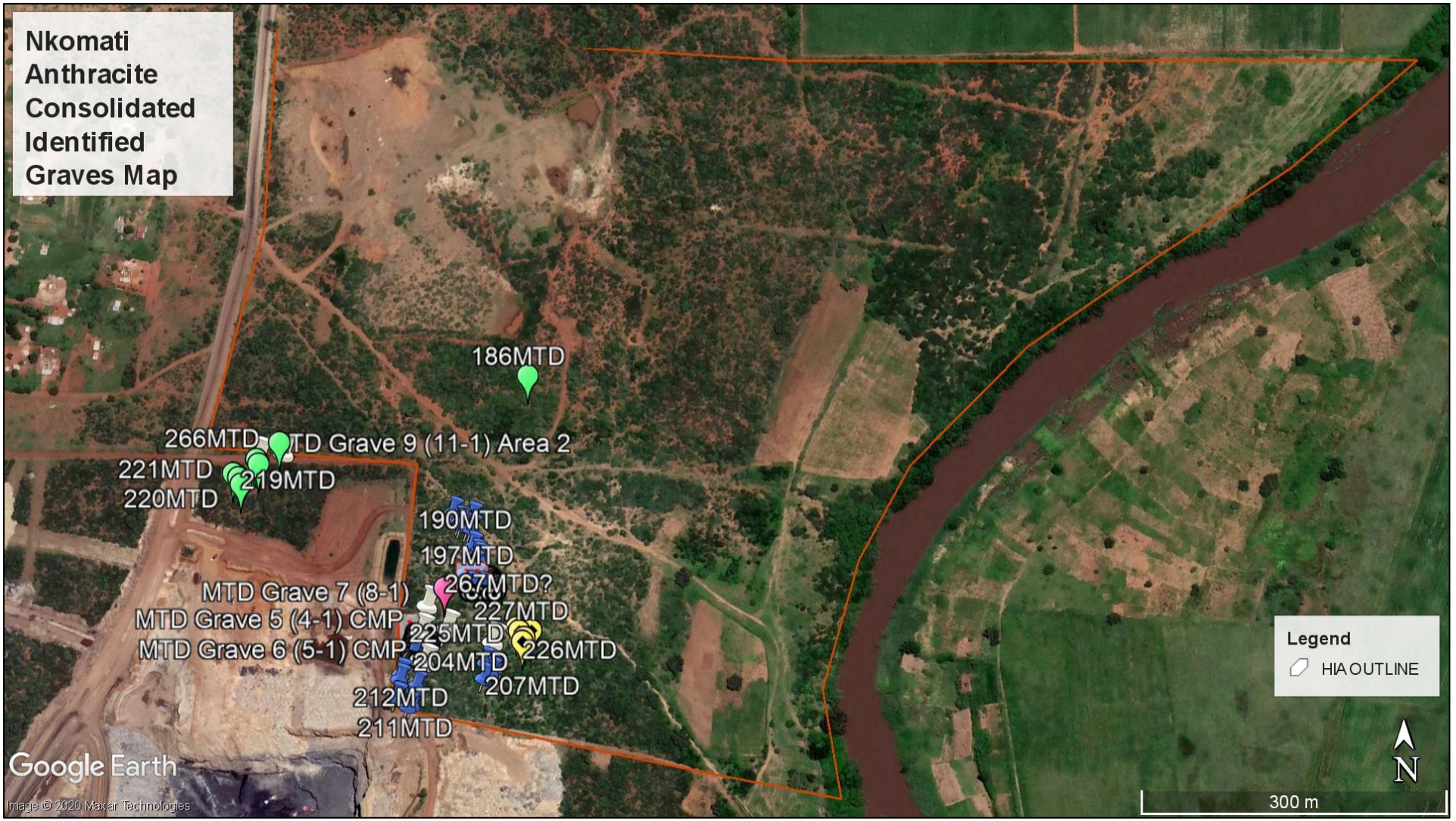

Figure 51 - Satellite image showing the consolidated identified grave sites within the current HIA study area

Figure 52 – Enlarged view of the location of the consolidated identified grave sites within the study area

APPENDIX C

SITES IDENTIFIED BY ARCHAETNOS IN 2011 AND 2018

Figure 53 – Satellite image showing heritage sites identified in 2011 HIA (yellow icons) and 2018 CMP grave sites (white icons) within the Madadeni Opencast mining area

Figure 54 -Enlarged view showing the location of previously identified sites within the proposed Northern Extension footprint area