



PGS HERITAGE

SANRAL R33 Road Upgrade Project

Located along the R33 between the N1 Highway and the town of Modimolle, Modimolle-Mookgopong Local Municipality, Waterberg District Municipality, Limpopo Province

Heritage Impact Assessment

| Template Number | Document Number | Revision | Date |
|-------------------|-----------------|----------|------------|
| PGS PJ REP 007 01 | 630HIA-001 | 3.0 | 11/09/2022 |



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| Version | Issue Date | Description of Changes |
|---------|------------|--|
| 001 | 12/09/2022 | First version of the report submitted to client |
| 002 | 13/09/2022 | Final version of the report submitted to client for review |
| 003 | 16/09/2022 | Final report with the comments and reviews of client integrated. |

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Declaration of Independence

I, Polke D. Birkholtz, 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

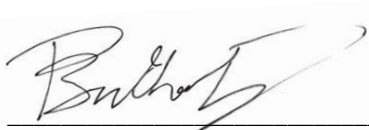
- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

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CONTACT PERSON:



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ACKNOWLEDGEMENT OF RECEIPT

| Report Title | Heritage Impact Assessment for the SANRAL R33 Road Upgrade Project located along the R33 between the N1 Highway and the town of Modimolle, Modimolle-Mookgopong Local Municipality, Waterberg District Municipality, Limpopo Province | | |
|---------------------|---|---|--|
| Control | Name | Signature | Designation |
| Reviewer | PD Birkholtz |  | PGS Heritage Project Manager/ Archaeologist |
| Reviewed | CK Legong |  | Environmental Edge (Pty) Ltd: Environmental Assessment Practitioner |

CLIENT: Environmental Edge (Pty) Ltd

CONTACT PERSON: Cyril Legong
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SIGNATURE:

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The Heritage Impact Assessment Report has been compiled considering the National Environmental Management Act (Act No. 107 of 1998) (NEMA): Appendix 6 of the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended, 2017) requirements for specialist reports as indicated in the table below.

| Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017 | Relevant section in report |
|--|--|
| 1.(1) (a) (i) Details of the specialist who prepared the report | Page iii of Report |
| (ii) The expertise of that person to compile a specialist report including a curriculum vita | Section 1.2 and Appendix B |
| (b) A declaration that the person is independent in a form as may be specified by the competent authority | Page iii of the report |
| (c) An indication of the scope of, and the purpose for which, the report was prepared | Section 1.1 |
| (cA) An indication of the quality and age of base data used for the specialist report | N/A |
| (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change; | Section 4 |
| (d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment | Section 3 and Section 4 |
| (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, Section 4 and Appendix A |
| (f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives; | Section 4 |
| (g) An identification of any areas to be avoided, including buffers | Section 4 |
| (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; | Figure 19 |
| (i) A description of any assumptions made and any uncertainties or gaps in knowledge; | Section 1.3 |
| (j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment | Section 5 |
| (k) Any mitigation measures for inclusion in the EMPr | Section 6 |
| (l) Any conditions for inclusion in the environmental authorization | Section 6 |
| (m) Any monitoring requirements for inclusion in the EMPr or environmental authorization | Section 6 |
| (n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and | Executive Summary and Section 7 |
| (n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and | |
| (n)(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 6 |
| (o) A description of any consultation process that was undertaken during the course of carrying out the study | N/A |
| (p) A summary and copies if any comments that were received during any consultation process | N/A |
| (q) Any other information requested by the competent authority. | N/A |
| (2) Where a government notice 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. | No protocols or minimum standards for HIAs or PIAs |

EXECUTIVE SUMMARY

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Introduction

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Edge (Pty) Ltd to undertake a Heritage Impact Assessment (HIA) that forms part of the Basic Environmental Assessment (BA) for the proposed R33 Road Upgrade Project. The proposed project is located between the N1 highway and the town of Modimolle in the Limpopo Province.

A further standalone Palaeontological Desktop Assessment (PDA) was completed for PGS by Dr Elize Butler of Banzai Environmental (Pty) Ltd.

The HIA identified various heritage resources within the study area including old bridges and historic buildings. Additionally, the risk for the presence of subterranean archaeological deposits associated with the history of the town of Modimolle was also identified. Further mitigation measures would be required to address the development impact on these heritage sites and risks.

The heritage sites identified during the fieldwork, are as follows:

- **MRUP 1:** Old Bridge
- **MRUP 2:** Old Bridge
- **MRUP 3:** Old Magistrate's Court
- **MRUP 4:** Building which Housed the Bioscope
- **MRUP 5:** The Face Brick Building containing the Pharmacy of Gerrit Bakker
- **MRUP 6:** Old House that is used as Business Premises

Additionally, the fieldwork found that the urban component of the study area is largely comprised of the existing road surface, parking spaces on each side of the road surface and built-up sidewalks. The areas located immediately outside of the study area boundaries in the urban section are characterised by primarily rows of buildings and structures on both sides of the road. Furthermore, the section of the urban component of the study area that is located between Paul Kruger Street and Vos Street is considered to have some historic value.

In terms of palaeontology, the PDA compiled by Banzai Environmental indicates that the proposed development will not lead to detrimental impacts on the palaeontological resources of the area (Butler, 2022). However, mitigation measures are outlined in the report that must be adhered to.

Impact Assessment

The HIA identified the following development impacts on heritage:

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- Destruction or disturbance of the old bridges at sites **MRUP 1** and **MRUP 2**;
- Destruction or disturbance of the four historic buildings identified at sites **MRUP 3, MRUP 4, MRUP 5** and **MRUP 6**; and
- Destruction or disturbance of subterranean archaeological middens of historical age associated with the history of the town of Modimolle.

Impact assessment calculations were undertaken, which revealed that mitigation measures would be required for the old bridges at sites **MRUP 1** and **MRUP 2** and also for the identified risk for the presence of subterranean archaeological middens within the study area.

Required Mitigation

*Mitigation Measures required for the Old Bridges at sites **MRUP 1** and **MRUP 2***

The following initial mitigation measures are required:

- Archival research to establish more precise ages for the two bridges; and
- Compilation of a report containing the findings and observations resulting from the archival research.

The following mitigation measures are required for all bridges that the archival research has shown are older than 60 years:

- Recording of the structural remains. Such recording may include photographic recording, measured drawings and the compilation of a site layout plan. Less recording would be required in cases where the archival research also yielded a building plan or plans;
- Compilation of a mitigation report containing all the findings of the archival research as well as the data yielded during the recording of the site; and
- Submission of the mitigation report with a destruction permit application to the appropriate heritage authority. Structural remains older than 60 years may only be destroyed once this permit is issued.

Structures that the archival research has revealed are younger than 60 years may be destroyed without the need for a permit.

Mitigation Measures required for the Possible Destruction of Subterranean Archaeological Deposits

The following mitigation measures are required:

- An archaeological watching brief must be implemented during all construction activities undertaken between Paul Kruger Street and Vos Street.

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Conclusions

On the condition that the general recommendations and mitigation measures outlined in this HIA report are adhered to, including the mitigation measures of the standalone palaeontological report, and in cognisance of the assumptions and limitations contained in this HIA report, no heritage reasons can be given for the development not to continue.

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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

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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 | Description |
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| | |
|------------------|--|
| 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 |
| NEMA | National Environmental Management Act |
| NHRA | National Heritage Resources Act |
| PHRA-G | Gauteng Provincial Heritage Resources Authority |
| PHS | Provincial Heritage Site |
| PSSA | Palaeontological Society of South Africa |
| SADC | Southern African Development Community |
| SAHRA | South African Heritage Resources Agency |

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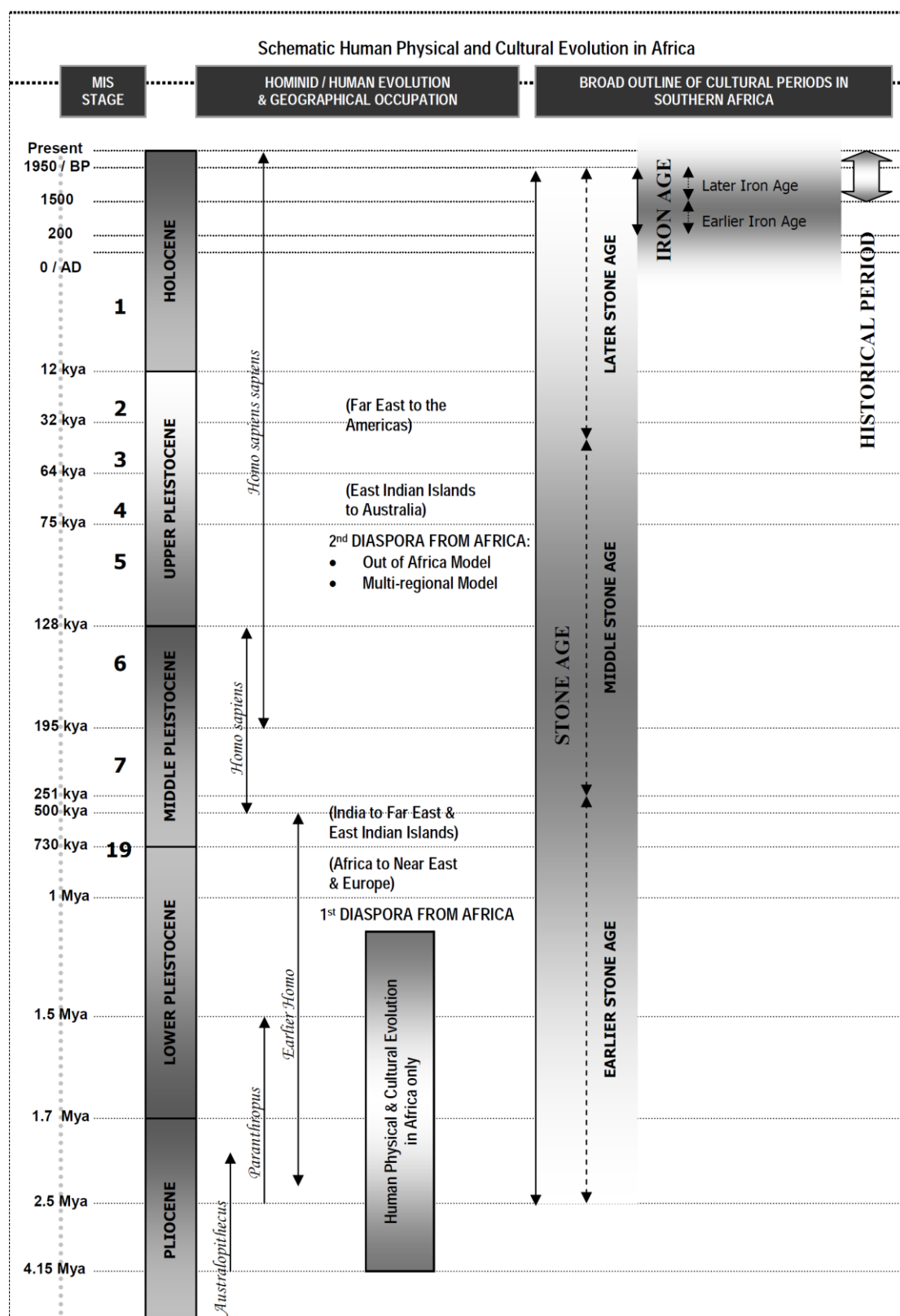


Figure 1 – Human and Cultural Timeline in Africa

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1 INTRODUCTION

PGS Heritage (Pty) Ltd (PGS) was appointed by Environmental Edge (Pty) Ltd to undertake a Heritage Impact Assessment (HIA) that forms part of the Basic Environmental Assessment (BA) for the proposed R33 Road Upgrade Project. The proposed project is located between the N1 highway and the town of Modimolle in the Limpopo Province.

A further standalone Palaeontological Desktop Assessment (PDA) was completed for PGS by Dr Elize Butler of Banzai Environmental (Pty) Ltd.

1.1 Scope of the Study

The aim of the study is to identify heritage sites and finds that may occur in the proposed project area. The HIA aims to inform the BA to assist the developer 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).

1.2 Specialist Qualifications

This HIA Report was compiled by 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.

The following staff members from PGS compiled this study:

- Polke D. Birkholtz, the project manager and principal heritage specialist, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is also accredited with the CRM Section of the same association. He has 21 years of experience in the heritage assessment and management field. He holds a B.A. (cum laude) from the University of Pretoria specialising in Archaeology, Anthropology and History and a B.A. (Hons.) in Archaeology (cum laude) from the same institution.

1.3 Assumptions and Limitations

The following assumptions and limitations can be identified for this report:

- 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

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necessarily represent all the possible heritage resources present within the area. As a result, it is always possible that the fieldwork findings made in this report are not a complete indication of all the archaeological and heritage fabric from within the study area. Any 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 identified during the development, the procedures and requirements pertaining to graves and burials as set out elsewhere in this report will apply.

- The study area was taken to be 5m on either side of the existing road all along the linear line provided by the client. This was the area assessed for the purposes of this report. Should any additional development footprints located outside of these study area boundaries be required, such additional areas will have to be assessed in the field by an experienced archaeologist/heritage specialist before construction.
- Walkthroughs were undertaken either side of the road for the entire rural section of the proposed road upgrade. This represents a section of the study area approximately 10km in length. The urban section where the study area comprises built-up sidewalks was assessed by slowly driving through this area four times and conducting frequent stops.

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:

- Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified
- National Environmental Management Act (NEMA), Act 107 of 1998 – Appendix 6
- National Heritage Resources Act (NHRA), Act 25 of 1999

1.4.1 Notice 648 of the Government Gazette 45421

Although minimum standards for archaeological (2007) and palaeontological (2012) assessments were published by SAHRA, GN.648 requires sensitivity verification for a site selected on the national web based environmental screening tool for which no specific assessment protocol related to any theme has been identified. The requirements for this Government Notice (GN) are listed in **Table 1** and the applicable section in this report noted.

Table 1: Reporting requirements for GN648

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| GN 648 | Relevant section in report | Where not applicable in this report |
|---|----------------------------|-------------------------------------|
| 2.2 (a) a desktop analysis, using satellite imagery; | section 4.3 | |
| 2.2 (b) a preliminary on-site inspection to identify if there are any discrepancies with the current use of land and environmental status quo versus the environmental sensitivity as identified on the national web-based environmental screening tool, such as new developments, infrastructure, indigenous/pristine vegetation, etc. | 4.1 | - |
| 2.3(a) confirms or disputes the current use of the land and environmental sensitivity as identified by the national web-based environmental screening tool; | section 4.1 | - |
| 2.3(b) contains motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; | section 4.1 | - |

1.4.2 NEMA – Appendix 6 requirements

The HIA report has been compiled considering the NEMA Appendix 6 requirements for specialist reports as indicated in the table below. For ease of reference, the table below provides cross-references to the report sections where these requirements have been addressed.

1.4.3 The National Heritage Resources Act

- National Heritage Resources Act (NHRA) Act 25 of 1999
 - Protection of Heritage Resources – Sections 34 to 36; and
 - Heritage Resources Management – Section 38

The NHRA is utilised as the basis for the identification, evaluation, and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically impacted on by development as stipulated in Section 38 of NHRA. This study falls under s38(8) and requires comment from the relevant heritage resources authority.

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2 TECHNICAL DETAILS OF THE PROJECT

2.1 Locality

2.1.1 Description

The proposed development extends over a distance of approximately 13km along the R33 near the town of Modimolle. The study area is located in the Modimolle-Mookgopong Local Municipality and the Waterberg District Municipality of the Limpopo Province. Additionally, it crosses over sections of the farms Nylstroom Town and Townlands 419 KR, T-Plaas 425 KR, Groenfontein 429 KR and Cyferfontein 457 KR. The proposed development area starts at a point 1,153m south-east of the N4, from where it crosses over the N1 highway and runs in a generally north-western direction all the way to the town of Modimolle. The proposed development ends on the northern periphery of this town. Refer to Error! Reference source not found. below.

2.2 Technical Project Description

2.2.1 Project description

The contents of this section were provided by Environmental Edge (Pty) Ltd.

The total length of the project is 12.3km. The project is divided into two distinct sections namely:

- Section 12 Km 77.0 to Km 86.0 (10.0km): This section has rural characteristics.
- Section 12 Km 86.0 to Section 13 Km 0.6 (2.3km): This section has urban characteristics¹.

The basic scope of work is as follows:

- Road widening to meet the minimum requirements of a Class 2 road that has an AADT of greater than 3000 veh/day, as recommended by SANRAL,
- Capacity upgrades in line with the traffic report
- Correction of horizontal geometry at some sections,
- Correction of vertical geometry at some sections,
- Upgrade/reinstatement of existing stormwater infrastructure,
- Intersection upgrades,
- Verge clearance to improve sight distance along the project route.
- Pavement strengthening by in-situ recycling and base import followed by double seal surfacing along the rural section,

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- Box cutting and bitumen treated base (BTB) construction followed by asphalt surfacing along the urban section,
- Upgrade of river bridge and major culvert,
- Widening of a rail bridge
- Reinstatement and provision of road signage/markings, and
- Construction of a hawkker facility at the beginning of the urban section.
- Upgrading of pedestrian walkways along the R33, with emphasis on the urban section
- Proper pedestrian accommodation at every signalised intersection (i.e. pedestrian signals with adequate time to cross the road and visible road marking indicating a pedestrian crossing)
- Special emphasis should be placed on Joe Slovo Drive and the R101 Thabo Mbeki Drive intersections due to the very high pedestrian activity at these intersections
- Upgrading of pedestrian facilities adjacent to the railway bridge (Km 86.75).

Major aspects of the project include:

- Strengthening of the existing pavement, general widening of the existing road cross section for capacity improvements and 3.0m surface shoulders,
- Substantial vertical and horizontal geometric improvements, widening of railway bridge and some major and minor culverts,
- Construction of 2 new river bridges
- Widening of existing agricultural underpass
- Possible 6.5 wide temporary deviation to accommodate two-way traffic during construction
- Stockpile areas and vegetation clearance outside road reserve in excess of one hectare¹.

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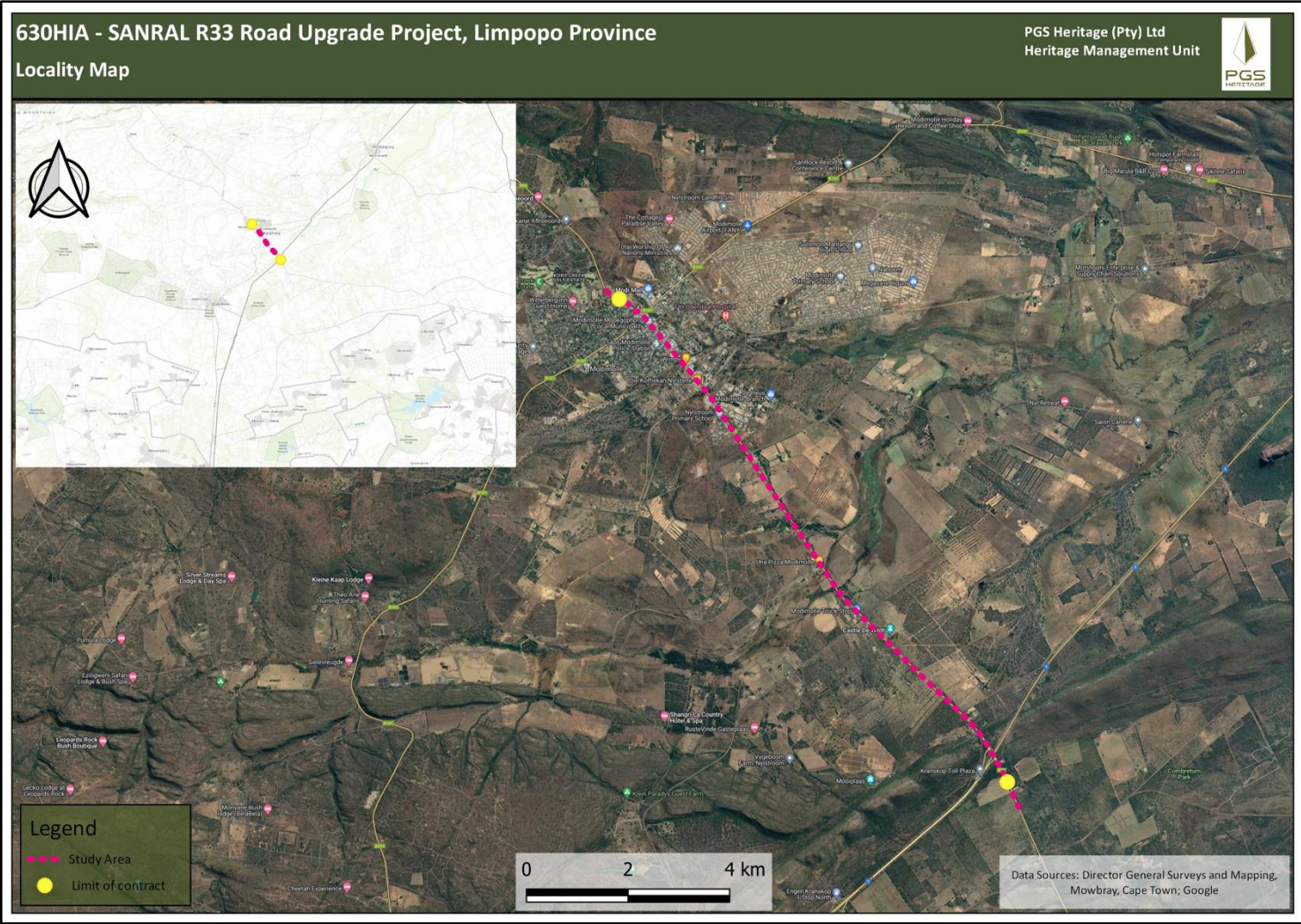


Figure 2 – Locality plan depicting the proposed development within its

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3 ASSESSMENT METHODOLOGY

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

3.1 Methodology for Conducting the Study

This HIA report was compiled by PGS for the proposed SANRAL R33 Road Upgrade Project. The applicable maps, tables and figures are included, as stipulated in the NHRA (no 25 of 1999) and the National Environmental Management Act (NEMA) (No. 107 of 1998). The HIA process consists of three steps:

Step I – Desktop Study: A detailed archaeological and historical overview of the study area and surroundings was undertaken. This work was augmented by an assessment of reports and data contained on the South African Heritage Resources Information System (SAHRIS). Additionally, an assessment was made of the available historic topographic maps. All these desktop study components were undertaken to support the fieldwork.

Step II – Fieldwork: The fieldwork component of the study was aimed at identifying tangible remains of archaeological, historical and heritage significance. The fieldwork was undertaken by a combination of vehicle and pedestrian access through the proposed project area by two archaeologists (Polke D. Birkholtz and Nicholas Fletcher) and a field assistant (Derrick James). The fieldwork was undertaken on Thursday, 21 July 2022.

Throughout the fieldwork, hand-held GPS devices were used to record the tracklogs showing the routes followed by the archaeologists on site. All sites identified during the fieldwork were photographically and qualitatively recorded, and their respective localities were documented using a hand-held GPS device.

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

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

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter)
 - Low - <10/50m²
 - Medium - 10-50/50m²

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- 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.

3.2 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 (2021) is implemented in this report. Additionally, site significance classification standards prescribed by the Heritage Western Cape Guideline (2016), were used for the purpose of this report (**Table 2** and **Table 3**).

Table 2: 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 Provincial Heritage Authority. 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. | | |

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| Grading | Description of Resource | Examples of Possible Management Strategies | Heritage Significance |
|---------|---|---|--|
| 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 |
| 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 3: 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 Provincial Heritage Authority. | Exceptionally High Significance |
| III | 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. | | |

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| Grading | Description of Resource | Examples of Possible Management Strategies | Heritage Significance |
|---------|--|---|--|
| IIIA | <p>Such a resource must be an excellent example of its kind or must be sufficiently rare.</p> <p>These are heritage resources which are significant in the context of an area.</p> | <p>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.</p> | High Significance |
| IIIB | <p>Such a resource might have similar significances to those of a Grade III A resource, but to a lesser degree.</p> <p>These are heritage resources which are significant in the context of a townscape, neighbourhood, settlement or community.</p> | <p>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.</p> | Medium Significance |
| IIIC | <p>Such a resource is of contributing significance to the environs</p> <p>These are heritage resources which are significant in the context of a streetscape or direct neighbourhood.</p> | <p>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.</p> <p>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.</p> | Low Significance |
| NCW | <p>A resource that, after appropriate investigation, has been determined to not have enough heritage significance to be retained as part of the National Estate.</p> | <p>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.</p> | No research potential or other cultural significance |

3.3 Methodology used in Determining the Significance of Environmental Impacts

The methodology used to determine the environmental impact significance was provided by Environmental Edge and is explained in **Appendix B**.

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4 CURRENT STATUS QUO

4.1 Site Description

The study area can be divided into two distinct sections, namely a longer section with rural characteristics and a shorter urban component. Starting at a point just over one kilometer south-east of the N1 highway and stopping at the southern periphery of the town of Modimolle, the 10,43km rural section can be described as topographically level and passes through a typical farming landscape with gated farm entrances on both sides of the road. The farm entrance roads on the south-western side of the R33 all have culverts allowing the roads to pass over the drainage channel located here. This section of the study area primarily comprises grass-covered surfaces with intermittent trees and bushes. Sections of telephone poles are also found in this section of the study area. The R33 passes over two bridges as well. Refer to **Figure 3** to **Figure 6** below.



Figure 3 – Typical view along the R33 in the rural component of the study area.



Figure 4 – Another view along the R33 in the rural component of the study area.



Figure 5 – Culverts and associated farm entrances characterise the rural section.



Figure 6 – Telephone poles such as the ones depicted here were also observed in sections.

The urban component of the study area starts near the southern periphery of the town of Modimolle, runs through its centre and ends again north of the town. This section passes through a built-up

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area characterised by almost exclusively business premises and activities typical of small towns across the country. The study area itself is primarily comprised of built-up sidewalks that are raised above the actual road surface and located between the road surface and shop entrances. In some instances, the distance between the road surface and the nearest buildings are not very wide. Parking spaces are provided along both sides of the road allowing patrons to access the businesses and shops. Urban sidewalk elements such as municipal concrete dustbins and lampposts are found ubiquitously throughout this section. Less frequent elements include electrical transformers housed in metal boxes and trees. The urban component of the study area includes several intersections associated with traffic lights and road signs. This component of the study area passes over two bridges. Refer to **Figure 3** to **Figure 6** below.



Figure 7 – Typical view along the R33 in the urban component of the study area.



Figure 8 – Another view within the urban section of the study area.



Figure 9 – Lampposts and concrete dustbins are found ubiquitously within this section.



Figure 10 – Intersections with traffic lights and road signs are found throughout this section.

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4.2 Heritage Desktop

4.2.1 Archaeological and Historical overview of the study area and surrounding landscape

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| The Study Area and Surroundings during the Stone Age | |
| The archaeological literature does not contain much information on the Stone Age archaeology of this area. It is likely that this reflects a lack of research rather than the fact that Stone Age sites are not found in this area. | |
| 2.5 million – 250 000 years ago | <p>The Earlier Stone Age (ESA) is the first and oldest phase identified in South Africa's archaeological history and comprises two technological phases. The earliest of these is known as Oldowan and is associated with crude flakes and hammer stones. It dates to approximately 2 million years ago. The second technological phase is the Acheulian and comprises more refined and better made stone artefacts such as the cleaver and bifacial hand axe. The Acheulian dates to approximately 1.5 million years ago.</p> <p>No ESA sites are known from the vicinity of the study area.</p> |
| 250 000 to 40 000 years ago | <p>The Middle Stone Age (MSA) is the second oldest phase identified in South Africa's archaeological history. This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique.</p> <p>No MSA sites are known from the vicinity of the study area.</p> |
| 40 000 years ago to the historic past | <p>The Later Stone Age (LSA) is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths. A well-known feature of the Later Stone Age is rock art in the form of rock paintings and engravings.</p> <p>Bergh (1999) states that a LSA site is known from the town of Modimolle. No additional information regarding this site exists. Additionally, an archaeologist named M.P.J. Moore conducted an archaeological survey of the Kranskop (Modimolle) hill in 1987, during which he identified several rock shelters and evidence which suggested an association with the LSA (Küsel (2019). This hill is located 7.7km north-east of the study area.</p> |
| The Study Area and Surroundings during the Iron Age | |
| <p>The arrival of early farming communities during the first Millenium 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 practised cultivation and pastoralist farming activities, metalworking, 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 Southern African Iron Age can be divided into an Early Iron Age (AD 200 – AD 900), Middle Iron Age (AD 900 – AD 1300) and Late Iron Age (AD 1300 – AD 1840) (Huffman, 2007).</p> <p>The hill known as Modimolle or Kranskop was a landmark that at least three groups claim to have been associated with during the Late Iron Age and early Historic Period. These were the</p> | |

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| Bakgatla (likely the Bakgatla ba Mmakau), the Bantwane a Pedi and the Ndebele of Langa. The word Modimolle is believed to mean the Gods or Ancestors have eaten (Küsel (2019). | |
| AD 150 – AD 650 | The Bambata facies of the Benfica Sub-Branch of the Kalundu Ceramic Tradition represents the earliest known Iron Age period within the surroundings of the study area. The decoration on the ceramics from this facies is characterised by fine decoration, multiple bands and cross-hatching on long rims and alternating blocks of stamped and incised lines in the necks (Huffman, 2007:215). |
| AD 1300 – AD 1500 | The Icon facies of the Moloko Branch of the Urewe Ceramic Tradition represents the second known Iron Age period in the surroundings of the study area. The decoration associated with Icon pottery is characterised by multiple incised bands separated by colour and lip decoration on bowls (Huffman, 2007:185). |
| AD 750 – AD 1000 | The Diamant facies of the Kalundu Ceramic Tradition represents the third known Iron Age period in the surroundings of the study area. The decoration associated with Diamant pottery is characterised by tapered rims with broadly incised herringbone motifs (Huffman, 2007:225). |
| AD 1000 – AD 1300 | The Eiland facies of the Kalundu Ceramic Tradition represents the fourth known Iron Age period within the surroundings of the study area. The decoration on the ceramics from this facies is characterised by fine herringbone with stamping (Huffman, 2007:221). |
| AD 1350 – AD 1750 | The Moor Park facies of the Urewe Ceramic Tradition represents the fifth known Iron Age period within the surroundings of the study area. The decoration of the Moor Park ceramics is characterised by punctates, rim notching and appliqué (Huffman, 2007:161). |
| AD 1500 – AD 1700 | <p>The Madikwe facies of the Blackburn Branch of the Urewe Ceramic Tradition represents the next phase in the Iron Age of the study area and surroundings. This facies can likely be dated to between AD 1500 and AD 1700. The decoration on the ceramics associated with this facies is characterised by multiple bands of cord impressions, incisions, stabs and punctates separated by colour (Huffman, 2007).</p> <p>As indicated above, the Madikwe facies represents one of three parallel Iron Age facies which had developed from the original Moloko facies known as Icon. As such, the Madikwe facies was the contemporary of the Olifantspoort and Letsibogo facies and developed into the Buispoort facies (AD 1700 – AD 1850) (Huffman, 2007).</p> |
| AD 1650 – AD 1750 | The Rooiberg facies of the Urewe Ceramic Tradition represents the seventh known Iron Age period within the surroundings of the study area. The decoration of the Rooiberg ceramics is characterised by stamped rim bands, mixture of stamped and incised bands, arcades and triangles in the neck (Huffman, 2007:177). |
| AD 1650 – AD 1820 | The Uitkomst facies of the Blackburn Branch of the Urewe Ceramic Tradition represents the eighth known Iron Age period to be identified for the surroundings of the study area. This facies can likely be dated to between AD 1650 and AD 1820. The decoration on the ceramics |

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| | <p>associated with this facies is characterised by stamped arcades, appliqué of parallel incisions, stamping and cord impressions and is described as a mixture of the characteristics of both Ntsuanatsatsi (Nguni) and Olifantspoort (Sotho) (Huffman, 2007).</p> <p>The type-site is Uitkomst Cave located near Krugersdorp. The site was excavated by Professor R.J. Mason of the University of the Witwatersrand as part of a project to excavate five cave sites in the Witwatersrand-Magaliesberg area. These five sites are Glenferness, Hennops River, Pietkloof, Zwartkops and Uitkomst. Uitkomst was chosen as the type site for the particular Iron Age material excavated at these sites as the Uitkomst deposit was found to be well stratified and the site “...illustrates the combination of a certain kind of pottery with evidence for metal and food production and stone wall building found at the open sites...” (Mason, 1962:385).</p> <p>The Uitkomst pottery is viewed as a combination of Ntsuanatsatsi and Olifantspoort, and with the Makgwareng facies is seen as the successors to the Ntsuanatsatsi facies. The Ntsuanatsatsi facies is closely related to the oral histories of the Early Fokeng people and represents the earliest known movement of Nguni people out of Kwazulu-Natal into the inland areas of South Africa. Regarding this theory, the Bafokeng settled at Ntsuanatsatsi Hill in the present-day Free State Province. Subsequently, the BaKwena lineage had broken away from the Bahurutshe cluster and crossed southward over the Vaal River to come in contact with the Bafokeng. As a result of this contact a Bafokeng-Bakwena cluster was formed, which moved northward and became further ‘Sotho-ised’ by coming into increasing contact with other Sotho-Tswana groups. According to this theory, this eventually resulted in the appearance of Uitkomst facies type pottery which contained elements of both Nguni and Sotho-Tswana speakers (Huffman, 2007). Huffman states that the Uitkomst facies is directly associated with the Bafokeng (Huffman, 2007). However, it worth noting that not all researchers agree with this preposition of the Bafokeng origins. In their book on the history of the Bafokeng, Bernard Mbenga and Andrew Mason indicate that the research of Prof. R.J. Mason and Dr. J.C.C. Pistorius “...would indicate that the Bafokeng originated from the Bahurutshe-Bakwena-Bakgatla lineage cluster. Tom Huffman holds a different view...” (Mbenga & Mason, 2010).</p> |
| 1823 – 1827 | <p>During the Difaqane the Khumalo Ndebele (or Matabele) of Mzilikazi established themselves along the banks of the Vaal River (Bergh, 1999). In c. 1827 the Matabele moved further north and settled along the Magaliesberg Mountain and in 1832 settled along the Marico River.</p> <p>The Bantwane a Pedi is said to have lived at the hill known as Modimolle or Kranskop during this time. They were attacked by the regiments of Mzilikazi in 1825 and many members of the Bantwane a Pedi is said to have been thrown from the cliffs of the hill at the time (Küsel (2019).</p> |
| The Study Area and Surroundings during the Historical Period | |
| <p>The Historical Period within the study area and surroundings commenced with the arrival of newcomers 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 mass flood of white immigrants during the 1830s, when a mass migration of roughly 2 540</p> | |

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| 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 named Voortrekkers (Visagie, 2011). The general surroundings of the study area underwent significant changes during this time, including the establishment of Nylstroom and associated infrastructural development such as the connecting of the town of Nylstroom with Pietersburg and Pretoria by railway line. | |
| 1836 - 1840 | The first Voortrekker parties crossed over the Vaal River (Bergh, 1999). According to Küsel (2019), when the first Voortrekkers reached the hill known as Modimolle or Kranskop, they found a large number of black people living at the foot of the mountain. These people are believed to have been the Ndebele of Langa who settled in proximity of the Berlin Mission Station near the present-day town of Modimolle because of the raids of Mzilikazi (Küsel (2019). As mentioned elsewhere, the hill known as Modimolle or Kranskop is located 7.7km north-east of the study area. |
| Early 1860s | Modimolle was first named Nylstroom, the toponymic origins of which have been viewed as one of the biggest navigational blunders in the country's history. At the time, a group of religious zealots from Groot Marico known as the Jerusalem-gangers (Jerusalem travellers) decided that they needed to trek to the Holy Land to remove themselves from the influence of the British. After travelling around the south-eastern end of the Waterberg plateau, they came upon a north-flowing river with what they believed was a pyramid nearby. As a result, they concluded that they have reached a point close enough to the Holy Land and named the river the Nile and established a settlement they called Nylstroom nearby. In fact, the Jerusalem-gangers had reached the headwaters of the Mogalakwena River, and the pyramid was in fact a cliff-sided hill known today as Kranskop or Modimolle (Erasmus, 2014.) |
| 1866 | The town of Nylstroom was laid out on the farm Rietvlei on 16 February 1866 (Erasmus, 2014). According to Bulpin (1989), the farm Rietvlei was owned by Ernest Collins before the establishment of the town. Once established, Nylstroom became the seat of the Magistrate for the newly founded Waterberg District. The first magistrate was Joachim Prinsloo. |
| 1880s | During the 1880s, the Transvaal newspaper De Volksstem described the town of Nylstroom as a "...miserable, sandy hole...(containing) a Dutch church and five or six miserable looking houses, all half devoured by white ants. It has a Landdrost, Landdrost's Clerk, Deputy Sheriff and Field-Cornet, who, with their families and two or three private people, constitute the total population of the place." (Bulpin, 1989:224). |
| 1899 | The railway line between Pretoria and Pietersburg was completed in 1899. This line also passed through Nylstroom (Bergh, 1999). |
| The Study Area and Surroundings during the South African War | |
| On 11 October 1899 war broke out between Britain and the two Boer republics of the Orange Free State and Transvaal (<i>Zuid-Afrikaansche Republiek</i>). Although the present study area and surroundings were never part of the main theatre of war, enough actions and events occurred here to warrant discussion in more detail. The burgers of Nylstroom and surroundings joined what was to be known as the Waterberg Commando for the duration of the war. | |

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| 11 October 1899 – 5 June 1900 | <p>During the first part of the war, the Waterberg Commando was placed under the command of General F.A. Grobler. At first, the main objective of the commando was to attack Fort Tuli north of the Limpopo River. However, it was decided from higher up that Grobler should send 500 of his men to Colesberg near the Orange River, while the rest of the commando should be divided into three camps situated at Soutpan, the lower-Lephalala river as well as at a spot between the Matlabas (Motlhabatsi) and Mokolo Rivers.</p> <p>The reason for the placement of these defensive camps in these far north-western sections of the Transvaal Republic, was partly to provide protection against British attacks from the north-west and north, but primarily was intended as defence against attacks by the BaKgatla-ba-ga-Kgafela. The South African War of 1899 to 1902 was definitely not only a white man's war, even though for many decades historians have refrained from paying attention to the reality that the war had a significant influence on, and was partaken in, by Coloureds, Indians and Africans (Nasson, 1999). In recent years historians have started to investigate and study the role of persons of colour in the conflict, and the influence the conflict had on them. In terms of the study area, it is especially the role of the BaKgatla, which is worth mentioning.</p> <p>At the end of the nineteenth century, the BaKgatla-ba-ga-Kgafela under Linchwe I, were divided into two components. While one section lived under British administration in the Bechuanaland Protectorate, the second component lived within the borders of the South African Republic at Saulspoort (Pilanesberg).</p> <p>When hostilities broke out, Linchwe I was placed in a difficult situation and found it hard to decide between the two sides. In the end he chose the British side, and this participation reached a climax at the Battle of Derdepoort on 25 November 1899, when Kgatla forces attacked the Boer laager located there. Subsequently, Kgatla regiments were sent into the South African Republic, and they attacked Boer forces, as well as raided the tribes believed to be assisting the Boers (such as the Fokeng, Phalane and Kwena) (Morton, 1985).</p> |
| 5 June 1900 – September 1900 | <p>After the fall of Pretoria on 5 June 1900, many of the burghers in the Waterberg and Soutpansberg commando's drifted back home. On 22 August 1900, approximately 10 000 British troops occupied Warmbad (present-day Bela-Bela). They were hindered by between 3 000 to 4 000 Transvaal and Free State burghers, but still managed to occupy the town.</p> |
| September 1900 – May 1902 | <p>In September 1900, command of the Boer forces north of Pretoria was removed from Grobler and handed to General Christiaan Frederick Beyers. A power struggle evolved between General Grobler, Assistant-General De Beer and the newly appointed General Beyers. This period, until the end of the war, was characterised by a change in military strategy applied by the Boer forces. Rather than attempting to face an ever-increasing British military force in formal set battles, the Boer Commanders decided to exploit the mobility of the Boer commando's on horse-back by using hit-and-run tactics that became known as the guerrilla phase of the war.</p> |

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| | <p>A British force consisting of some 1 300 mounted men and 9 artillery pieces under the command of Lieutenant-Colonel Plumer left Pretoria on 26 March 1901. The objective of the force was to attack the areas north of Pretoria. The 1st of April 1901 saw Plumer in Nylstroom (present-day Modimolle), and by 5 April he was in Potgietersrus (present-day Mokopane). The most important set battle during this time in the Waterberg, occurred at Sandrivierspoort and Tambotierand, which commenced on 20 June 1901. These two battles occurred some distance away from the present study area.</p> <p>As part of the so-called 'scorched earth' policy initiated by Lord Kitchener, many Boer farmhouses were destroyed. This would certainly also have been true for the surroundings of the study area as well. Another aspect characteristic of the 'scorched earth' policy was the system of concentration camps (also referred to as refugee camps) in which Boer as well as Black women and children were held. The closest of any of these camps to the southern section of the study area, was the one at Modimolle and which was in existence from May 1901 to March 1902. This camp, which was established by the British authorities and used for the keeping of Boer women and children, resulted in the death of 525 persons, 429 of whom were under the age of 15 years (www.angloboerwar.com).</p> <p>In terms of the participation of the Bakgatla-ba-ga-Kgafela in the war, by 1901 the Kgatla regiments attacked Boer farms, and forces, as far as Pretoria and Thabazimbi to the north. By the end of the war, the Kgatla forces were effectively in control of the land reaching from Rustenburg in the south, to the present-day border between South African and Botswana in the north (Morton, 1985). This indicates that during the last years of the war, the study area and surroundings were primarily controlled by the Bakgatla. This assertion is supported by Odendaal (n.d.), who mentions that one of Linchwe's regiments reached as far as Vaalpenskraal (possibly Vaalpenspan?) on the Matlabas River. The farm Vaalpenskraal is located on the Crocodile River some 29km from the closest point of the study area, whereas the farm Vaalpenspan is located in proximity to the Matlabas River immediately adjacent to a section of the present study area.</p> <p>Many of the Boer farmhouses were burnt down during these attacks, and the raiding of cattle and sheep often occurred.</p> |
| May 1902 | The Anglo-Boer War came to an end with the signing of the Peace Treaty of Vereeniging in May 1902. |
| After 1902 | That the war caused a lot of suffering and bitterness is quite evident and the treatment of the National Scouts by the Boer communities from the Waterberg region serves as an example of this. The National Scouts were burghers who joined forces with the British (Odendaal, n.d.). These National Scouts were hated by those who had fought to the bitter end, and it is mentioned that in certain churches from the region some of the bitter enders did not want to attend Holy Communion with erstwhile National Scouts (Pont, 1965). This feeling of discontent felt towards those who had fought on the British side, is captured by the following section taken from the register of the Nederduitsch Hervormde Gemeente Waterberg in present-day Modimolle: |

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| | <p><i>“...aan de leden der Gemeente die zich gedurende de laatste oorlog aan de zijde van de vijand hebben geschaard, kennis te geven voor de Kerkraad te komen ten einde zich te verantwoorden...”</i> (Pont, 1965:77).</p> <p>Another interesting aspect relating to the history of the South African War in these parts, is the so-called Gamlanders or Gamjanners. The Gamlanders were burghers who had decided not to further participate in the war. These boers laid down their arms to Chief Khama of the Bechuanaland Protectorate and settled there for the remainder of the war (Odendaal, n.d.).</p> |
| The Study Area and Surroundings during the Twentieth Century | |
| The general surroundings of the study area underwent significant changes and development during the twentieth century, including the further establishment of farms and agricultural development as well as extensive development of the town of Nylstroom (Modimolle). | |
| 1954 - 1958 | <p>Long-time resident of Nylstroom, Advocate J.G. Strijdom, became Prime Minister of South Africa between 1954 and 1958. From 1929 he represented the Waterberg constituency for nearly 30 years and was known as the “Lion of the North” (Erasmus, 2014). On 8 October 1976, J.G. Strijdom’s house in Modimolle was opened as a museum. The museum has been closed for a while and recently, on 31 August 2022, the building collapsed.</p> <p>The Strijdom House Museum is located 220m south-west of the closest point along the proposed study area.</p> |
| 8 October 1959 | Nylstroom became a municipality on 8 October 1959 (Erasmus, 2014). |
| Late 1980s | While the exact date is not certain, the N1 highway between Pretoria and Pietersburg (present-day Polokwane) appears to have been completed during the late 1980s. Changuion (1986) mentions that the construction of this highway already commenced during the 1970s but was delayed for a long time in the section between Settlers and Warmbaths (present-day Bela Bela). |

4.2.2 National and Provincial Heritage Resources

No National Heritage Resources are known to be located within the study area or its surroundings. Additionally, while no Provincial Heritage Resources are known from the study area, the following Provincial Heritage Resources are known from the surroundings of the study area:

- J.G. Strijdom House

This is the former residence of Advocate J.G. Strijdom who was Prime Minister of South Africa between 1954 and 1958. The house was designed by the famous South African architect Gerhard Moerdyk in the neo-Cape Dutch style. The site was declared a National

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Monument in terms of the National Monuments Act (Act 28 of 1969) on 10 January 1975. It was opened as a museum on 8 October 1976. Recently, the house and museum fell into disrepair. At the end of August 2022, the roof and sections of walling of the house collapsed.

The Strijdom House Museum is located 220m south-west of the closest point along the proposed study area.

- Old Reformed Church

The site comprises the historic building of the Waterberg Reformed Church that was first taken into use on 23 November 1889. President Paul Kruger was present at the time. During the Anglo Boer War, a wing was added to the northern end of the building, which transformed it into a cruciform church. Also during the same war, the church was used as a hospital by the British Army.

The site was declared a National Monument in terms of the National Monuments Act (Act 28 of 1969) on 17 October 1975. This declaration also included the stand on which the church was built, namely the remaining extent of Erf 170.

The stand on which the Waterberg Reformed Church sits is located 88m south-west of the closest point along the proposed study area. The church building is located 120m from the closest point along the proposed study area.

4.2.3 Historical maps

The examination of historical data and cartographic resources represents a critical tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Relevant topographic maps were studied to identify structures, possible burial grounds or archaeological sites present in the footprint area.

With the study area extending across two topographic maps (1:50 000), the first edition historical topographic maps for 2428CB and 2428CD were used for this study. The first edition maps were decided upon as they both provide the best historic view of the landscape, with very little changing over time on the subsequent maps. study area was overlain on the map sheets to identify structures or graves situated within or immediately adjacent to the study area that could possibly be older than 60 years and thus protected under Section 34 and 36 of the NHRA.

First Edition of the 2428CB Topographic Map

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Figure 11 below depicts a section of the First Edition of the 2428CB Topographical Map Sheet. This sheet was based on aerial photography undertaken in 1960, was surveyed in 1965 and drawn in 1967 by the Trigonometrical Survey Office. Using the overlay function of Google Earth, an overlay was made of the study area over this topographic sheet. The following observations can be made of this depiction.

- No graves or cemeteries are depicted within proximity to the study area; and
- Four features were identified on the map. While all these are not necessarily features depicted on the map, they are highlighted to allow for further observations below.

The following features are marked on the depiction below:

- Feature 1

This feature comprises the bridge over the Klein-Nylrivier. The map clearly indicates that the bridge already existed at the time that this map was surveyed. This means that this bridge is at least 57 years old, and quite likely older than 60 years.

- Feature 2

This feature comprises the position of the road bridge that was built across the railway line. According to this area depicted on the map, the bridge was not yet built at the time that the map was surveyed. This correlates with the observations made during the fieldwork which indicated that the bridge was built in 1971.

- Feature 3

Two homesteads in the form of 'huts' are depicted in proximity to the study area. Despite the proximity suggested by this map depiction, both structures appear to be located more than 50m outside the study area boundaries.

- Feature 4

This feature comprises the position of the road bridge that was built across the Groot-Nylrivier. What is interesting is that no bridge is depicted on this map in this position. While the omission of the bridge from this map depiction suggest that the bridge was not yet built at the time that the map was surveyed (1965), the observations made during the fieldwork suggest that the bridge dates from a period even before the compilation of this map.

First Edition of the 2428CD Topographic Map

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Figure 13 below depicts a section of the First Edition of the 2428CD Topographical Map Sheet. This sheet was based on aerial photography undertaken in 1960, was surveyed in 1965 and drawn in 1967 by the Trigonometrical Survey Office.

Using the overlay function of Google Earth, an overlay was made of the study area over this topographic sheet. The following observations can be made of this depiction.

- No graves or cemeteries are depicted within proximity to the study area; and
- One feature was identified on the map. While all the map features marked here and in the previous section are not necessarily features depicted on the maps, they are highlighted to allow for further observations below.

The following features are marked on the depiction below:

- Feature 1

This feature comprises the place where the N1 highway between Pretoria and Polokwane cuts across the R33 road. It is clear from this depiction that the highway was not yet built at the time that the map was surveyed in 1967

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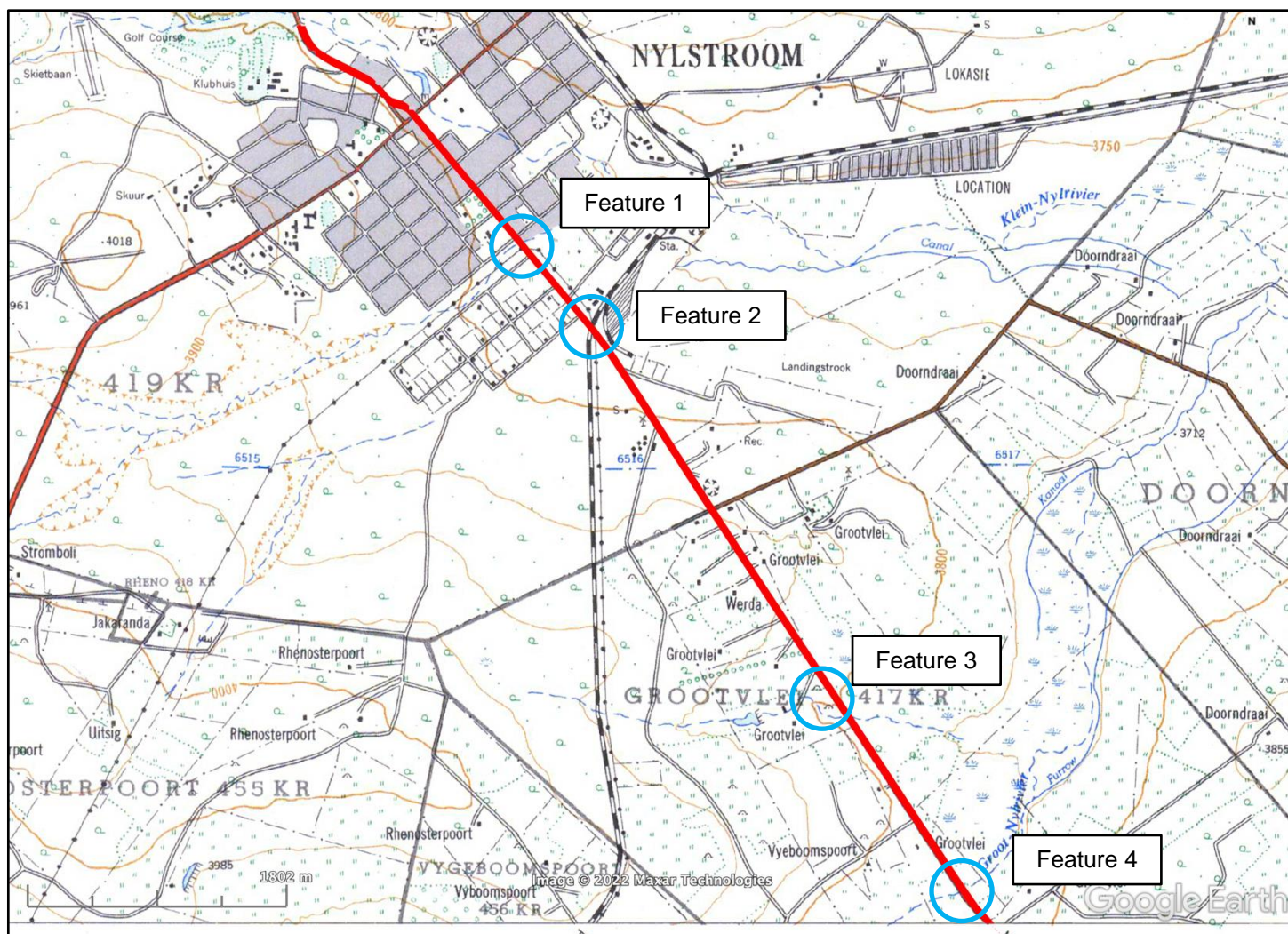


Figure 11 – Detail view of the northern section of the study area as depicted on the First Edition of the 2428CB Topographical Sheet.

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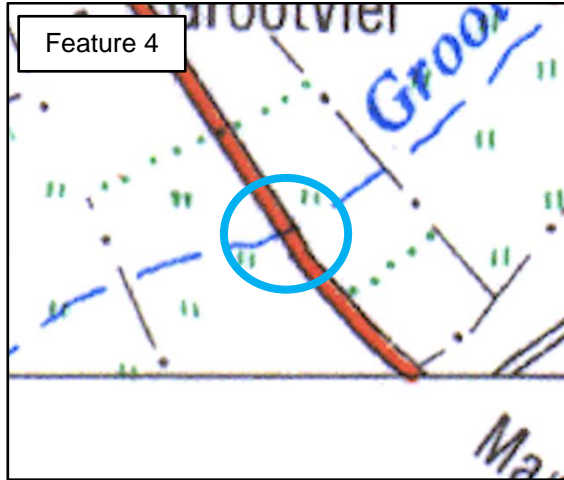
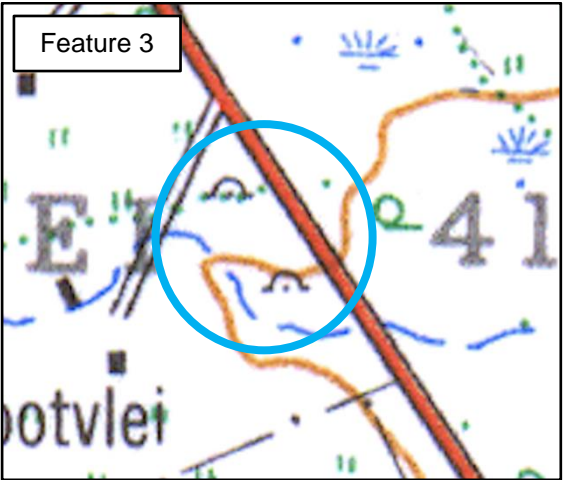
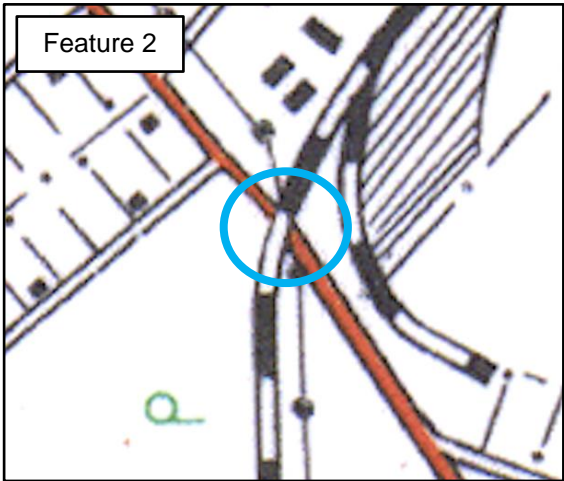
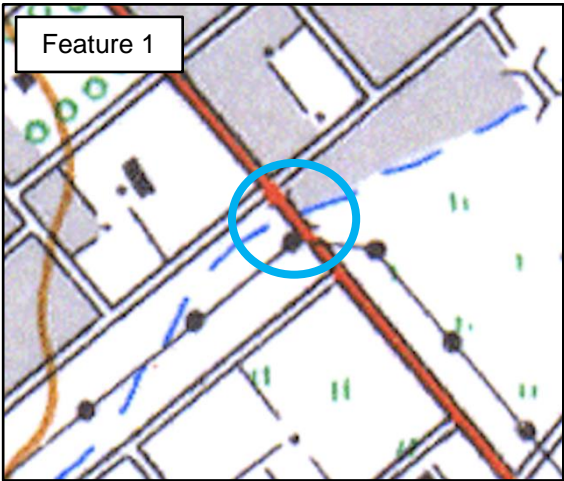


Figure 12 – These four images provide detailed views of the four features identified on the previous depiction of the 2428CB Topographic Sheet.

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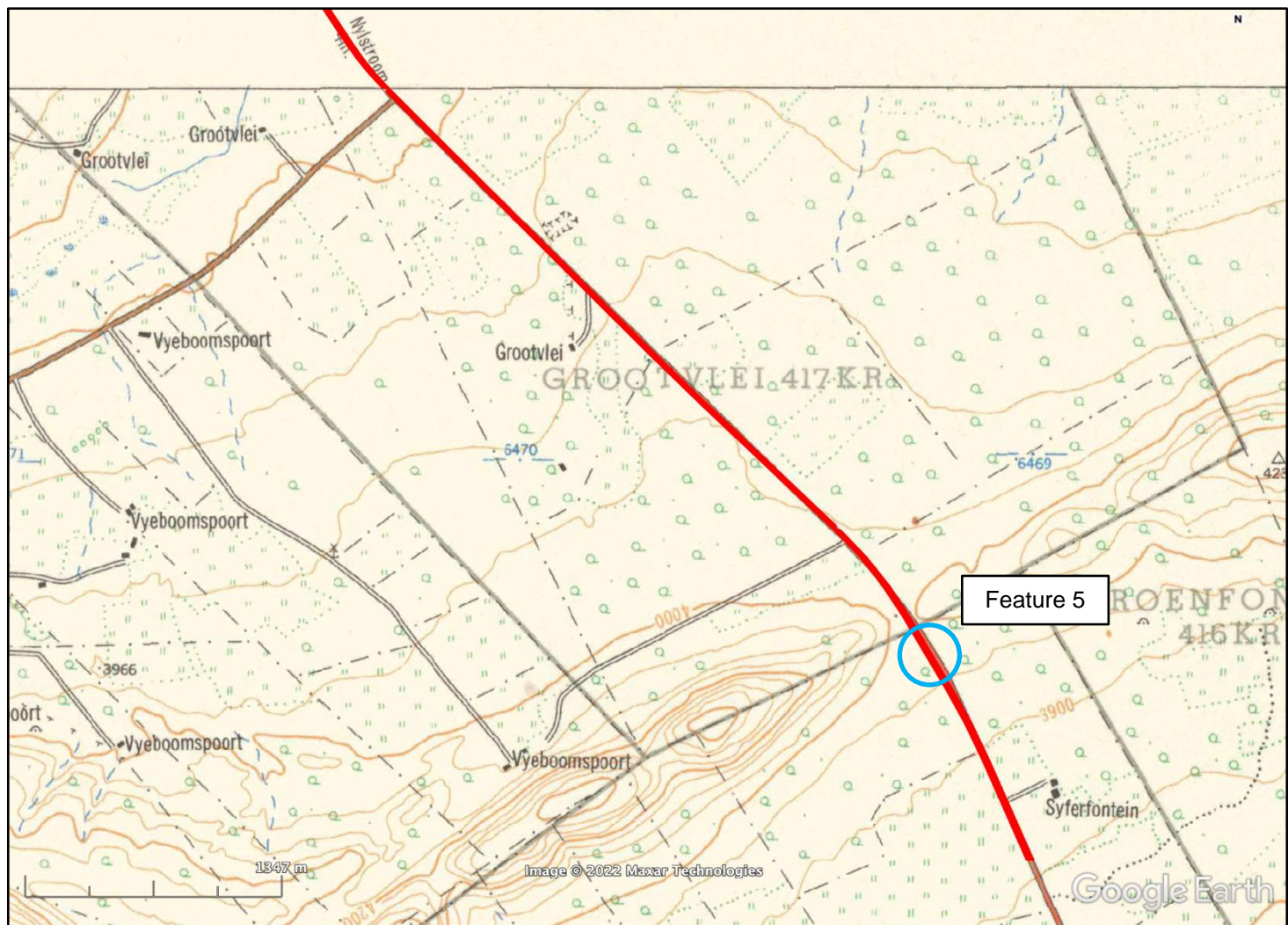


Figure 13 – Detail view of the southern section of the study area as depicted on the First Edition of the 2428CD Topographical Sheet.

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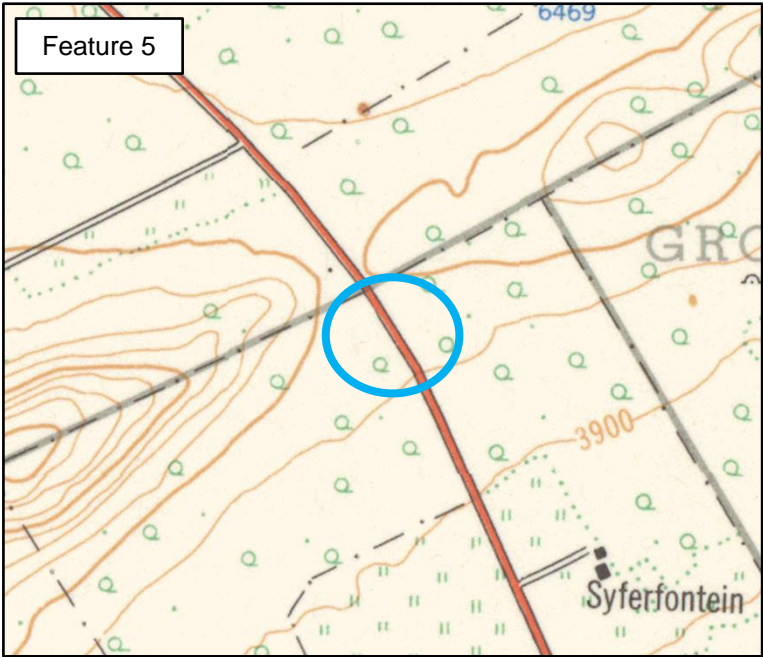


Figure 14 – This image provides a detailed view of the feature identified on the previous depiction of the 2428CD Topographic Sheet.

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4.2.4 Previous heritage impact assessment reports from the study area and surroundings

A search of the South African Heritage Resources Information System (SAHRIS) database revealed that several previous archaeological and heritage impact assessments had been undertaken within the surroundings of the study area. In each case, the results of each study are shown in bold. These previous studies are listed in chronological order below:

- Roodt, F. 2002. *Heritage Exemption Letter for a Proposed Vodacom Mast at Laerskool Eenheid, Nylstroom*. Unpublished report for Gaia Earth Science. **As this document is an exemption letter, no heritage resources were identified.**
- Stegmann, L. & F. Roodt. 2008. *Phase 1 Heritage Resources Scoping Report: Substation Extension and Powerline Upgrade, Modimolle, Limpopo*. Unpublished report for EnviroExcellence. **No heritage resources were identified.**
- Roodt, F. 2009. *Phase 1 Heritage Resource Impact Assessment for a Proposed Township Extension Modimolle (Nylstroom Extension 33), Limpopo*. Unpublished report for Envirodel. **No heritage resources were identified.**
- Muroyi, R. 2016. *Heritage Impact Assessment Study for the Proposed Modimolle Bulk Water Supply and Storage Reservoir, Modimolle, Limpopo Province*. Unpublished report for Green Vision Consulting. **No heritage resources were identified.**
- Van Vollenhoven, A.C. 2016. *A Report on a Heritage Impact Assessment for the Proposed Modimolle Substation, Limpopo Province*. Unpublished report for Texture Environmental Consultants. **No heritage resources were identified.**
- Van Vollenhoven, A.C. 2016b. *A Report on a Walk Down Heritage Impact Assessment for the Proposed Phagameng 11 kV Line, Limpopo Province*. Unpublished report for Texture Environmental Consultants. **No heritage resources were identified.**
- Gaigher, S. 2017. *Phase 1 Heritage Impact Assessment for the Mining Rights Application located on Portion 11 and Portion 34 of the Farm Cyferfontein 457-KR in the Waterberg District Municipality of the Limpopo Province*. Unpublished report for Manyabe Consultancy. **A burial ground comprising at least four graves was identified.**
- Küsel, U. 2019. *Phase 1 Cultural Heritage Resources Impact Assessment for Section 102 Portion 61 and 62 of the Farm Cyferfontein 457 KR, Modimolle Local Municipality, Limpopo Province*. Unpublished report for BECS Environmental. **No heritage resources were identified.**

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4.2.5 Heritage screening

A heritage screening report was compiled by the Department of Environmental Affairs National Web-based Environmental Screening Tool as required by Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended. According to the heritage screening report, the north-western section of the project area, which is the area associated with the town of Modimolle, has a Very High Heritage Sensitivity (**Figure 15**). The fieldwork has confirmed this in that out of six heritage sites identified during the fieldwork, four are located within the town of Modimolle.

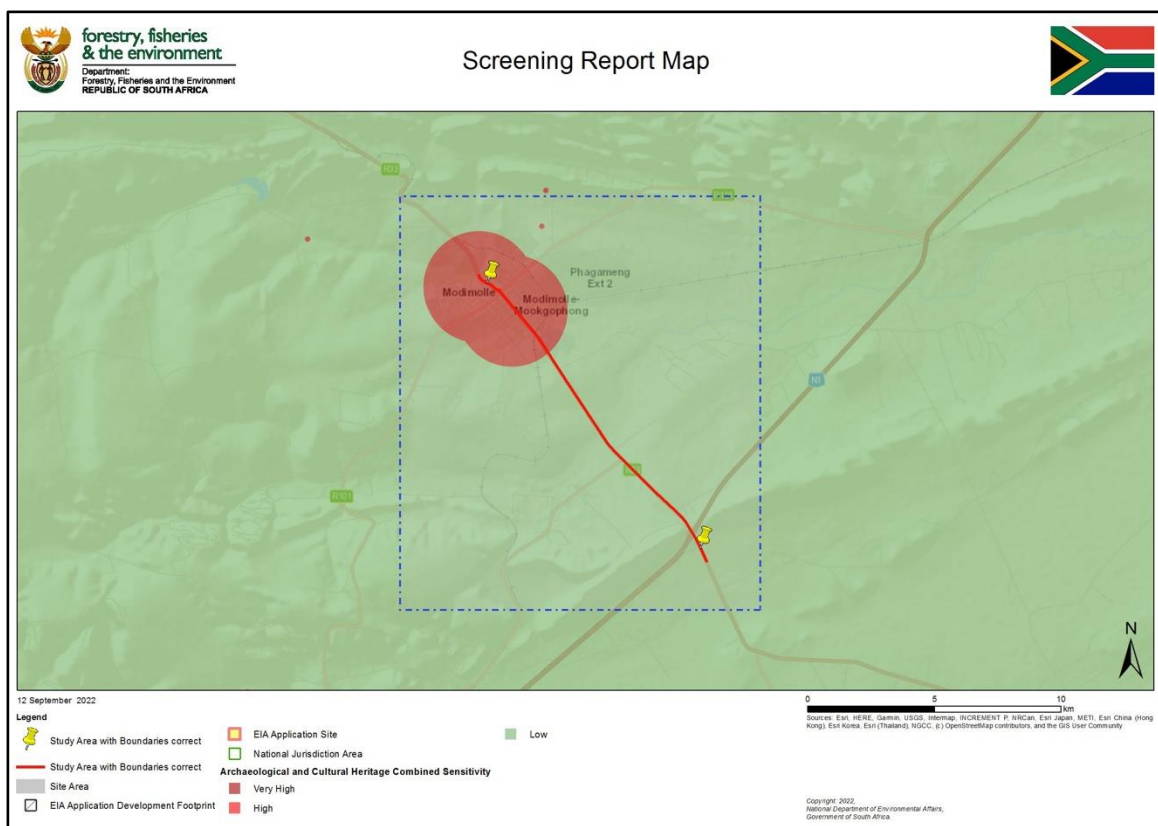


Figure 15 - Screening tool map indicating a very high combined sensitivity rating for archaeology and cultural heritage for the town of Modimolle.

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4.3 Fieldwork findings¹

4.3.1 Overview of Fieldwork Findings

The fieldwork was conducted on Thursday, 21 July 2022 by an experienced fieldwork team from PGS. The fieldwork team included two archaeologists (Polke D. Birkholtz and Nicholas Fletcher) and one fieldwork assistant (Derrick James). Their movement on site was tracked by two hand-held GPS devices. Refer to **Figure 16**, **Figure 17** and **Figure 18** for the maps depicting these recording tracklogs.

Walkthroughs were undertaken either side of the road for the entire rural section of the proposed road upgrade. This represents a section of the study area approximately 10km in length. The urban section where the study area comprises built-up sidewalks was assessed by slowly driving through this area four times and conducting frequent stops. During the fieldwork, a total of six heritage features and resources were identified, with two heritage sites identified in the rural component of the study area and four heritage sites identified in the urban component. Refer to **Figure 19** for a map depicting the distribution of these identified heritage sites.

The heritage sites identified during the fieldwork, are as follows:

- **MRUP 1:** Old Bridge
- **MRUP 2:** Old Bridge
- **MRUP 3:** Old Magistrate's Court
- **MRUP 4:** Building which Housed the Bioscope
- **MRUP 5:** The Face Brick Building containing the Pharmacy of Gerrit Bakker
- **MRUP 6:** Old House that is used as Business Premises

Additionally, the fieldwork found that the urban component of the study area is largely comprised of the existing road surface, parking spaces on each side of the road surface and built-up sidewalks. The areas located immediately outside of the study area boundaries in the urban section are characterised by primarily rows of buildings and structures on both sides of the road. Furthermore, the section of the urban component of the study area that is located between Paul Kruger Street and Vos Street is considered to have some historic value.

¹ Site in this context refers to a place where a heritage resource is located and not a proclaimed heritage site as contemplated under s27 of the NHRA.

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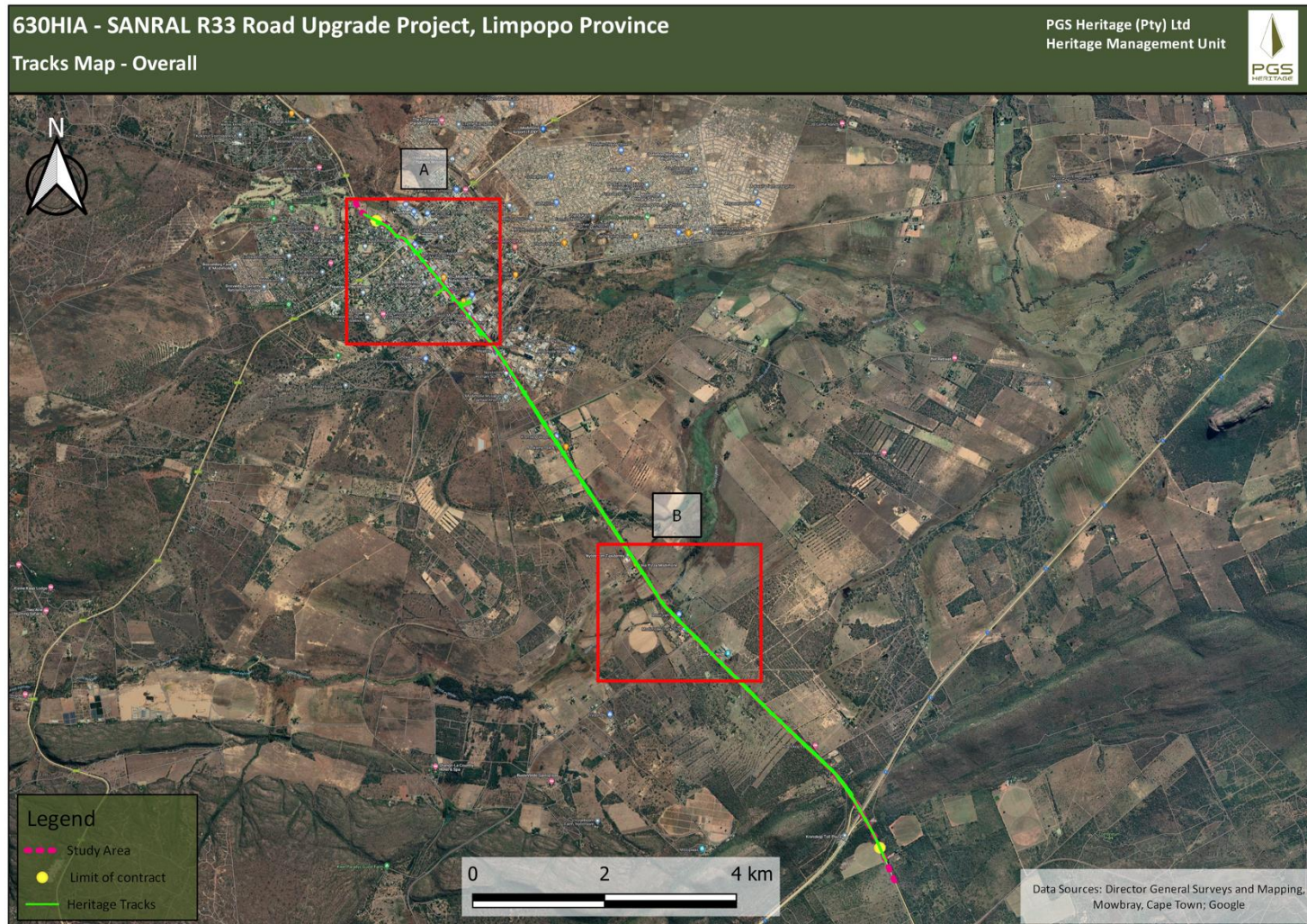


Figure 16 – Map depicting the tracks that were recorded during the fieldwork. The recorded tracks are in green line.

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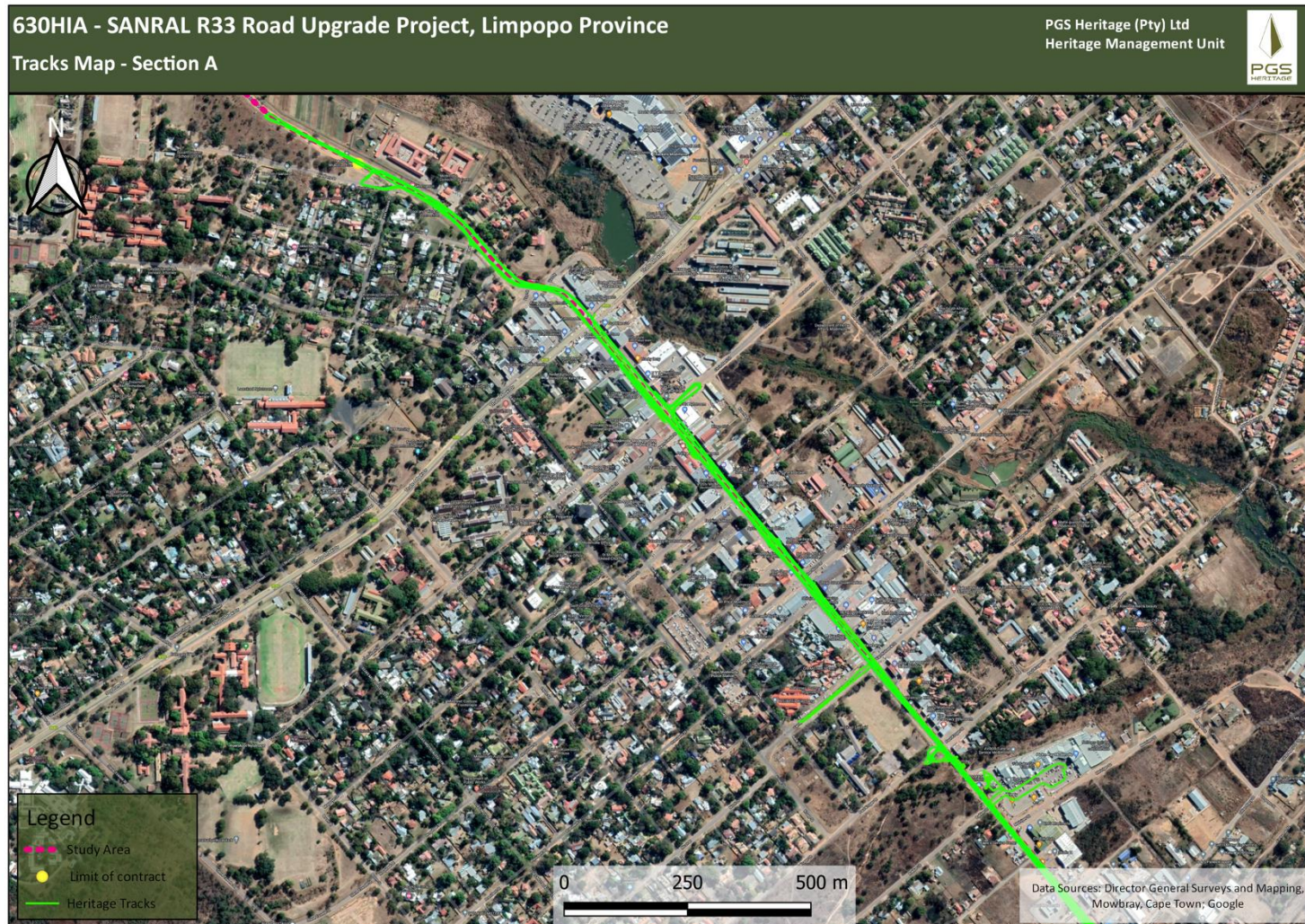


Figure 17 – Closer view of a section of the project area to illustrate the tracks (green line) that were recorded in the study area's urban component.

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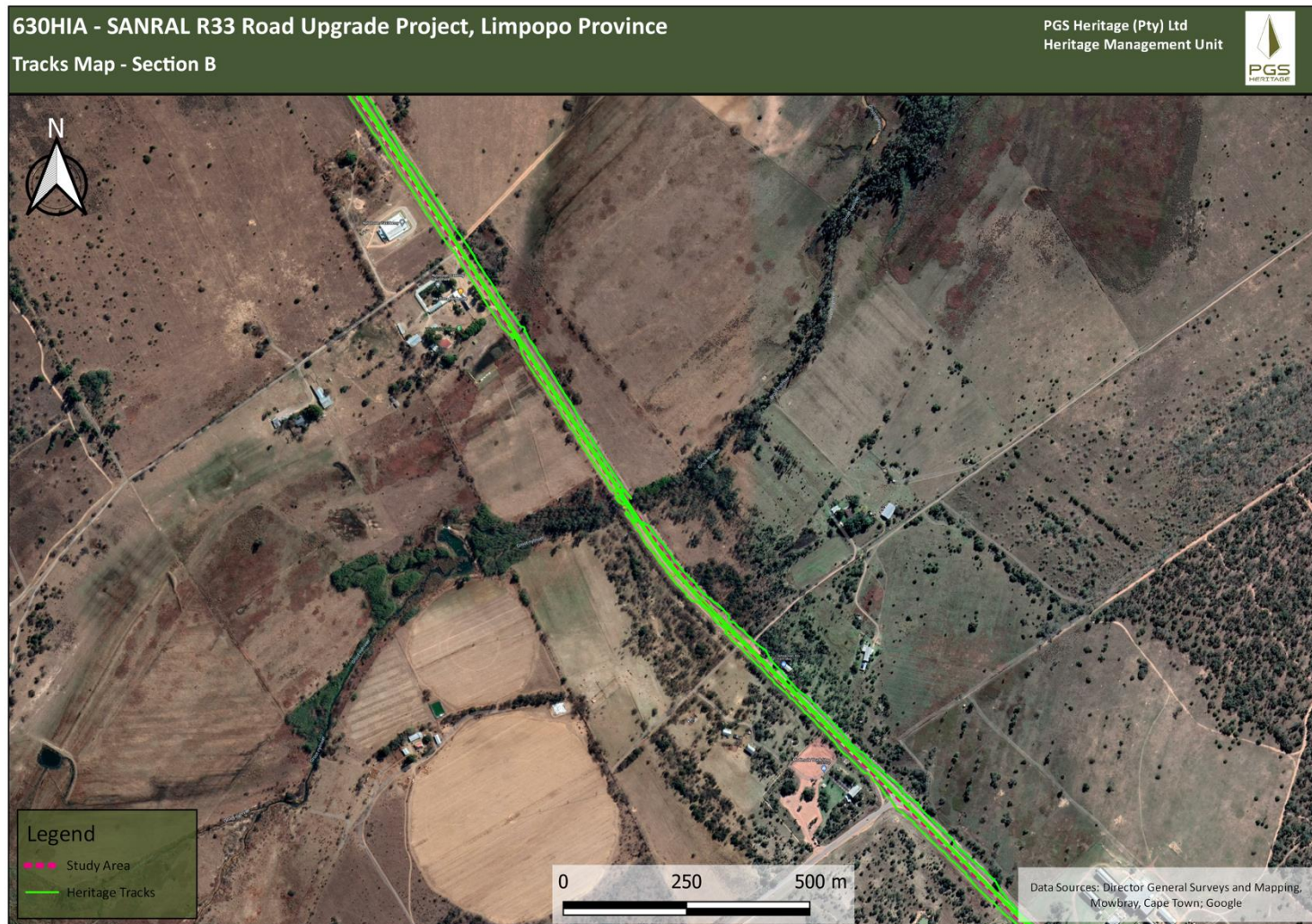


Figure 18 – Closer view of a section of the project area to illustrate the tracks (green line) that were recorded in the study area's rural component.

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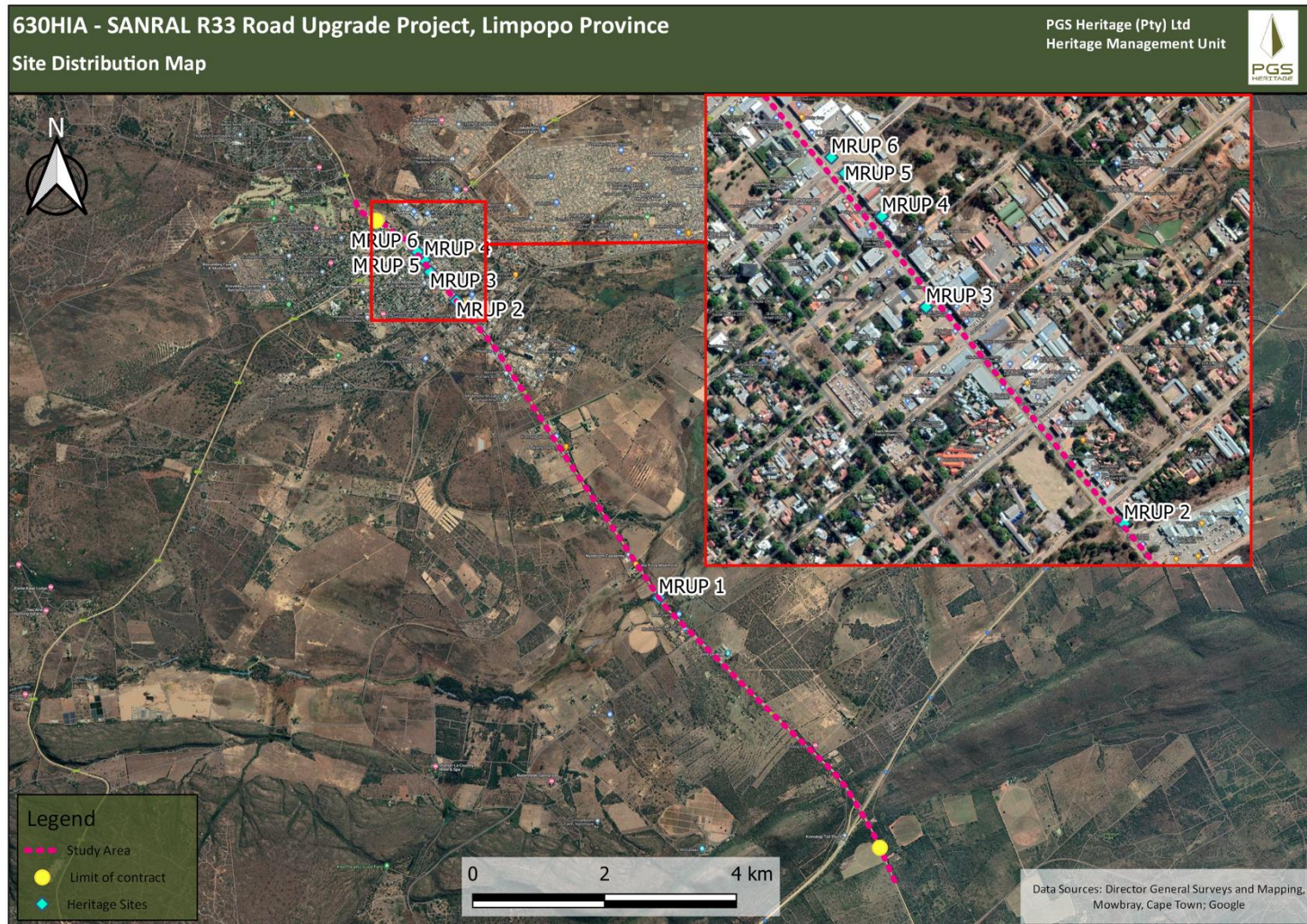


Figure 19 – Distribution of identified heritage sites across the study area.

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4.3.2 Heritage Sites identified in the Rural Component of the Study Area

The rural component of the study area was intensively assessed by way of walkthroughs conducted on both sides of the road. Despite the intensiveness of the fieldwork undertaken, only two heritage sites were identified in this section of the study area. These two sites are both bridges that are believed to be older than 60 years. These two sites are discussed in more detail below.

During the walkthroughs of the rural component of the study area a line of telephone poles was observed. The telephone poles were observed primarily along the south-western side of the R33, although a smaller section in proximity to the N1 highway was also identified along the other side of the road. These connected telephone poles were erected in such a way that the poles were placed in proximity to the farm fences while also allowing for the resulting telephone lines to run parallel to the fences. A closer inspection of these telephone poles revealed that they appear to be very old and must have been erected many years ago. Most of these telephone poles contain an inscription that was embossed at the base of these poles. The inscription reads as follows: “D.F. Thomson & Co. London.” A company by this time is known to have been merchants of wrought iron tubes and cast-iron pipe during the early twentieth century. See for example the Report of the Tariff Commission of Great Britain for the year 1909.

While the old telephone line is located outside of the study area, it is important that care be taken during construction to avoid any unnecessary disturbance or impact on the old telephone line.



Figure 20 – View of the lower section of one of the old telephone poles.



Figure 21 – Detail view of the embossed inscription found on many of these old poles.

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Site MRUP 1

GPS Coordinates:

S -24.748586

E 28.443643

Type: Historical Structure

Description:

Site **MRUP 1** comprises an old concrete bridge that was constructed over the Groot-Nylrivier. It was built using a technique called shuttering whereby predefined sections were added piecemeal, with the next section only added once the one below had sufficiently hardened.

In terms of age, the assessment of the First Edition of the 2428CB sheet that was surveyed in 1965 suggests that the bridge was not built yet. Although not included in this report, the Second Edition of the same map surveyed in 1981 also does not depict the bridge. The first depiction of a bridge here is on the Third Edition of the 2428CB sheet that was surveyed in 2005. According to this information, the bridge is between 41 and 17 years old. However, the tangible remains, and general characteristics of the bridge as observed during the fieldwork, suggest an older construction date.

Until further information on the age of the building becomes available by way of the recommended archival research, the structure is considered to be older than 60 years.

Significance:

The site is believed to be older than 60 years but cannot be considered a particularly unique structure. The site is of **Grade IIIC** or **Low Significance**. The structure may be demolished, but mitigation would be required.

Site Extent:

The site is 70m x 30m in extent.

Impact Assessment and Mitigation:

See **Chapter 5** for impact assessment calculations and **Chapter 6** for required mitigation and measures.

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Figure 22 – General view of the bridge at site **MRUP 1**.



Figure 23 – Closer view of the bridge at site **MRUP 1**.

Site MRUP 2

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GPS Coordinates:

S -24.708136

E 28.413285

Type: Historical Structure

Description:

Site **MRUP 2** comprises an old concrete bridge that was constructed over the Klein-Nylrivier. The bridge is located on the southern periphery of the town of Modimolle. It appears to have been built in two sections at different times.

In terms of age, the assessment of the First Edition of the 2428CB Topographic Map that was surveyed in 1965 indicates that the bridge was certainly already built at the time. This map indicates that the bridge is at least 57 years old and quite likely older than 60 years. This is supported by the tangible remains and general characteristics of the bridge as observed during the fieldwork

Significance:

The site is believed to be older than 60 years. This said, it cannot be considered a particularly unique structure. As such, the site is considered to be of **Grade IIIC** or **Low Significance**. The structure may be demolished, but mitigation would be required.

Site Extent:

The site is 40m x 20m in extent.

Impact Assessment and Mitigation:

See **Chapter 5** for impact assessment calculations and **Chapter 6** for required mitigation and measures.

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Figure 24 – General view across the surface of the bridge at site **MRUP 2**. This view was taken towards the south-east.



Figure 25 – View along the eastern side of the bridge at site **MRUP 2**.

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4.3.3 Heritage Sites identified in the Urban Component of the Study Area

The urban component of the study area is largely comprised of the existing road surface, parking spaces on each side of the road surface and built-up sidewalks. The areas located immediately outside of the study area boundaries in the urban section are characterised by primarily rows of buildings and structures on both sides of the road.

Four clearly identifiable historic buildings were identified in proximity to the study area during the field assessment of the urban component of the proposed development. While these four buildings represent the most historic buildings associated with the urban section of the study area, they cannot be considered as a complete record of all the historic buildings associated with the urban section of the study area.

The urban component of the study area, and especially that section of the study area located at the very core of the CBD of Modimolle, can be considered to have some historic value. This section is located between Paul Kruger Street in the south and Vos Street in the north. The built fabric found in proximity to this component of the study area can be described as a combination of old buildings in their original form such as the old Magistrate's Court (site **MRUP 3**) and old house (site **MRUP 6**) and newer yet historic buildings of which the bioscope (**MRUP 4**) is an example. This section of the urban component is also primarily associated with shops and commercial buildings, many of which have steel superstructures providing ventilation to the shops, shade to potential customers and surfaces against which signage can be placed. While the structural cores of several of the buildings from this section may in fact be older than 60 years, they have been modified to such an extent that their ages are not evident from the outside anymore. In other cases, the original buildings were demolished, and newer structures erected on the same premises. An example of this is the old pharmacy of Gerrit Bakker that was demolished and replaced by a face brick building (site **MRUP 5**).

Several filling stations, take away restaurants and one school (Eenheid Primary) are also associated with the core of the urban component of the study area. According to an article that appeared on 31 August 2020 in a local newspaper, one of the concentration camps where Boer women and children were held during the Anglo Boer War, was located on the premises of this school (Die Pos, 2020).

Apart from the rows of buildings and structures on both sides of the study area, the urban component is also characterised by several elements only found in this section. These include lampposts, cylindrical concrete dustbins, municipal transformers, traffic lights, traffic signs and road signs. Additionally, the surface of the urban section is almost exclusively defined by parking areas on the sides of the road surface and built-up sidewalks.

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While no buildings are expected to be disturbed or destroyed during the proposed road upgrade project, it is important for the construction team to be made aware of the historic value of these buildings. The potential for archaeological middens associated with the early history of the town to have been capped and protected by the construction of sidewalks throughout this area, also exist. Archaeological monitoring during construction activities would therefore also be required for the section between Paul Kruger Street in the south and Vos Street in the north.



Figure 26 – General view of a section of the urban component. Note the shops as well as the cylindrical concrete dustbins and lampposts.



Figure 27 – Two older shops associated with the urban component of the study area. The imposing building on the left is the old bioscope that is included in this report as site MRUP 4.

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Figure 28 – Another typical view of a section of the urban component showing rows of shops.



Figure 29 – This view was taken along the sidewalk of the urban component showing covered shopfronts. Note the palm trees and lamppost.

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Figure 30 – This view also shows the shaded shopfronts, lampposts, and concrete dustbins.



Figure 31 – This section of the urban component is characterised by double-storied buildings with a row of palm trees in the front.

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Figure 32 – This old municipal transformer box appears to be located within the study area.



Figure 33 – This photograph was taken across the front of Eenheid Primary and shows one of the filling stations on the left as well as a very old tree in the back.

Site MRUP 3

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GPS Coordinates:

S -24.704199

E 28.409324

Type: Historical Structure

Description:

Site **MRUP 3** comprises a very old building that appears to have been the old Magistrate's Court of Nylstroom (Modimolle). While the site includes all the buildings located on this historic stand, the imposing building positioned directly on the road is of highest significance. This building was constructed on a stone foundation and depicts elaborate architectural detail across its façade.

While the exact age of the building is not currently known, its architectural characteristics indicate that it is at least 100 years old, and quite likely a few years older.

Significance:

The site is believed to be older than 100 years. The building appears to be one the oldest remaining buildings located on Nelson Mandela Drive. It is unique and of very high historic significance. As such, the site is considered to be of **Grade IIIA** or **High Significance**.

Site Extent:

The site is 60m x 50m in extent.

Impact Assessment and Mitigation:

See **Chapter 5** for impact assessment calculations and **Chapter 6** for required mitigation and measures.

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Figure 34 – General view of the old Magistrate's Court at site **MRUP 3**.



Figure 35 – Closer view of a section of the building at site **MRUP 3**.

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Site MRUP 4

GPS Coordinates:

S -24.702548

E 28.408439

Type: Historical Structure

Description:

Site **MRUP 4** comprises a very high building that appears to have been the town's former bioscope. Such bioscopes became features of many towns in South Africa. While the exact age of the building is not known, it is certainly older than 60 years.

Significance:

The site is believed to be older than 60 years. The building represents a reasonably unique structure that almost symbolized a period in the history of the country. As a result, it can be considered unique for its surroundings and of historic significance. As such, the site is considered to be of **Grade IIIB** or **Medium Significance**.

Site Extent:

The site is 50m x 22m in extent.

Impact Assessment and Mitigation:

See **Chapter 5** for impact assessment calculations and **Chapter 6** for required mitigation and measures.

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Figure 36 – General view of the old bioscope at site **MRUP 4**.



Figure 37 – The front façade of the bioscope at site **MRUP 4**.

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Site MRUP 5

GPS Coordinates:

S -24.701766

E 28.407698

Type: Historical Structure

Description:

Site **MRUP 5** comprises an unassuming face brick building that is currently used as a Spar. Lettering added to the front façade of the building indicates in both English and Afrikaans that this used to be the pharmacy of Gerrit Bakker. The date 1910 is also provided. While it is clear from the architectural characteristics of the building that it is certainly not 112 years old, the building is likely older than 60 years. Additionally, this was also the site where the original pharmacy of Gerrit Bakker was located.² The original pharmacy was opened in 1910 an old house located on the premises. The original house was evidently demolished when the face brick building was erected.

Gerrit Bakker is a well-known figure associated with the early history and development of what was then known as Nylstroom. He came to South Africa as a pharmacist for the Netherlands-South African Railway Company (NZASM). Later in his life he also acted as a member of the town council.

Significance:

The site is believed to be older than 60 years. The building represents a reasonably unique structure associated with a historic figure from this town and landscape. As such, the site is considered to be of **Grade IIIA** or **High Significance**.

Site Extent:

The site is 42m x 38m in extent.

Impact Assessment and Mitigation:

See **Chapter 5** for impact assessment calculations and **Chapter 6** for required mitigation and measures.

² Information regarding Gerrit Bakker and his pharmacy were obtained from information on the Facebook page of The Heritage Foundation that was posted on 26 February 2016.

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Figure 38 – General view of the pharmacy building at site **MRUP 5**. The building is currently used as a business premises by the Spar.



Figure 39 – Closer view of the lettering placed on the façade of the old building at site **MRUP 5**. It reads 'Gerrit Bakker Apteker en Druggist Anno 1910'.

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GPS Coordinates:

S -24.701478

E 28.407428

Type: Historical Structure

Description:

Site **MRUP 6** comprises a remarkably small through very old residential dwelling that was turned into a business. While the exact age of the building is not known, it is definitely older than 60 years and almost certainly older than 100 years as well. The building was partially constructed on a stone foundation and has a pyramid-shaped corrugated iron roof with a ventilated top.

Significance:

The building is certainly older than 100 years. This is the only dwelling of this age that could be observed anywhere in proximity to the study area. As a result, it can be considered unique for its surroundings and of historic significance. As such, the site is considered to be of **Grade IIIB** or **Medium Significance**.

Site Extent:

The site is 20m x 11m in extent.

Impact Assessment and Mitigation:

See **Chapter 5** for impact assessment calculations and **Chapter 6** for required mitigation and measures.

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Figure 40 – General view of the residential dwelling at site **MRUP 6**. The dwelling was turned into a business with one section used as a practice for an eye specialist.



Figure 41 – An angled view of the old dwelling at site **MRUP 6**.

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4.4 Palaeontology

Banzai Environmental was appointed by PGS to conduct the Palaeontological Desktop Assessment (PDA) for the project area. This PDA revealed that the proposed development is underlain by diabase as well as the Alma and Swaershoek Formations (Nylstroom Subgroup, Waterberg Group) (Butler, 2022). According to the PalaeoMap on the SAHRIS database, the Palaeontological Sensitivity of diabase is Zero while that of the Nylstroom Subgroup (Waterberg Group) is Moderate (Almond and Pether 2008, SAHRIS website).

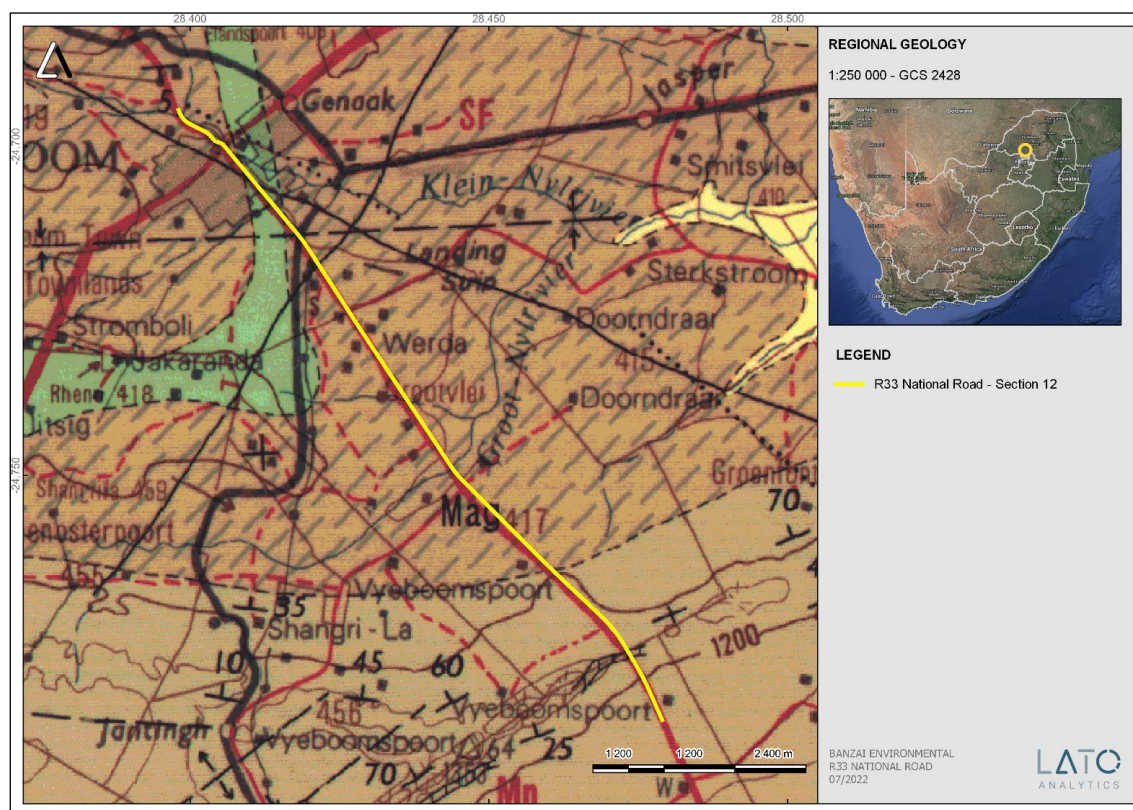


Figure 42 – The proposed R33 National Road Upgrade is underlain by diabase (d, green); Alma Formation (Mag, stippled brown) and Swaershoek Formation (Ms, brown) of the Nylstroom Subgroup, Waterberg Group (Butler, 2022:12).

A Low Significance has been allocated to the development. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological resources of the area. The construction and operation of the project may be authorised, as the whole extent of the development footprint is not considered sensitive in terms of palaeontological heritage. If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the Environmental Control Officer (ECO) in charge of these developments must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a palaeontologist. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

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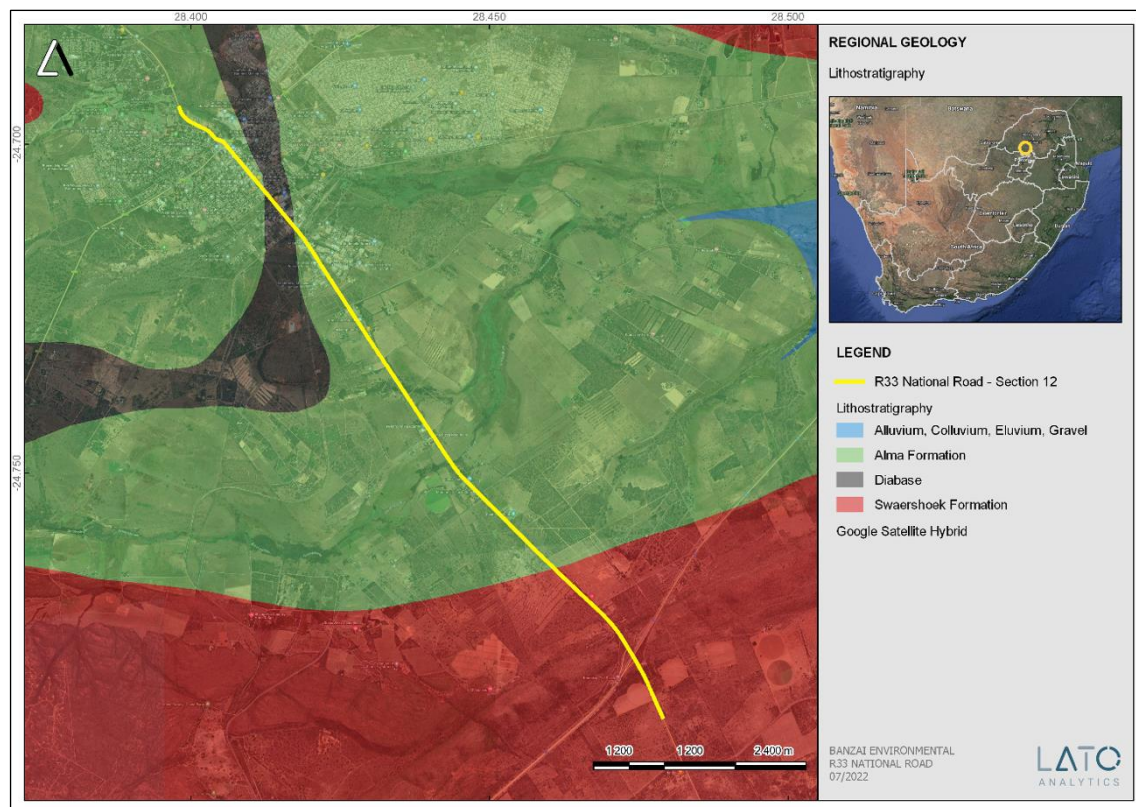


Figure 43 – Geology indicated by Shape Files (Council for Geosciences, Pretoria) (Butler, 2022:15).

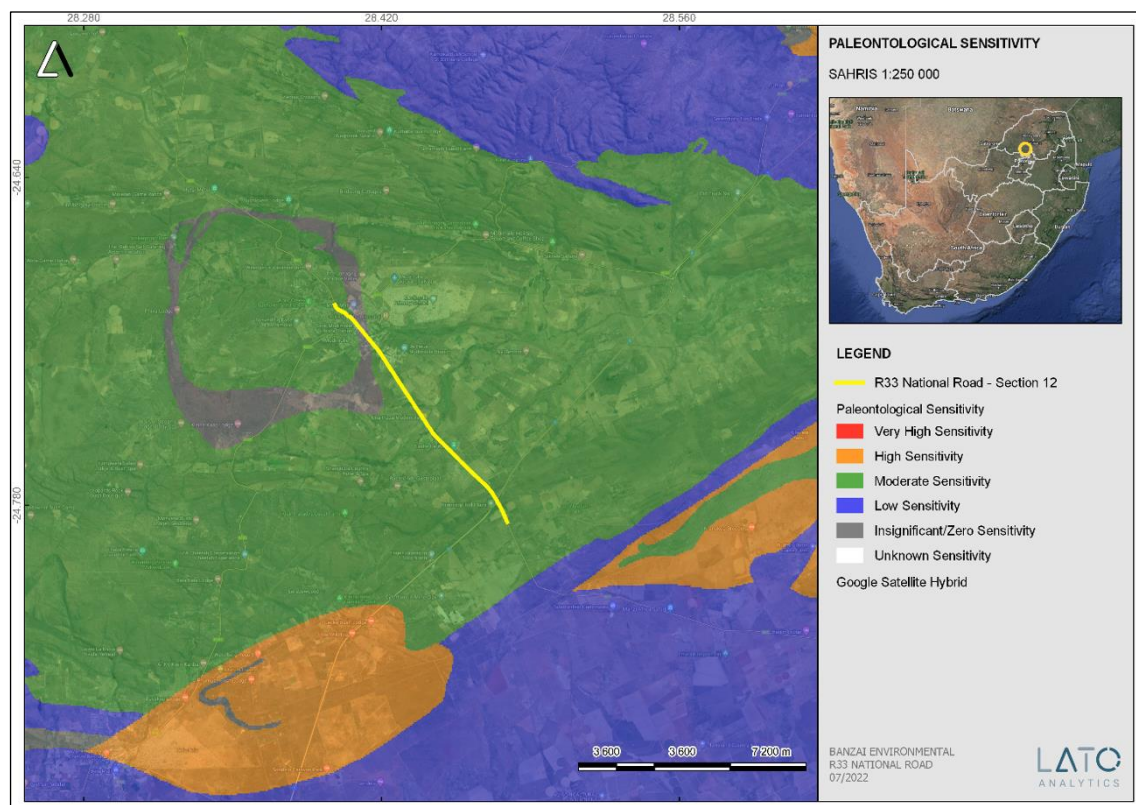


Figure 44 – Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating the proposed development in yellow.

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5 IMPACT ASSESSMENT

5.1 Introduction

The following development impacts on heritage can be identified:

- Destruction or disturbance of the old bridges at sites **MRUP 1** and **MRUP 2**;
- Destruction or disturbance of the four historic buildings identified at sites **MRUP 3**, **MRUP 4**, **MRUP 5** and **MRUP 6**; and
- Destruction or disturbance of subterranean archaeological middens of historical age associated with the history of the town of Modimolle.

The PDA that was compiled by Banzai Environmental indicates that that the proposed development will not lead to detrimental impacts on the palaeontological resources of the area (Butler, 2022).

The assessment of the significance of these development impacts due to the proposed SANRAL R33 Road Upgrade Project, will be undertaken below. These impact assessments will be undertaken according to the impact assessment methodology provided by Environmental Edge (Pty) Ltd. Refer to **Appendix B**.

5.2 Impact Assessments

The impact assessments as calculated using the impact assessment methodology will be provided on the pages below.

Table 4: Assessment of the Impact of the Proposed Development on Bridges

| IMPACT TABLE FORMAT | | | |
|--|---|-------------------|------------------|
| | Description | Before Mitigation | After Mitigation |
| Heritage | <i>Destruction or disturbance of the old bridges at sites MRUP 1 and MRUP 2.</i> | | |
| Extent (Ex) | <i>A brief description indicating the chances of the impact occurring.</i> | 3 | 2 |
| Probability (Pr) | <i>A brief description of the ability of the environmental components recovery after a disturbance as a result of the activity.</i> | 3 | 2 |
| Reversibility (Re) | <i>A brief description of the environmental aspect likely to be affected by the activity e.g. Surface water.</i> | 4 | 3 |
| Irreplaceable loss of resources (L) | <i>A brief description of the degree in which irreplaceable resources are likely to be lost.</i> | 2 | 1 |

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| | | | |
|--------------------------------|--|---------------------------------|------------------------------|
| Duration (D) | <i>A brief description of the amount of time the activity is likely to take to its completion.</i> | 2 | 2 |
| Cumulative effect (CE) | <i>A brief description of whether the impact will be exacerbated as a result of the activity.</i> | 3 | 1 |
| Intensity/magnitude (M) | <i>A brief description of whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily.</i> | 3 | 2 |
| Significance Rating | <i>A brief description of the importance of an impact which in turn dictates the level of mitigation required.</i> | -51 (Negative Medium Impact) | -22 (Negative Low Impact) |
| Mitigation measures | <p><i>The following initial mitigation measures are required:</i></p> <ul style="list-style-type: none"> <i>Archival research to establish more precise ages for the two bridges; and</i> <i>Compilation of a report containing the findings and observations resulting from the archival research.</i> <p><i>The following mitigation measures are required for all bridges that the archival research has shown are older than 60 years:</i></p> <ul style="list-style-type: none"> <i>Recording of the structural remains. Such recording may include photographic recording, measured drawings and the compilation of a site layout plan. Less recording would be required in cases where the archival research also yielded a building plan or plans;</i> <i>Compilation of a mitigation report containing all the findings of the archival research as well as the data yielded during the recording of the site; and</i> <i>Submission of the mitigation report with a destruction permit application to the appropriate heritage authority. Structural remains older than 60 years may only be destroyed once this permit is issued.</i> <p><i>Structures that the archival research has revealed are younger than 60 years may be destroyed without the need for a permit.</i></p> | | |

Table 5: Assessment of the Impact of the Proposed Development on Historic Buildings

| IMPACT TABLE FORMAT | | | |
|--|--|-------------------|------------------|
| | Description | Before Mitigation | After Mitigation |
| Heritage | <i>Destruction or disturbance of the four historic buildings at sites MRUP 3, MRUP 4, MRUP 5 and MRUP 6.</i> | | |
| Extent (Ex) | <i>A brief description indicating the chances of the impact occurring.</i> | 3 | N/A |
| Probability (Pr) | <i>A brief description of the ability of the environmental components recovery after a disturbance as a result of the activity.</i> | 2 | N/A |
| Reversibility (Re) | <i>A brief description of the environmental aspect likely to be affected by the activity e.g. Surface water.</i> | 2 | N/A |
| Irreplaceable loss of resources (L) | <i>A brief description of the degree in which irreplaceable resources are likely to be lost.</i> | 1 | N/A |
| Duration (D) | <i>A brief description of the amount of time the activity is likely to take to its completion.</i> | 2 | N/A |
| Cumulative effect (CE) | <i>A brief description of whether the impact will be exacerbated as a result of the activity.</i> | 2 | N/A |

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| | | | |
|--------------------------------|--|------------------------------|-----|
| Intensity/magnitude (M) | <i>A brief description of whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily.</i> | 2 | N/A |
| Significance Rating | <i>A brief description of the importance of an impact which in turn dictates the level of mitigation required.</i> | -24 (Negative Low Impact) | N/A |
| Mitigation measures | <i>No mitigation is required. However, the following management measures are advised:</i> <ul style="list-style-type: none"> <i>The EAP and construction team must be made aware of these historic buildings and their significance; and</i> <i>The EAP and construction team must be informed to ensure that no disturbance to these historic buildings take place.</i> | | |

Table 6: Assessment of the Development Impact on the Possible Presence of Subterranean Archaeological Middens of Historical Age

| IMPACT TABLE FORMAT | | | |
|--|---|---------------------------------|------------------------------|
| | Description | Before Mitigation | After Mitigation |
| Heritage | <i>Destruction or disturbance of the subterranean archaeological middens</i> | | |
| Extent (Ex) | <i>A brief description indicating the chances of the impact occurring.</i> | 3 | 2 |
| Probability (Pr) | <i>A brief description of the ability of the environmental components recovery after a disturbance as a result of the activity.</i> | 2 | 1 |
| Reversibility (Re) | <i>A brief description of the environmental aspect likely to be affected by the activity e.g. Surface water.</i> | 4 | 3 |
| Irreplaceable loss of resources (L) | <i>A brief description of the degree in which irreplaceable resources are likely to be lost.</i> | 3 | 2 |
| Duration (D) | <i>A brief description of the amount of time the activity is likely to take to its completion.</i> | 3 | 3 |
| Cumulative effect (CE) | <i>A brief description of whether the impact will be exacerbated as a result of the activity.</i> | 2 | 2 |
| Intensity/magnitude (M) | <i>A brief description of whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily.</i> | 2 | 1 |
| Significance Rating | <i>A brief description of the importance of an impact which in turn dictates the level of mitigation required.</i> | -34 (Negative Medium Impact) | -13 (Negative Low Impact) |
| Mitigation measures | <i>The following mitigation measures are required:</i> <ul style="list-style-type: none"> <i>An archaeological watching brief must be implemented during all construction activities undertaken between Paul Kruger Street and Vos Street.</i> | | |

Table 7: Assessment of the Development Impact on Palaeontology

| IMPACT TABLE FORMAT | | | |
|---------------------|-------------|-------------------|------------------|
| | Description | Before Mitigation | After Mitigation |

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| | | | |
|--|--|---------------------------------|------------------------------|
| Heritage | <i>Destruction or disturbance of the subterranean archaeological middens</i> | | |
| Extent (Ex) | <i>A brief description indicating the chances of the impact occurring.</i> | 1 | 1 |
| Probability (Pr) | <i>A brief description of the ability of the environmental components recovery after a disturbance as a result of the activity.</i> | 2 | 2 |
| Reversibility (Re) | <i>A brief description of the environmental aspect likely to be affected by the activity e.g. Surface water.</i> | 4 | 4 |
| Irreplaceable loss of resources (L) | <i>A brief description of the degree in which irreplaceable resources are likely to be lost.</i> | 4 | 4 |
| Duration (D) | <i>A brief description of the amount of time the activity is likely to take to its completion.</i> | 4 | 4 |
| Cumulative effect (CE) | <i>A brief description of whether the impact will be exacerbated as a result of the activity.</i> | 2 | 2 |
| Intensity/magnitude (M) | <i>A brief description of whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily.</i> | 2 | 1 |
| Significance Rating | <i>A brief description of the importance of an impact which in turn dictates the level of mitigation required.</i> | -34 (Negative Medium Impact) | -17 (Negative Low Impact) |
| Mitigation measures | <p><i>If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the Environmental Control Officer (ECO) in charge of these developments must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a palaeontologist.</i></p> <p><i>It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.</i></p> | | |

6 MITIGATION

6.1 Introduction

The impact assessment calculations undertaken in **Chapter 5** revealed that mitigation measures would be required for the following development impacts:

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- Destruction or disturbance of the old bridges at sites **MRUP 1** and **MRUP 2**; and
- Destruction or disturbance of subterranean archaeological middens of historical age associated with the history of the town of Modimolle.

6.2 Required Mitigation

6.2.1 Mitigation Measures required for the Old Bridges at sites **MRUP 1** and **MRUP 2**

The following initial mitigation measures are required:

- Archival research to establish more precise ages for the two bridges; and
- Compilation of a report containing the findings and observations resulting from the archival research.

The following mitigation measures are required for all bridges that the archival research has shown are older than 60 years:

- Recording of the structural remains. Such recording may include photographic recording, measured drawings and the compilation of a site layout plan. Less recording would be required in cases where the archival research also yielded a building plan or plans;
- Compilation of a mitigation report containing all the findings of the archival research as well as the data yielded during the recording of the site; and
- Submission of the mitigation report with a destruction permit application to the appropriate heritage authority. Structural remains older than 60 years may only be destroyed once this permit is issued.

Structures that the archival research has revealed are younger than 60 years may be destroyed without the need for a permit.

6.2.2 Mitigation Measures required for the Possible Destruction of Subterranean Archaeological Deposits

The following mitigation measures are required:

- An archaeological watching brief must be implemented during all construction activities undertaken between Paul Kruger Street and Vos Street.

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7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

The HIA identified various heritage resources within the study area including old bridges and historic buildings. Additionally, the risk for the presence of subterranean archaeological deposits associated with the history of the town of Modimolle was also identified. Further mitigation measures would be required to address the development impact on these heritage sites and risks.

The heritage sites identified during the fieldwork, are as follows:

- **MRUP 1:** Old Bridge
- **MRUP 2:** Old Bridge
- **MRUP 3:** Old Magistrate's Court
- **MRUP 4:** Building which Housed the Bioscope
- **MRUP 5:** The Face Brick Building containing the Pharmacy of Gerrit Bakker
- **MRUP 6:** Old House that is used as Business Premises

Additionally, the fieldwork found that the urban component of the study area is largely comprised of the existing road surface, parking spaces on each side of the road surface and built-up sidewalks. The areas located immediately outside of the study area boundaries in the urban section are characterised by primarily rows of buildings and structures on both sides of the road. Furthermore, the section of the urban component of the study area that is located between Paul Kruger Street and Vos Street is considered to have some historic value.

In terms of palaeontology, the PDA compiled by Banzai Environmental indicates that the proposed development will not lead to detrimental impacts on the palaeontological resources of the area (Butler, 2022). However, mitigation measures are outlined in the report that must be adhered to.

7.2 Impact Assessment

The HIA identified the following development impacts on heritage:

- Destruction or disturbance of the old bridges at sites **MRUP 1** and **MRUP 2**;
- Destruction or disturbance of the four historic buildings identified at sites **MRUP 3**, **MRUP 4**, **MRUP 5** and **MRUP 6**; and
- Destruction or disturbance of subterranean archaeological middens of historical age associated with the history of the town of Modimolle.

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Impact assessment calculations were undertaken, which revealed that mitigation measures would be required for the old bridges at sites **MRUP 1** and **MRUP 2** and also for the identified risk for the presence of subterranean archaeological middens within the study area.

7.3 Required Mitigation

7.3.1 *Mitigation Measures required for the Old Bridges at sites **MRUP 1** and **MRUP 2***

The following initial mitigation measures are required:

- Archival research to establish more precise ages for the two bridges; and
- Compilation of a report containing the findings and observations resulting from the archival research.

The following mitigation measures are required for all bridges that the archival research has shown are older than 60 years:

- Recording of the structural remains. Such recording may include photographic recording, measured drawings and the compilation of a site layout plan. Less recording would be required in cases where the archival research also yielded a building plan or plans;
- Compilation of a mitigation report containing all the findings of the archival research as well as the data yielded during the recording of the site; and
- Submission of the mitigation report with a destruction permit application to the appropriate heritage authority. Structural remains older than 60 years may only be destroyed once this permit is issued.

Structures that the archival research has revealed are younger than 60 years may be destroyed without the need for a permit.

7.3.2 *Mitigation Measures required for the Possible Destruction of Subterranean Archaeological Deposits*

The following mitigation measures are required:

- An archaeological watching brief must be implemented during all construction activities undertaken between Paul Kruger Street and Vos Street.

7.4 Conclusions

On the condition that the general recommendations and mitigation measures outlined in this HIA

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report are adhered to, including the mitigation measures of the standalone palaeontological report, and in cognisance of the assumptions and limitations contained in this HIA report, no heritage reasons can be given for the development not to continue.

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8.3 Historical Topographic Maps

All the historic topographical maps used in this report were obtained from the Directorate: National Geo-spatial Information of the Department of Rural Development and Land Reform in Cape Town.

8.4 Historical Topographic Maps

At least some of the aerial depictions of the study area were obtained using Google Earth.

APPENDIX A ENVIRONMENTAL IMPACT METHODOLOGY

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Rating System Used To Classify Impacts

Table: Significance calculation and ratings.

| NATURE | | |
|--|--|--|
| A brief overview of the effects of the environmental parameters being evaluated in the context of the project is included. These criteria require a short-written statement of the environmental factor that a specific action or behaviour affects. | | |

| GEOGRAPHICAL EXTENT | | |
|--|--|--|
| This is described as the region over which the effect is transmitted. The magnitude and significance of an effect usually have distinct scales and grouping ranges are often needed. This is also useful in the thorough evaluation of a project in order to better define it. | | |

| | | |
|---|----------------------------|---|
| 1 | Site | The impact only affects the site. |
| 2 | Local/district | Have affect on the local area or district. |
| 3 | Province/region | Have affect on the entire province or region. |
| 4 | International and National | Have affect on the entire country. |

| PROBABILITY | | |
|---|--|--|
| This describes the chance of occurrence of an impact. | | |

| | | |
|---|----------|---|
| 1 | Unlikely | The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence). |
| 2 | Possible | The impact may occur (Between a 25% to 50% chance of occurrence). |
| 3 | Probable | The impact is likely occurring (Between a 50% to 75% chance of occurrence). |
| 4 | Definite | Impact certainly occurs (Greater than a 75% chance of occurrence). |

| REVERSIBILITY | | |
|---|--|--|
| This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity. | | |

| | | |
|---|-----------------------|--|
| 1 | Completely reversible | The impact is reversible with implementation of minor mitigation measures. |
| 2 | Partly reversible | The impact is partly reversible but more intense mitigation measures are required. |
| 3 | Barely reversible | The impact is unlikely to be reversed even with intense mitigation measures. |
| 4 | Irreversible | The impact is irreversible, and no mitigation measures exist. |

| IRREPLACEABLE LOSS OF RESOURCES | | |
|---|-------------------------------|---|
| This describes the degree to which resources are irreplaceably lost because of a proposed activity. | | |
| 1 | No loss of resource. | The impact does not result in the loss of any resources. |
| 2 | Marginal loss of resource | The impact results in marginal loss of resources. |
| 3 | Significant loss of resources | The impact results in significant loss of resources. |
| 4 | Complete loss of resources | The impact is result in a complete loss of all resources. |

| DURATION | | |
|--|--|--|
| This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact because of the proposed activity. | | |

| | | |
|---|-------------|---|
| 1 | Short term | The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years). |
| 2 | Medium term | The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years). |
| 3 | Long term | The impact and its effects will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years). |
| 4 | Permanent | The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite). |

| CUMULATIVE EFFECT | | |
|---|--|--|
| This describes the cumulative effect of the impacts on the environmental parameter. A cumulative effect/impact is an effect which may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question. | | |

| | | |
|---|------------------------------|---|
| 1 | Negligible Cumulative Impact | The impact would result in negligible to no cumulative effects. |
| 2 | Low Cumulative Impact | The impact would result in insignificant cumulative effects. |
| 3 | Medium Cumulative impact | The impact would result in minor cumulative effects. |
| 4 | High Cumulative Impact | The impact would result in significant cumulative effects. |

| INTENSITY/ MAGNITUDE | | |
|--------------------------------------|-----|--|
| Describes the severity of an impact. | | |
| 1 | Low | Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible. |

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| | | |
|---|-----------|--|
| 2 | Medium | Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity). |
| 3 | High | Impact affects the continued viability of the system/ component, and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation. |
| 4 | Very high | Impact affects the continued viability of the system/component, and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible, rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation. |

Table: Significance calculation and ratings.

SIGNIFICANCE

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

$SIGNIFICANCE = (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) \times magnitude/intensity.$

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

| Points | Impact Type | Impact Significance Rating | Description |
|------------|-------------|----------------------------|--|
| > -90 | Negative | Negative Very High Impact | The impact has highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws". |
| -61 to -90 | Negative | Negative High Impact | The impact has significant effects and requires significant mitigation measures to achieve an acceptable level of impact. |
| -31 to -60 | Negative | Negative Medium Impact | The impact has moderate negative effects and requires moderate mitigation measures. |
| -1 to -30 | Negative | Negative Low Impact | The impact has negligible negative effects and requires little to no mitigation. |
| 0 | Neutral | No Impact | The impact has moderate positive effects. |
| 1 to 30 | Positive | Positive Low Impact | The impact has minor positive effects. |
| 31 to 60 | Positive | Positive Medium Impact | The impact has moderate positive effects. |
| 61 to 90 | Positive | Positive High Impact | The impact has significant positive effects. |
| >90 | Positive | Positive Very High Impact | The impact has highly significant positive effects. |

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APPENDIX B PGS TEAM CVS

PROFESSIONAL CURRICULUM VITAE FOR POLKE DOUSSY BIRKHOLTZ

Name: *Polke Doussy Birkholtz*

Date & Place of Birth: *9 February 1975 – Klerksdorp, North West Province, South Africa*

Place of Tertiary Education & Dates Associated:

Institution: University of Pretoria

Qualification: BA (Cum Laude) - Bachelor of Arts Specializing in Archaeology, History & Anthropology

Date: 1996

Institution: University of Pretoria

Qualification: BA Hons (Cum Laude) - Bachelor of Arts with Honours Degree Specializing in Archaeology

Date: 1997

Qualifications:

BA - Degree specialising in Archaeology, History and Anthropology

BA Hons - Professional Archaeologist

Memberships:

Association of Southern African Professional Archaeologists (ASAPA)

Professional Member of the CRM Section of ASAPA

Overview of Post Graduate Experience:

1997 – 2000 – Member/Archaeologist – Archaeo-Info

2001 – 2003 – Archaeologist/Heritage Specialist – Helio Alliance

2000 – 2008 – Member/Archaeologist/Heritage Specialist – Archaeology Africa

2003 - Present – Director / Archaeologist / Heritage Specialist – PGS Heritage

Languages: English: Speak, Read & Write & Afrikaans: Speak, Read & Write

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Total Years' Experience: 22 Years

Experience Related to the Scope of Work:

- Polke has worked as a **HERITAGE SPECIALIST / ARCHAEOLOGIST / HISTORIAN** on more than 300 projects and acted as **PROJECT MANAGER** on almost all of these projects. His experience includes the following:
 - Development of New Sedimentation and Flocculation Tanks at Rand Water's Vereeniging Pumping Station, Vereeniging, Gauteng Province. Heritage Impact Assessment for *Greenline*.
 - EThekweni Northern Aqueduct Project, Durban, KwaZulu-Natal. Heritage Impact Assessment for *Strategic Environmental Focus*.
 - Johannesburg Union Observatory, Johannesburg, Gauteng Province. Heritage Inventory for *Holm Jordaan*.
 - Development at Rand Water's Vereeniging Pumping Station, Vereeniging, Gauteng Province. Heritage Impact Assessment for *Aurecon*.
 - Comet Ext. 8 Development, Boksburg, Gauteng Province. Phase 2 Heritage Impact Assessment for *Urban Dynamics*.
 - Randjesfontein Homestead, Midrand, Gauteng Province. Baseline Heritage Assessment with Nkosinathi Tomose for Johannesburg City Parks.
 - Rand Leases Ext. 13 Development, Roodepoort, Gauteng Province. Heritage Impact Assessment for *Marsh*.
 - Proposed Relocation of the Hillendale Heavy Minerals Plant (HHMP) from Hillendale to Fairbreeze, KwaZulu-Natal. Heritage Impact Assessment for *Goslar Environmental*.
 - Portion 80 of the farm Eikenhof 323 IQ, Johannesburg, Gauteng Province. Heritage Inventory for *Khare Incorporated*.
 - Comet Ext. 14 Development, Boksburg, Gauteng Province. Heritage Impact Assessment for *Marsh*.
 - Rand Steam Laundries, Johannesburg, Gauteng Province. Archival and Historical Study for *Impendulo* and *Imperial Properties*.
 - Mine Waste Solutions, near Klerksdorp, North West Province. Heritage Inventory for *AngloGold Ashanti*.
 - Consolidated EIA and EMP for the Kroondal and Marikana Mining Right Areas, North West Province. Heritage Impact Assessment for *Aquarius Platinum*.
 - Wilkoppies Shopping Mall, Klerksdorp, North West Province. Heritage Impact Assessment for the *Center for Environmental Management*.
 - Proposed Vosloorus Ext. 24, Vosloorus Ext. 41 and Vosloorus Ext. 43 Developments, Ekurhuleni District Municipality, Gauteng Province. Heritage Impact Assessment for *Enkanyini Projects*.

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- Proposed Development of Portions 3, 6, 7 and 9 of the farm Olievenhoutbosch 389 JR, City of Tshwane Metropolitan Municipality, Gauteng Province. Heritage Impact Assessment for *Marsh*.
- Proposed Development of Lotus Gardens Ext. 18 to 27, City of Tshwane Metropolitan Municipality, Gauteng Province. Heritage Impact Assessment for *Pierre Joubert*.
- Proposed Development of the site of the old Vereeniging Hospital, Vereeniging, Gauteng Province. Heritage Scoping Assessment for *Lekwa*.
- Proposed Demolition of an Old Building, Kroonstad, Free State Province. Phase 2 Heritage Impact Assessment for *De Beers Consolidated Mines*.
- Proposed Development at Westdene Dam, Johannesburg, Gauteng Province. Heritage Impact Assessment for *Newtown*.
- West End, Central Johannesburg, Gauteng Province. Phase 1 Heritage Impact Assessment for the *Johannesburg Land Company*.
- Kathu Supplier Park, Kathu, Northern Cape Province. Heritage Impact Assessment for *Synergistics*.
- Matlosana 132 kV Line and Substation, Stilfontein, North West Province. Heritage Impact Assessment for *Anglo Saxon Group* and *Eskom*.
- Marakele National Park, Thabazimbi, Limpopo Province. Cultural Resources Management Plan for *SANParks*.
- Cullinan Diamond Mine, Cullinan, Gauteng Province. Heritage Inventory for *Petra Diamonds*.
- Highveld Mushrooms Project, Pretoria, Gauteng Province. Heritage Impact Assessment for *Mills & Otten*.
- Development at the Reserve Bank Governor's Residence, Pretoria, Gauteng Province. Archaeological Excavations and Mitigation for the *South African Reserve Bank*.
- Proposed Stones & Stones Recycling Plant, Johannesburg, Gauteng Province. Heritage Scoping Report for *KV3*.
- South East Vertical Shaft Section of ERPM, Boksburg, Gauteng Province. Heritage Scoping Report for *East Rand Proprietary Mines*.
- Proposed Development of the Top Star Mine Dump, Johannesburg, Gauteng Province. Detailed Archival and Historical Study for *Matakoma*.
- Soshanguve Bulk Water Replacement Project, Soshanguve, Gauteng Province. Heritage Impact Assessment for *KWP*.
- Biodiversity, Conservation and Participatory Development Project, Swaziland. Archaeological Component for *Africon*.
- Camdeboo National Park, Graaff-Reinet, Eastern Cape Province. Cultural Resources Management Plan for *SANParks*.
- Main Place, Central Johannesburg, Gauteng Province. Phase 1 Heritage Impact Assessment for the *Johannesburg Land Company*.

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- Modderfontein Mine, Springs, Gauteng Province. Detailed Archival and Historical Study for *Consolidated Modderfontein Mines*.
 - Proposed New Head Office for the Department of Foreign Affairs, Pretoria, Gauteng Province. Heritage Impact Assessment for *Holm Jordaan Group*.
 - Proposed Modification of the Lukasrand Tower, Pretoria, Gauteng Province. Heritage Assessment for IEPM.
 - Proposed Road between the Noupoot CBD and Kwazamukolo, Northern Cape Province. Heritage Impact Assessment for *Gill & Associates*.
 - Proposed Development at the Johannesburg Zoological Gardens, Johannesburg, Gauteng Province. Detailed Archival and Historical Study for *Matakoma*.
- Polke's **KEY QUALIFICATIONS:**
 - Project Management
 - Archaeological and Heritage Management
 - Archaeological and Heritage Impact Assessment
 - Archaeological and Heritage Fieldwork
 - Archival and Historical Research
 - Report Writing
 - Polke's **INFORMATION TECHNOLOGY EXPERIENCE:**
 - *MS Office – Word, Excel, & Powerpoint*
 - *Google Earth*
 - *Garmin Mapsource*
 - *Adobe Photoshop*
 - *Corel Draw*

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