West Wits Mining MLI (Pty) Ltd, Roodepoort, Johannesburg Metropolitan Municipality, Gauteng Province

Proposed West Wits Mining Project: Various portions of farms, Vogelstruisfontein 231IQ & 233IQ, Roodepoort 236IQ & 237IQ, Vlakfontein 238IQ, Witpoortjie 245IQ, Uitval 677 IQ, Tshekisho 710 IQ, Roodepoort Magisterial District, Gauteng

Heritage Impact Assessment

Issue Date: **17 May 2019**
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Declaration of Independence

- I, Jennifer Kitto, declare that –
- General declaration:

- I act as the independent heritage practitioner in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting heritage impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in section 38 of the National Heritage Resources Act (NHRA) Act 25 of 1999, 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 National Environmental Management Act (NEMA), Act 107 of 1998.

Disclosure of Vested Interest

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

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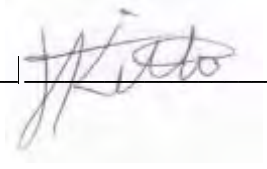
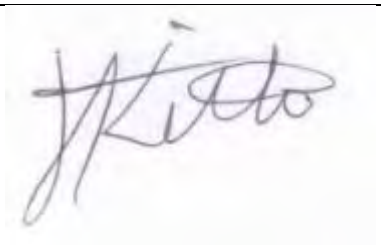
SIGNATURE: 

ACKNOWLEDGEMENT OF RECEIPT

Report Title	**Proposed West Wits Mining Project: Various portions of farms Vogelstruisfontein 231IQ & 233IQ, Roodepoort 236IQ & 237IQ, Vlakfontein 238IQ, Witpoortjie 245IQ, Uitval 677 IQ, Tshekisho 710, Roodepoort Magisterial District, Gauteng**		
Control	**Name**	**Signature**	**Designation**
Author	**J Kitto**		**Heritage Specialist**
Reviewed	**W Fourie**		**Project Sponsor/ Archaeologist**

CLIENT: **SLR Consulting (Pty) Ltd**

CONTACT PERSON: Marline Medallie
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mmedallie@slrconsulting.com

SIGNATURE: _____

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 Process (EIAP) Regulations of 2014 (as amended) 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**
Details of the specialist who prepared the report	Page ii of Report – Contact details and company
The expertise of that person to compile a specialist report including a curriculum vita	Section 1.2 – refer to **Appendix D**
A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report
An indication of the scope of, and the purpose for which, the report was prepared, including: A) an indication of the quality and age of base data used for the specialist report; B) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change:	Section 1.1, Section 3, Section 8, References
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 5.
A description of the methodology adopted in preparing the report or carrying out the specialised process, inclusive of equipment and modelling used	Section 3.2, **Appendix B, Appendix C**
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 3.2.1
An identification of any areas to be avoided, including buffers	Section 5
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 3.2.1
A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
A description of the findings and potential implications of such findings on the impact of the proposed activity, or activities	Section 5 and 6
Any mitigation measures for inclusion in the EMPr	Section 8 and 9
Any conditions for inclusion in the environmental authorisation	Section 6
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 6
A reasoned opinion whether the proposed activity, activities or portions thereof should be authorised; (A) regarding the acceptability of the proposed activity or activities; and	Section 6

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	
A description of any consultation process that was undertaken during the course of carrying out the study	Limited. A public consultation process is handled as part of the EIAP and EMP process. Section 5.
A summary and copies of any comments that were received during any consultation process	Section 5 and Appendix D.
Any other information requested by the competent authority.	. Not applicable
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	No protocols or minimum standards for HIAs or PIAs promulgated through a governmental notice.

EXECUTIVE SUMMARY

PGS Heritage (Pty) Ltd was appointed by SLR Consulting (South Africa) Pty Ltd (SLR), to undertake a Heritage Impact Assessment (HIA) that forms part of the Environmental Impact Assessment Process (EIAP) for the proposed mining operation in an area located south of Roodepoort and to the north of Soweto in the City of Johannesburg Metropolitan Municipality, Gauteng. West Wits MLI (Proprietary) Limited (West Wits), is the applicant.

West Wits has re-applied for a mining right in terms of the Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA) as amended, for gold, uranium and silver over various portions of farms. The northern section of the project area would be crossed by the R41 (Main Reef/Randfontein) provincial road, with the R24 (Albertina Sisulu/Hamberg) provincial road running along sections of the northern boundary of the project area.

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant. This report considers the footprints of the five opencast pit areas, two proposed infrastructure footprints, the portion of ore trucking road included in the greater mining right application area boundary. In addition, any mining activity to be undertaken outside the specified footprint areas will require a separate HIA study to be conducted. Other management measures as listed and required in other HIA's conducted in the area must still be implemented for other heritage features identified in the larger mining right application area.

The desktop analysis and field survey has enabled the identification of possible heritage sensitive areas that included:

- Dwellings;
- Clusters of dwellings
- Historical Mining structures; and
- Graves and burial grounds.

Note that these structures refer to possible heritage sites as listed in the table below *Table* **12**.

Table 1 - Tangible Heritage sites in the study area

Name	Description	Legislative protection
Dwellings and dwelling clusters	Possibly older than 60 years	NHRA Sect 3 and 34
Historical Mining Structures	Possibly older than 60 years	NHRA Sect 3 and 34
Graves and Burial Grounds	Graves	NHRA Sect 3 and 36

Previous studies conducted in the greater area have shown that the heritage resources expected could include historical structures and graves or burial grounds with occasional archaeological sites.

The field survey identified 24 heritage sites within the study area. Of these, 18 were identified within the individual project footprint areas. These include mainly historical structures or remains (**WW001 to WW018**) and two religious sites (**WW002, WW010**). Six heritage sites were identified in the greater mining right application area. These include two burial grounds (**WW022, WW024**), and four historical structures (**WW019, WW020, WW021, WW023**).

Refer to **Figure 1** for the locality of heritage resources in relation to the proposed development area, below.

Archaeology

No archaeological material or sites were identified in the study area. However, occasional finds of stone tools have been recorded in previous HIA studies of the larger area, and an historic midden was identified by Birkholtz (2008) in the Creswell Park area. This indicates the possibility of sub-surface archaeological material being uncovered by the proposed activities.

Therefore, the impact of the proposed project on archaeological material is rated as having a LOW to MEDIUM negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance.

Historical Structures

Twenty historical structures or remains were identified. Of these 16 are located within the individual footprints and four are located within the greater mining right application area (**WW019, WW020, WW021, WW023**).

The impact of the proposed project on the historical structures is rated as MEDIUM to HIGH negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.

Burial Grounds and Graves

Two informal burial grounds were identified within the greater mining right application area (**WW022**, and **WW024**). Due to the social and cultural significance of burial grounds and graves, a high heritage significance is given to such sites.

The impact of the proposed project on the burial grounds is rated as having a HIGH negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance after mitigation.

Palaeontology

A basic palaeontological sensitivity was determined using the SAHRIS database palaeosensitivity map (http://www.sahra.org.za/sahris/map/palaeo). As the entire proposed mining right application area occurs in an area where palaeontology is assessed as being entirely of Low significance (coloured blue) no palaeontological studies are required. Furthermore, confirmation of the Low palaeontological significance of the area by both SAHRA and a qualified palaeontologist was located during the desktop research. It is therefore recommended that an application for exemption from the standard requirement for a finds protocol be made to SAHRA.

The impact of the proposed project on the palaeontology is rated as having a LOW significance rating before mitigation with no further mitigation measures required.

Living Heritage/Sacred Sites

Two open air religious sites were identified within or immediately adjacent to the individual footprint areas (**WW002**, and **WW010**). These religious sites could have significant heritage value to the relevant church group. Although such sites have been given a Medium heritage significance, it is expected that alteration/ or destruction of these sites could be undertaken with stakeholder engagement and consent (e.g. local community/ church group). Note that this would probably require moving the site to another location with the agreement of the church group which uses the site.

The impact of the proposed project on the these living heritage/sacred sites is rated as having a MEDIUM negative significance rating before mitigation with a LOW significance rating after mitigation.

General

In the event that heritage resources are discovered during site clearance, construction activities must stop and a qualified archaeologist be appointed to evaluate and make recommendations on mitigation measures.

The overall impact of the development on heritage resources is seen as being of low to high significance but can be mitigated to an acceptable level of low significance.

Figure 1: Map of Tracklogs for the greater mining right application area, showing all 24 heritage sites located

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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 Iron Age (Early Farming Communities)

The archaeological period from AD 200 – AD 900, associated with the first Early Farming Communities, including iron-working and farming activities such as herding and agriculture.

Early Stone Age

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

Fossil

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

Heritage

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

Heritage resources

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

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

Holocene

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

Late Stone Age

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

Late Iron Age (Early Farming Communities)

The archaeology of the last 1 000 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
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DMR	Department of mineral Resources
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Early Iron Age
EIAP	Environmental Impact Assessment Process
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
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NHA	National Health Act, 2003 (Act No. 61 of 2003)
NHRA	National Heritage Resources Act, 1999 (Act 25 of 1999)
PHRA	Provincial Heritage Resources Authority
PSSA	Palaeontological Society of South Africa
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency

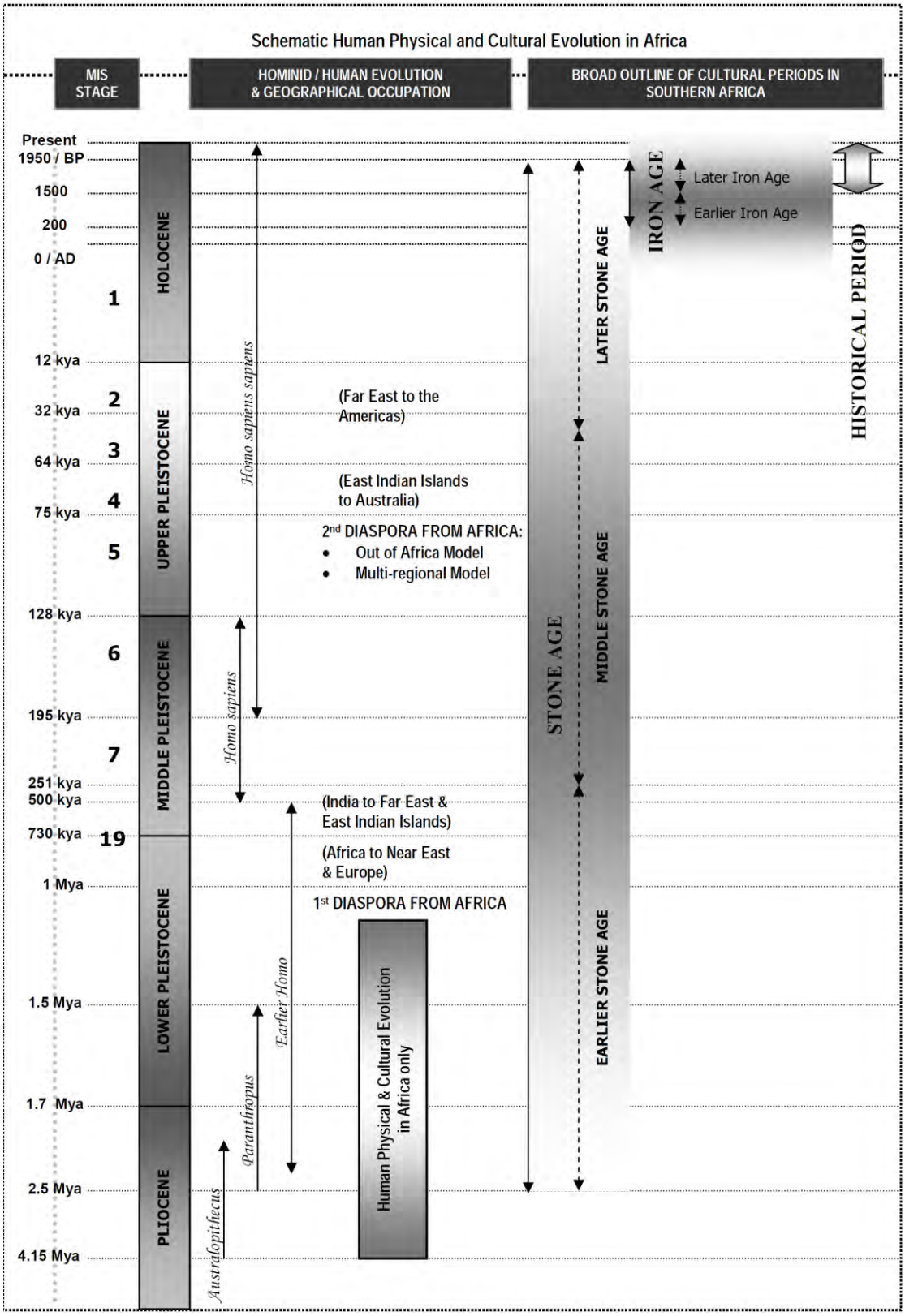

Figure 2: Human and Cultural Time line in Africa (Morris, 2008)

1 INTRODUCTION

PGS Heritage (Pty) Ltd was appointed by SLR Consulting (South Africa) Pty Ltd (SLR), to undertake a Heritage Impact Assessment (HIA) that forms part of the Environmental Impact Assessment Process (EIAP) for the proposed mining operation in an area located south of Roodepoort and to the north of Soweto in the City of Johannesburg Metropolitan Municipality, Gauteng. West Wits MLI (Proprietary) Limited (West Wits), is the applicant.

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1.1 Scope of the Study

The aim of the study is to identify possible heritage sites and finds that may occur in the proposed mining right application area. The HIA aims to inform the EIAP 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).

The study will identify and map heritage resources within the footprints of the proposed five opencast mining areas and two infrastructure complexes, determine the likelihood of fossils occurring within the project area, provide input on the project plan, assess potential impacts associated with each of the project phases, identify requirements for any additional permits and develop a heritage management plan.

1.2 Specialist Qualifications

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

The staff at PGS has a combined experience of nearly 40 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.

Wouter Fourie, the Project Coordinator, is registered with the Association of Southern African Professional Archaeologists (ASAPA) as a Professional Archaeologist and is accredited as a Principal Investigator; he is further an Accredited Professional Heritage Practitioner with the Association of Professional Heritage Practitioners (APHP).

Jennifer Kitto, the author of this report and Heritage Specialist, has 18 years' experience in the heritage sector, a large part of which involved working for a government department responsible for administering the National Heritage Resources Act, No 25 of 1999. She is therefore well-versed in the legislative requirements of heritage management. She holds a BA in Archaeology and Social Anthropology and a BA (Hons) in Social Anthropology.

1.3 Assumptions and Limitations

Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites and the sometimes dense vegetation cover, as well as restricted access to some areas. As such, should any heritage features and/or objects not included in the present inventory be located or observed, a heritage specialist must immediately be contacted.

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

Please note that the field survey for this project was constrained by security issues related to illegal mining activity in the footprint areas, as well as obscured visibility due to some areas of dense vegetation and extensive dumping. It should be noted that, only the specific footprints for the five opencast pits and two infrastructure areas, as well as the ore trucking road portion within the mining right application area (as detailed in section 2) were examined for heritage resources. The greater mining right application area was excluded from an intensive field survey due to the large extent (the extent of this area was revised at a very late stage in the project timeline).

However, some heritage resources were identified within the greater mining right application area, mainly as a consequence of travelling between the individual footprints. but also as a result of, limited stakeholder engagement, based on the Public Participation process recorded during the Scoping phase, , Therefore, should any mining activity be undertaken outside the above specified footprint areas this would require a separate HIA study to be conducted.

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:

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

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

i. GNR 326 of 2017 (Government Gazette 40772) promulgated under the (NEMA
    a. Basic Assessment Report (BAR) – Regulations 19 and 23
    b. Environmental Scoping Report (ESR) – Regulation 21 and 23
    c. Environmental Impacts Report (EIR) – Regulation 21 and 23
    d. Environmental Management Programme (EMPr) – Regulations 19 and 23
ii. NHRA:
    a. Protection of Heritage Resources – Sections 34 to 36; and
    b. Heritage Resources Management – Section 38
iii. MPRDA Regulations of 2014:
    a. Environmental reports to be compiled for application of mining right – Regulation 48
    b. Contents of scoping report– Regulation 49
    c. Contents of environmental impact assessment report – Regulation 50
    d. Environmental management programme – Regulations 51
    e. Environmental management plan – Regulation 52
iv. The Regulations relating to the Management of Human Remains (GNR 363 of 2013 in Government Gazette 36473) promulgated under the National Health Act (Act No. 61 of 2003)
    a. Exhumation and Reburial of Human Remains - Regulations 26, 27 and 28

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Sections 34-36 provides general protection to heritage resources such as structures older than 60 years, archaeological and palaeontological resources and burial grounds and graves. Section 34(1) of the NHRA states that, “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…” This study also falls under s38(8) and requires comment from the relevant heritage resources authority.

The NHRA is utilized as the basis for the identification, evaluation and management of heritage resources and, in the case of Cultural Resources Management (CRM), those resources specifically impacted on by development as stipulated in Section 38(1) of NHRA, and those developments administered through NEMA and MPRDA legislation (s38(8)). In the latter cases, the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorizations are granted for development. The last few years

have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impacts Processes required by NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008).

The NEMA 23(2)(b) states that an integrated environmental management plan should, "…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage". A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements in the NEMA reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken account of in the Regulations under NEMA is the Specialist Report requirements laid down in Section 33 of the regulations (Fourie, 2008).

1.5 International Requirements

The regulatory aspects dealt with above relate solely to the in-house South African laws and regulations and would usually be the only requirements for an application for a Mining Right. However, it may be that international financing is required for a large-scale project, in which case Project Finance Advisory Services, Project Finance, Project-Related Corporate Loans or Bridging Loans may be required. In such a case, the applicant for international financing will need to comply with the requirements of the International Finance Corporation (IFC) Performance Standards and the Equator Principles observed by most large international financial institutions. Summaries of these requirements are set out below.

i. The International Finance Corporation

The IFC Performance Standards are an international benchmark for identifying and managing environmental and social risk and have been adopted by many organizations as a key component of their environmental and social risk management. The IFC's Environmental, Health, and Safety (EHS) Guidelines provide technical guidelines with general and industry-specific examples of good international industry practice to meet the IFC's Performance Standards (PS).

In many countries, the scope and intent of the IFC Performance Standards is addressed or partially addressed in the country's environmental and social regulatory framework. The IFC Performance Standards encompass eight topics of which PS 7 and PS 8 have direct relevance to heritage resources:

i. PS 1 - Environmental and Social Assessment and Management System;
ii. PS 2 - Labour and Working Conditions;
iii. PS 3 - Pollution Prevention and Abatement;
iv. PS 4 - Community Health, Safety and Security;
v. PS 5 - Land Acquisition and Involuntary Resettlement;
vi. PS 6 - Biodiversity Conservation and Sustainable Natural Resource Management;

vii. PS 7 - Indigenous Peoples;

viii. PS 8 - Cultural Heritage

Table 2 provides a listing of the relevant sections pertaining to cultural heritage.

Table 2 :Sections of IFC Standards relevant to heritage resources and their management

GUIDELINE	RELEVANT CHAPTER	DESCRIPTION OF THE REQUIREMENT
International Finance Corporations (IFC) Performance Standard	Standard (PS) 5 – Paragraph 3	Minimization and avoidance of impacts from project related activities.
	Standard (PS) 5 – Paragraph 10 (Community Engagement) (2012).	Engagement with affected communities and the disclosure of relevant information of the relocation process.
	Standard (PS) 5 – Paragraph 20	Respecting the social and cultural institutions of the displaced persons and any host communities.
	Standard (PS) 8 – Paragraph 9 (Consultation) (2012).	The need for consultation with affected communities to identify cultural heritage of importance and involve affected communities and involve the relevant national or local regulatory authorities in the decision-making processes.
	Standard (PS) 8 – Paragraph 12 (Removal of Non-Replicable Cultural Heritage) (2012).	The removal of cultural heritage must only be considered when no other alternative is available.

The IFC's Performance Standards offer a framework for understanding and managing environmental and social risks for high profile, complex, international or potentially high impact projects. The financial institution is required to verify, as part of its environmental and social due diligence process, that the commercial client/investee complies with the IFC Performance Standards. To do so, the financial institution needs to be knowledgeable about the environmental and social laws of the country in which it operates and compare these regulatory requirements against those of the IFC Performance Standards to identify gaps. A good understanding of both sets of requirements, as well as potential gaps, ensures that the financial institution will effectively identify and assess the key environmental and social risks and impacts that might be associated with a financial transaction.

If non-compliances with the IFC Performance Standards are identified, and depending on the severity of the issue, the financial institution can require the commercial client/investee to develop a corrective action plan for addressing the issue within a reasonable timeframe and stipulate this as a condition of the financial transaction with the commercial client/investee.

The IFC Performance Standards help the IFC and its clients to manage and improve their environmental and social performance through an outcomes-based approach and provide a solid base from which clients may increase the sustainability of their business operations. The desired outcomes are described in the objectives of each Performance Standard, followed by specific requirements to help clients achieve these outcomes through means that are appropriate to the nature and scale of the project and commensurate with the level of environmental and social risks (likelihood of harm) and impacts.

ii. Equator Principles

The Equator Principles (EP) is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making.

The EP apply globally, to all industry sectors and to four financial products –

1) Project Finance Advisory Services;
2) Project Finance;
3) Project-Related Corporate Loans; and
4) Bridge Loans. The relevant thresholds and criteria for applications are described in detail in the Scope section of the EP.

Equator Principles Financial Institutions (EPFI) commit to implementing the EP in their internal environmental and social policies, procedures and standards for financing projects and will not provide Project Finance or Project-Related Corporate Loans to projects where the client will not, or is unable to, comply with the EP.

The EP have greatly increased the attention and focus on social/community standards and responsibility, including robust standards for indigenous peoples, labour standards, and consultation with locally affected communities within the Project Finance market. They have also promoted convergence around common environmental and social standards. Multilateral development banks, including the European Bank for Reconstruction & Development, and export credit agencies through the Organisation for Economic Co-operation and Development (OECD) Common Approaches are increasingly drawing on the same standards as the EP.

The EP have also helped spur the development of other responsible environmental and social management practices in the financial sector and banking industry (for example, Carbon Principles

in the US, Climate Principles worldwide) and have provided a platform for engagement with a broad range of interested stakeholders, including non-governmental organisations (NGOs), clients and industry bodies.

The EP consist of 10 Principles, outlined below:

i. Principle 1: Review and Categorisation

When a Project is proposed for financing, the EPFI will, as part of its internal environmental and social review and due diligence, categorise it based on the magnitude of its potential environmental and social risks and impacts. Such screening is based on the environmental and social categorisation process of the International Finance Corporation (IFC).

Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale and stage of the Project, and with the level of environmental and social risks and impacts.

The categories are:

Category A – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented;

Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and

Category C – Projects with minimal or no adverse environmental and social risks and/or impacts.

ii. Principle 2: Environmental and Social Assessment

For all Category A and Category B Projects, the EPFI will require the client to conduct an Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and impacts of the proposed Project. The Assessment Documentation should propose measures to manage impacts in a manner relevant and appropriate to the nature and scale of the proposed Project. One or more specialised studies may also need to be undertaken for the Assessment Documentation. It may, in some cases, be appropriate for the client to complement its Assessment Documentation with specific human rights due diligence.

For all Projects, in all locations, when combined Scope 1 and Scope 2 Emissions are expected to be more than 100,000 tonnes of CO2 equivalent annually, an alternatives analysis will be conducted to evaluate less Greenhouse Gas (GHG) intensive alternatives.

iii. Principle 3: Applicable Environmental and Social Standards

The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.

EPFIs operate in diverse markets: some with robust environmental and social governance, legislation systems and institutional capacity designed to protect their people and the natural

environment; and some with evolving technical and institutional capacity to manage environmental and social issues.

The EPFI will require that the Assessment process evaluates compliance with the applicable standards for what are known as Designated Countries (the First World countries with robust regulatory systems), where the Assessment process evaluates compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues; and Non-Designated Countries, where the Assessment process evaluates compliance with the then applicable IFC Performance Standards

iv. Principle 4: Environmental and Social Management System and Equator Principles Action Plan

For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS). Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree an Equator Principles Action Plan (AP). The Equator Principles AP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards.

v. Principle 5: Stakeholder Engagement

For all Category A and Category B Projects, the EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. The engagement process should be free from external manipulation, interference, coercion and intimidation. The client will take account of, and document, the results of the Stakeholder Engagement process, including any actions agreed resulting from such process. For Projects with environmental or social risks and adverse impacts, disclosure should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis. EPFIs recognise that indigenous peoples may represent vulnerable segments of project-affected communities. Projects affecting indigenous peoples are subject to a more rigorous process of Informed Consultation and Participation.

vi. Principle 6: Grievance Mechanism

For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish a grievance mechanism designed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The grievance mechanism will seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate, readily accessible, at no cost, and without retribution to the party that originated the issue or concern. The mechanism should not impede

access to judicial or administrative remedies. The client will inform the Affected Communities about the mechanism in the course of the Stakeholder Engagement process.

vii. Principle 7: Independent Review: Project Finance

For all Category A and, as appropriate, Category B Projects an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles compliance.

Project-Related Corporate Loans

An Independent Review by an Independent Environmental and Social Consultant is required for Projects with potential high-risk impacts including, but not limited to, any of the following adverse impacts on indigenous peoples, Critical Habitat impacts, Significant cultural heritage impacts and Large-scale resettlement.

In other Category A, and as appropriate Category B, Project-Related Corporate Loans, the EPFI may determine whether an Independent Review is appropriate or if internal review by the EPFI is sufficient. This may take into account the due diligence performed by a multilateral or bilateral financial institution or an OECD Export Credit Agency, if relevant.

viii. Principle 8: Covenants

An important strength of the Equator Principles is the incorporation of covenants linked to compliance. For all Projects, the client will covenant in the financing documentation to comply with all relevant host country environmental and social laws, regulations and permits in all material respects.

Furthermore, for all Category A and Category B Projects, the client will covenant the financial documentation:

a) to comply with the ESMPs and Equator Principles AP (where applicable) during the construction and operation of the Project in all material respects;
b) to provide periodic reports in a format agreed with the EPFI (with the frequency of these reports proportionate to the severity of impacts, or as required by law, but not less than annually), prepared by in-house staff or third-party experts, that document compliance with the ESMPs and Equator Principles AP (where applicable), and provide representation of compliance with relevant local, state and host country environmental and social laws, regulations and permits; and
c) to decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan.
d) Where a client is not in compliance with its environmental and social covenants, the EPFI will work with the client on remedial actions to bring the Project back into compliance to the extent feasible. If the client fails to re-establish compliance within an agreed grace period, the EPFI reserves the right to exercise remedies, as considered appropriate.

ix. Principle 9: Independent Monitoring and Reporting Project Finance

To assess Project compliance with the Equator Principles and ensure ongoing monitoring and reporting after Financial Close and over the life of the loan, the EPFI will, for all Category A and, as appropriate, Category B Projects, require the appointment of an Independent Environmental and Social Consultant, or require that the client retain qualified and experienced external experts to verify its monitoring information which would be shared with the EPFI.

Project-Related Corporate Loans

For Projects where an Independent Review is required under Principle 7, the EPFI will require the appointment of an Independent Environmental and Social Consultant after Financial Close or require that the client retain qualified and experienced external experts to verify its monitoring information which would be shared with the EPFI.

x. Principle 10: Reporting and Transparency Client Reporting Requirements

The following client reporting requirements are in addition to the disclosure requirements in Principle 5.

For all Category A and, as appropriate, Category B Projects:

The client will ensure that, at a minimum, a summary of the ESIA is accessible and available online.

The client will publicly report GHG emission levels (combined Scope 1 and Scope 2 Emissions) during the operational phase for Projects emitting over 100,000 tonnes of CO2 equivalent annually.

EPFI Reporting Requirements

The EPFI will report publicly, at least annually, on transactions that have reached Financial Close and on its Equator Principles implementation processes and experience, taking into account appropriate confidentiality considerations.

There are two important Attachments to the Equator Principles: Annexure A dealing with Climate Change: Alternatives Analysis, Quantification and Reporting of Greenhouse Gas Emissions; and Annexure B dealing with Minimum Reporting Requirements on:

- Data and Implementation Reporting
- Project Finance Advisory Services Data
- Bridge Loans Data
- Implementation Reporting
- Project Name Reporting for Project Finance

2 TECHNICAL DETAILS OF THE PROJECT

2.1 Locality

West Wits MLI (Proprietary) Limited (West Wits), the applicant, is proposing to establish a mining operation in an area located south of Roodepoort and to the north of Soweto in the City of Johannesburg Metropolitan Municipality, Gauteng. The northern section of the project area would be crossed by the R41 (Main Reef/Randfontein) provincial road, with the R24 (Albertina Sisulu/Hamberg) provincial road running along sections of the northern boundary of the project area.

West Wits has applied for a mining right in terms of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA) for gold, uranium and silver over various portions of farms.

A description of the property on which the proposed project would be located is provided in **Table *3*.**

Table 3: Description of the property

Description	Detail
Farm Name	Portions: 131, 151, 152, 154, 157, 163, 168, 170, 173, 178, 179, 183, 184, 186, 187, 193, 210, 213, 216, 222, 223 and portions of Portions: 15, 42, 43, 149, 175, 185, 206, 211, 212, 214, 224 and the remainder of portions 4 and 161 and a portion of the remainder of portion 17 and 18 of the Farm Vogelstruisfontein 231 IQ The remainder of portion 36 of the Farm Vogelstruisfontein 233 IQ Remainder of portion 1, 94 and a portion of portion 92 of the Farm Vlakfontein 238 IQ Portion 1 and the Remainder of the Farm Roodepoort 236 Portions: 26, 27, 43, 44, 135, 136, 137, 138, 193, 389, 393, 400, 403, 404, 409, 410, 429, and the remainder of portions 1 , 5, 401, 407 and a portion of portion 182, 196, 408 and a portion of the remainder of portion 14 of the Farm Roodepoort 237 IQ A portion of Portion 1 of the Farm Witpoortjie 245 IQ The Farm Uitval 677 IQ, previously known as portion 91 of the Farm Vogelstruisfontein 233 IQ and portion 47 of the Farm Vlakfontein 238 IQ The Farm Tshekisho 710 IQ, previously known as portions 402 and 445 of the Farm Roodepoort 237 IQ and portion 95 of the Farm Vlakfontein 238 IQ
Application area (ha)	Total Area of 2078.996 Hectares in Extent

Description	Detail
	A surface disturbance area of approximately (~) 66 ha comprising opencast pit areas of ~ 5 ha and infrastructure complex areas of ~ 10 ha.
Magisterial district	City of Johannesburg Metropolitan Municipality Roodepoort Magisterial District
Distance and direction from nearest town	Located immediately south of Roodepoort and north of Soweto in Gauteng.

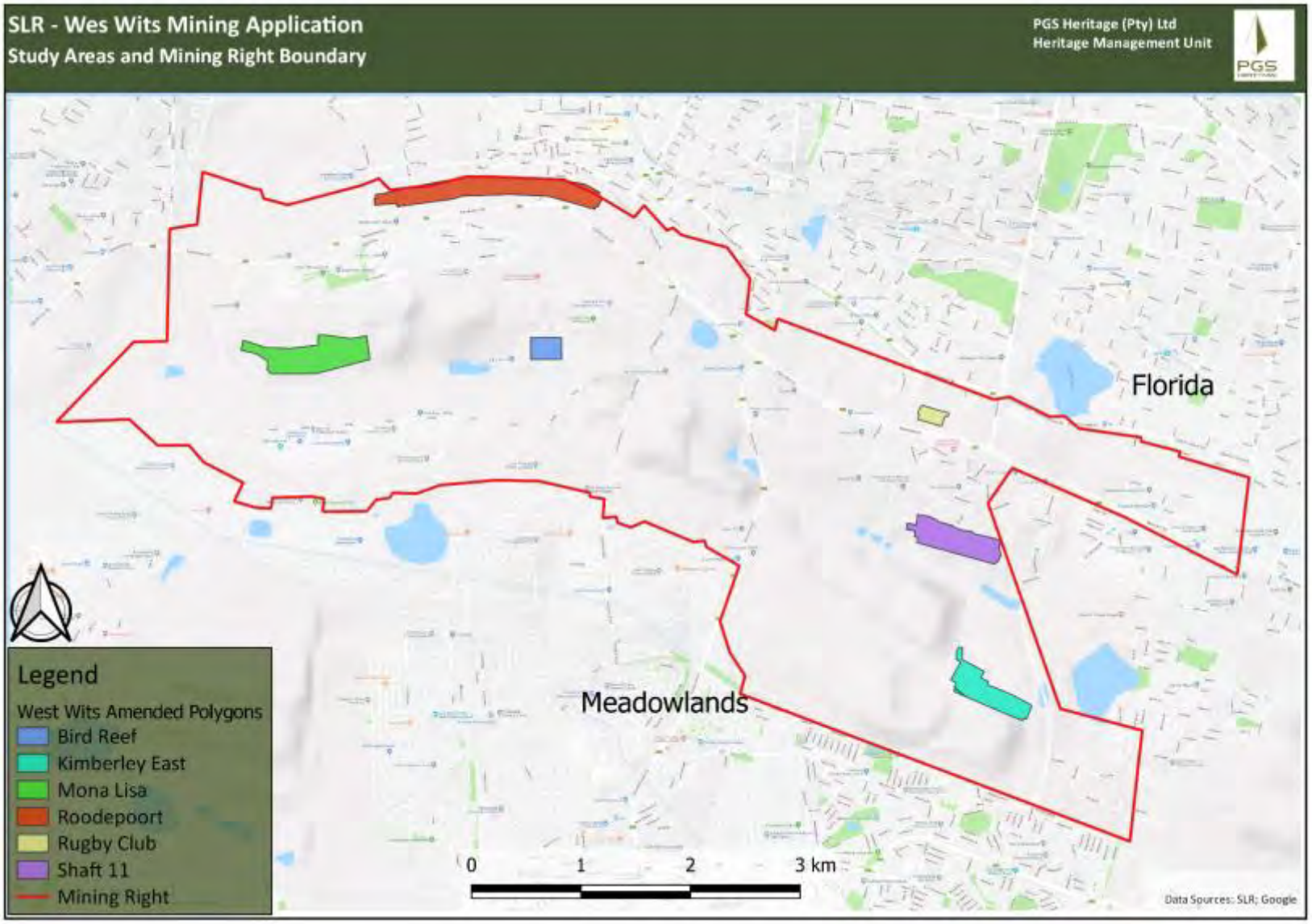
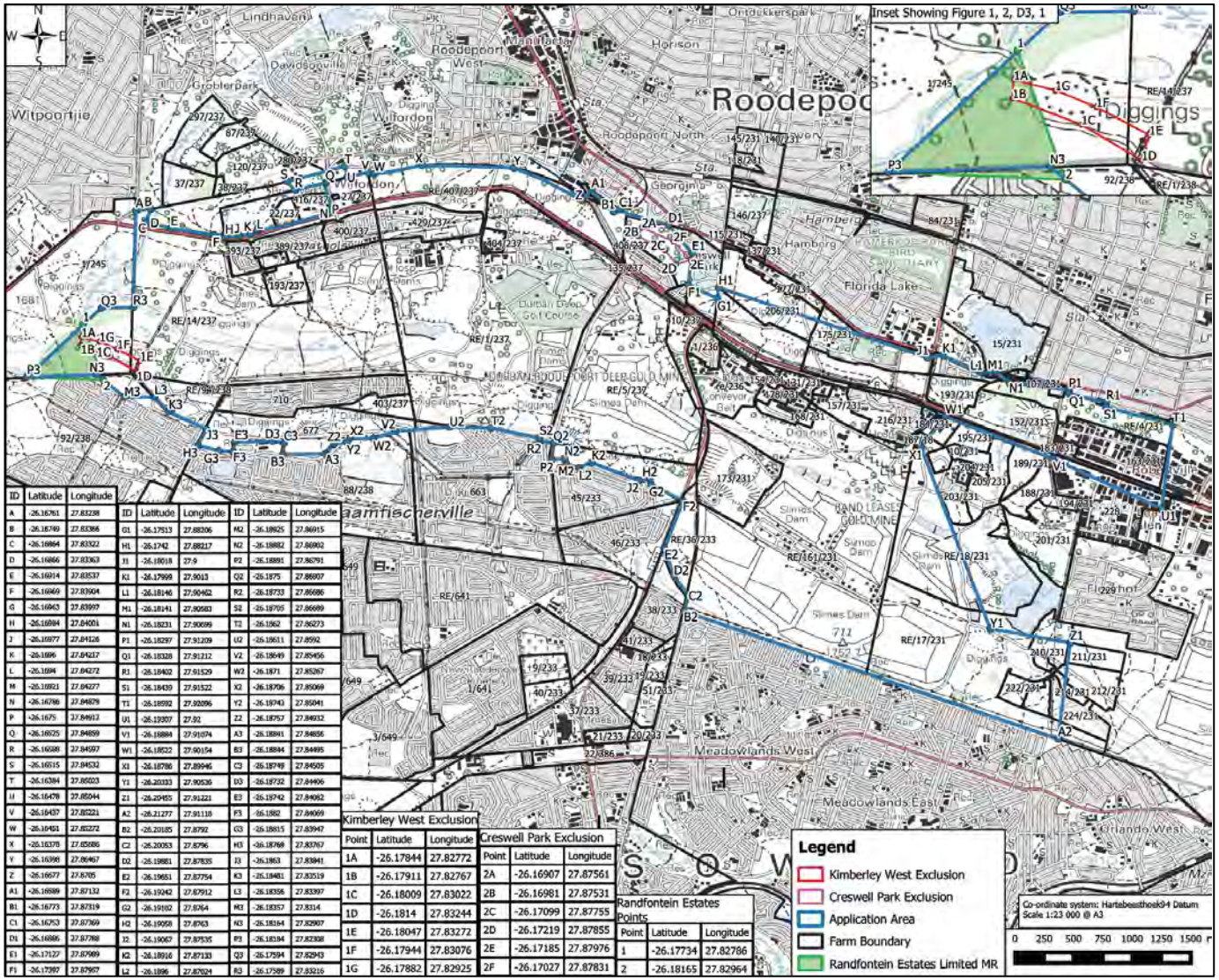


Figure 3: Locality plan showing the greater mining right application area (red polygon) and individual footprints



ID	Latitude	Longitude
A	-26.16761	27.83238
B	-26.16749	27.83386
C	-26.16864	27.83322
D	-26.16866	27.83363
E	-26.16914	27.83537
F	-26.16969	27.83904
G	-26.16943	27.83997
H	-26.16984	27.84001
J	-26.16977	27.84128
K	-26.1696	27.84217
L	-26.1694	27.84272
M	-26.16921	27.84277
N	-26.16786	27.84079
P	-26.1675	27.84611
Q	-26.16925	27.84859
R	-26.16588	27.84597
S	-26.16515	27.84532
T	-26.16384	27.85023
U	-26.16478	27.85044
V	-26.16437	27.85221
W	-26.16451	27.85272
X	-26.16378	27.85686
Y	-26.16398	27.86467
Z	-26.16677	27.8705
A1	-26.16989	27.87132
B1	-26.16773	27.87319
C1	-26.16753	27.87369
D1	-26.16886	27.87788
E1	-26.17127	27.87909
F1	-26.17397	27.87967

ID	Latitude	Longitude
G1	-26.17513	27.88206
H1	-26.1742	27.88217
J1	-26.18018	27.9
K1	-26.17998	27.9013
L1	-26.18146	27.90462
M1	-26.18141	27.90583
N1	-26.18231	27.90699
P1	-26.18297	27.91209
Q1	-26.18328	27.91212
R1	-26.18402	27.91529
S1	-26.18439	27.91522
T1	-26.18592	27.92096
U1	-26.19307	27.92
V1	-26.18884	27.91074
W1	-26.18522	27.90154
X1	-26.18786	27.89946
Y1	-26.20333	27.90536
Z1	-26.20455	27.91221
A2	-26.21277	27.91118
B2	-26.20185	27.8792
C2	-26.20053	27.8796
D2	-26.19881	27.87835
E2	-26.19651	27.87754
F2	-26.19242	27.87912
G2	-26.19102	27.8764
H2	-26.19058	27.8763
J2	-26.19067	27.87535
K2	-26.18916	27.87133
L2	-26.1896	27.87024

ID	Latitude	Longitude
M2	-26.18925	27.86915
N2	-26.18882	27.86902
P2	-26.18891	27.86791
Q2	-26.1875	27.86907
R2	-26.18733	27.86686
S2	-26.18705	27.86689
T2	-26.1862	27.86273
U2	-26.19611	27.8592
V2	-26.18649	27.85456
W2	-26.1871	27.85267
X2	-26.18706	27.85069
Y2	-26.18743	27.85041
Z2	-26.18757	27.84932
A3	-26.18841	27.84856
B3	-26.18844	27.84495
C3	-26.18748	27.84505
D3	-26.18732	27.84406
E3	-26.18742	27.84062
F3	-26.1882	27.84069
G3	-26.18815	27.83947
H3	-26.18768	27.83767
J3	-26.1863	27.83841
K3	-26.18481	27.83519
L3	-26.18356	27.83397
M3	-26.18357	27.8314
N3	-26.18184	27.82907
P3	-26.18184	27.82808
Q3	-26.17594	27.82943
R3	-26.17589	27.83216

Kimberley West Exclusion

Point	Latitude	Longitude
1A	-26.17844	27.82772
1B	-26.17911	27.82767
1C	-26.18009	27.83022
1D	-26.1814	27.83244
1E	-26.18047	27.83272
1F	-26.17944	27.83076
1G	-26.17882	27.82925

Creswell Park Exclusion

Point	Latitude	Longitude
2A	-26.16907	27.87561
2B	-26.16981	27.87531
2C	-26.17099	27.87755
2D	-26.17219	27.87855
2E	-26.17185	27.87976
2F	-26.17027	27.87831

Randfontein Estates Points

Point	Latitude	Longitude
1	-26.17734	27.82786
2	-26.18165	27.82964

Figure 4: Detailed Mining Right Application plan (SLR 2018)

2.2 Technical Project Description

The following brief project description for the project has been supplied by SLR. In broad terms the proposed project would involve the development of five open pit mining areas and refurbishment of two existing infrastructure complexes, including additional infrastructure, to access the existing underground mine workings.

Construction (required only when the underground mining operations commence)

Construction contractor's site camp areas would be established at the start of the construction phase for the underground mining. The facilities could include one or more of the following:

- workshops, stores, washbay and lay-down areas
- handling and storage area for construction materials (paints, solvents, oils, grease) and wastes
- fuel handling and storage area
- mobile site offices
- portable change houses and ablution facilities
- generators for temporary power supply
- water storage and management infrastructure
- main access road and internal roads
- parking area
- security and access control.

These facilities would either be removed at the end of the construction phase or incorporated into the layout of the infrastructure complexes.

Mining operations

The proposed project would include:

- five open pit mining areas and associated topsoil stockpiles, run-of-mine ore stockpiles and crusher areas, waste rock dumps and haul roads; and
- an underground mine comprised of two surface infrastructure complexes, underground mine workings and access roads.

Primary mineral processing will take place on site, where ore will be crushed prior to transportation offsite. All run-of mine material will be transported to an existing processing plant off-site for concentrating of minerals.

Initially, near surface resources will be targeted for mining through means of open pit methods. The resources at the open pit targets are generally outcropping and production would commence at the onset of mining activities. No construction activities, as such, are associated with the open pit sites. When the resources at the open pit targets near depletion, the underground mining operations would commence. The activities required to enable extraction of these resources include re-

establishment of existing incline, circular and vertical shafts and related infrastructure as well as rehabilitation of the existing workings.

Specific details regarding the proposed opencast and underground mining operations with specific reference to their location, duration of operation and rehabilitation is provided in Table 3 below and illustrated conceptually in Figure 3, Figure 4, Figure 5 and Figure 6. The conceptual process flow diagram provides an overview of each potential component of the operation and highlights inputs to and outputs from each component

Data on the proposed opencast and underground mining operations is included in the table below.

Table 4: Proposed Mining Operations

Features			Details				
Target commodities			Gold, uranium and silver				
Mineable resource			~ 9 000 000 tonnes				
Opencast mining							
Open pits			**Rugby Club**	**Roodepoort**	**11 Shaft**	**Mona Lisa**	**Kimberley East**
Location			See Figure 7	See Figure 6	See Figure 7	See Figure 5	See Figure 8
Coordinates	A	Longitude	27° 53' 38.62"E	27° 50' 57.47"E	27° 53' 38.32"E	27° 50' 17.66"E	27° 53' 50.18"E
		Latitude	26° 10' 52.28"S	26° 9' 54.74"S	26° 11' 21.58"S	26° 10' 35.60"S	26° 12' 2.05"S
	B	Longitude	27° 53' 44.62"E	27° 50' 57.60"E	27° 54' 1.52"E	27° 50' 49.79"E	27° 53' 49.87"E
		Latitude	26° 10' 53.89"S	26° 9' 55.88"S	26° 11' 28.05"S	26° 10' 35.04"S	26° 12' 3.15"S
	C	Longitude	27° 53' 39.04"E	27° 52' 3.02"E	27° 54' 1.90"E	27° 50' 49.23"E	27° 54' 9.92"E
		Latitude	26° 10' 52.70"S	26° 9' 55.00"S	26° 11' 26.12"S	26° 10' 32.82"S	26° 12' 10.78"S
	D	Longitude	27° 53' 39.04"E	27° 52' 3.62"E	27° 53' 38.93"E	27° 50' 18.28"E	27° 54' 10.58"E
		Latitude	26° 10' 51.05"S	26° 9' 53.88"S	26° 11' 19.64"S	26° 10' 33.40"S	26° 12' 9.91"S
Mining sequence			1	2	3	4	5
Mining direction			East to West	West to East	East to West	West to East	West to East
Size of mining area			~ 2.6 ha	~ 26.5 ha	~ 15 ha	~ 20 ha	~ 9.2 ha
Mining rate (per month)			15 000 tonnes	15 000 tonnes	15 000 tonnes	15 000 tonnes	15 000 tonnes

Features	Details				
Pit depth	7 to 10 m	7 to 10 m	20 to 30 m	20 to 30 m	20 to 30 m
Mineable resource (tonnes)	30 212	179 290	117 631	34 351	62 917
Mining duration (including concurrent rehabilitation, season dependent)	~ 6 months	~ 6 months	~ 6 months	~ 3 months	~ 5 months
Final rehabilitation duration	~ 3 months	~ 2 months	~ 2 months	~ 2 months	~ 2 months
Temporary waste rock dump volume	260 288 m^3	1 103 323 m^3	1 013 436 m^3	295 947 m^3	503 336 m^3
Temporary waste rock dump height	10 m	10 m	20 to 30 m	20 to 30 m	20 to 30 m

Underground mining				
Infrastructure complexes			**Kimberley Reef East**	**Bird Reef Central**
Location			See Figure 8	See Figure 6
Coordinates	A	Longitude	27° 51' 44.97"E	27° 53' 47.58"E
		Latitude	26° 10' 32.99"S	26° 12' 2.20"S
	B	Longitude	27° 51' 43.91"E	27° 53' 57.31"E
		Latitude	26° 10' 36.95"S	26° 12' 4.07"S
	C	Longitude	27° 51' 49.45"E	27° 53' 54.84"E
		Latitude	26° 10' 36.91"S	26° 11' 59.19"S
	D	Longitude	27° 51' 50.56"E	27° 53' 50.52"E
		Latitude	26° 10' 32.99"S	26° 11' 56.98"S
Mining sequence			1	2
Infrastructure complex size			~ 3.5 ha	2.19 ha
Size of mining area			~ 100 ha	~ 52 ha
Mining rate (per month)			15 000 tonnes	15 000 tonnes
Workings depth			100 m to interception of reef (up 3 km below surface)	100 m to interception of reef (up 3 km below surface)
Mining duration			20 years	10 years
Waste rock			All waste rock will remain in the underground workings.	All waste rock will remain in the underground workings.

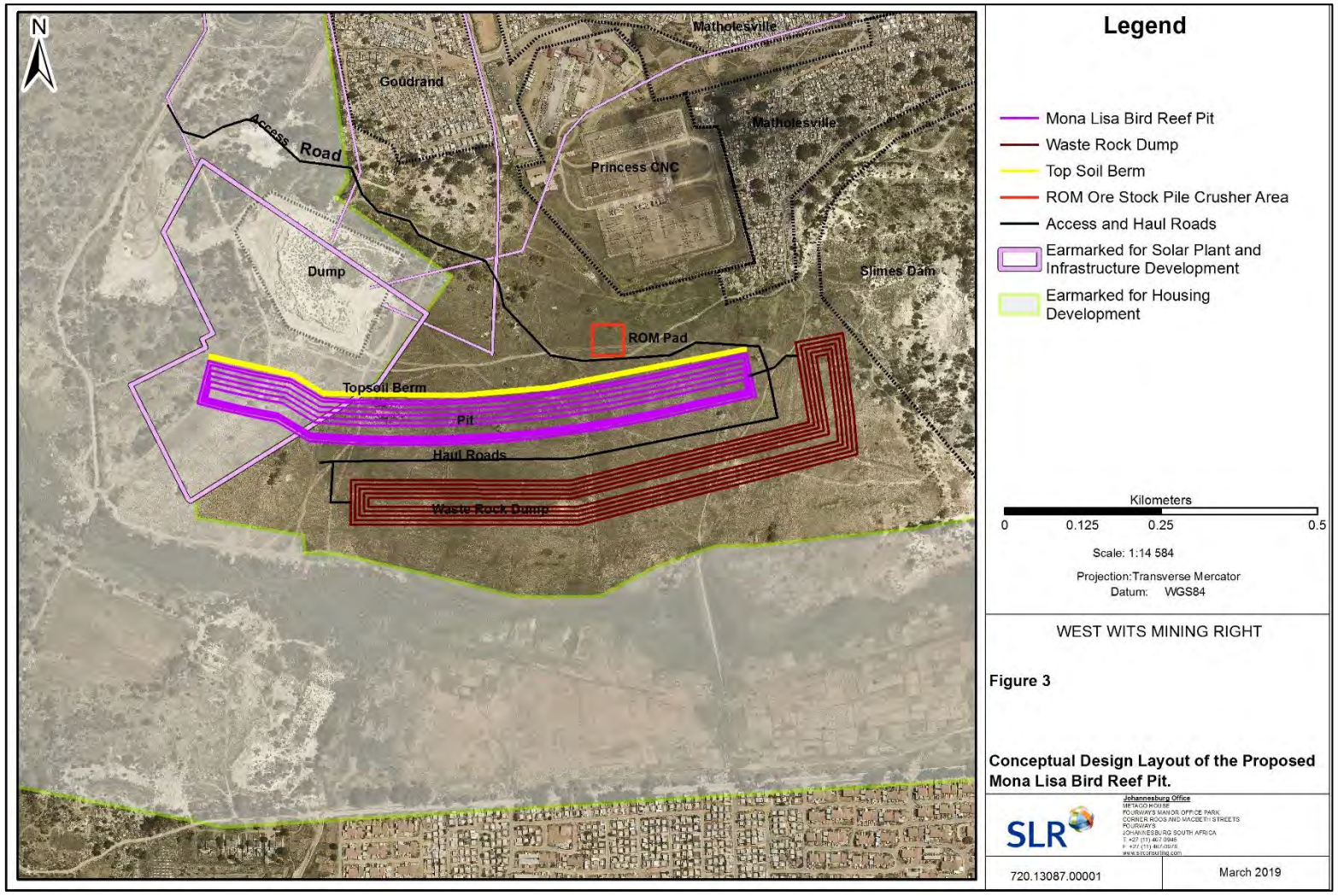


Figure 5: Conceptual Design Layout of the Proposed Mona Lisa Bird Reef Pit.

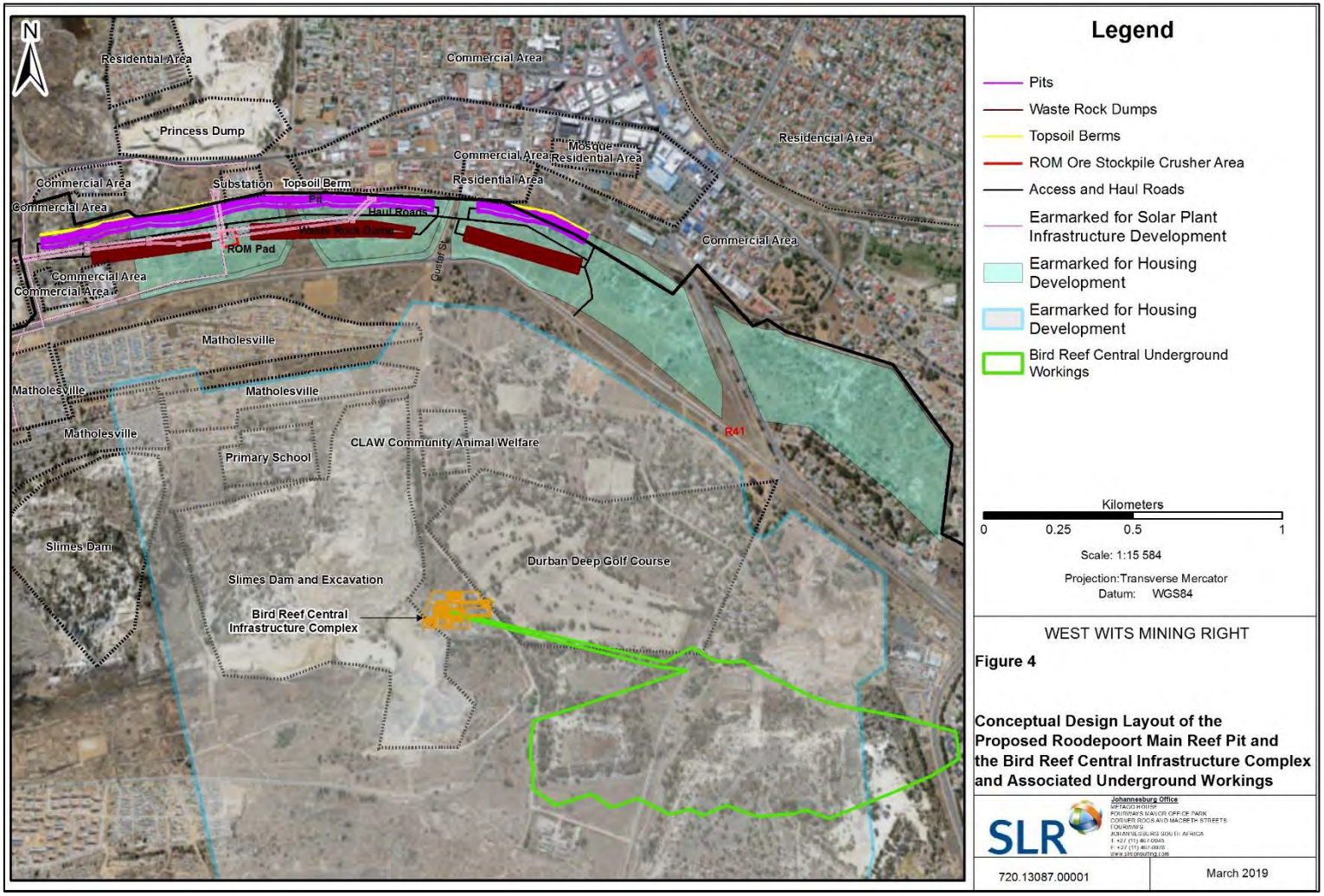


Figure 6: Conceptual Design Layout of the Proposed Roodepoort Main Reef Pit and the Bird Reef Central Infrastructure Complex and Associated Underground Workings

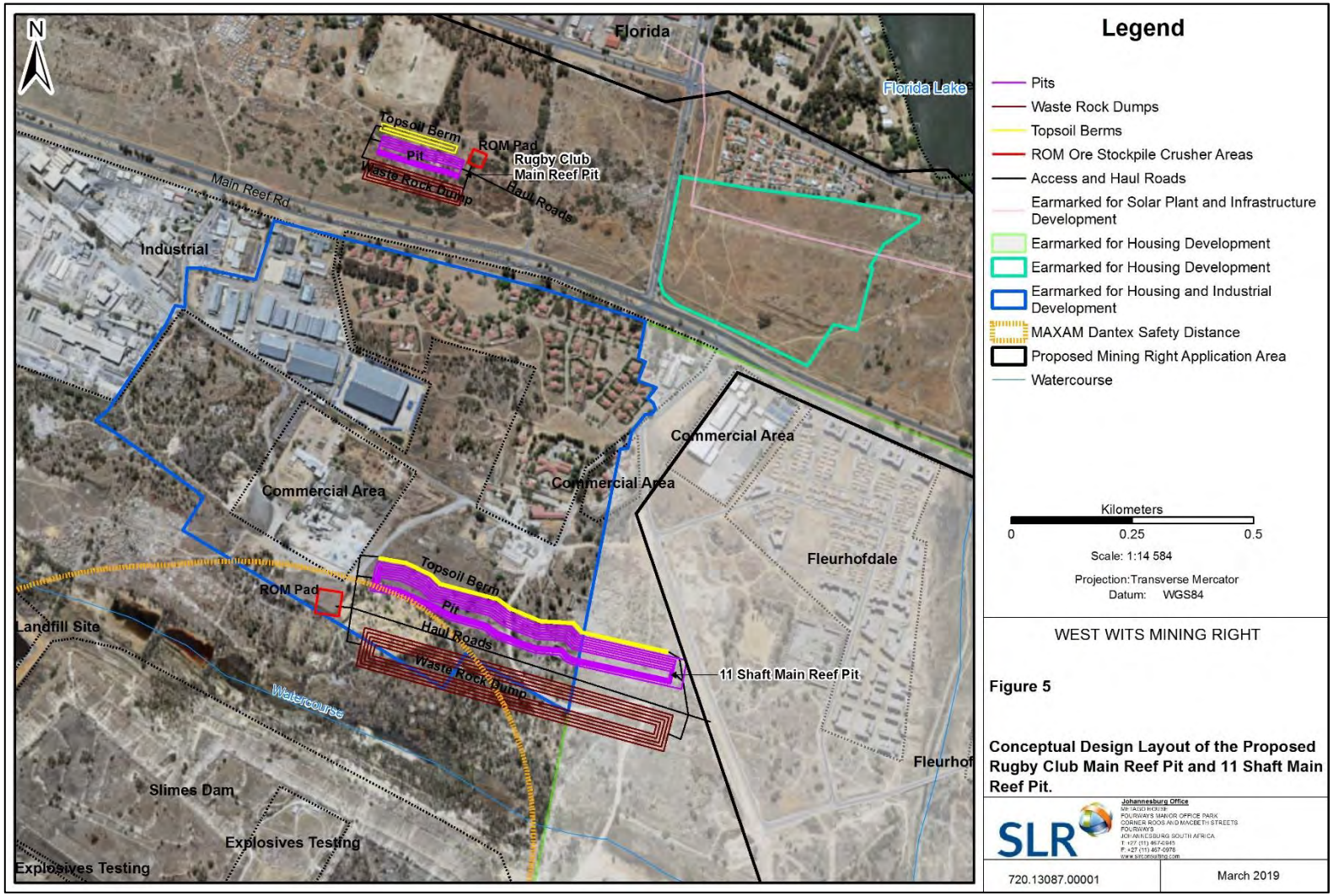


Figure 7: Conceptual Design Layout of the Proposed Rugby Club Main Reef Pit and 11 Shaft Main Reef Pit.

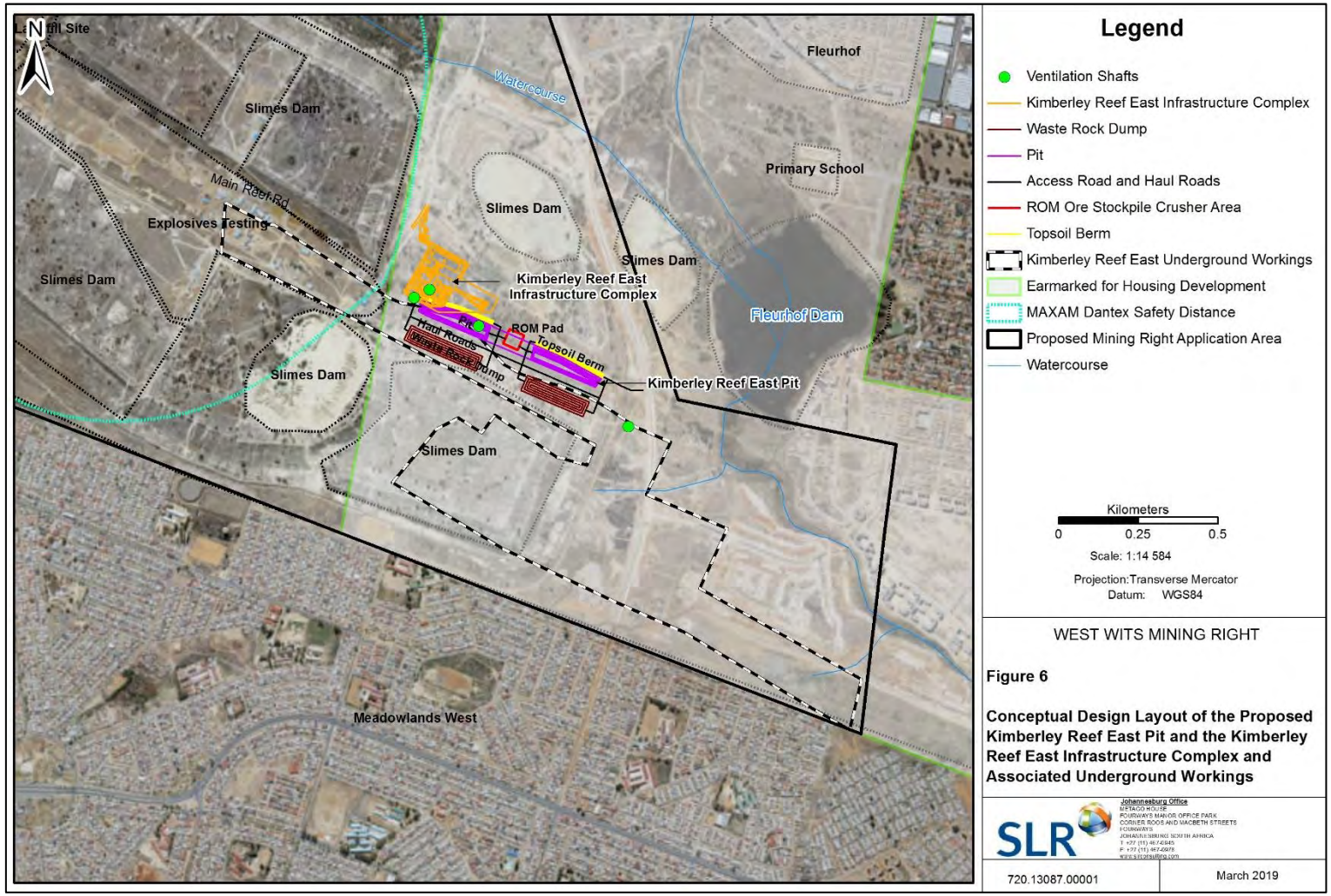


Figure 8: Conceptual Design Layout of the Proposed Kimberley Reef East Pit and the Kimberley Reef East Infrastructure Complex and Associated Underground Workings

Opencast mining

Opencast mining activities would include a conventional excavate, load and haul mining cycle. Once the topsoil and waste rock have been removed and stockpiled, an Xcentric ripper would be used to break the ground (see ***Figure 10***). This equipment replaces the need to conduct blasting. This is both for safety reasons and to minimise impacts on the surrounding environment. Ore would then be excavated and hauled to an ore stockpile for crushing before transportation off-site. The five proposed opencast mining areas would be developed in a phased approach. In this regard, once an opencast area has been mined, backfilled using waste rock and rehabilitated, the next opencast area would be targeted. Following final rehabilitation and adequate stabilisation, each of the areas would be made available in line with post closure land use objectives. No waste rock dumps would remain. It is anticipated that up to 180 000 tonnes of ore would be mined per annum from the opencast resources.

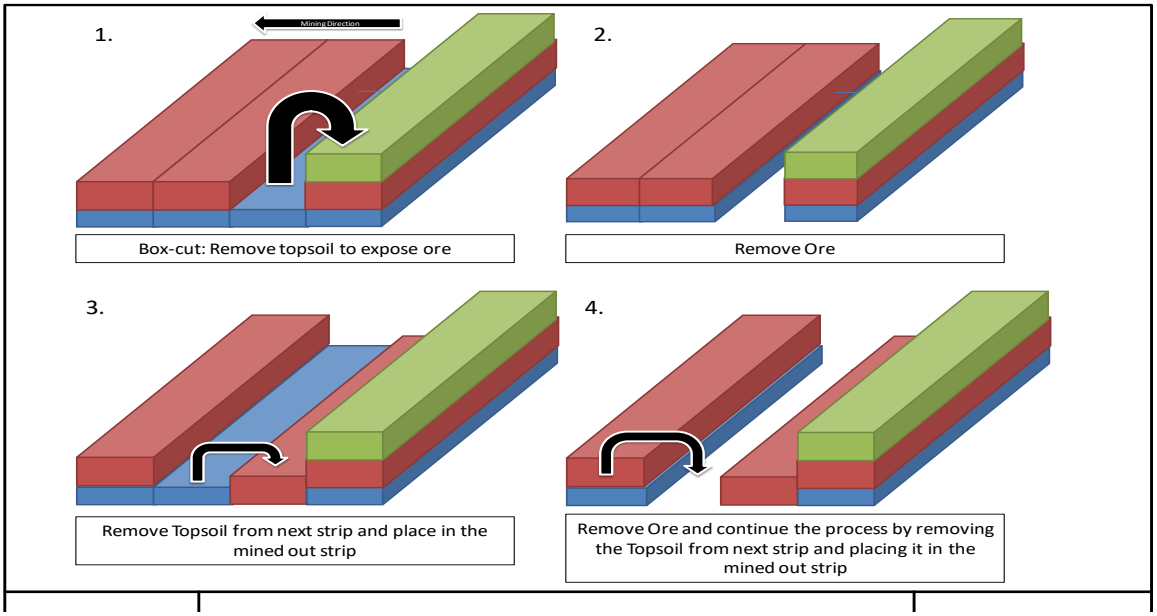


Figure 9: Schematic of Concurrent Rehabilitation in the Open Pits

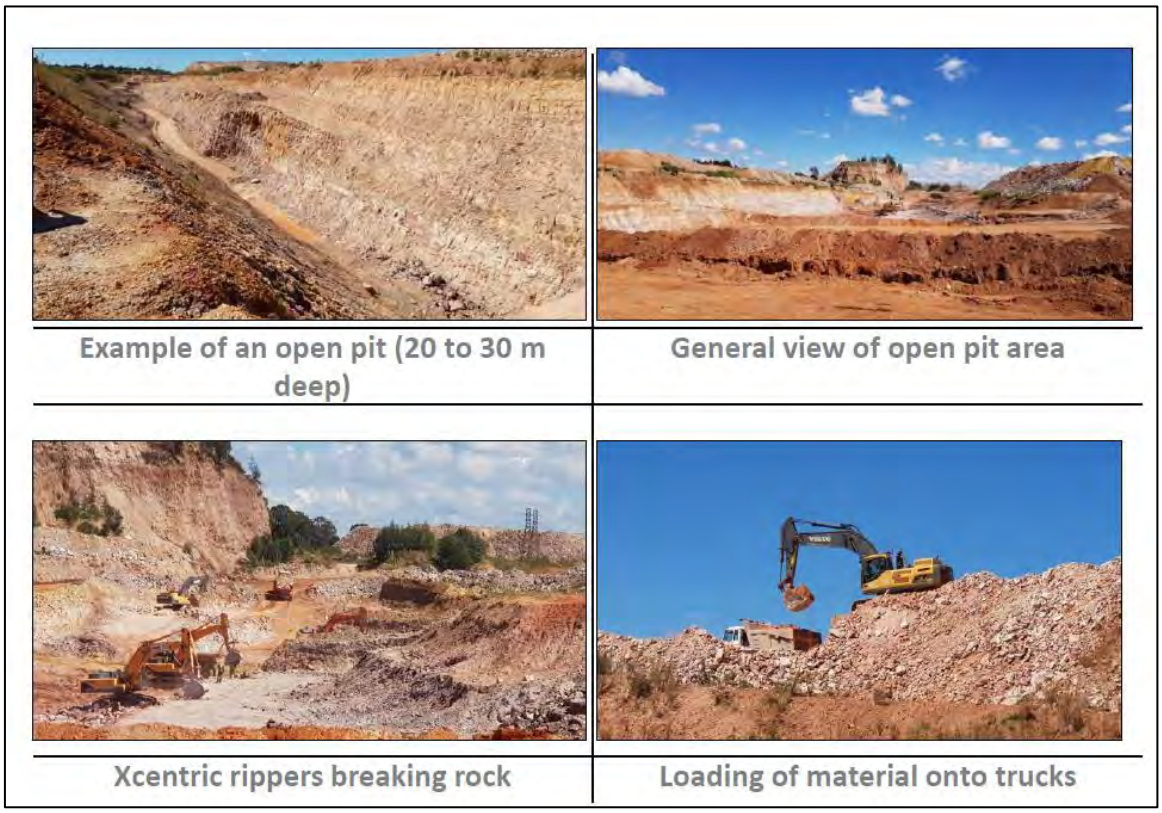


Figure 10: *Example of the Opencast mining operations*

Underground mining

The underground mining method would be conventional drill and blast breast mining methods. The incline shafts, equipped with a winder house, would provide means for movement of men, material and rock to and from the underground workings. Ore drives would be developed on reef with raises developed from the drives. Loading boxes would be constructed and winches would be installed on the down-dip side of the raise to remove the broken rock from the stopes. Ore would be transported to the incline shafts by means of conventional track bound equipment. Ore would be stored for initial crushing before transportation off-site. Any waste rock produced by the underground mining operations would remain underground. It is anticipated that up to 360 000 tonnes of ore would be mined per annum from the underground resources.

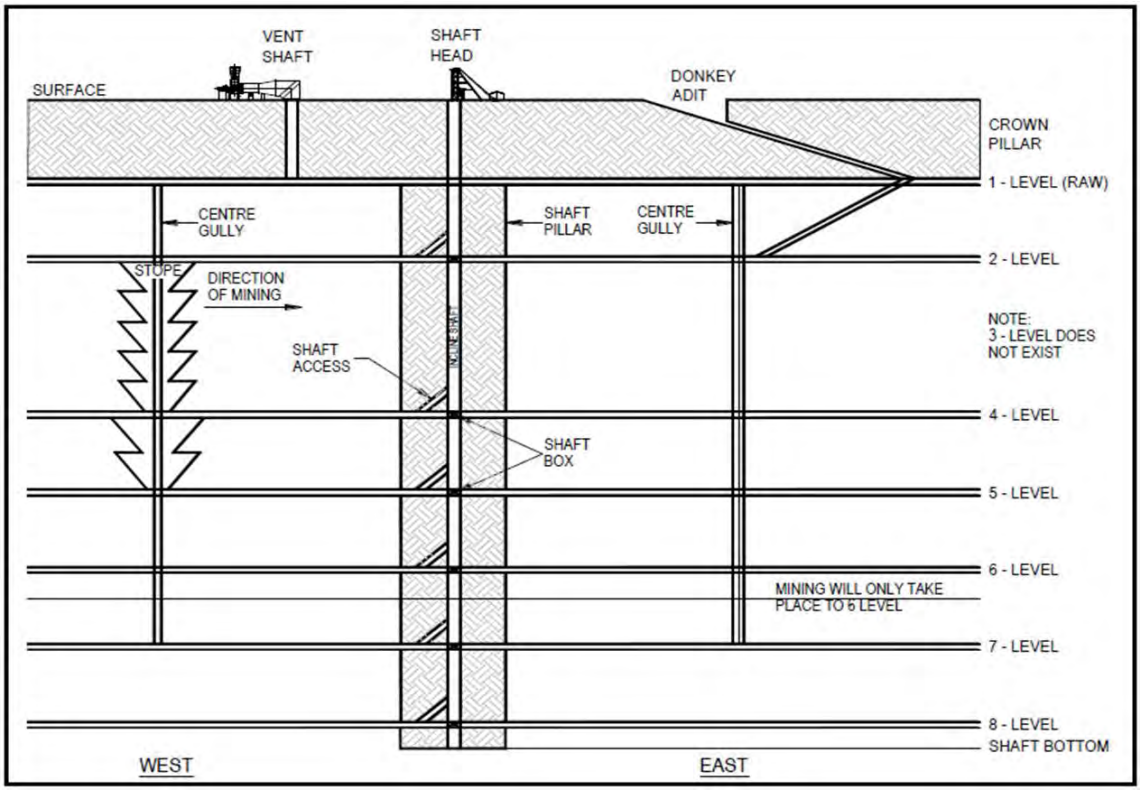


Figure 11: Schematic of Underground Mining Method

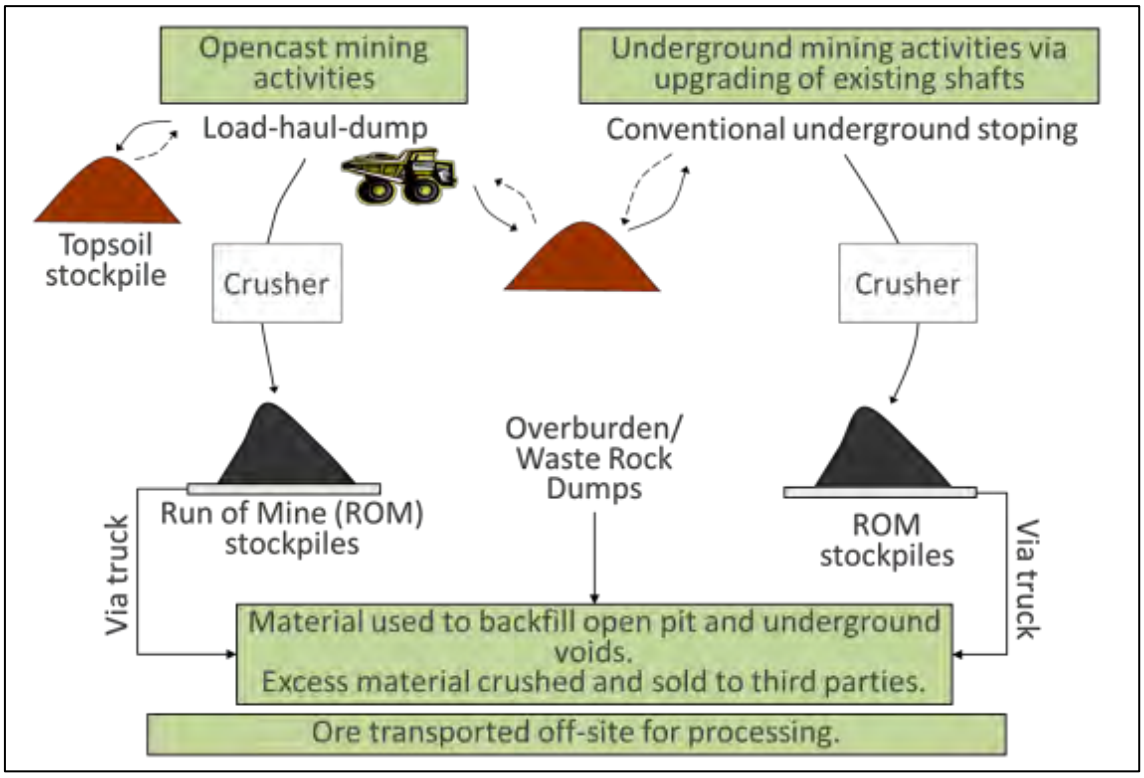


Figure 12: Conceptual Process Flow Diagram of the Mining Operations

Access and Transport

A network of public roads exists in the project area. These comprise both surfaced and gravel roads. The northern section of the project area would be crossed by the R41 (Main Reef/Randfontein) provincial road; Cemetery Road feeds off Main Reef road to the south and runs through the project area linking Roodepoort in the north to Soweto in the south.

Existing surfaced and gravel roads would be used for the project as far as possible. Where site specific access is required to access a pit or infrastructure complex, this would be undertaken with input from the traffic engineering study.

For the opencast mining operations, based on a mining rate of 15 000 tonnes per month, it is estimated that 18 36-ton trucks would be required to transport ore off-site. For the underground mining operations with a proposed mining rate of 30 000 tonnes per month, this number would double. This equates to an average of one or two trucks a day. Ore would be transported via the R41 and R558 to an existing processing plant in the Gauteng region.

Decommissioning and Closure

Broadly speaking, the decommissioning phase would include the removal of infrastructure from site and the final rehabilitation of areas. In consultation with I&APs (especially landowners) the final post closure land use has been identified during the EIAP. The conceptual closure plan objectives would be aligned with a rehabilitation plan that supports a post-closure land use of a residential and/or agriculture. A rehabilitation and closure plan is included in the EIAP in line with the requirements of the NEMA EIA Regulations, 2014 (as amended) and Financial Provisioning Regulations, 2015 (GNR.1147 of 2015).

3 CURRENT STATUS QUO

3.1 Site Description

The project area is dominated by rolling plains with interspersed hills, with a dominant hill crest in the north where previous mining activities have impacted on the outcrop. The general elevation across the project area varies from 1 600 to 1 780 m above mean sea level (mamsl), which generally slopes to the south-west. Historical mining activities have altered the natural topography with the presence of various old slimes dams scattered throughout the project area.

The greater Roodepoort region has been affected by historical mining activities since the farms Vogelstruisfontein, Roodepoort, Langlaagte and the two portions comprising Paardekraal (in Krugersdorp) were proclaimed as public diggings by the then Zuid-Afrikaansche Republiek (ZAR) government in 1886.

Existing land uses associated with the project area include a combination of informal settlements, low-cost and high-cost residential areas, community and municipal facilities, agricultural areas, recreational areas, industrial areas, manufacturing and distribution facilities, commercial businesses, historical mine housing and historical mine infrastructure (slimes dams, shafts, derelict/abandoned buildings and water dams), illegal informal mining activities, mining activities, open land, substations and powerlines, gas and petrol pipelines and road infrastructure. Surrounding land uses are similar to those listed above.

Within the proposed opencast mining areas and infrastructure complexes, the land uses are limited to historical mine infrastructure (shafts and/or derelict/abandoned buildings), illegal informal mining activities, illegal dumping of waste and/or open land.

The larger mining right application area contains several separate mining activity footprint areas, five of which will be mined as opencast pits while two will be mined by underground methods. Two shaft infrastructure areas are proposed to be developed to access the underground mining activity areas. The portion of the trucking road contained within the larger mining right application area was also investigated.

The five opencast pit footprint areas are:

- Mona Lisa Bird Reef Pit
- Roodepoort Main Reef Pit
- Rugby Club Main Reef Pit
- 11 Shaft Main Reef Pit
- Kimberley Reef East Pit

The two shaft infrastructure footprints for the underground mining areas are:

- Bird Reef/Central Circular Shaft
- Kimberley Reef East Infrastructure

Figure 13: General view of Mona Lisa Bird Reef Pit, showing the vegetation.

Figure 14: Another view of the Mona Lisa Bird Reef Pit area, towards the east end .

Figure 15: View of Roodepoort Main Reef Pit area, showing vegetation and disturbed areas, looking west

Figure 16: View of Roodepoort Main Reef Pit area, showing dense vegetation and rubble heaps, looking east

Figure 17: Roodepoort Main Reef Pit area, showing the original Shaft 11 site

Figure 18: Roodepoort Main Reef Pit area, showing more dumping sites

Figure 19: Rugby Club Main Reef Pit area, showing illegal mining entrance (arrow)

Figure 20: Rugby Club Main Reef Pit area, showing dense vegetation

Figure 21: Kimberley Reef East Pit area, showing the tailings dams on the southern boundary

Figure 22: Kimberley Reef East Pit area, view of dense vegetation and dumping

Figure 23: 11 Shaft Main Reef Pit area, showing the building rubble from demolished mining structures

Figure 24: 11 Shaft Main Reef Pit area, showing illegal mining activities

Figure 25: Bird Reef/Central Circular Shaft Infrastructure area, looking west

Figure 26: Bird Reef/ Central Circular Shaft Infrastructure area showing soil heap to the south

3.2 Archival findings

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

3.2.1 Heritage Sensitivity Mapping

The sensitivity maps were produced by overlying:

- Satellite Imagery; and
- Topographical Maps dating from the 1940s to the 1970s.

This enabled the identification of possible heritage-sensitive areas that included:

- Structures/Buildings;
- Burial grounds and graves;
- Possible archaeological sites (based on experience)

By superimposition and analysis, it was possible to rate these structures/areas according to age and thus their level of protection under the NHRA. Note that these structures refer to possible tangible heritage sites as listed in
Table *5***.**

Table 5: Possible tangible heritage sites in the study area

Name	Description	Legislative protection
Architectural Structures	Possibly older than 60 years	NHRA Sect 3 and 34
Burial grounds and graves	Possibly older than 60 years	NHRA Sect 3 and 36
Archaeological sites	Possibly older than 100 years	NHRA Sect 3 and 35

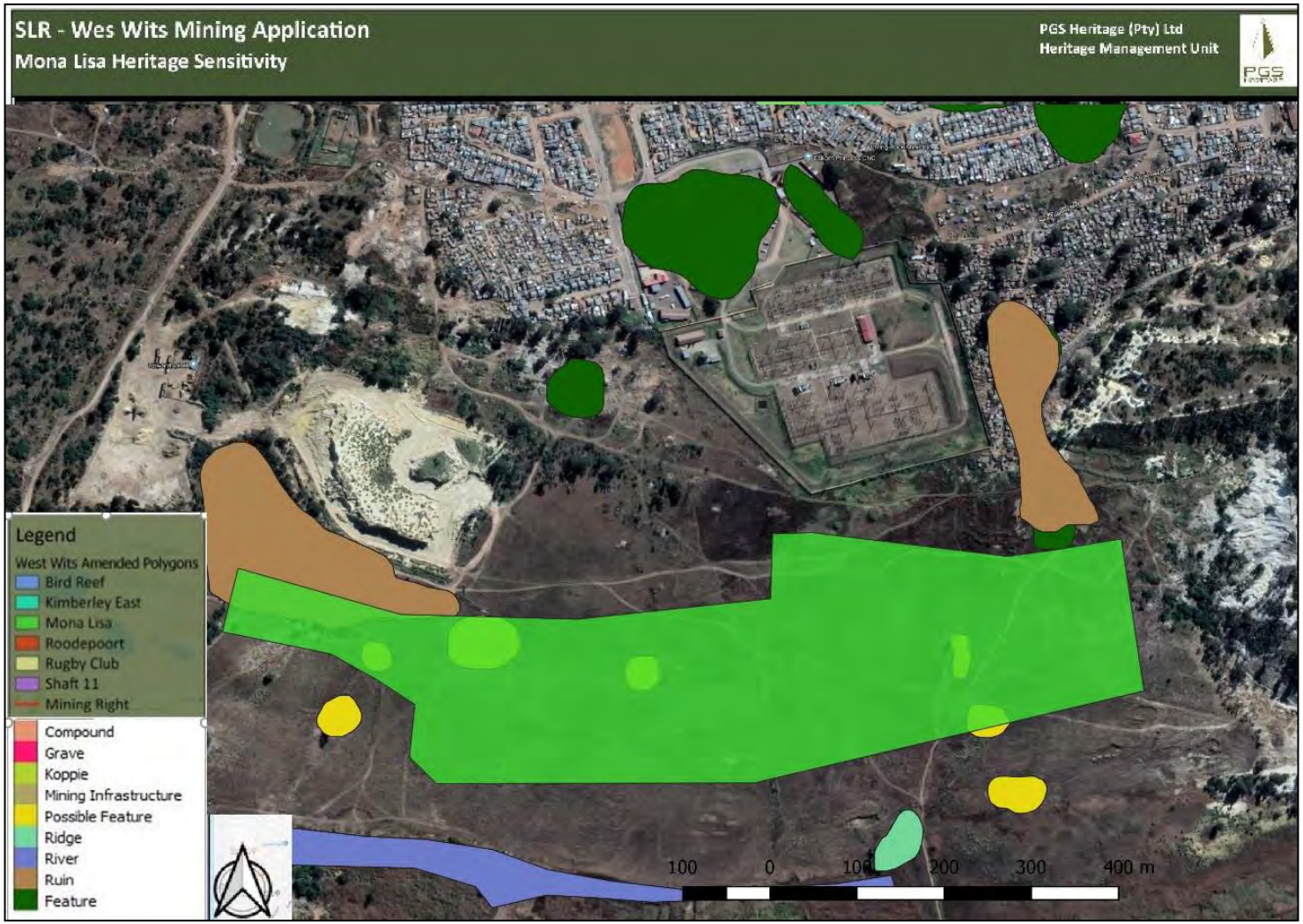


Figure 27: Mona Lisa Bird Reef Pit Heritage Sensitivity map

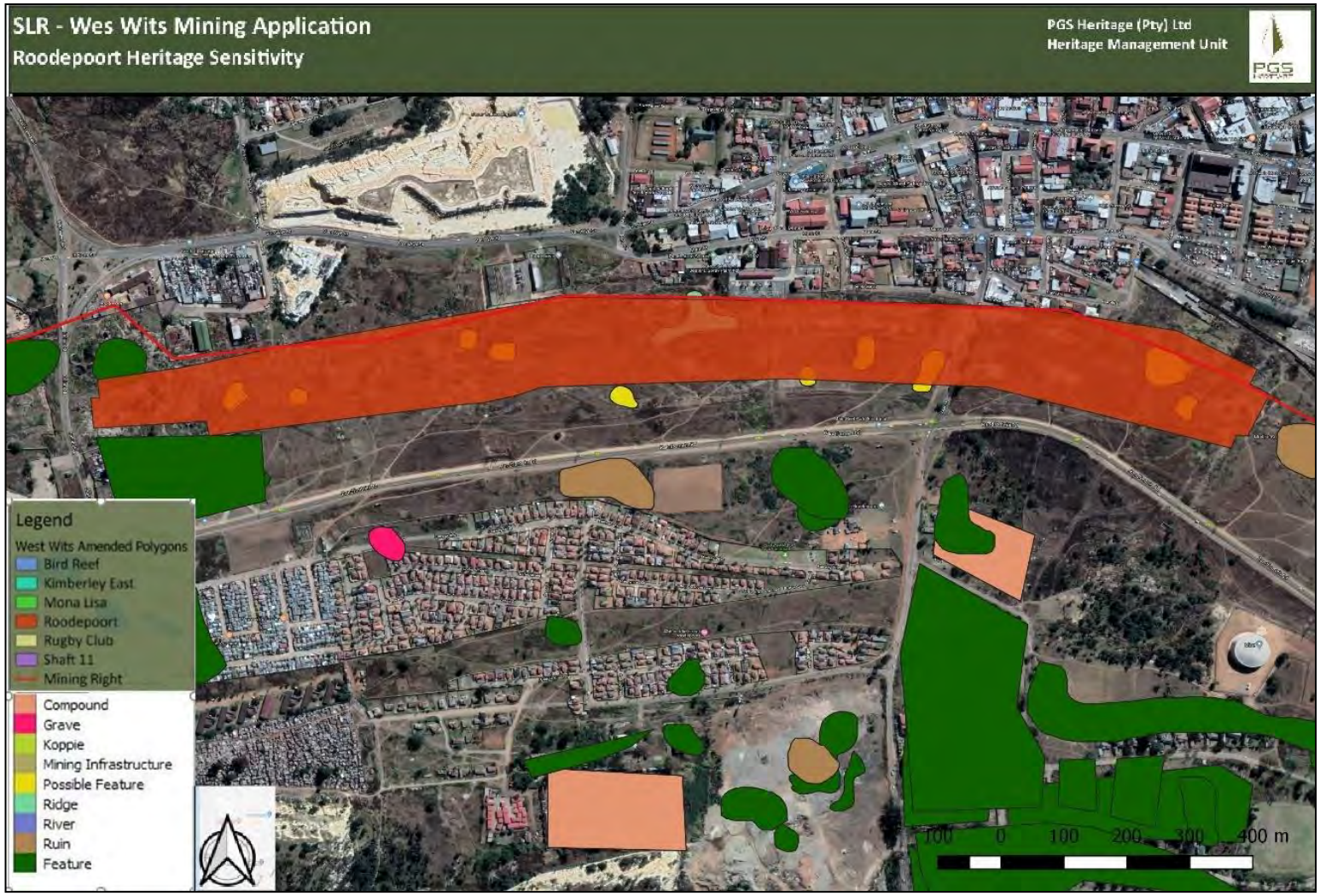


Figure 28: Roodepoort Main Reef Heritage Sensitivity map

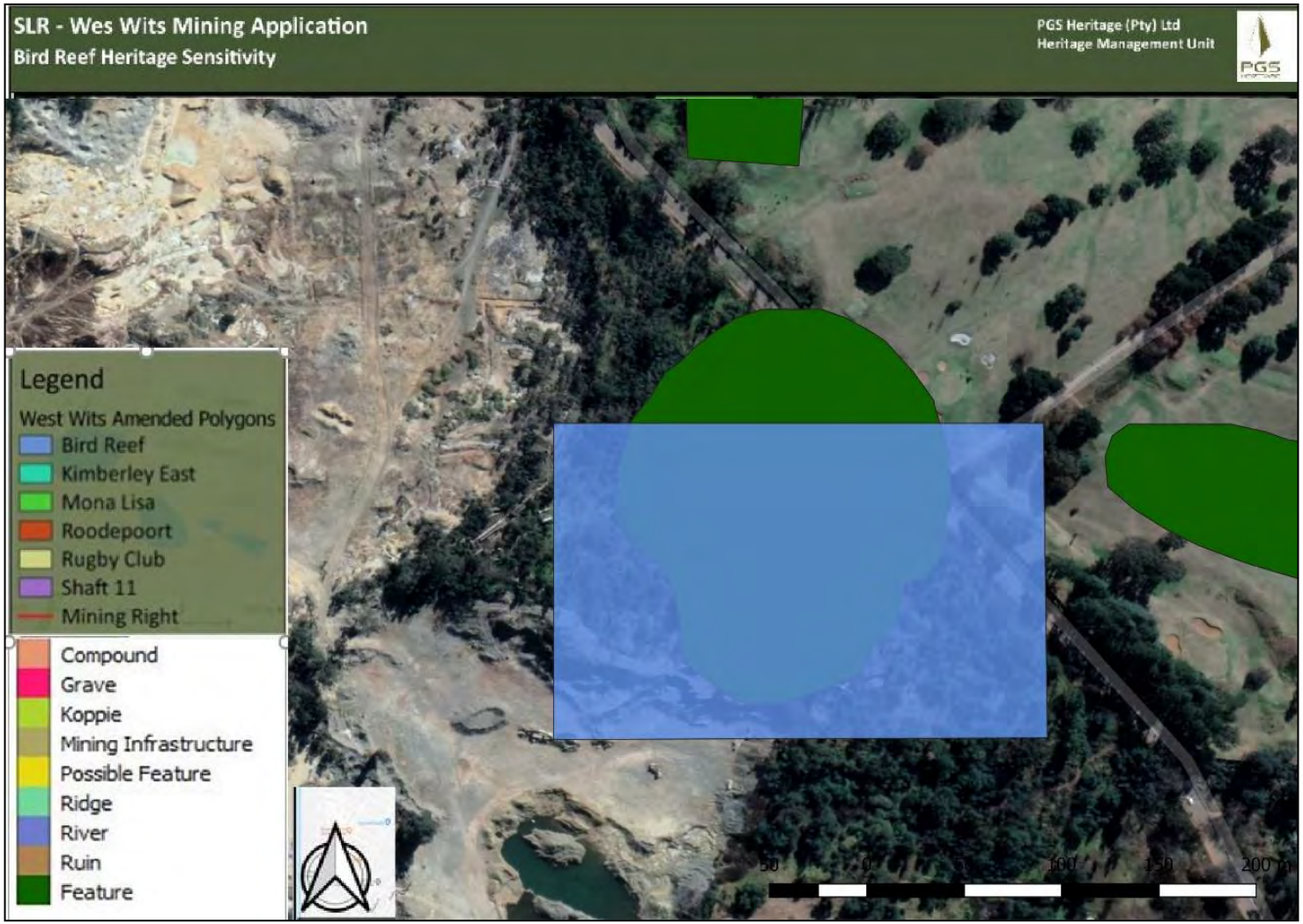


Figure 29: Bird Reef/ Central Circular Shaft heritage sensitivity map

Figure 30: Rugby Club Main Reef Pit heritage sensitivity map

Figure 31: 11 Shaft Main Reef Pit heritage sensitivity map

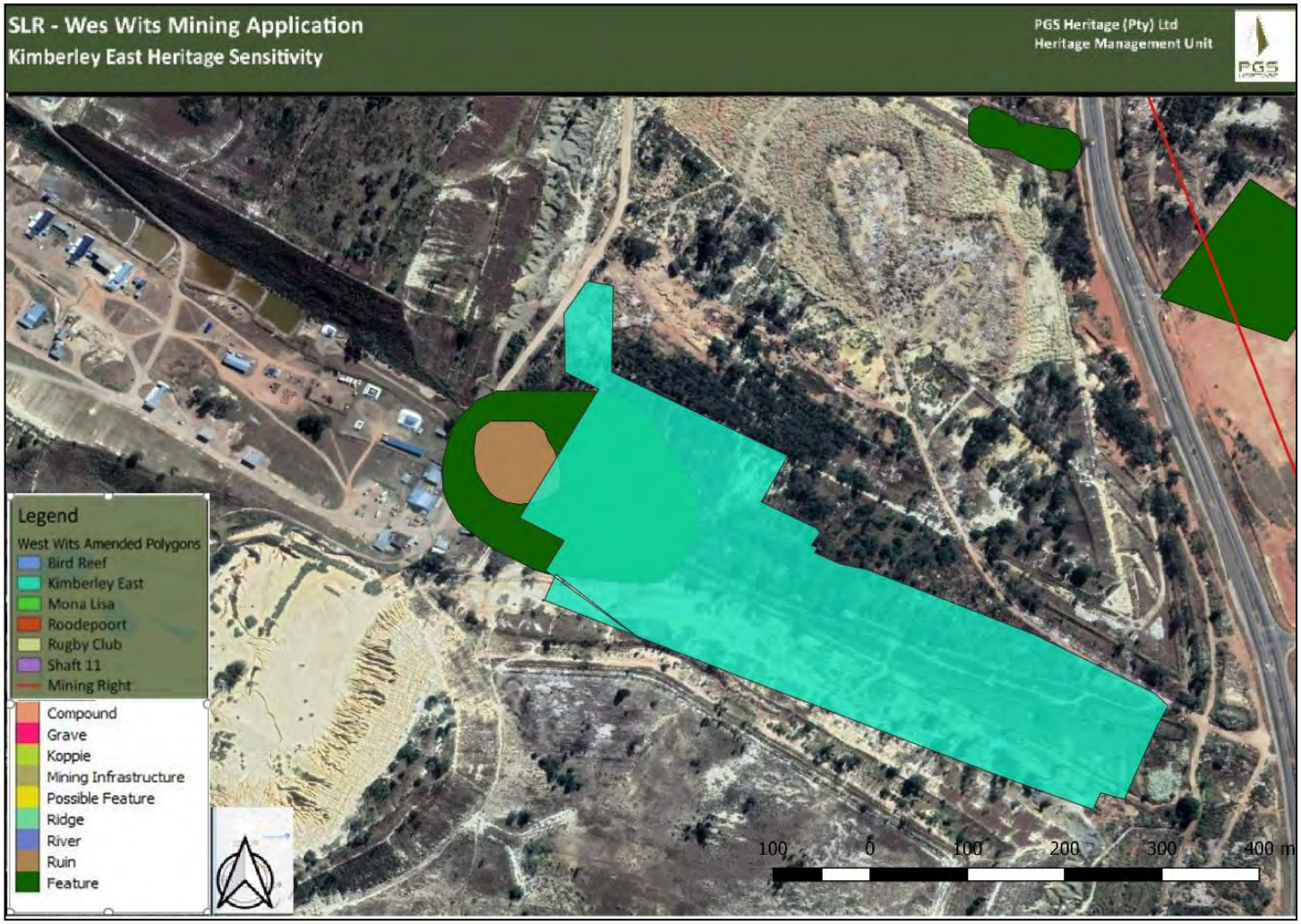


Figure 32: Kimberley Reef East Pit and Infrastructure heritage map

3.2.2 South African Heritage Resources Information System (SAHRIS)

A scan of SAHRIS has revealed the following studies conducted in and around the study area of this report. These are summarised below in ascending date order:

- *Birkholtz. PD. 2001. Heritage Impact Assessment for the Bram Fischerville Ext. 7 Property Development, Located between Soweto and the Roodepoort CBD, Gauteng. Compiled by CRM Africa CC for Globecon Environmental Management Services*

The HIA report was undertaken as part of the Scoping Report for the proposed development. Only one site was identified, which consisted of two stone artefacts noted on top of a soil heap 20m from the edge of a water pan. The soil heap came from an excavation of about 1.6m deep. It was assumed that the stone artefacts therefore originated from the bottom of the excavation. The site is located 4.29km to the south-west of the mining right application area southern boundary.

- *Birkholtz. PD. 2006. Phase 1 Heritage Impact Assessment for the Proposed Jameson Field Extension 1 Residential Township Development, Gauteng Province. Compiled for: KWP Landscape Architects/Environmental Consultants By Archaeology Africa CC*

Archaeology Africa was commissioned by Marsh Environmental Services to undertake a HIA for the proposed Jameson Field Extension 1 development located on Portions 12 and 37 of the farm Vlakfontein 238 IQ. The study identified seven heritage sites comprising three sites that can be directly associated with the Jameson Raid and its final battle on 2 January 1896, three buildings and one cemetery. This study area is located roughly 3.74km to the south-west of the Mona Lisa opencast footprint area.

- *Birkholtz. PD. 2008. Phase 1 Heritage Impact Assessment for the Proposed Development of Portions 407 and 408 of the Farm Roodepoort 237 IQ, City of Johannesburg Metropolitan Municipality, Roodepoort, Gauteng Province. Compiled for Marsh (Pty) Ltd by Archaeology Africa CC.*

This was a Phase 1 HIA for a proposed residential, commercial & business development on portions 407 and 408 of the farm Roodepoort 237 IQ. The developer for the project was Rand Leases Properties (Pty) Ltd. Sixteen heritage sites were located which were associated with historical gold mining activities. The sites included: eight abandoned mine shafts, five historic mine buildings and infrastructure, one mine tram line, one old cemetery and one historic ash midden. This study area included the Creswell Park footprint area and the ash midden was the only site identified in the immediate area of the footprint, but it was located outside the northern boundary of the footprint (approx. 38m away from the northern boundary). Since both the satellite imagery and the field survey indicated that this area has been disturbed extensively by

dumping and illegal mining excavations, it is highly likely that most of the site has been destroyed since it was identified. However, there may be subsurface material still present.

- *Birkholtz and M. Naudé. 2010. Heritage Impact Assessment - Proposed Development of the Remaining Extent of Portion 161 of the Farm Vogelstruisfontein 231-IQ, City of Johannesburg Metropolitan Municipality, Gauteng Province. Compiled for Marsh (Pty) Ltd by Professional Grave Solutions Heritage Unit.*

The HIA study was undertaken for the proposed development known as Rand Leases Ext. 13. It consisted of a mixed density residential development incorporating commercial uses for the affordable housing market. The heritage sites identified included 54 historical mining-related structures, including: 45 housing units, six communal garages, one transformer station, one office complex and one mine shaft. The study area for this project is located within the north-east corner of the greater mining right application area, immediately south of Main Reef Road.

- *Du Pisanie, J. 2014. Mining Right Application for Reclamation of the Soweto Cluster Dumps, Roodepoort, Gauteng Province Heritage Impact Assessment. DMR Ref Number: GP 30/5/1/2/2(10020) MR. Prepared for Ergo Mining (Pty) Ltd by Digby Wells Environmental.*

The proposed Soweto Cluster Project area is located in the Gauteng Province on the farms Vogelstruisfontein 231 IQ; Roodepoort 237 IQ; and Vlakfontein 238 IQ. The project area is situated adjacent to several suburbs of greater Soweto, approximately 20 km from the Johannesburg Central Business District (CBD). This study identified two burial grounds, several historical structures, several industrial era buildings, the historical Durban Roodepoort Deep Mine and associated structures, and one declared heritage site. The extensive study area included the current mining right application area.

- *Birkholtz, P. 2017. Heritage Impact Assessment for the Proposed Establishment of Goudrand Ext. 12 and Goudrand Ext. 13, located within the Roodepoort Magisterial District, City of Johannesburg Metropolitan Municipality, Gauteng Province. for Client: Hunter Theron Inc. By PGS Heritage.*

The HIA study formed part of the EIAP for the proposed establishment Goudrand Ext. 12 and Goudrand Ext. 13, situated within the Roodepoort Magisterial District, City of Johannesburg Metropolitan Municipality, Gauteng Province. Three sites comprising the mostly demolished ruins of historical mining infrastructure were identified during the fieldwork. The study area for this project is located within the southern boundary of the greater mining right application area, within 1km south of the Bird Reef Central Infrastructure footprint.

3.3 Archaeological background

Stone Age period

The Early Stone Age (ESA) (2.5 million to 250 000 years ago) 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 (Korsman, & Meyer, 1999). A few ESA sites are known from the general vicinity. One of these is situated roughly 4.29km to the south-west of the southern boundary of the mining right application area (Birkholtz, 2001).

The Middle Stone Age (MSA) is the second oldest phase identified in South Africa's archaeological history (250 000 to 40 000 years ago). This phase is associated with flakes, points and blades manufactured by means of the so-called 'prepared core' technique (Korsman, & Meyer, 1999).

The Later Stone Age (LSA) (40 000 years ago to the historic past) is the third archaeological phase identified and is associated with an abundance of very small artefacts known as microliths (Korsman, & Meyer, 1999). A rock shelter site containing LSA artefacts was excavated by Wadley at Kloofendal in the north-east of Roodepoort 1983 (Wadley, 1983).

Overview of the Iron Age in the Johannesburg region

Early Iron Age (EIA) sites in the Witwatersrand area date between 500 AD and 900 AD. The Magaliesberg mountain range represents the most southern point of distribution of these sites. The most well-known EIA site in this general area is Broederstroom, located next to the Hartebeespoort Dam, to the west of the route corridor. This site is dated to 350 - 600 AD and represents the first phase of occupation in the region by Bantu speaking farmers (Huffman 2007). No EIA sites are known from the immediate vicinity of the footprint area.

The Late Iron Age (LSA) occupation of this area by Sotho-Tswana communities is represented by four ceramic sequences of the Urewe tradition: Ntsuanatsatsi (1450-1650), Olifantspoort (AD 1500 -1700), Uitkomst (AD 1700-1850) and Buispoort (1700-1840) (Huffman 2007). No LIA sites are known from the immediate vicinity of the footprint area.

It seems that agropastoralists did not settle in the Johannesburg region until the LIA (AD 1300-1840). According to the ceramic evidence, Sotho-Tswana and Nguni speakers moved south into southern Africa between about AD 1100 and 1300. Generally, Nguni occupied the eastern regions, while Sotho-Tswana moved onto the plateau, starting in the Limpopo Province.

After a while, the first Sotho-Tswana groups split into two clusters: a Western cluster (that today includes BaHurutshe, BaKwena, BaKgatla, BaNgwaketse and BaNgwato) centred in the present-day Northwest Province; and a Southwestern cluster (including BaRolong and BaThlaping) that

inhabited the region from the Magaliesberg to Potchefstroom, including Johannesburg. Radiocarbon dates place the pottery (called Olifantspoort after the site where it was first recorded) between about AD 1450 and 1700.

In the 15th century BaFokeng people, using the early type of walling, spread north across the Vaal. Type N sites are on record near Balfour, in the Suikerbosrand, Vredefort Dome, Pretoria and Greater Johannesburg area. For Johannesburg, some of the best examples occur in the Klipriviersberg to the south. The associated pottery is called “Uitkomst” (after the name of a cave where it was first found). Radiocarbon dates place this first walling with “Uitkomst” pottery between about AD 1440 and 1665 (Bergh 1999, http://www.sahistory.org.za/places/johannesburg).

All agropastoralists appear to have left Greater Johannesburg between AD 1670 and 1780 when the climate became cooler and drier. When conditions improved 100 years later, Sotho-Tswana farmers once again lived in the area. Sotho-Tswana occupation came to an end in the Greater Johannesburg in 1823 during the difaqane period when Mzilikazi’s Ndebele group moved into and through the area. Mzilikazi first established his headquarters near Heidelberg before moving to Pretoria (Bergh 1999, http://www.sahistory.org.za/places/johannesburg).

3.4 Archival/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 and satellite imagery were studied to identify structures, possible burial grounds or archaeological sites present in the footprint area.

Topographic maps (1:50 000) for various years (1943, 1954, 1977) were assessed to observe the development of the area, as well as the location of possible historical sites and burial grounds. The maps were also used to assess the possible age of structures located, to determine whether they could be considered as heritage sites. Map overlays were created showing the possible heritage sites identified within the areas of concern, as can be seen below (**Figure 33** to **Figure 38**).

The relevant topographical maps include:

- Roodepoort 2627BB Edition 1, 1943: which was compiled and drawn by the Survey Depot South African Engineering Corps. (SAEC) and reprinted by the Government Printer in 1955
- Roodepoort 2627BB Edition 2, 1954: which was surveyed in 1954 and drawn in 1956 by the Trigonometric Survey Office from Air Photography in 1952. It was printed by the Government Printer in 1957.
- Roodepoort 2627BB Edition 3, 1977: which was remapped in 1977 by the Director-General of Surveys and printed by the Government Printer in 1979.

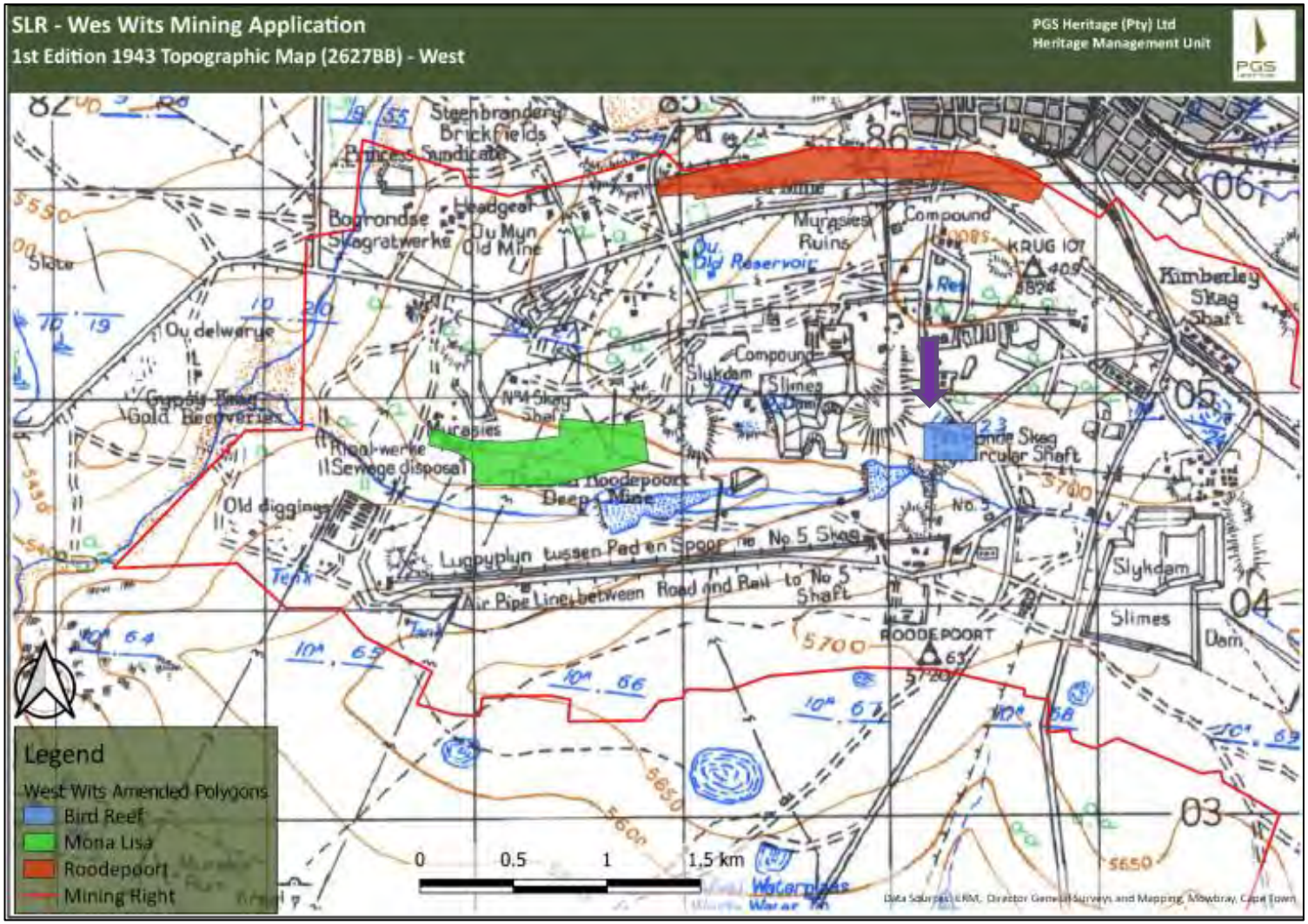


Figure 33: Roodepoort 2627BB Edition 1, 1943: The western section of the mining right application area shows many structures and features (e.g. slimes dams, diggings) that are 75 years or older. Several structures (purple arrow) are depicted in the location of the Bird Reef/ Central Circular Shaft footprint, while no obvious structures are visible in the locations of the Roodepoort Main Reef Pit or Mona Lisa Bird Reef Pit footprints.

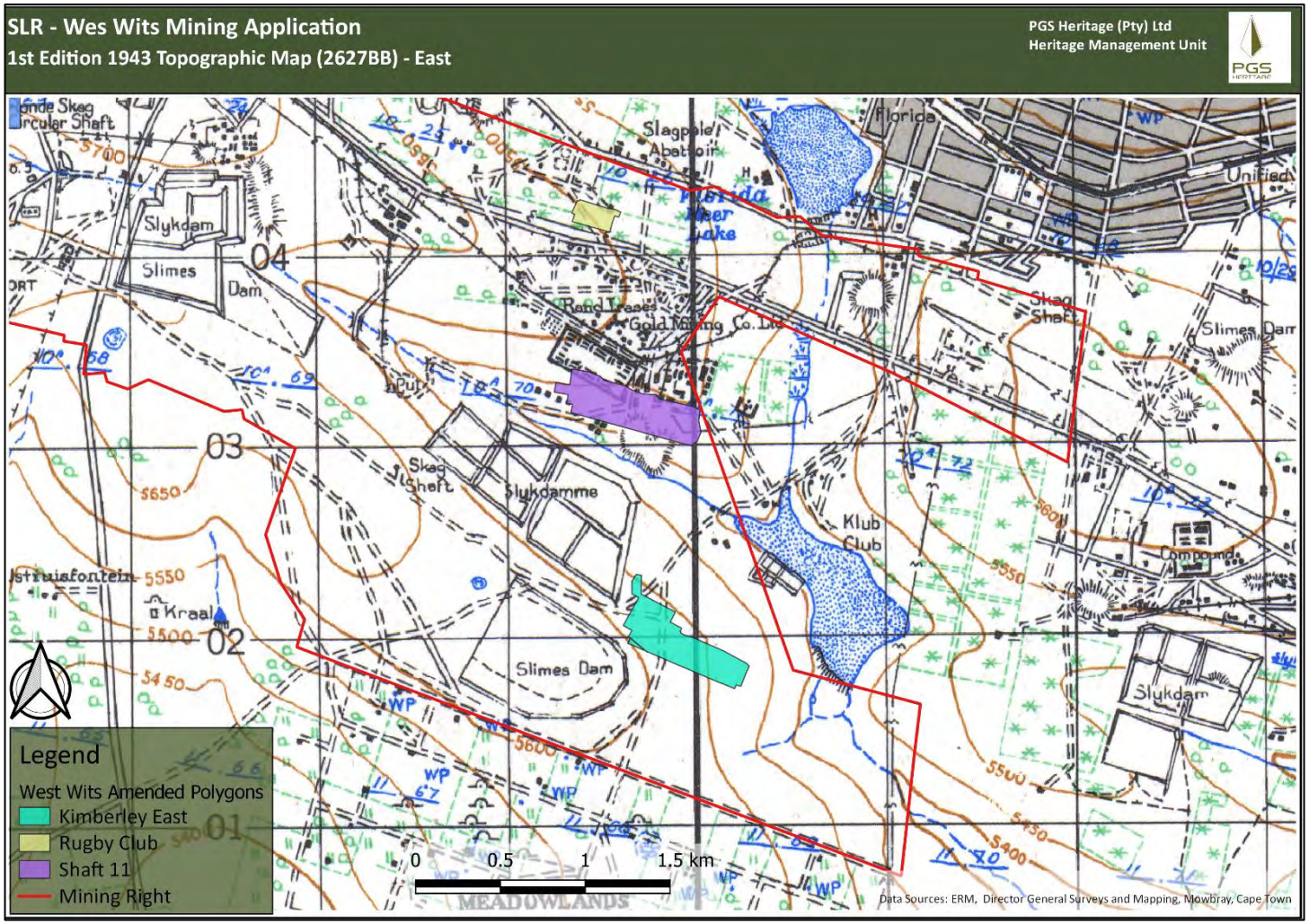


Figure 34: Roodepoort 2627BB Edition 1, 1943: The eastern section of the mining right application area shows many structures and features (e.g. slimes dams, diggings) that are 75 years or older. Some of these are associated with the historical Rand Leases Gold Mining Company. Several structures are depicted in the locations of the 11 Shaft Main Reef Pit and Rugby Club Main Reef Pit footprints. The Kimberley Reef East Pit and Infrastructure footprint shows no obvious features.

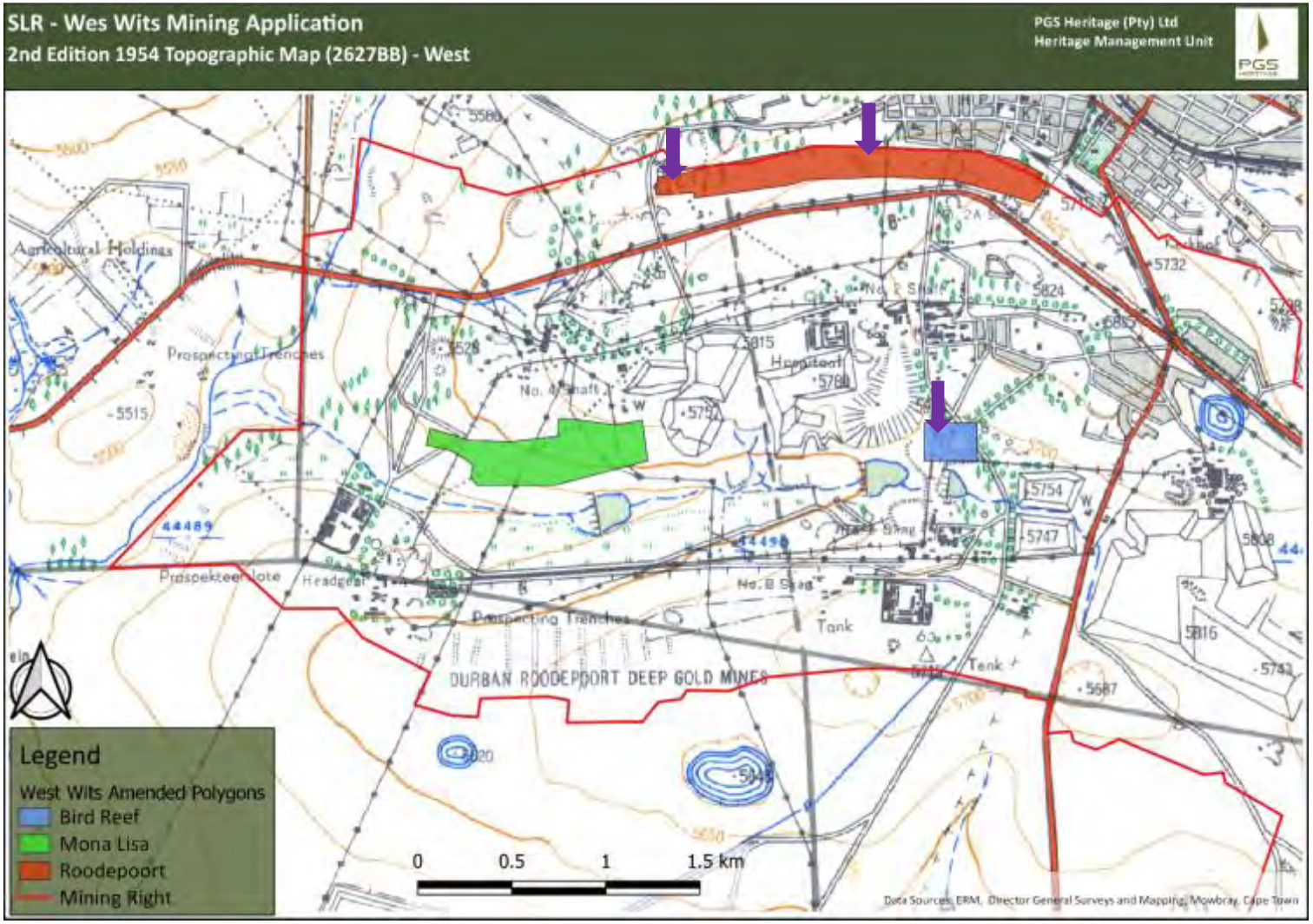


Figure 35: Roodepoort 2627BB Edition 2, 1954: The western section of the mining right application area shows many structures and features (e.g. slimes dams, diggings) that are 64 years or older. Some of these are associated with the historical Durban Roodepoort Deep Mine. Several structures are depicted within the Roodepoort Main Reef Pit footprint and the Bird Reef/ Central Circular Shaft footprint. No obvious features are shown within the Mona Lisa Bird Reef Pit footprint.

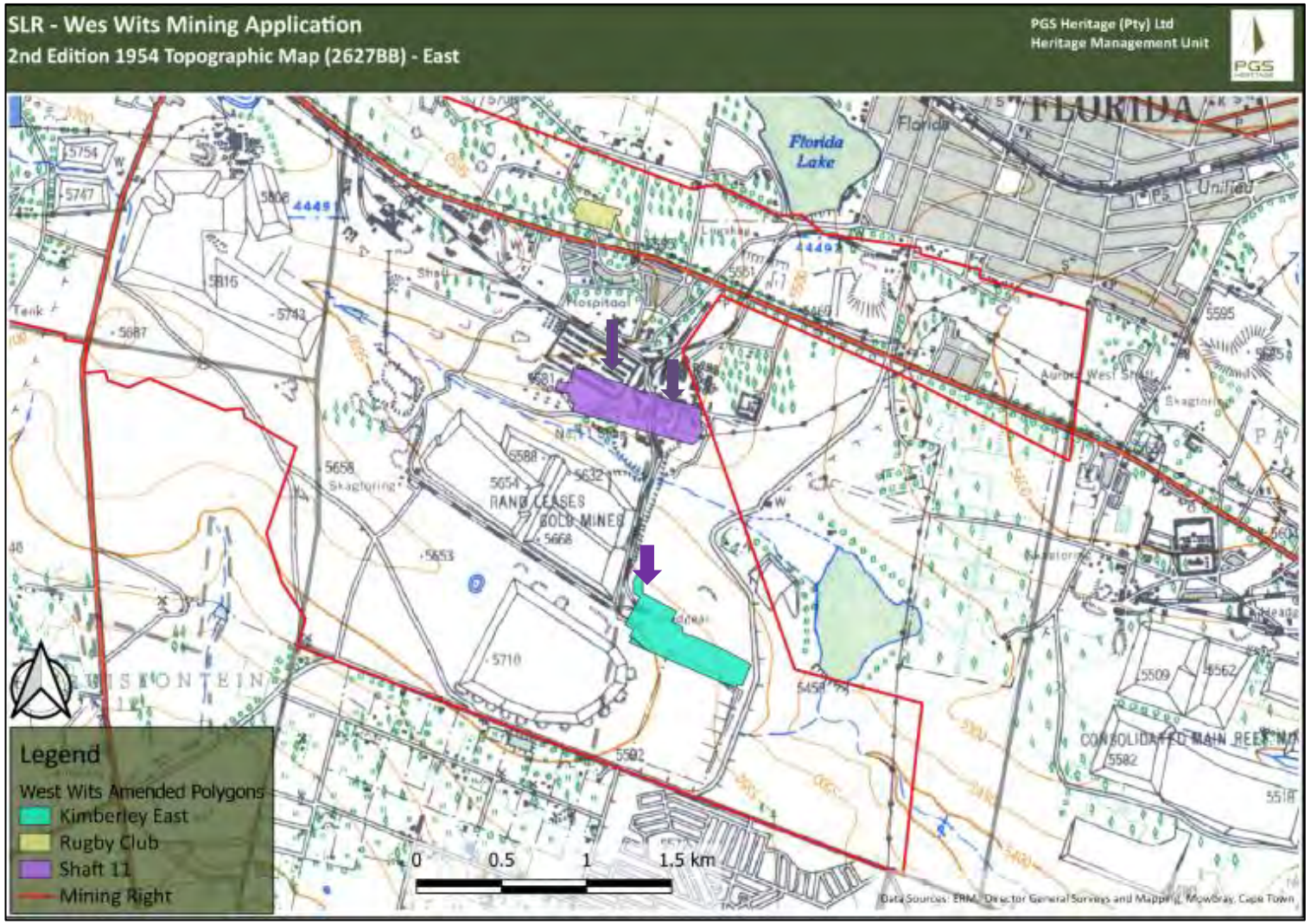


Figure 36: Roodepoort 2627BB Edition 2, 1954: The eastern section of the mining right application area shows many structures and features (e.g. slimes dams, diggings) that are 64 years or older. Some of these are associated with the historical Rand Leases Gold Mining Company. Several structures are depicted in the location of the 11 Shaft Main Reef Pit footprint. The Kimberley Reef East Pit and Infrastructure footprint depicts a railway track and headgear at the western end.

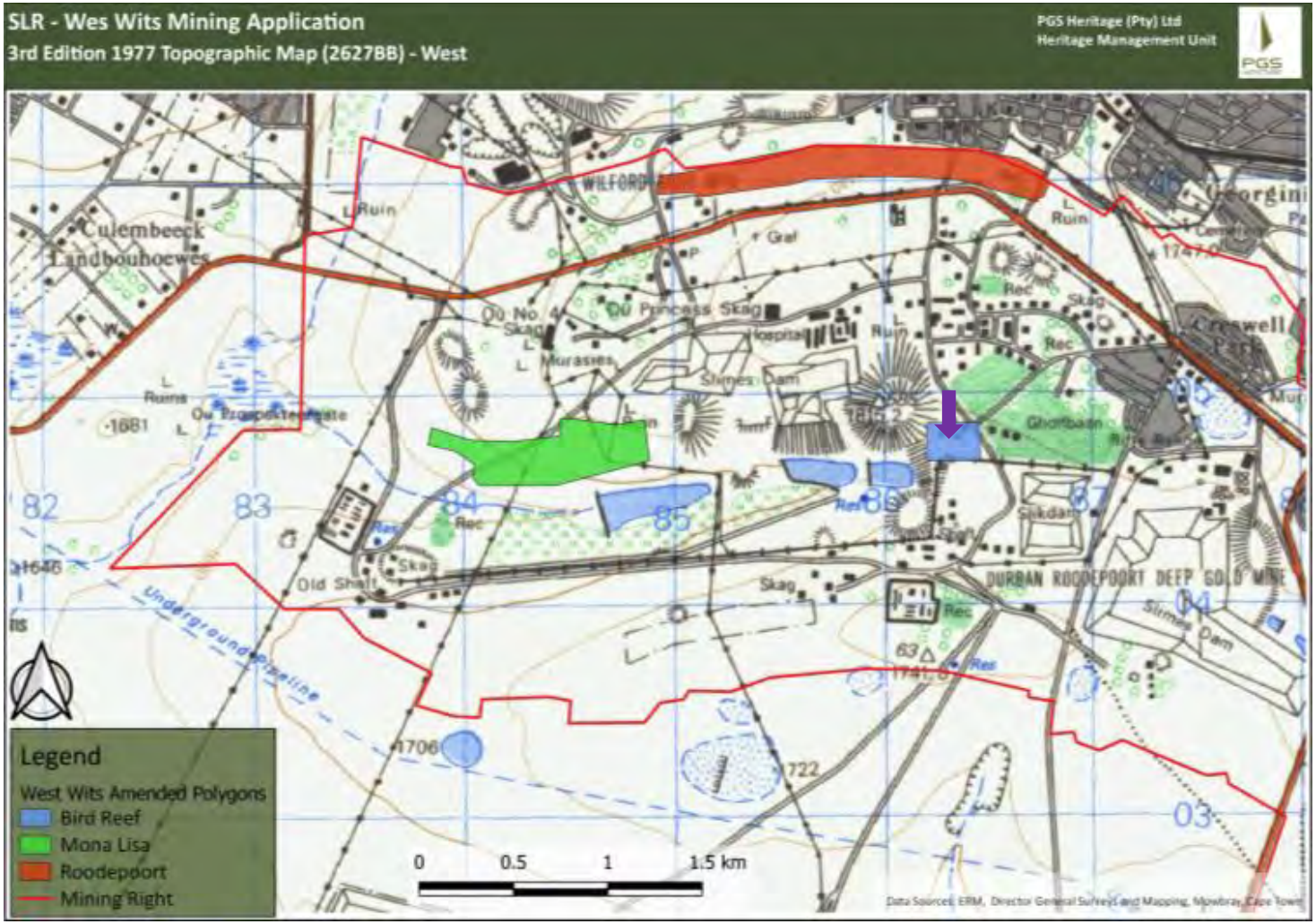


Figure 37: Roodepoort 2627BB Edition 3, 1977: The western section of the mining right application area contains many structures and features (e.g. slimes dams, diggings) that are between 64 and 41 years. Some of these are associated with the historical Durban Roodepoort Deep Mine. Some structures are depicted within the Bird Reef/ Central Circular Shaft footprint. No obvious features, except for roads, are shown within the Mona Lisa Bird Reef Pit footprint or the Roodepoort Main Reef Pit footprint.

Figure 38: Roodepoort 2627BB Edition 2, 1977: The eastern section of the mining right application area contains many structures and features (e.g. slimes dams, diggings) that are between 64 -41 years. Some of these are associated with the historical Rand Leases Gold Mining Company. Several structures are depicted in the location of the 11 Shaft Main Reef Pit footprint. The Kimberley Reef East Pit and Infrastructure footprint depicts a ruin at the western end

3.5 Aspects of the area's history as revealed by the archival/desktop study

3.5.1 Brief History of Roodepoort and surrounds

After the discovery of gold on the farm Roodepoort and surrounding farms during 1886, these properties were declared public prospecting areas by a Notice in the "Staatscourant" published on 8 September 1886 (Roux, 1955). The expansion of gold prospecting activities in and around the farm Roodepoort, resulted in the need for a town. By February 1887, the first residential stands of what would become Roodepoort had been sold (Erasmus, 2004). The Jameson raid occurred at the end of 1895 and ended in the surrender of a small British and "Uitlander" force led by Leander Starr Jameson to Genl. Cronje and his burgher Republican force on the farm Vlakfontein, just south of Roodepoort. It is seen by many historians as one of the key contributing factors in the breakdown of relations between the Zuid-Afrikaansche Republiek and Great Britain, and eventually to the outbreak of the Second South African War of 1899-1902 (Payne 1948; Birkholtz 2006).

In 1904, the town of Roodepoort-Maraisburg was given municipal status (Erasmus, 2004). In 1925 HRH the Prince of Wales visited the Roodepoort-Maraisburg municipality. Since the Municipality at the time did not possess a Mayoral Chain, the Council decided to get one specially made for the royal visit. The three gold mining companies which were still producing, of which one was the Durban Roodepoort Deep, all agreed to contribute gold for the mayoral chain (Payne 1948).
In November 1948 a cyclone struck Roodepoort and resulted in extensive damage to buildings and houses with a number of people being killed. (Rand Daily Mail, 27 November 1948).

3.5.2 History of Gold Mining within the Study Area and Surrounding Landscape (Birkholtz 2006 and 2017)

<u>The farms Roodepoort, Vlakfontein, Vogelstruisfontein and Gold Mining</u>

Roodepoort

The farm Roodepoort located on the southern ridge of the Witwatersrand originally belonged to the brothers J.H. and A.S. du Plessis. On 14 November 1885 the brothers signed a contract with a group of prospectors which provided for prospecting rights on the farm Roodepoort in return for a percentage of the profits gained from the discovery and mining of any minerals found there. Four months after this, one of the prospectors, J.G. Bantjies, discovered the so-called Bird Reef during March 1886 on the farm Roodepoort. This was about the same time that the Main Reef was discovered accidentally by George Harrison and George Walker on the farm Langlaagte. Fred Struben subsequently discovered the same reef on the western boundary of the farm Vogelstruisfontein, and before long it was located on a number of the neighbouring farms, including Roodepoort.

In April of 1886 President Kruger received three petitions requesting that the farms Vogelstruisfontein, Roodepoort, Langlaagte and the two portions comprising Paardekraal be declared public diggings. The amended gold laws of 4 August 1886 had enabled the government

to proclaim privately owned land as public diggings with or without the owner's approval. Subsequently, on 8 September 1886, a notice in the "De Staatscourant" informed all interested parties that the government had located yielding gold reefs on the Witwatersrand in the district of Heidelberg, including the farms Vogelstruisfontein and Roodepoort. The farms Vogelstruisfontein and Roodepoort were to be declared a public prospecting area on the 11 October 1886, as long as the owners or renters did not have the land cordoned off as workable areas, gardens, arable land and water furrows. By the end of 1886 there were approximately 150 persons residing on the farm Roodepoort (Roux, 1955).

Three mynpachts were granted on the farm Roodepoort in 1886 and in 1887 two of these mynpachts were transferred in trust to the Roodepoort Gold Mining Company (G.M. Co.) which was later known as the Kimberley Roodepoort G.M. Co. The remaining mynpacht was obtained by the Durban Roodepoort G.M. Co. The Roodepoort G.M. Co was one of the first companies to begin crushing the Main Reef (Payne, 1948). Roodepoort United absorbed the Kimberley Roodepoort in December 1908. The First World War caused the cost of mining operations to rise considerably and this resulted in the closure of several mines between 1917 and 1928, including the Roodepoort United, which had been one of the biggest mines (Payne, 1948).

Vlakfontein

The farm Vlakfontein (numbered 155, later 45 and presently 238-IQ) was first inspected on 8 June 1859 by J.G. Marais. On 11 August 1859 it was granted to Jan Joosten. On the same day (11 August 1859) the farm was divided into three equal portions (A, B and C), which were transferred to the Harmse brothers (Birkholtz, 2006):

Vlakfontein – Portion B was later transferred in 1884 to Willem Hendrik Steijn. WH Stein subsequently transferred this portion to Robert Morton Findlay for Stijn Sindicaat on 15 June 1888. The ownership was then transferred to R.M. Findlay for Steyn Estate and Gold Mining Company Ltd on 29 September 1888 and subsequently, on 18 March 1895, to the New Steyn Estate Gold Mines Limited. The archival records only indicate the ownership history up to the 1890s (Birkholtz, 2006). Troye's Map of the Witwatersrand Gold Fields (1890), confirms that the Steyn Estate & Gold Mining Company, owned 7000 acres on the farms Vlakfontein and Doornkop in 1890 (**Figure 39**).

Figure 39: Enlarged section of Troy's Map of the Witwatersrand Goldfields (The Digger's News Printing & Publishing Co Ltd.), dated 1890

Gold mining shares subsequently boomed in 1895. However, this boom and the progress of the gold mining industry was affected severely by the Jameson raid at the end of 1895. The farm of Vlakfontein was the scene of the surrender to Genl. Cronje., whose Boer forces held the koppie of Doornkop, blocking the way to Johannesburg (Payne, 1948).

In 1934, the property and assets of the New Steyn Estate were taken over by the Durban Deep mining company. These included the claims, plant and building of the old Roodepoort United. By 1948, the Durban Deep owned 3,007 mining claims on the farms Roodepoort, Vogelstruisfontein, Vlakfontein and Witpoortjie. In addition, its freehold property measured 4, 443 morgen (Payne, 1948).

Vogelstruisfontein

The farm Vogelstruisfontein initially fell under the Potchefstroom district of the then Transvaal Republiek (up to 1866). After 1866, the district of Heidelberg was established and Vogelstruisfontein then came under the jurisdiction of that District (Payne, 1948). According to Payne, the eastern portion of Vogelstruisfontein had been purchased by JG Steyn on 29 August 1864. The western portion of Vogelstruisfontein was owned by JN van der Berg, who also received his Deed of Transfer in August 1864. It seems that both JG Bantjes and Fred Struben were undertaking prospecting activities on the farm Vogelstruisfontein (Bantjes on the eastern portion and Struben on the western portion) at around the same time and both found the continuation of the Main Reef on the respective portions of the farm around June 1886 (Payne, 1948).

A prospecting license for Steyn's farm was issued to Bantjes on 5 July 1886. Subsequently, Bantjes was a participant in two separate syndicates each with a lease over Steyn's portion of Vogelstruisfontein, divided into the land east of the spruit and that west of the spruit. The properties associated with Bantjes' involvement on Steyn's portion of the farm subsequently formed the basis for the formation of the Bantjes Reef Gold Mining Company by JB Robinson on 8 September 1887 in Kimberley (Payne, 1948).

Struben leased van der Berg's portion of Vogelstruisfontein in July 1886 and was granted a mynpachtbrief over 249 morgen on the farm on 1 September 1886. Struben claimed that he had sunk the first shaft ever put down on the Main Reef on this west portion of Vogelstruisfontein. In July 1887, Struben entered into a contract with two men (CL Redwood and GA Tilney) who intended to form a company for the purpose of mining. This contract resulted in the formation of the Vogelstruisfontein Gold Mining Company on 28 February 1888 (Rosenthal, 1970).

The farm Vogelstruisfontein was to be declared a public prospecting area on 11 October 1886 (Rosenthal, 1970).

3.5.3 The two major Gold Mining Companies: Durban Roodepoort Deep and Rand Leases

Durban Roodepoort Deep Mine

In 1895 several new companies were formed to work the deep level claims lying to the south of the original outcrop properties in the Roodepoort area. One of these was Durban Roodepoort Deep (capital £350 000), which was formed to work 281 deep level claims to the south of the Durban Roodepoort G.M. Co. and Roodepoort United. The Durban Roodepoort Deep was one of the mines under the control of the Rand Mines, Ltd. group, formed 17th February 1893, which was the pioneer of deep level mining (Payne, 1948).

After the end of the South African War in 1902, the gold mines experienced a shortage of labour mainly due to the return of large numbers of African men to the rural areas during the War. The manager of the Durban Roodepoort GM Co. subsequently visited China to investigate alternative sources of labour and the result of his report was a recommendation by the Chamber of Mines to the Lieutenant Governor supporting indentured labour which was followed by the legislative Council of the Transvaal passing a motion in favour, at the end of 1903. The first contingent of Chinese indentured labourers arrived in South Africa in June 1904, and thousands were employed on the mines in the Roodepoort area, including the Durban Roodepoort mine. For various reasons, over time the issue of Chinese workers in the mines became a source of intense conflict and in 1908 the Government was forced to legislate that all Chinese workers should return to China (Payne, 1948)

The mines continued to grow during the period between the Boer War and the First World War of 1914-1918. However, World War I caused the cost of mining operations to rise considerably and several mines closed down between 1917 and 1928. The Durban Roodepoort Deep was one of only two mines left working during this time (Payne, 1948).

The Union Government abandoned the Gold standard on the 29th December 1932. This resulted in the price of gold rising immediately. The enhanced price of gold enabled vast bodies of low grade ore to be worked profitably. The two producing mines in the area, of which Durban Roodepoort Deep (DRD) was one, were able to expand the scale of their operations immensely. By 1948, the

DRD's milling capacity had increased to 204, 000 tons per month and the company was earning higher profits than the other surviving mine in the Roodepoort area, Consolidated Main Reef (CMR).

In 1923, the Durban Deep purchased 129 claims from the Princess Estate. In 1934, the property and assets of the New Steyn Estate were taken over. These included the claims, plant and building of the old Roodepoort United. By 1948 the Durban Deep owned 3,007 mining claims on the farms Roodepoort, Vogelstruisfontein, Vlakfontein and Witpoortjie. In addition, its freehold property measured 4, 443 morgen.

From the date of commencement of operations in 1898, to the end of December 1946, the company produced 7,654,674 ozs of gold valued at £48,936,000. The grade of ore produced by Durban Deep over its lifetime (up to 1948) was slightly higher than that of CMR, the other main producer in the area. The Durban Deep was also a steady dividend payer since 1908, with the exception of a couple of bad years (Payne, 1948).

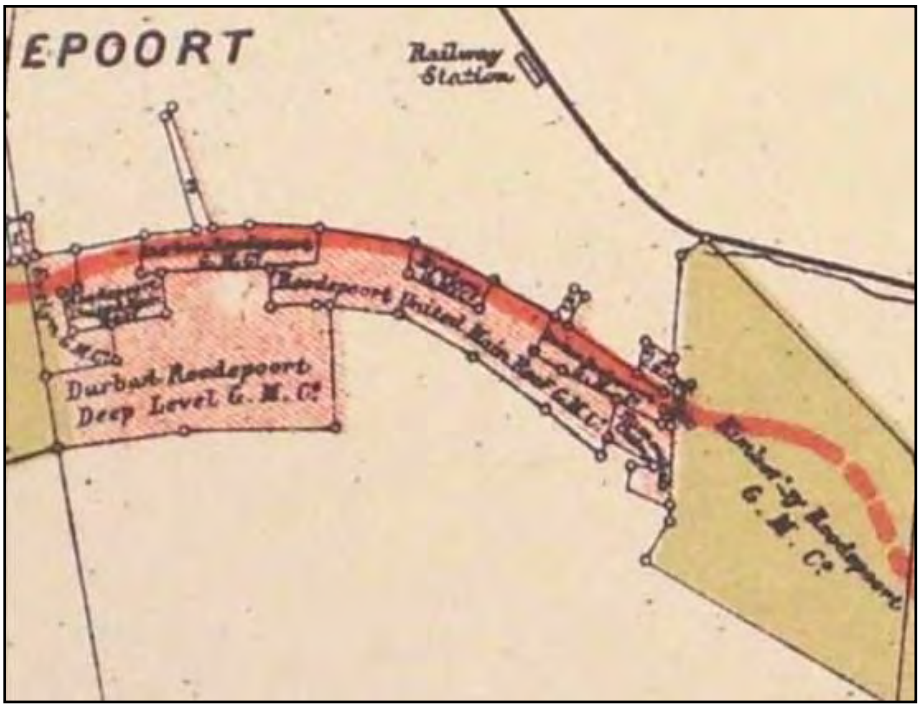


Figure 40: An enlarged section of C.S. Goldmann's "The Witwatersrand Gold Fields" map, (dated to August 1891), showing the Durban Roodepoort Deep mine property, Roodepoort United Main Reef property and the Kimberley-Roodepoort property (Birkholtz, 2008).

The Rand Leases Gold Mining Company

The history of the Rand Leases Gold Mine has its origins in the establishment of the Anglo-Transvaal Consolidated Investment Company Limited on the 1st of June 1933 by AS Hersov, SG Menell and NS Erleigh (Cartwright, 1962; The Anglovaal Chronicle, 1983). The company obtained a lease on an extensive portion of derelict mining land between Aurora West Gold Mine in the east and Durban Roodepoort Deep Gold Mine in the west. This lease contained the old mining areas of the Bantjes Consolidated Company, Vogelstruis Estates, Vogelstruis Deep and Marie Louise Gold

Mine. The area contained no less than five gold-bearing reefs, namely Main Reef, Main Reef Leader (M.R.L.), South Reef, Kimberley Reef and Bird Reef.

Subsequently, a mining company by the name of Rand Leases (Vogelstruisfontein) Gold Mining Company was registered on the 15th of September 1933 (Payne, 1948) by Norbert Erleigh and A.S. Hersov, with a start out capital of £1,000,000.00 (Scholtz, 1979). The company's mining property comprised approximately 1,933 claims located on the farms Vogelstruisfontein and Roodepoort. The freehold property of the mine consisted of an area of approximately 830 acres (morgen) on the farm Vogelstruisfontein which included the remaining extent of Hamburg Township. As ten old mine shafts already existed within the Rand Leases area, the mine rapidly proceeded with the production stage. According to the mine's annual reports, a new crushing and treatment plant was erected during the year ending on the 30th of June 1935. This increased the mine's crushing capacity to 600,000 tons per annum (Birkholtz & Naude 2010). Milling operations started a year later in April 1936. However, the Second World War (1939-1945) had a curtailing effect on Rand Leases and also states that the impact of the war lasted until the late 1940s (Parker 1952).

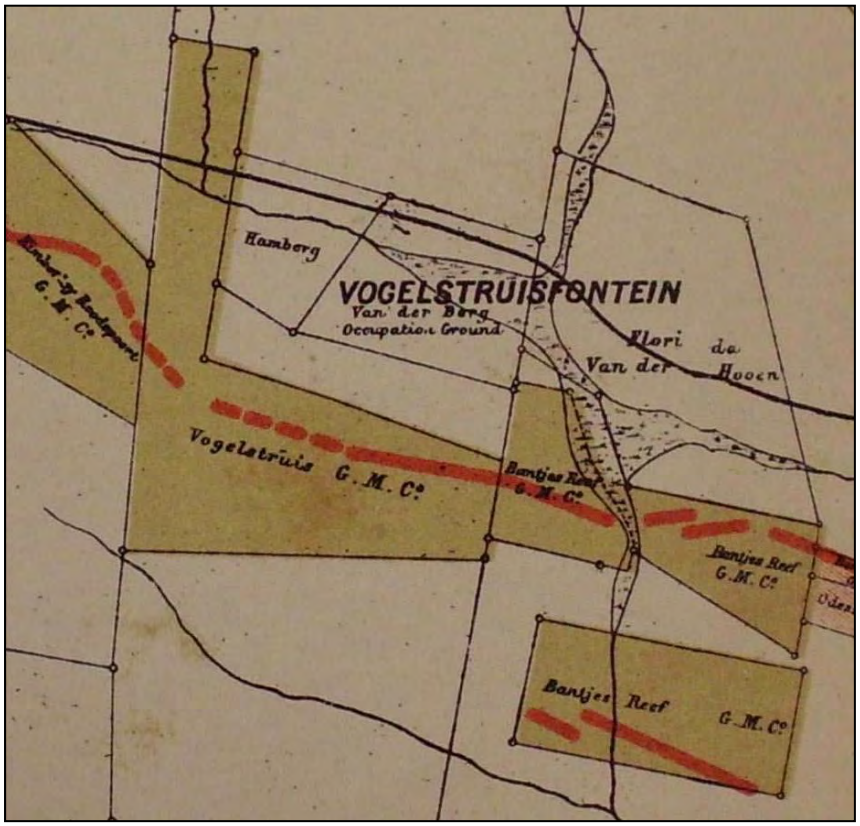


Figure 41:The location of the Vogelstruis Gold Mining Company mynpacht can be seen on this map which dates from the early 1890s (Goldmann, 1892). The red lines indicate the position of the gold bearing reefs.

Although the start of the 1950s was a time of better prospects for the mine, production and development started slowing down with the passing of a couple of years. In 1952 and 1953 the

mine was affected by severe power cuts due to greatly increased power demands on ESKOM as well as a shortage of labour (Birkholtz & Naude 2010). In 1971 the Rand Leases mine was closed down and later sold to Anglovaal, who in turn sold it to the Severin Mining and Development Company (Pty) Ltd in 1986. As far as can be established they refurbished the mine and started production in 1988 (Vorster, 1987).

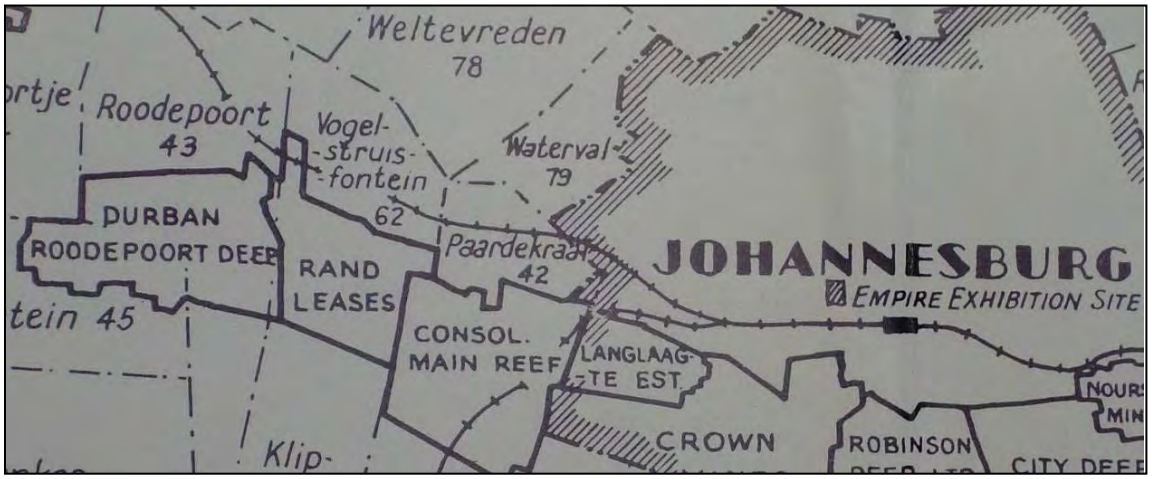


Figure 42: A portion of the general plan of the Witwatersrand Gold Fields dated to 1936. The Durban Roodepoort Deep mine and the Rand Leases mine can be seen on the left (map from Letcher, 1936)

3.6 Conclusions

The archival and historical research has revealed that the entire area of the original farms now forming Vogelstruisfontein 231IQ & 233IQ, Roodepoort 236IQ & 237IQ, and Vlakfontein 238IQ, on which the proposed mining rights activities would be situated, has been affected on a continual basis by historical mining activities, since c.1886/87 and was associated with several historical gold mine companies. These mining activities have continued to the present day, both formally and informally (illegal). The ground affected by the proposed mining right application is therefore extremely disturbed. There is also high potential for the existence of heritage sites associated with the historical mining activities (e.g. historical mining structures, historical residential structures, and historical graves and burial grounds).

4 PALAEONTOLOGY

A basic palaeontological sensitivity was determined using the palaeosensitivity map on the SAHRIS database (South African Heritage Resources Information System) (http://www.sahra.org.za/sahris/map/palaeo). As can be seen in **Figure 44** and **Figure 43,** the entire proposed mining right area occurs in an area where palaeontology is assessed as being entirely of Low sensitivity (coloured blue) and no palaeontological studies are required. However, SAHRA usually requires a finds protocol even for Low sensitivity formations.

Furthermore, a search of the SAHRIS database located a previous Palaeontological Impact Assessment (PIA) report for the Rand Leases Ext. 13 development (Rubidge 2011) and a SAHRA response letter to West Wits MLI for the farm Roodepoort (SAHRA, 2014), which both confirmed the low palaeontological significance of the underlying geology in this area. Rubidge stated the underlying geology is the Precambrian Booysens Formation, Johannesburg Subgroup, of the Witwatersrand Supergroup which is Precambrian in age and not known to contain fossils. The SAHRA letter stated that since the proposed prospecting project was situated in an area of low palaeontological significance, no palaeontological studies would be required. It is therefore recommended that an application for exemption from the standard requirement for a finds protocol be made to SAHRA.

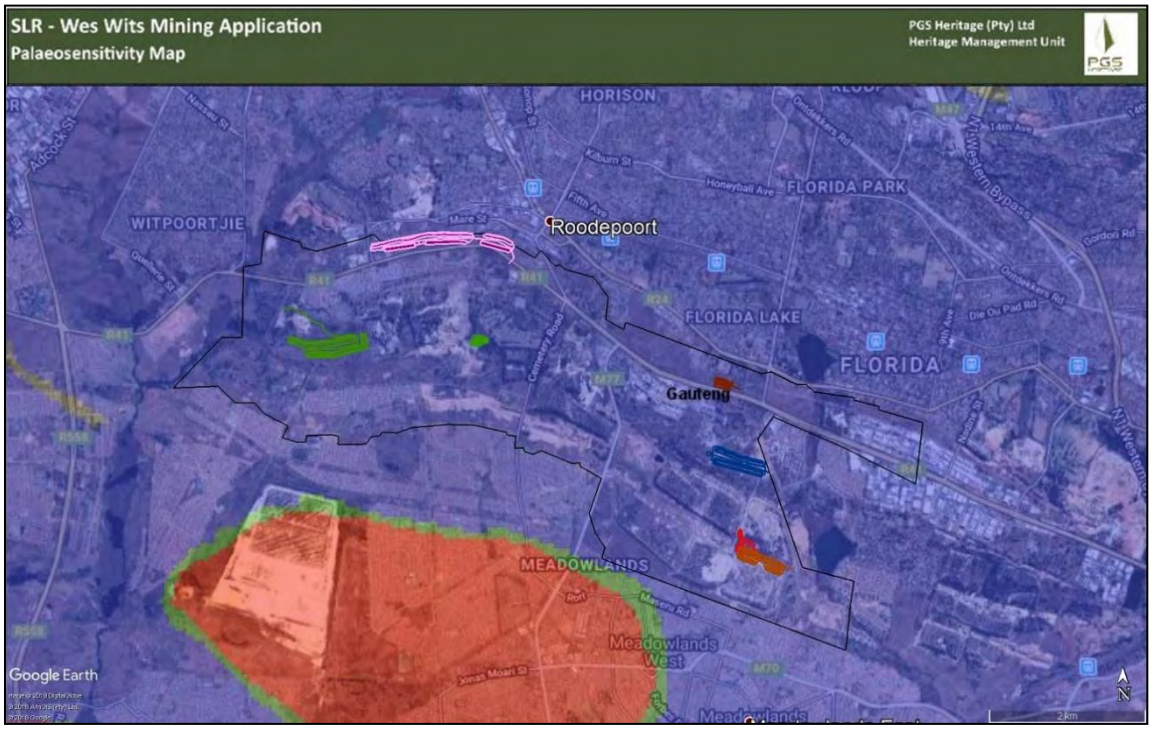


Figure 43: Overlay of the mining right application area and individual footprints on the palaeosensitivity map from the SAHRIS database (showing that the entire footprint is coloured blue, which is rated as Low sensitivity).

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

Figure 44: *SAHRIS palaeosensitivity ratings table*

5 I&AP / STAKEHOLDER ENGAGEMENT

PGS undertook limited stakeholder engagement with specific Interested and Affected Parties (I&APs), based on heritage issues recorded in the Issues and Response Report for the Public Consultation process of the project. Telephonic contact was made with specific individuals who had raised specific issues concerning heritage resources. Based on the telephonic discussions, the issue raised was addressed during the fieldwork component of the study, if required (**Appendix D**).

The main issue raised for the mining right application area was the existence of one or more graves or burial grounds (by a representative of the Dobsonville Heritage Foundation - DHF). Accordingly, a site visit was arranged with representatives of the DHF to enable the identification of the graves or burial ground, as noted in the Issues and Response report. The site visit resulted in the identification of a large informal burial ground situated within the greater mining right application area, but not within any of the specific proposed mining activity footprints (**WW022**). The description of this site is included in the fieldwork findings below.

The only other heritage issue identified by an I&AP, regarding the mining right application area was a request that any historical or archaeological artefacts uncovered during the construction or operation activities should be deposited at the Roodepoort Museum. A request was also made for photographs of the Main Reef to be provided to the Roodepoort Museum (**Appendix D**).

6 FIELD WORK FINDINGS

Due to the nature of cultural remains, with the majority of artefacts occurring below the surface, a controlled-exclusive surface survey was conducted. It should be noted that due to various revisions of the overall study area boundary and the individual footprints several separate fieldwork surveys were undertaken on separate days (26 April, 30 May 2018, 1 August and 10 January 2019).

The surveys were conducted by vehicle and on foot by various teams from PGS consisting of an archaeologist and a heritage specialist or a heritage specialist and two field technicians. Two security guards were also part of the survey team as the study area is known to be subject to extensive illegal mining activity. Two members of the PGS team were equipped with a hand-held GPS and a digital camera and all finds were marked and photographed. The recorded track logs are depicted below (**Figure 45 to Figure 51**). The additional surveys were undertaken to assess areas which had not been included in the original footprint areas provided to PGS.

The survey focussed on the footprints of the individual mining activity areas (five opencast pits, two shaft infrastructure areas), as well as the portion of ore trucking road located within the larger mining right application area. Some footprint areas were accessible by both vehicle and foot and others were accessible only partially by vehicle and not at all by foot due to the presence of illegal miners and their recent excavations, as well the presence of previous historic mining excavations. Most of

the areas were also characterised by extremely dense and tall vegetation which restricted visibility and sometimes access.

The various field survey visits recorded a total of 18 heritage sites situated within the seven individual footprint areas visited. See the maps with the tracklog record below and **Table 6** and **Table 7**. In addition, six heritage sites were identified within the larger mining right application area (**Table 8** and Table 9).Therefore, 24 heritage sites were identified in total.

Figure 45: Map of Tracklogs for the greater mining right application area, showing all 24 heritage sites located

6.1 Mona Lisa Bird Reef Pit

This area was accessed by a combination of pedestrian and vehicle survey. There was a large area of pampas grass, but otherwise the visibility was good as most of the area was covered in short grass. The area also forms part of a shallow vlei. Outcrops of sandstone occur.

No heritage sites were identified within the study area, except for the concrete supports for a defunct pipeline (**WW017**).

Figure 46: Tracklog for Mona Lisa Bird Reef Pit footprint, only one site was identified

6.2 Roodepoort Main Reef Pit

This area was mostly inaccessible for pedestrian survey, although some portions were partially accessible by foot. This was due to a combination of extremely overgrown and dense vegetation ('Khakibos') as well as the visible presence of illegal miners. There were also areas of previous excavations and dumps of building rubble and other waste. Three heritage sites were identified in this area, two religious sites situated within or on the boundary of the footprint (**WW002**, **WW010**) and one site with the remains of mining infrastructure situated adjacent to the eastern end (**WW0012**).

6.3 Ore Trucking road (Portion with the mining rights area)

Six sites were located adjacent to the existing road, mainly in the area around the old Durban Deep mine (**WW011, WW012, WW013, WW014, WW015, WW016**). These sites are included in the tracklog and sites map for the Roodepoort Main Reef Pit footprint.

Figure 47: Tracklog for Roodepoort Main Reef Pit footprint, showing the two sites identified within the footprint, as well as the six sites along the proposed Ore Trucking road

6.4 Rugby Club Main Reef Pit

This area was not easily accessed by vehicle or on foot due to extremely dense vegetation and the presence of illegal miners. This area contains one of the main underground entrances used by the illegal miners. On two different occasions one male team member with a security guard managed a short walk into the area. The presence of an illegal informal weapon was noted. There is also an informal settlement situated to the north-west of this area. Only one heritage site was identified: a concrete plaque marking the sealed adit for Shaft 58 (no waypoint was taken due to the above noted security reasons).

Figure 48: Tracklog for Rugby Club Main Reef Pit footprint, no sites were identified

6.5 11 Shaft Main Reef Pit

This area contains a large number of rubble and mining spoil heaps. The area is also being used extensively by illegal miners, who are excavating the mining spoil heaps and carrying out sluicing of the soil from these spoil heaps. The remains of a number of structures associated with the old mine shaft were identified (**WW003 and 003-1, WW004, WW008, WW009 and 009-1**).

Figure 49: Tracklog for 11 Shaft Main Reef Pit footprint, four sites were identified

6.6 Kimberley Reef East Pit and Infrastructure footprints

This area is located very close to tailings dumps from previous mining activities. The area is highly disturbed with rubble dumps and covered in dense vegetation growth (Khakibos, pampas grass and eucalyptus trees). The area contains a large number of excavations by illegal miners. Due to the extremely dense growth of eucalyptus trees, especially within the infrastructure footprint, it was not considered safe for individual team members to walk on separate tracks. The proposed dump area was extremely disturbed with various erosion gulleys and illegal excavations noted. Two sites containing the remains of mining infrastructure (probably historical) were identified, as well as an historical mining tunnel or adit (**WW005, WW006, WW007**).

Figure 50: Tracklog for Kimberley Reef East Pit and Infrastructure footprint, three sites were identified

6.7 Bird Reef /Central Circular Shaft footprint

This area is also known as the “old Circular Shaft area”. The area is covered by dense vegetation, including long grass and khakibos, with eucalyptus trees. Two visits were made to this area as the footprint was amended and enlarged to the south and west. The foundations and rubble remains of several mining structures were identified in the immediate surroundings of the existing shaft including an existing metal headgear. The remains of several large mining structures were also identified. Since the structures are all located within a relatively small area, the same GPS coordinate was used for all structures (**WW018**).

Figure 51: Tracklog for Bird Reef/ Central Circular Shaft footprint, several structure remains were identified and marked with one coordinate

Refer to section 9 for the recommended general management measures as proposed for inclusion in the EMPr.

6.8 Site Descriptions for Heritage Sites Identified within the individual footprints

Table 6 indicates the locality of each identified heritage resource in relation to the proposed footprint areas. **Table 7** lists the site descriptions for the 18 heritage sites identified within the proposed individual footprints.

Table 6: Heritage resources in relation to proposed footprint areas

Resource Number	Resource Type	Heritage Grading	Impact Zone
WW001	Historical mining structure remains	GP.C - Low	Roodepoort Main Reef pit footprint
WW002	Open air religious site	GP.B – Medium	Roodepoort Main Reef pit footprint
WW003 and WW003-1	Historical mining structure remains	GP.C - Low	11 Shaft Main Reef pit footprint
WW004	Historical mining structure remains	GP.C - Low	11 Shaft Main Reef pit footprint
WW005	Historical mining structure remains	GP.C - Low	Kimberley Reef East infrastructure footprint
WW006	Historical mining remains - adit	GP.C - Low	Kimberley Reef East infrastructure footprint
WW007	Historical mining structure remains	GP.C - Low	Kimberley Reef East infrastructure footprint
WW008	Historical mining structure remains	GP.C - Low	11 Shaft Main Reef pit footprint
WW009 and WW009-1	Historical mining structure remains	GP.C - Low	11 Shaft Main Reef pit footprint
WW010	Open air religious sites	GP.B – Medium	Roodepoort Main Reef pit footprint
WW011	Historical structures	GP.B - Medium	Ore trucking road
WW012	Historical mining structure remains	GP.C – Low	Ore trucking road
WW013	Three historical houses	GP.B - Medium	Ore trucking road
WW014	One historical house	GP.B - Medium	Ore Trucking road
WW015	One historical house	GP.B/ – Medium	Ore Trucking road
WW016	One historical house	GB.B/A – Medium/High	Ore Trucking road
WW017	Pipeline remains	GP.C - Very Low	Mona Lisa Bird Reef pit footprint
WW018	Several mining structure remains and a historical headgear	GP.B/A – Medium/High	Bird Reef/ Central Circular Shaft footprint

Table 7: Sites within the individual footprint areas

Site No.	Lat	Lon	Description	Footprint Area	Signifi-cance	Heritage Rating
WW-001	-26° 9'54.84"S	27°50'59.95"E	The site comprises the demolished concrete remains and foundations of several previous mining structures. Two or three structures are depicted in this location on the 1943 topographical map, 3-4 structures are depicted on the 1954 map and no structures are depicted on the 1977 map. Site size: 1034m^2 (estimated from satellite imagery)	Roodepoort Main Reef footprint - pit area	Low	GP.C
Mitigation:		Since the structures are likely to be 60 years or older, a permit from the Gauteng PHRA will be required for any destruction of these structures.				

Figure 52: Site WW-001, foundation remains of old mining structures

Figure 53: Another view of the foundation remains

Site No.	Lat	Lon	Description	Footprint Area	Signifi-cance	Heritage Rating
WW-002	-26.164864°	27.864586°	The site comprises a cleared square-shaped area marked out with stones that is typical of an outdoor religious site. *Site size*: 977m^2 (estimated from satellite imagery).	Roodepoort Main Reef footprint - - dump area	Medium	GP.B
Mitigation:			The religious site could have significant heritage value to the relevant church group. Alteration/destruction can be done with stakeholder engagement and consent (e.g. local community/ church group). Note that this would probably require moving the site to another location with the agreement of the church group which uses the site.			

Figure 54: Site WW-002, the religious site situated in the dump area of the footprint

Site No.	Lat	Lon	Description	Footprint Area	Signifi-cance	Heritage Rating
WW-003/ WW-003-1	-26.190289°/ -26.189709°	27.898333°/ 27.898605°	The site comprises the remains of a number of structures associated with the old mine shaft. There are also several rubble dumps from the remains of now-demolished structures. Site WW-003-1 extends to the north of the opencast footprint. Several structures are depicted in this location on the 1943, 1954 and 1977 topographical maps. *Site size*: total area of Sites WW-003 and WW-003-1 = 7.24ha (estimated from satellite imagery).	11 Shaft Main Reef footprint – pit area and to the north of the pit area	Low	GP.C
Mitigation:		A permit from the Gauteng PHRA may be required for any destruction of these structures. The structures may require documentation by drawings or photographs				

Figure 55: Site WW-003, remains of one structure

Figure 57: Site WW-003-1, remains of a structure

Figure 56: Site WW-003, view of remains of structure that could have held explosives

Figure 58: Site WW-003, view showing demolished remains

Site No.	Lat	Lon	Description	Footprint Area	Significance	Heritage Rating
WW-004	-26.189428°	27.894850°	The site comprises the remains of a few concrete structures that are likely to have been old mining structures. A portion of a large hostel building is depicted in this location on the 1943, 1954 and 1977 topographical maps. The remains are all that survives. *Site size*: difficult to estimate due to the scattered nature of the few remains (estimated from satellite imagery).	11 Shaft Main Reef footprint – pit area	Low	GP.C
Mitigation:		A permit from the Gauteng PHRA may be required for any destruction of these structures.				

Figure 59: Site WW-004, remains of concrete structures

Figure 60: View of remains of structures

Site No.	Lat	Lon	Description	Footprint Area	Significance	Heritage Rating
WW-005	- -26.199882°	27.896978°	The remains of a very large long structure (foundation) and associated tunnel are located here. The structure extends to the west and east of the tunnel. The foundation and tunnel are constructed of stone and cement. A rail track and terminus are shown in this location on the 1954 topographical map. The structure is likely to be the remains of the rail track. *Site size*: approx. 80m long and 2-4m high (incl. the tunnel) (estimated from satellite imagery).	Kimberley Reef East infrastruc-ture footprint	Low	GP.C
Mitigation:			A permit from the Gauteng PHRA will be required for any destruction of this structure. The structure may require documentation by drawings or photographs.			

Figure 61: View showing the long structure (right hand side) and associated tunnel

Figure 62: View of the rear of the tunnel

Site No.	Lat	Lon	Description	Footprint area	Signifi-cance	Heritage Rating
WW-006	-26.201119°	27.899268°	Old (historical) mining tunnel/adit, (and associated spoil heap) located to the north). Extremely overgrown with grass and bluegums/wattle. *Site size*: difficult to estimate as not visible from satellite imagery, roughly several 100m in length. Coordinates taken at the east end.	Kimberley Reef East infrastruc-ture and pit footprint -topsoil dump area	Low	GP.C
Mitigation:		A permit from the Gauteng PHRA may be required for any destruction of this structure.				

Figure 63: view of the east end of the historical mining adit/tunnel

Site No.	Lat	Lon	Description	Footprint area	Signifi-cance	Heritage Rating
WW-007	-26.199888°	27.897819°	The dilapidated remains of a second mining structure (foundations and part of a wall) located close to the site at WW-005 (to the north). No structures besides the rail track are depicted in this location on the 1943, 1954 and 1977 topographical maps. However, the 1954 map indicates a headgear in the vicinity and the 1977 map labels the area as "Kimberley Skag". *Site size:* 491m^2 (estimated from satellite imagery).	Kimberley Reef East infrastruc-ture footprint	Low	GP.C
Mitigation:		A permit from the Gauteng PHRA may be required for any destruction of this structure.				

Figure 64: View of the demolished structure

Figure 65: the foundation remains of the structure

Site No.	Lat	Lon	Description	Footprint area	Signifi-cance	Heritage Rating
WW-008	-26.190876°	27.896528°	The dilapidated remains of a small square building, with walls but no roof. The structure is located on top of an existing waste rock dump so is likely to be less than 60 years old. A structure is depicted in approximately this location on the 1954 and 1977 topographical maps. *Site size:* 6m x 6m (estimated from satellite imagery).	11 Shaft Main Reef footprint – dump area	Low	GP.C
Mitigation:		A permit from the Gauteng PHRA may be required for any destruction of this structure.				

Figure 66: WW-008, view of small structure at top of waste rock dump

Site No.	Lat	Lon	Description	Footprint area	Signifi-cance	Heritage Rating
WW-009/ WW-009-1	-26.190728°/ -26.191638°	27.894813°/ 27.894906°	The remains of at least five mining structures are located here, some with only foundations. One structure is situated within the dump area (WW-009) while the other structures are located outside the dump area but within 25m away to the south (WW-009-1). Four structures are depicted in the location of WW-009-1 on the 1943 topographical map, while several structures are depicted in the general location on the 1954 map. No structures are depicted on the 1977 map. *Site size:* total size approx. 2ha (estimated from satellite imagery).	11 Shaft Main Reef footprint – dump area and adjacent	Low	GP.C
Mitigation:			A permit from the Gauteng PHRA may be required for any destruction of this structure.			

Figure 67: WW009 and WW009-1, general view showing the structure remains and foundations

Figure 68: Closer view of structure remains

Figure 69: Closer view of the foundations

Site No.	Lat	Lon	Description	Footprint area	Signifi-cance	Heritage Rating
WW-010	-26.165106°	27.860533°	An area where the grass had been cut short, containing two separate open air religious sites, one round and one square in shape. Since the two areas were located less than 200m apart, they are treated as one site. *Site size:* Total combined size = 3209m^2 (estimated from satellite imagery).	Roode-poort Main Reef footprint – dump area	Medium	GP.B
Mitigation:			The religious site could have significant heritage value to the relevant church group. Alteration/destruction can be done with stakeholder engagement and consent (e.g. local community/ church group). Note that this would probably require moving the site to another location with the agreement of the church group which uses the site.			

Figure 70: WW010, view showing one of the two cleared areas in the site

Figure 71: View showing stone and stick structure at the one cleared area

Figure 72: WW010, view of the second site with cleared earth

Figure 73: A view showing the second site

Site No.	Lat	Lon	Description	Footprint area	Signifi-cance	Heritage Rating
WW-011	-26.171294°	27.864112°	Two historical buildings, one of which is currently used as a tuckshop. They are located at a small traffic circle. The building is identified as "Durban Deep" by painted signage. Satellite imagery indicates two other buildings situated behind (south) the tuckshop. Several stands are depicted on the 1943 topographical map, but no structures. However, a structure is depicted in this location on the 1954 and 1977 maps. *Site size:* Size of the property = 3236 m^2 (estimated from satellite imagery).	Ore transport road	Medium	GP.B
Mitigation:			A permit from the Gauteng PHRA will be required for any destruction of these structures. The structures may require documentation by drawings or photographs			

Figure 74: View of the two structures, the right one is the tuckshop

Figure 75: Closer view of the sign referring to Durban Deep Village

Site No.	Lat	Lon	Description	Footprint area	Signifi-cance	Heritage Rating
WW-012	-26.170768°	27.863807°	The remains of several mining buildings are located close to the Durban Deep tuckshop building (to the north across the traffic circle). The site contains the dilapidated remains of one structure where the walls still survive and the foundation remains of at least four other structures. One structure is depicted in this location on the 1943 topographical map, while between 8 and 3 structures are depicted on the 1954 and 1977 topographical maps.	Ore transport road	Low	GP.C
Mitigation:		A permit from the Gauteng PHRA will be required for any destruction of these structures.				

Figure 76: WW012, *view of the structure remains with foundations*

Figure 77: *Closer view showing a section of rail*

Site No.	Lat	Lon	Description	Footprint area	Signifi-cance	Heritage Rating
WW-013	-26.170084°	27.864004°	Three historical houses, with separate garage structures are located on the west side of the road, within 8-10m from the road edge. They are all constructed in the same style, with stone foundations, brick walls and corrugated iron roofs and front verandas. One house has a corrugated iron outbuilding. One house is bigger than the other two. All of the houses are occupied. It is highly likely that the houses are associated with the DRD mine. Three structures are depicted in this location on the 1954 topographical map but only one on the 1977 map. *Site size:* total size of 3 stands combined = 2954m^2 (estimated from satellite imagery).	Ore transport road	Medium	GP.B
Mitigation:	To be retained and avoided. A buffer zone of 50m is required if any upgrading of the road is undertaken. A permit from the Gauteng PHRA will be required for any destruction of these structures. The structures may require documentation by drawings or photographs					

Figure 78: View showing the verandah at one of the houses

Figure 79: View of a house with a single gable

Figure 80: View of the house with a double gable

Site No.	Lat	Lon	Description	Footprint area	Signifi-cance	Heritage Rating
WW-014	-26.169210°	27.863461°	A historical house that is likely to be over 60 years old, surrounded by a low wall. The house is constructed with brick, plaster and paint with decorative and a veranda with columns. There is a small separate outbuilding. The house is occupied. It is located behind the three houses at site WW013 and roughly 50m from the road edge. It is likely to be associated with the Durban Roodepoort Deep Mine. Two structures are depicted in this location on the 1954 topographical map and one on the 1977 map. The structure is therefore at least 64 years old. *Site size:* stand size = 2745m^2 (estimated from satellite imagery).	Ore Trucking road	Medium	GP.B
Mitigation:	To be retained and avoided. A buffer zone of 50m is required if any upgrading of the road is undertaken. A permit from the Gauteng PHRA will be required for any destruction of these structures. The structures may require documentation by drawings or photographs					

Figure 81: *View of the front of the house*

Figure 82: *View showing the separate outbuilding/garage*

Site No.	Lat	Lon	Description	Footprint area	Signifi-cance	Heritage Rating
WW-015	--26.167028°	27.862267° (co-ords taken from the road)	A historical house, likely to be 60 years or older, is located on the east side of the road, within 20m of the road edge. The house is occupied and surrounded by a modern pre-cast wall. Four structures are depicted in roughly this location on the 1943 topographical map, one structure on the 1954 map and three structures on the 1977 topographical map. *Site size:* Size of the stand 2612m^2 (estimated from satellite imagery).	Ore trucking road	- Medium	GP.B
Mitigation:		A permit from the Gauteng PHRA will be required for any destruction of this structure. The structure may require documentation by drawings or photographs.				

Figure 83: View of the house from the existing road

Site No.	Lat	Lon	Description	Footprint area	Signifi-cance	Heritage Rating
WW-016	-26.168447°	27.849795°	A historical house that is likely to be between 60-100 years (possibly Victorian) is located here. Veranda with columns. Several additions have been made to the original building and it is currently occupied. The house is located 82m south of the main trucking road, on the outskirts of an informal settlement. It is likely to be associated with the DRD mine. A structure is depicted in this location on the 1943, 1954 and 1977 topographical maps. It is therefore older than 60 years. On the 1977 map, the structure is labelled P (Post Office). *Site size:* The size of the stand is 731m^2 (estimated from satellite imagery).	Ore transport road	Medium -high	GP.B
Mitigation:	To be retained and avoided. A buffer zone of 50m is required if any upgrading of the road is undertaken. A permit from the Gauteng PHRA will be required for any destruction of this structure. The structure may require documentation by drawings or photographs.					

Figure 84: View of the historical house from the existing road

Site No.	Lat	Lon	Description	Footprint area	Significance	Heritage Rating
WW-017	-26.178091°	27.840483°	The remains of several concrete structures forming a pipeline support were located running across the property. No structures are depicted in this location on any of the topographical maps. *Site size:* difficult to estimate as only a few remains survive.	Mona Lisa Bird Reef footprint-dump area	Very Low	GP.C
Mitigation:		No mitigation measures are required.				

Figure 85: View along the surviving pipeline supports

Site No.	Lat	Lon	Description	Footprint area	Signifi-cance	Heritage Rating
WW-018	--26.176169°	27.863138°	The whole area contains the remains of several mining structures and an outstandingly well preserved historical metal headgear structure that could be 60-100 years old. The headgear still has a sign labelling it as “Durban Deep” and is fenced off with a gate and a security guard. There was a maintenance person doing work on the structure during the field visit. The survival of such headgear structures is extremely rare and it is directly associated with the DRD Mine, which was one of the earliest gold mines in the Roodepoort and Johannesburg area. The other structure remains survive in various stages of dilapidation with several as foundation only. Some are constructed of stone and others of cement. Several structures are depicted in this location on the 1943, 1954 and 1977 topographical maps. Therefore, some of the structures are likely to be 60-75 years or older. *Site size:* The total site size is approx. 12 ha (estimated from satellite imagery).	Bird Reef /Central Circular Shaft footprint	Medium -High	GP.B / GP.A
Mitigation:		The headgear should be avoided and retained *in situ,* if this is feasible. A buffer zone of at least 50m is required if any construction of new infrastructure is undertaken. The existing fence should be retained. However, should it not be feasible to retain the structure, then a permit from the Gauteng PHRA will be required for any destruction or removal of the headgear structure. The headgear will require documentation by drawings or photographs. Some of the ruined structures are likely to be 60 years or older and will require a permit from the PHRAG before they can be destroyed.				

Figure 86: View showing foundation remains at the site

Figure 87: View of ruined structure and building rubble

Figure 88: View of large ruined stone and cement structures

Figure 89: View of large stone structure

Figure 90: View of ruined concrete structure

Figure 91: View of soil/rubble dump at the site

Figure 92: View of the metal headgear

Figure 93: "Durban Deep" sign on headgear

6.9 Site Descriptions for Heritage Sites Identified within the larger mining right application area

Table* 8** indicates the locality of each identified heritage resource in relation to the mining right application area, relative to the nearest footprint areas. ***Table 9 lists the site descriptions for the six heritage sites identified within the mining right application area.

Table 8: Heritage resources within the mining right application area

Resource Number	Type	Heritage Grading	Impact Zone
WW019	Four historical houses	GP.B - Medium	Larger mining right application area – south of Mona Lisa Bird Reef pit
WW020	One historical house	GP.A - High	Larger mining right application area – north-east of Bird Reef/ Central Circular Shaft
WW021 and WW021-1	Old mine shaft and foundation remains of mining structures	GP.C - Low	Larger mining right application area – close to Roodepoort Main Reef Pit
WW022-1 to WW022-3-	Very large informal burial ground	GP.A - High	Larger mining right application area – between Bird Reef/ Central Circular Shaft and Mona Lisa Bird Reef Pit
WW023	Historical mine compound and hospital remains	GP.C/B – Low/ medium	Larger mining right application area – between Bird Reef Central Circular Shaft and Mona Lisa Bird Reef
WW024	Informal burial ground	GP.A - High	Larger mining right application area – north of Bird Reef/ Central Circular Shaft, close to Ore transport road

Six heritage sites were identified within the greater mining right application area. These sites are included in this report due to their location within the larger mining right study area and proximity to some of the individual footprint areas. Two of these sites are informal burial grounds.

Table 9: Heritage resources within the mining right application area

Site No.	Lat	Lon	Description	Area	Signifi-cance	Heritage Rating
WW-019	-26.182633°	27.838253°	The site comprises four historical houses which are likely to be associated with the historical DRD mine. Three of the structures are similar in style, while the fourth one is of a different style and likely to be of a later date. The site is located just over 500m south of the Mona Lisa opencast footprint. Four stands are depicted on the 1943 topographical map and four structures are shown on the 1954 map. Three structures are depicted on the 1977 map. The houses are likely to be older than 60 years and to be associated with the historical DRD mine. *Site size*: Total size of the four combined stands is approx. 7132m^2 (estimated from satellite imagery)	Larger Mining Right Application Area – south-west of Mona Lisa Opencast	Medium	GP.B
Mitigation:		The structures should be retained and avoided. A permit from the Gauteng PHRA will be required for any destruction of these structures. The structures may require documentation by drawings or photographs.				

Figure 94: Site WW019, view of three of the four houses that are of the same architectural style and date

Figure 95: Closer view of one of the three houses showing the architectural style

Figure 96: View of the fourth house, that seems to be of a later architectural style

Site No.	Lat	Lon	Description	Area	Signifi-cance	Heritage Rating
WW-020	-26.173706°	27.862285°	A historical wood and corrugated iron house with a more recent outbuilding is located on the east side of the road. This is likely to be around 100 years old. It is occupied at present. The site is located approx. 212m north from the Bird Reef infrastructure area and 36m east of the road edge. This house is likely to be associated with historical mining activities. Extant examples of such wood and iron houses are extremely rare. Two to three structures are depicted in this location on the 1943 and 1954 topographical maps and one structure on the 1977 map. Site size: is approx. the total stand size is 1389m^2 (estimated from satellite imagery)	Larger Mining Right Application Area – close to the Bird Reef/ Central Circular Shaft	High	GP.A
Mitigation:	The house should be avoided and retained *in situ*. A permit from the Gauteng PHRA will be required for any alteration to or destruction of this structure. The structure may require documentation by drawings or photographs.					

Figure 97: *View of the historical house*

Figure 98: *View of the historical house and later outbuilding*

Site No.	Lat	Lon	Description	Area	Signifi-cance	Heritage Rating
WW-021/ WW-021-1	-26.166908° -26.166020°	27.870067° 27.868704°	The site comprises a cleared soil area with a concrete plaque marking the sealed entrance of an old mine shaft. The plaque seems to be labelled as “Shaft 11”. WW-021-1 comprises the foundation remains of mine structures visible on satellite imagery but not identified during the field survey (due to dense vegetation). The sites are located to the south-east of the Roodepoort Opencast pit footprint (128m from the pit area). No structures are depicted in this location on the 1943 or 1954 topographical maps and only a ‘ruin’ is shown on the 1977 map. The structure remains are therefore likely to be less than 60 years old. *Site size:* The combined size is approx. 7377m^2 (estimated from satellite imagery)	Larger Mining Right Application Area – south-east of the Roodepoort Main Reef Pit	Low	GP.C
Mitigation:			No mitigation is necessary.			

Figure 99: Site WW-003, Shaft No. 11 plaque

Site No.	Lat	Lon	Description	Area	Signifi-cance	Heritage Rating
WW 022-1; WW 022-2; WW 022-3;	-26.171502°; -26.173227°; -26.171939°;	27.854733° 27.854074° 27.854482°	The site is a very large informal burial ground situated between two old tailings dumps. It is estimated there could be between 1500-2000 graves or more. Most of the graves have stone-packed dressings. A few graves have formal headstones with inscriptions and dates which include: 1929, 1933, 1962, 1972 and 1985. Names from the inscriptions are all black African. One of the graves with a formal inscribed headstone apparently belongs to the grandfather of one of the local councillors. The general area is overgrown with long grass, khakibos, pampas grass and stands of bluegum trees. The area also contains extensive dumping of building rubble and general household rubbish. There is an informal settlement in close proximity. Several dilapidated historical residential buildings are located immediately north of the burial ground. *Site size*: is approx. 2ha (estimated from satellite imagery)	Larger Mining Right Application Area – between and to the north of the Bird Reef/ Central Circular Shaft and the Mona Lisa Bird Reef Pit	High	GP.A
Mitigation:			The identified burial ground and the graves have significant heritage value to the relevant families (if identified) and should therefore be avoided and retained in situ. A permit from the SAHRA will be required for any destruction/removal of the graves. Social consultation with local communities (and the Dobsonville Heritage Foundation) will be required for any proposed work that may affect the burial ground. A buffer zone of 100m (Regulations 17.6(a) and 17.7(a) of the Mine Health and Safety Act Regulations (2014)) is required. **Note**: This site was identified by representatives of the Dobsonville Heritage Foundation. The existence of graves in the area was noted in the public consultation section of the Scoping report and therefore PGS had contacted the Heritage Foundation.			

Figure 100: View of the graves in open area, looking north

Figure 101: View of graves within eucalyptus tree

Figure 102: View of graves, showing dumping

Figure 103: View showing a robbed grave

Figure 104: Headstone with one of the oldest dates

Figure 105: Headstone with the most recent date

Figure 106: View of site looking south to tailings dump

Figure 107: View to north-east corner, showing the adjacent historical buildings

Site No.	Lat	Lon	Description	Area	Signifi-cance	Heritage Rating
WW-023	-26.171734°;	27.856165°	Several historical residential buildings (semi-detached) and a dilapidated larger double-storey building are located very close to the burial ground (on the north and east sides). Several historical mine compound buildings are also located on the eastern side of the burial ground. The burial ground is likely to be associated with these buildings. *Site size*: The combined size is approx. 7377m^2 (estimated from satellite imagery)	Larger Mining Right Application Area – between and to the north of the Bird Reef/ Central Circular Shaft and the Mona Lisa Bird Reef Pit	Low-Medium	GP.C/B
Mitigation:			A permit from the Gauteng PHRA will be required for any destruction or alteration of the historical houses, the remains of the double-storey building and the compound housing. The structures may require documentation by drawings or photographs. **Note**: the remains of the "hospital' building is located in the position where a compound building is depicted on the 1943 map. The same building is labelled as a hospital on both the 1954 and 1977 maps. The 1954 map also depicts the other houses and mine compound buildings situated adjacent to the hospital building.			

Figure 108: Site WW023, view of historical houses

Figure 109: View of dilapidated large double-storey building

Figure 110: View of large double-storey building

Figure 111: View of section of mine compound building

Site No.	Lat	Lon	Description	Area	Signifi-cance	Heritage Rating
WW-024	-26.170055°	27.868213°	This is an informal burial ground located on the east side of the large concrete water reservoir which is situated to the south of Main Reef road. It contains approx. 200-300 stone-packed graves. None of the graves has an inscribed headstone. The site is fenced on three sides by the reservoir fence. However, one open side provides access from an informal road and the southern end is consequently covered with rubble and rubbish dump material. The site seems to have been disturbed at some time as there are also a number of soil heaps. It is likely that this burial ground contains mineworker graves, as other mineworker burial grounds have been identified and accidentally uncovered in other locations along the Main Reef road (e.g. in the Fleurhof and Stormill areas). *Site size*: The size is approx. 5 508m^2 (estimated from satellite imagery)	Larger Mining Right Application Area – north of the Bird Reef/ Central Circular Shaft and south of the Roodepoort Main Reef Pit	High	GP.A
Mitigation:			It is important to understand that the identified burial ground and the graves could have significant heritage value to the relevant families (if identified) and should therefore be avoided and retained in situ. A permit from the SAHRA will be required for any destruction/removal of the graves. Social consultation with local communities (and the Dobsonville Heritage Foundation) will be required for any proposed mining related activities that may affect the burial ground.			

Figure 112: Site WW024, view of the graves, showing overgrown grass

Figure 113: Closer view of graves

Figure 114: Rubble dumped over the graves

Figure 115: Evidence of previous soil disturbance on the edge of the burial ground

7 IMPACT ASSESSMENT

The impact assessment rating is based on the rating scale as contained in **Appendix C**.

The aim of the impact evaluation is to determine the extent of the impact of the proposed project on the identified heritage resources and predict possible impacts on unidentified heritage resources.

During the field assessment of the mining right application area, 18 heritage sites were located within specific individual mining activity footprints and the direct impact on heritage resources can be assessed for the footprint area. In addition, six sites were identified within the larger mining right application area and situated close to specific footprint areas, therefore the indirect impact on these heritage resources is required to be assessed. Refer to **Figure 45** for the locality of these heritage resources in relation to the proposed mining right area.

It must be considered that the heritage significance of the identified sites plays a role in the evaluation of the impact and must influence the magnitude rating of the impact tables. Thus, a heritage resource with a high heritage significance rating will have a higher impact magnitude rating than a resource with a low or no heritage significance rating. Consequently, mitigation measures will be more extensive for a heritage resource with a high heritage significance than for those with a low heritage significance.

The impacts are expected to happen during both construction and operational activities, with some impacts occurring during rehabilitation activities.

7.1 Status Quo

7.1.1 Status Quo

Although heritage resources of a medium to high significance were identified within the proposed mining right application area, these can be mitigated. Therefore, **no fatal flaws** were identified from a cultural, historical, archaeological and paleontological perspective.

7.2 Details of all alternatives considered

This section describes alternative means of carrying out the operation and the consequences of not proceeding with the proposed project.

The shallow ore reserves that were identified during prospecting would be developed in the form of open pit mining, as these areas cannot be accessed using underground mining methods. The deeper ore bodies could only be mined by underground mining, as has been undertaken historically in the area. Once the open pit mining areas have been mined and rehabilitated the land would be made available for housing developments earmarked for the area and/or agricultural activities.

As indicated above, the location of the open pit mining areas was informed by the presence of economically mineable resources to which West Wits would have access. The layouts of the open pit operations have been designed to optimise the extraction of mineral resources. The topsoil and waste rock dumps have been positioned to create a safety, visual and/or noise berm between the mining operations and nearby receptors. No other surface infrastructure is planned for these areas.

For the underground mining, the positioning of the two infrastructure complexes was informed by the position of the mineable resource, areas historically disturbed by mining activities and infrastructure in order to ensure a feasible access point to the mineable resource. Thus, no locational alternatives are considered in this HIA.

The network of roads existing in the area would be used to access the operational sites. Where site specific access is required, this would be undertaken in consultation with a traffic specialist and the relevant roads authority (as part of the EIAP). Any site specific access routes would be optimised to ensure compliance with road regulations and requirements. Note: no access alternatives were available at time of undertaking the heritage study. Therefore, no access alternatives are considered in this HIA. However, if any access alternatives are proposed, the route of these alternatives would need to be surveyed by a heritage specialist prior to construction of the road.

The “no-go” alternative refers to the option of not going ahead with the proposed project. This would mean that there would be no change to the current status of the site and the positive socio-economic benefits of the proposed project would not be realised.

The project alternatives being considered therefore include:

- Layout and orientation of the infrastructure complexes;
- Operational aspects; and
- the “No-go” alternative.

The main design or layout changes for each of the proposed open pit mining areas are listed below (**Figure 116** to **Figure 120**):

- Mona Lisa Bird Reef Pit
  - Shift in position of the proposed waste rock dump in an eastern to north-eastern direction, with associated re-alignment of haul roads;
  - Reduced size of the proposed ROM ore stockpile crusher area; and
  - Change in location of the proposed ROM ore stockpile crusher area in an eastern direction.
- Roodepoort Main Reef Pit:
  - Shift in position of one of the three proposed mine pits in a south-eastern direction, with
  - Associated re-alignment of haul roads; and
  - Reduced size of the proposed ROM ore stockpile crusher area.
- Rugby Club Main Reef Pit:
  - Shift in location of the proposed topsoil berm in a north-western direction;
  - Reduced width and elongation of the proposed waste rock dump.
  - Reduced size of the proposed ROM ore stockpile crusher area; and
  - Change in location of the proposed ROM ore stockpile crusher area, from the eastern side of the proposed waste rock dump to the north-west of the proposed mine pit.
- 11 Shaft Main Reef Pit:
  - Reduced size of the proposed ROM ore stockpile crusher area; and
  - Change in location of the proposed ROM ore stockpile crusher area, from the south-east to the north-western side of the proposed waste rock dump.
- Kimberley Reef East Pit:
  - Reduction in the size of the proposed ROM ore stockpile crusher area.

The no-go alternative

The assessment of this option requires a comparison between the options of proceeding with the proposed project with that of not proceeding with the proposed project. Proceeding with the proposed project attracts potential economic benefits and potential negative environmental and social impacts. Not proceeding with the proposed project leaves the status quo of no additional negative social or environmental impacts than what is currently experienced. This will be detailed further in the EIAP report.

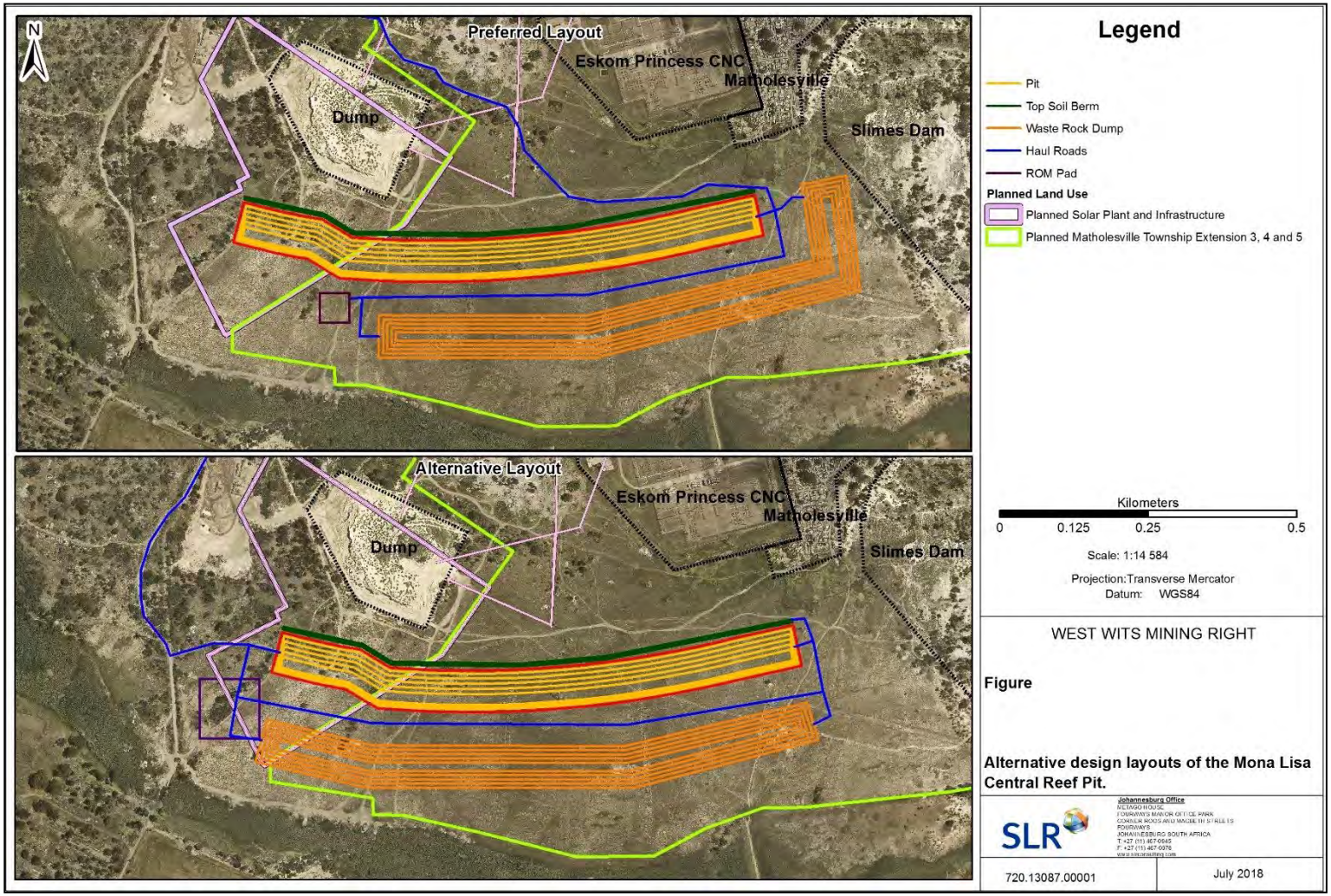


Figure 116: Alternative design layouts of the proposed Mona Lisa Bird Reef Pit

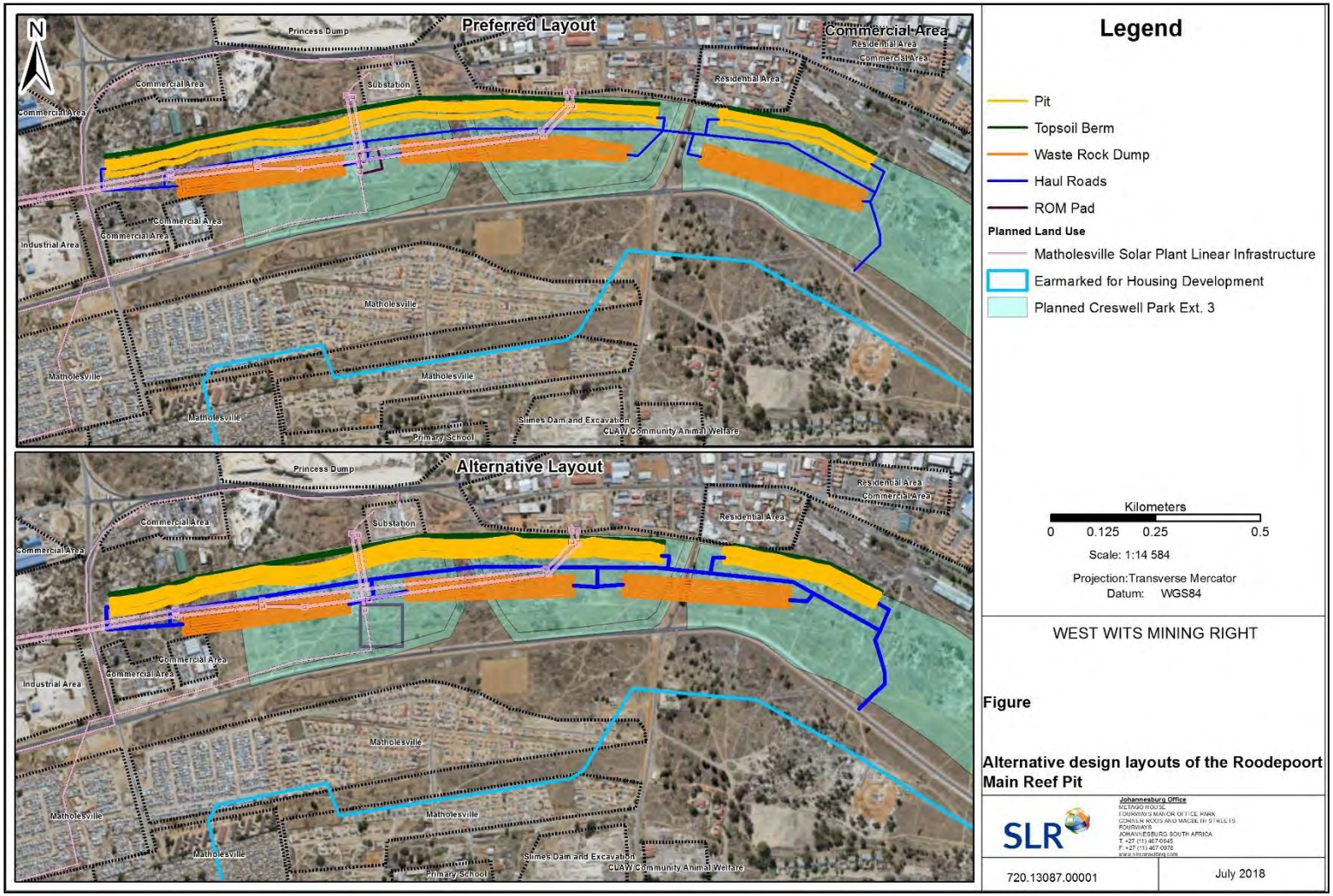


Figure 117: Alternative design layouts of the proposed Roodepoort Main Reef Pit

Figure 118: Alternative design layouts of the proposed Rugby Club Main Reef Pit

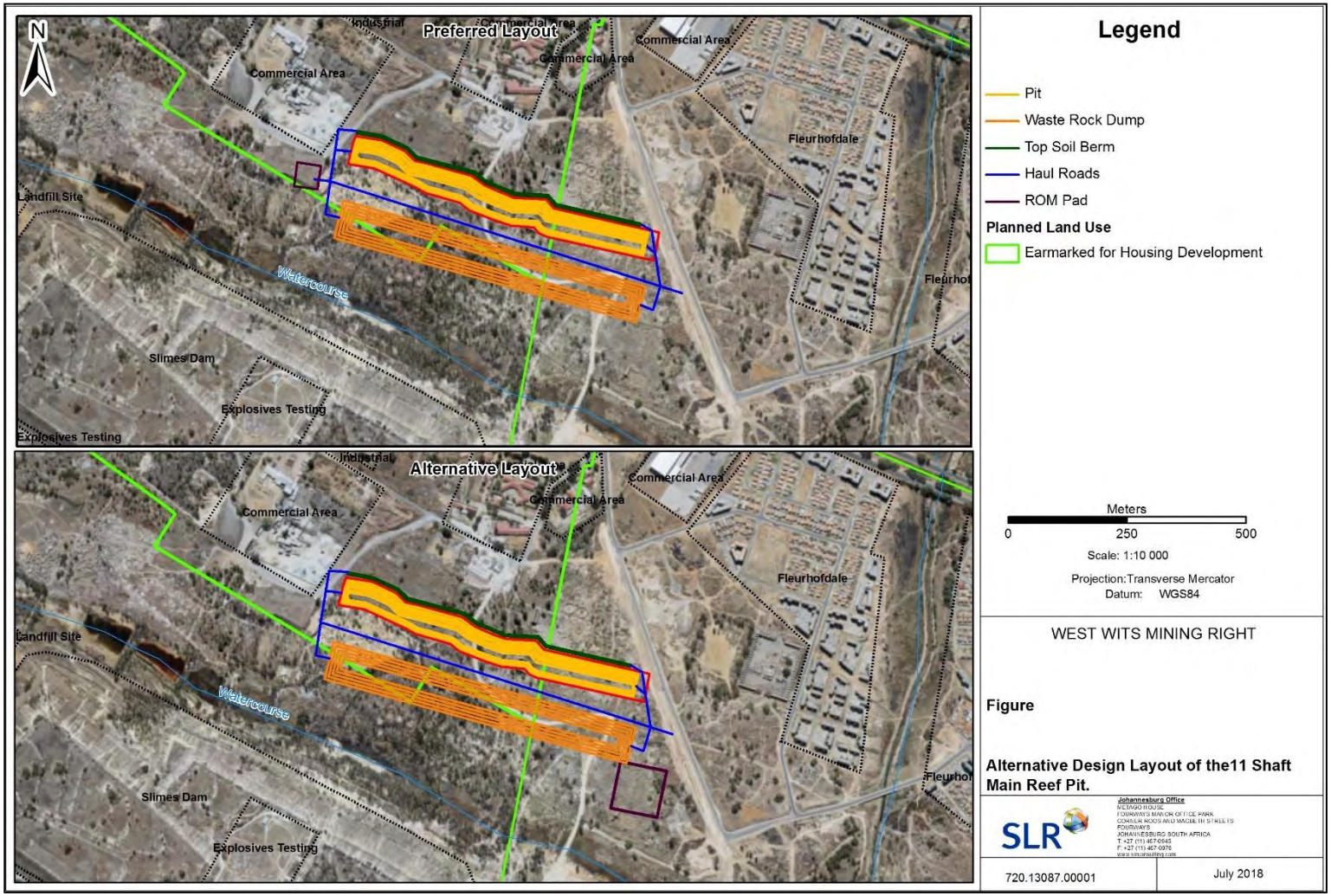


Figure 119: Alternative design layouts of the proposed 11 Shaft Main Reef Pit

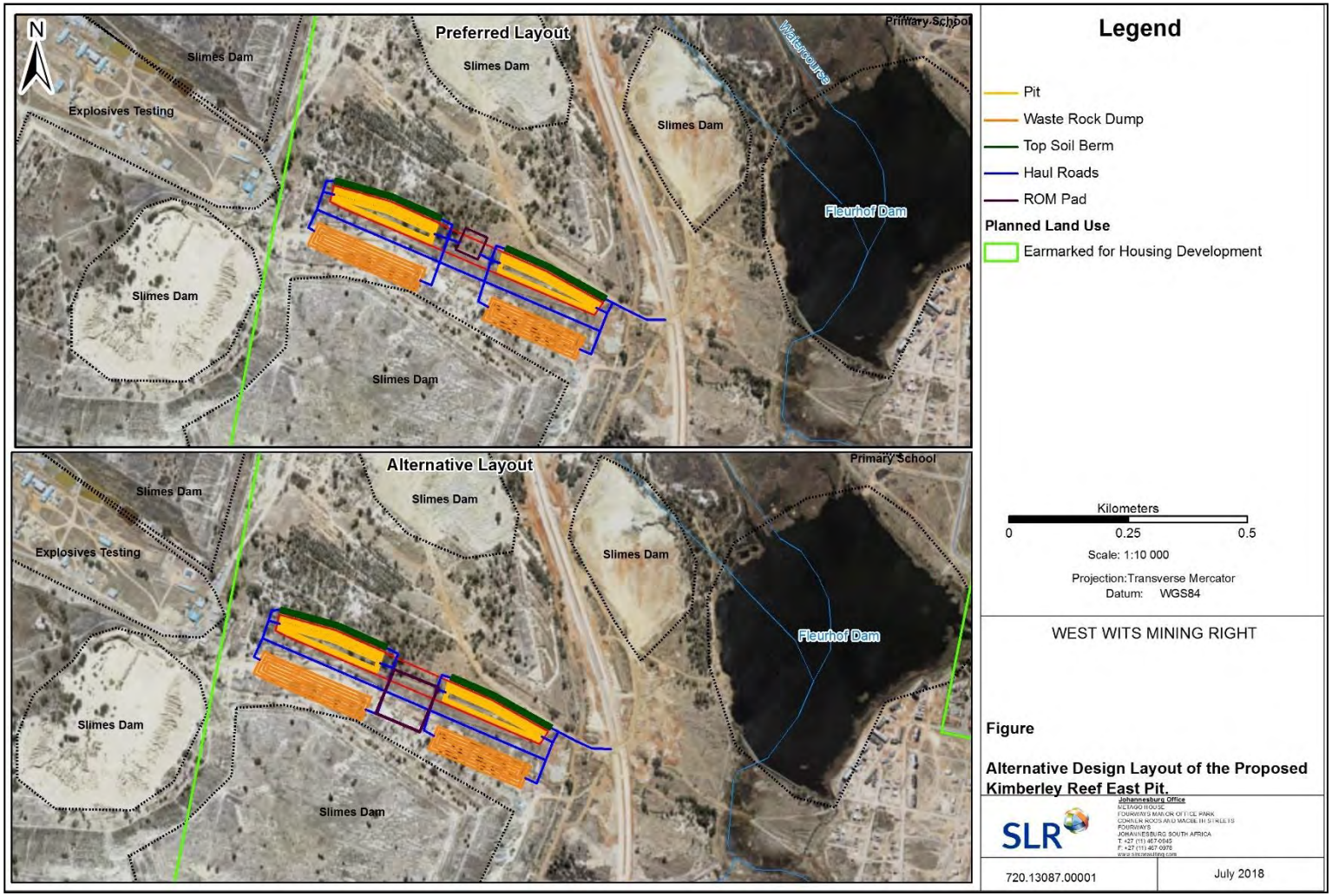


Figure 120: Alternative design layouts of the proposed Kimberley Reef East Pit

7.3 Impact Assessment Methodology

The method used for the assessment of impacts is set out in **Table 10**. This assessment methodology enables the assessment of environmental impacts, including: cumulative impacts, the severity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

Note: Part A provides the definition for determining impact consequence (combining intensity, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D.

Table 10: Impact Assessment Methodology Applied

PART A: DEFINITION AND CRITERIA*		
Definition of SIGNIFICANCE		**Significance = consequence x probability**
Definition of CONSEQUENCE		**Consequence is a function of severity, spatial extent and duration**
Criteria for ranking of the SEVERITY/ INTENSITY of environmental impacts	**H**	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action. Irreplaceable loss of resources.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints. Noticeable loss of resources.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints. Limited loss of resources.
	VL	Very minor/low to no deterioration (no existing resource) Change not measurable. No complaints. No loss of resources
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints. Limited improvement of resources.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction. Noticeable improvement of resources.
	H+	Substantial improvement. Will be within or better than the recommended level. Favourable publicity. Significant improvement of resources.
	L	Quickly reversible. Less than the project life. Short term

Criteria for ranking the DURATION of impacts		**M**	Reversible over time. Life of the project. Medium term		
		H	Permanent. Beyond closure. Long term.		
Criteria for ranking the SPATIAL SCALE of impacts		**L**	Localised - Within the site boundary.		
		M	Fairly widespread – Beyond the site boundary. Local		
		H	Widespread – Far beyond site boundary. Regional/ national		
PART B: DETERMINING CONSEQUENCE					
SEVERITY = VL					
DURATION	Long term	**H**	**Low**	**Medium**	**Medium**
	Medium term	**M**	**Low**	**Low**	**Medium**
	Short term	**L**	**Low**	**Low**	**Low**
SEVERITY = L					
DURATION	Long term	**H**	**Medium**	**Medium**	**Medium**
	Medium term	**M**	**Low**	**Low**	**Medium**
	Short term	**L**	**Low**	**Low**	**Medium**
SEVERITY = M					
DURATION	Long term	**H**	**Medium**	**High**	**High**
	Medium term	**M**	**Medium**	**Medium**	**High**
	Short term	**L**	**Low**	**Medium**	**Medium**
SEVERITY = H					
DURATION	Long term	**H**	**High**	**High**	**High**
	Medium term	**M**	**Medium**	**Medium**	**High**
	Short term	**L**	**Medium**	**Medium**	**High**
			L	**M**	**H**
			Localised Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/ national
			SPATIAL SCALE		

PART C: DETERMINING SIGNIFICANCE					
PROBABILITY (of exposure to impacts)	Definite/ Continuous	**H**	**Medium**	**Medium**	**High**
	Possible/ frequent	**M**	**Medium**	**Medium**	**High**
	Unlikely/ seldom	**L**	**Low**	**Low**	**Medium**
			L	**M**	**H**
			CONSEQUENCE		

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	**Decision guideline**
High	It would influence the decision regardless of any possible mitigation.
Medium	It should have an influence on the decision unless it is mitigated.
Low	It will not have an influence on the decision.

*H = high, M= medium and L= low and + denotes a positive impact.

8 POSITIVE AND NEGATIVE IMPACTS OF THE PROPOSED ACTIVITY AND ALTERNATIVES

8.1 Heritage resources and sensitivity

The identified heritage resources have been allocated a sensitivity buffer based on the recognised management buffers accepted by SAHRA in the past few years. No regulations in the NHRA provide guidelines on buffer zones. However, in the case of heritage sensitivity, a buffer of 30 – 50 meters is generally proposed based on the type of heritage resource. In the case of burial grounds and graves (BGG) a buffer of 50 meters is generally proposed and 30 meters for a heritage structure such as ruins and other historical structures.

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

The potential heritage impacts of the proposed project that were identified during the Impact Assessment process, are discussed under each of the identified issues in this section.

8.2 Impact on burial grounds

Two informal burial grounds were identified during the fieldwork. They are both situated outside the individual footprint areas but within the greater mining right application area. Due to the social and cultural significance of burial grounds and graves, a high heritage significance is given to such sites.

The impact of the proposed project on the burial grounds is rated as having a HIGH negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance after mitigation.

Phase	Severity /Intensity	Duration	Extent	Consequence	Probability	Significance
Unmitigated						
Construction	H	H	L	High	M	High
Operation	H	H	L	High	M	High
Rehabilitation	L	H	L	Medium	L	Low
Mitigated						
Construction	L	H	L	Medium	L	Low
Operation	L	H	L	Medium	L	Low
Rehabilitation	L	H	L	Medium	L	Low

8.3 Living Heritage/Sacred Sites

Two open air religious sites were identified within or immediately adjacent to the individual footprint areas. Due to the social and cultural significance of such religious sites, a Medium heritage significance is given to such sites.

The impact of the proposed project on the these living heritage/sacred sites is rated as having a MEDIUM negative significance rating before mitigation with a LOW significance rating after mitigation.

Phase	Severity /Intensity	Duration	Extent	Consequence	Probability	Significance
Unmitigated						
Construction	M	M	L	Medium	M	Medium
Operation	M	M	L	Medium	M	Medium
Rehabilitation	M	M	L	Medium	M	Medium

Mitigated						
Construction	L	L	L	Low	L	Low
Operation	L	L	L	Low	L	Low
Rehabilitation	L	L	L	Low	L	Low

8.4 Impact on Historical Structures

Twenty historical structures or remains were identified in total. Sixteen historical structure sites are located within the individual footprints and four historical structures sites are located within the greater mining right application area.

The impact of the proposed project on the historical structures is rated as MEDIUM to HIGH negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.

Phase	Severity /Intensity	Duration	Extent	Consequence	Probability	Significance
Unmitigated						
Construction	H	H	L	High	H	High
Operation	M	H	L	Medium	M	Medium
Rehabilitation	M	H	L	Medium	M	Medium
Mitigated						
Construction	L	H	L	Medium	L	Low
Operation	L	H	L	Medium	L	Low
Rehabilitation	L	H	L	Medium	L	Low

8.5 Impact on Palaeontological Resources

The palaeontological sensitivity of the area determined using the SAHRIS database palaeosensitivity map (http://www.sahra.org.za/sahris/map/palaeo) indicated that the entire proposed mining right area footprint is underlain by geology of a Low palaeontological significance and no palaeontological studies are required. Furthermore, confirmation of the Low palaeontological significance of the area by both SAHRA and a qualified palaeontologist was located during the desktop research. It is therefore recommended that an application for exemption from the standard requirement for a finds protocol be made to SAHRA.

The impact of the proposed project on the Palaeontology is rated as having a LOW significance rating with no mitigation measures required.

Phase	Severity /Intensity	Duration	Extent	Consequence	Probability	Significance
Unmitigated						
Construction	VL	H	L	Low	L	Low
Operation	VL	H	L	Low	L	Low
Rehabilitation	VL	H	L	Low	L	Low
Mitigated						
Construction	VL	H	L	Low	L	Low
Operation	VL	H	L	Low	L	Low
Rehabilitation	VL	H	L	Low	L	Low

8.6 Impact on Archaeological Resources

No archaeological material was identified in the HIA. However, occasional finds of stone tools have been recorded in previous HIA studies of the area and a historic midden was identified by Birkholtz (2008) in the Creswell Park area, which indicates the possibility of sub-surface archaeological material being uncovered by the proposed activities. Therefore, the impact of the proposed project on archaeological material is rated as having a LOW to MEDIUM negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance

Phase	Severity /Intensity	Duration	Extent	Consequence	Probability	Significance
Unmitigated						
Construction	M	H	L	Medium	M	Medium
Operation	L	H	L	Medium	L	Low
Rehabilitation	L	H	L	Medium	L	Low
Mitigated						
Construction	L	H	L	Medium	L	Low
Operation	L	H	L	Medium	L	Low
Rehabilitation	L	H	L	Medium	L	Low

8.7 Project Impact (Unmitigated)

Eighteen heritage sites were located within the individual mining activity footprints and six sites were located outside these footprints within the larger mining right application area (24 sites in

total). The direct impact of the proposed project unmitigated therefore will be MEDIUM to HIGH and will require a certain amount of mitigation.

The indirect impact of the proposed project unmitigated on the identified heritage resources will be MEDIUM to HIGH and may require some mitigation.

According to the SAHRIS palaeontological sensitivity map the Witwatersrand Goldfields geology underlying the proposed opencast footprint and general region is rated as Low sensitivity for palaeontological resources. Therefore, no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required, An application for exemption from the standard requirement of providing a finds protocol should be submitted to SAHRA. It is thus considered that the establishing of the proposed development is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area.

8.8 Cumulative Impact

The larger mining right application area (and the overall Roodepoort/Soweto region) has been disturbed extensively by both historical and recent gold mining activities. Most archaeological or other heritage resources that existed within the larger mining right application area have been destroyed by these activities and therefore the additional project impacts will not increase or decrease the significance of the existing baseline impacts within the mining right application area. However, heritage resources were identified within and close to some of the individual mining activity footprints The impact is going to happen and will be long term in nature. The impact risk class is thus Medium to High with regards to cumulative impacts within the footprint area.

However, the cumulative impacts of the proposed project on heritage resources identified in close proximity to the footprint area, are likely to increase the significance of the existing baseline impacts in the area immediately adjacent to the footprint area. The impact is going to happen and will be long term in nature.

The impact risk class is thus Medium to High with regards to cumulative impacts on the historical structures located adjacent to the footprints area.

The impact risk class is thus Medium to High with regards to cumulative impacts on the burial ground/s located within the larger mining rights application area.

The baseline impacts are considered to be Low for palaeontological resources, and additional project impacts (if no mitigation measures are implemented) will not increase the significance of the existing baseline impacts, the cumulative unmitigated impact will probably be of a Low negative

significance. The impact is going to happen and will be long term in nature. The impact risk class is thus Low.

The baseline impacts are considered to be Low for archaeological resources, and additional project impacts (if no mitigation measures are implemented) will not increase the significance of the existing baseline impacts, the cumulative unmitigated impact will probably be of a Low negative significance. The impact is going to happen and will be long term in nature. The impact risk class is thus Low.

9 MANAGEMENT RECOMMENDATIONS AND GUIDELINES

9.1 Construction phase

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camps area and small-scale infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project and these must be catered for. Temporary infrastructure, such as construction camps and laydown areas, is often changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following monitoring and chance find procedure is implemented.

9.2 Chance find procedure

- A heritage practitioner should be appointed to develop a heritage induction program and conduct training for the ECO, as well as team leaders, in the identification of heritage resources and artefacts.
- An appropriately qualified archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities be halted.

- The qualified archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the material and data are recovered.
- Construction can commence as soon as the site has been cleared and signed off by the archaeologist.

9.3 Possible finds during construction and operation (mining activities)

The study area occurs within a greater historical and archaeological site as identified during the desktop and fieldwork phase. Excavations of foundations and soil clearance, as well as mining related activities, can uncover the following:

- stone foundations;
- ash middens associated with the historical structures that can contain bone, glass and clay ceramics, ash, metal objects such as spoons, forks, and knives.
- Unmarked graves

9.4 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames.Error! Reference source not found. **Table 11** gives guidelines for approximate lead times on permitting.

Table 11: Lead times for permitting and mobilisation

ACTION	RESPONSIBILITY	TIMEFRAME
Preparation for field monitoring and finalisation of contracts	The contractor and service provide	1 months
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	1 month
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	2 weeks
Relocation of burial ground or graves in the way of construction	Service provider – Archaeologist, SAHRA, local government and provincial government	6 months

9.5 Heritage Management Plan for EMPr implementation

Heritage Type	Resource No.	Heritage grading	Location	Mitigation measures	Project phase	Party responsible for implementation	Monitoring frequency	Performance indicators
Cultural sites within the proposed infrastructure footprints.	WW002	Medium	Roodepoort Main Reef pit	Avoid these sites where feasible and apply a buffer zone of least 30 m. If the sites cannot feasibly be avoided, conduct stakeholder engagement and obtain consent to relocate the sites to a suitable alternative location, to be provided by the mine.	Construction Operation Decommissioning	Applicant Environmental Control Officer (ECO)	Quarterly	ECO checklist/report
	WW010	Medium	Roodepoort Main Reef pit					
Historical structures within the proposed infrastructure footprints.	WW001	Low	Roodepoort Main Reef pit	Avoid these sites where feasible and apply a buffer zone of least 30 m. The ore trucking road alignment will be adjusted to avoid heritage resources. If the sites cannot feasibly be avoided, document the site and obtain a destruction permit from the provincial heritage resource authority (Gauteng). In this regard, structures older than 60	Construction Operation Decommissioning	Applicant ECO	Quarterly	ECO checklist/report
	WW003 and WW003-1	Low	11 Shaft Main Reef pit					
	WW004	Low	11 Shaft Main Reef pit					
	WW005	Low	Kimberley Reef East infrastructure					

Heritage Type	Resource No.	Heritage grading	Location	Mitigation measures	Project phase	Party responsible for implementation	Monitoring frequency	Performance indicators
	WW006	Low	Kimberley Reef East infrastructure	years will require permits for destruction. Implement a chance find procedure in cases where possible additional heritage finds are made. Contact SAHRA and appoint a qualified heritage specialist to evaluate the finds and make appropriate recommendation on mitigation.				
	WW007	Low	Kimberley Reef East infrastructure					
	WW008	-Low	11 Shaft Main Reef pit					
	WW009 and WW009-1	Low	11 Shaft Main Reef pit					
	WW011	Medium	Ore trucking road					
	WW012	Low	Ore trucking road					
	WW013	Medium	Ore trucking road					
	WW014	Medium	Ore Trucking road					
	WW015	Medium	Ore Trucking road					
	WW016	Medium/High	Ore Trucking road					

Heritage Type	Resource No.	Heritage grading	Location	Mitigation measures	Project phase	Party responsible for implementation	Monitoring frequency	Performance indicators
	WW017	Very Low	Mona Lisa Bird Reef pit					
	WW018	**Medium/High**	Bird Reef/ Central Circular Shaft					
Historical structures within the project area, but outside of the proposed infrastructure footprints.	WW019	Medium	South of Mona Lisa Bird Reef pit	Demarcate sites with a 30-meter buffer and avoid them. Implement a chance find procedure in cases where possible additional heritage finds are made. Contact SAHRA and appoint a qualified heritage specialist to evaluate the finds and make appropriate recommendation on mitigation.	Construction Operation Decommissioning	Applicant ECO	Quarterly	ECO monthly checklist/report
	WW020	High	North-east of Bird Reef/ Central Circular Shaft					
	WW021 and WW021-1	Low	Close to Roodepoort Main Reef Pit					
	WW023	Low/ medium	Between Bird Reef Central Circular Shaft and Mona Lisa Bird Reef					
Burial Grounds located within the project area, but outside of the proposed infrastructure footprints.	WW022-1 to WW022-3	High	Between Bird Reef/ Central Circular Shaft and Mona Lisa Bird Reef Pit	Demarcate sites with a 100-meter buffer and avoid them. Implement stakeholder engagement as required by the NHRA in developing practical management measures to avoid further	Construction Operation Decommissioning	Applicant ECO	Quarterly	ECO checklist/report
	WW024	High	North of Bird Reef/ Central					

Heritage Type	Resource No.	Heritage grading	Location	Mitigation measures	Project phase	Party responsible for implementation	Monitoring frequency	Performance indicators
			Circular Shaft, close to Ore transport road	damage to these burial grounds and allow community access. Implement a chance find procedure in cases where possible additional heritage finds are made. Contact SAHRA and appoint a qualified heritage specialist to evaluate the finds and make appropriate recommendation on mitigation.				
Archaeological and paleontological material	None found on site			Implement a chance find procedure in cases where possible heritage finds are made. Contact SAHRA and appoint a qualified heritage specialist to evaluate the finds and make appropriate recommendation on mitigation.	Construction Operation Decommissioning	Applicant ECO Heritage Specialist	Quarterly	ECO checklist/report

10 CONCLUSIONS AND RECOMMENDATIONS

Heritage resources are unique and non-renewable and as such any impact on such resources must be seen as significant. This report focusses expressly on the footprints of the five opencast pit areas, two proposed infrastructure footprints and the portion of ore trucking road included in the greater mining right application area boundary. In addition, any mining activity to be undertaken outside the specified footprint areas will require a separate HIA study to be conducted. Other management measures as listed and required in other HIA's conducted in the area must still be implemented for other heritage features identified in the larger mining right application area.

The desktop analysis and field survey has enabled the identification of possible heritage sensitive areas that included:

- Dwellings;
- Clusters of dwellings (homesteads and farmsteads);
- Historical Mining structures; and
- Graves and burial grounds.

Note that these structures refer to possible heritage sites as listed in **Table 12**.

Table 12 - Tangible Heritage sites in the study area

Name	Description	Legislative protection
Dwellings and dwelling clusters	Possibly older than 60 years	NHRA Sect 3 and 34
Historical Architecture	Possibly older than 60 years	NHRA Sect 3 and 34
Graves and Burial Grounds	Graves	NHRA Sect 3 and 36

Previous studies conducted in the greater area have shown that the heritage resources expected could include historical structures and graves or burial grounds with occasional archaeological sites.

The field survey identified 24 heritages in total within the study area. Of these, 18 heritage sites were identified within the individual footprint areas. These include mainly historical structures or remains (**WW001 to WW018**) and a couple of religious sites (**WW002, WW010**). Six heritage sites were identified in the greater mining right application area. These include two burial grounds (**WW022, WW024**), and four historical structures (**WW019, WW020, WW021, WW023**).

Refer to **Figure 45** for the locality of heritage resources in relation to the proposed development area.

10.1 Archaeology

No archaeological material or sites were identified in the study area. However, occasional finds of stone tools have been recorded in previous HIA studies of the larger area and a historic midden was identified by Birkholtz (2008) in the Creswell Park area, which indicate the possibility of sub-surface archaeological material being uncovered by the proposed activities.

Therefore, the impact of the proposed project on archaeological material is rated as having a LOW to MEDIUM negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance.

10.2 Historical Structures

Twenty historical structures or remains were identified in total. Sixteen historical structure sites are located within the individual footprints and four historical structures sites are located within the greater mining right application area (**WW019**, **WW020, WW021, WW023**).

The impact of the proposed project on the historic heritage resources is rated as MEDIUM to HIGH negative significance before mitigation and with the implementation of the mitigation measures the impact significance is reduced to LOW negative.

10.3 Burial Grounds and Graves

Two informal burial grounds were identified within the greater mining right application area (WW022, WW024). Due to the social and cultural significance of burial grounds and graves, a high heritage significance is given to such sites.

The impact of the proposed project on the burial grounds is rated as having a HIGH negative significance before mitigation and with the implementation of mitigation measures as having a LOW negative significance after mitigation.

10.4 Palaeontology

A basic palaeontological sensitivity was determined using the SAHRIS database palaeosensitivity map (http://www.sahra.org.za/sahris/map/palaeo). As can be seen in **Figure 43** and **Figure 44**, the entire proposed mining right application area occurs in an area where palaeontology is assessed as being entirely of Low significance (coloured blue) and no palaeontological studies are required.. Furthermore, confirmation of the Low palaeontological significance of the area by both SAHRA and a qualified palaeontologist was located during the desktop research. It is therefore recommended that an application for exemption from the standard requirement for a finds protocol be made to SAHRA.

The impact of the proposed project on the Palaeontology is rated as having a VERY LOW significance rating before mitigation with no further mitigation measures required.

10.5 Living Heritage/Sacred Sites

Two open air religious sites were identified within or immediately adjacent to the individual footprint areas (**WW002, WW010**). These religious sites could have significant heritage value to the relevant church group. Although such sites have been given a Medium heritage significance, it is expected that alteration/ or destruction of these sites could be undertaken with stakeholder engagement and consent (e.g. local community/ church group). Note that this would probably require moving the site to another location with the agreement of the church group which uses the site.

The impact of the proposed project on the these living heritage/sacred sites is rated as having a MEDIUM negative significance rating before mitigation with a LOW significance rating after mitigation.

10.6 General

In the event that heritage resources are discovered during site clearance, construction activities must stop and a qualified archaeologist appointed to evaluate and make recommendations on mitigation measures.

The overall impact of the development on heritage resources is seen as being of low to high significance but impacts can be mitigated to an acceptable level of low significance .

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APPENDIX A

LEGISLATIVE REQUIREMENTS – TERMINOLOGY AND ASSESSMENT CRITERIA

1 General principles

In areas where there has not yet been a systematic survey to identify conservation worthy places, a permit is required to alter or demolish any structure older than 60 years. This will apply until a survey has been done and identified heritage resources are formally protected.

Archaeological and paleontological sites, materials, and meteorites are the source of our understanding of the evolution of the earth, life on earth and the history of people. In the NHRA, permits are required to damage, destroy, alter, or disturb them. People who already possess material are required to register it. The management of heritage resources is integrated with environmental resources and this means that before development takes place heritage resources are assessed and, if necessary, rescued.

In addition to the formal protection of culturally significant graves, all graves, which are older than 60 years and are not in a formal cemetery (such as ancestral graves in rural areas), are protected. The legislation protects the interests of communities that have an interest in the graves - they should be consulted before any disturbance takes place. The graves of victims of conflict and those associated with the liberation struggle are to be identified, cared for, protected and memorials erected in their honour.

Anyone who intends to undertake a development must notify the heritage resource authority and if there is reason to believe that heritage resources will be affected, an impact assessment report must be compiled at the construction company's cost. Thus, the construction company will be able to proceed without uncertainty about whether work will have to be stopped if an archaeological or heritage resource is discovered.

According to the National Heritage Act (Act 25 of 1999 section 32) it is stated that -
An object or collection of objects, or a type of object or a list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including –

- objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects, meteorites and rare geological specimens;
- visual art objects;
- military objects;
- numismatic objects;
- objects of cultural and historical significance;
- objects to which oral traditions are attached and which are associated with living heritage;

- objects of scientific or technological interest;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1 (xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996), or in a provincial law pertaining to records or archives; and
- any other prescribed category.

Under the National Heritage Resources Act (Act No. 25 of 1999), provisions are made that deal with, and offer protection to, all historic and pre-historic cultural remains, including graves and human remains.

2 Graves and cemeteries

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

Graves older than 60 years, but younger than 100 years, fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act) as well as the Human Tissues Act (Act 65 of 1983) and are under the jurisdiction of the South African Heritage Resource Agency (SAHRA). The procedure for Consultation Regarding Burial Grounds and Graves (Section 36(5) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in the category located inside a formal cemetery administrated by a local authority will also require the same authorisation as set out for graves younger than 60 years, over and above SAHRA authorisation.

If the grave is not situated inside a formal cemetery but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws set by the cemetery authority must be adhered to.

APPENDIX B
HERITAGE ASSESSMENT METHODOLOGY

Methodology for Assessing Heritage Site significance

This HIA report was compiled by PGS Heritage (PGS) for the proposed West Wits Mining Right application area. 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 consisted of three steps:

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

Step II – Physical Survey: A physical survey was conducted on foot through the proposed project area by a qualified archaeologist and heritage specialist which was aimed at locating and documenting sites falling within and adjacent to the proposed development footprint.

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

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

- Site integrity (i.e. primary vs. secondary context);
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures);
- Density of scatter (dispersed scatter)
    - Low - <10/50m^2
    - Medium - 10-50/50m^2
    - High - >50/50m^2;
- Uniqueness; and
- Potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:
A - No further action necessary;
B - Mapping of the site and controlled sampling required;
C - No-go or relocate development activity position;
D - Preserve site, or extensive data collection and mapping of the site; and
E - Preserve site.

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

5) Site Significance

Site significance classification standards prescribed by the SAHRA (2006) and approved by the ASAPA for the Southern African Development Community (SADC) region, were used for the purpose of this report.

Table: Site significance classification standards as prescribed by SAHRA.

Field Rating	Grade	Significance	Recommended Mitigation
National Significance (NS)	Grade 1	-	**Conservation; National Site nomination**
Provincial Significance (PS)	Grade 2	-	**Conservation; Provincial Site nomination**
Local Significance (LS)	Grade 3A	High Significance	**Conservation; Mitigation not advised**
Local Significance (LS)	Grade 3B	High Significance	**Mitigation (Part of site should be retained)**
Generally Protected A (GP.A)	-	High / Medium Significance	**Mitigation before destruction**
Generally Protected B (GP.B)	-	Medium Significance	**Recording before destruction**
Generally Protected C (GP.A)	**-**	**Low Significance**	**Destruction**

APPENDIX C

THE IMPACT ASSESSMENT METHODOLOGY

Methodology Used In Determining The Significance Of Environmental Impacts

The method used for the assessment of impacts is set out in the table below. This assessment methodology enables the assessment of environmental impacts including: cumulative impacts, the severity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

Table: Impact Assessment Methodology Applied In Scoping

Note: Part A provides the definition for determining impact consequence (combining intensity, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D.

Table Impact Assessment Methodology Applied

PART A: DEFINITION AND CRITERIA*		
Definition of SIGNIFICANCE		**Significance = consequence x probability**
Definition of CONSEQUENCE		**Consequence is a function of severity, spatial extent and duration**
Criteria for ranking of the SEVERITY/ INTENSITY of environmental impacts	**H**	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action. Irreplaceable loss of resources.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints. Noticeable loss of resources.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints. Limited loss of resources.
	VL	Very minor/low to no deterioration (no existing resource) Change not measurable. No complaints. No loss of resources
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints. Limited improvement of resources.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction. Noticeable improvement of resources.

	H +	Substantial improvement. Will be within or better than the recommended level. Favourable publicity. Significant improvement of resources.
Criteria for ranking the DURATION of impacts	**L**	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of impacts	**L**	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national

PART B: DETERMINING CONSEQUENCE					
SEVERITY = VL					
DURATION	Long term	**H**	**Low**	**Medium**	**Medium**
	Medium term	**M**	**Low**	**Low**	**Medium**
	Short term	**L**	**Low**	**Low**	**Low**
SEVERITY = L					
DURATION	Long term	**H**	**Medium**	**Medium**	**Medium**
	Medium term	**M**	**Low**	**Low**	**Medium**
	Short term	**L**	**Low**	**Low**	**Medium**
SEVERITY = M					
DURATION	Long term	**H**	**Medium**	**High**	**High**
	Medium term	**M**	**Medium**	**Medium**	**High**
	Short term	**L**	**Low**	**Medium**	**Medium**
SEVERITY = H					
DURATION	Long term	**H**	**High**	**High**	**High**
	Medium term	**M**	**Medium**	**Medium**	**High**
	Short term	**L**	**Medium**	**Medium**	**High**
			L	**M**	**H**
			Localised Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/ national

			SPATIAL SCALE		
PART C: DETERMINING SIGNIFICANCE					
PROBABILITY (of exposure to impacts)	Definite/ Continuous	**H**	**Medium**	**Medium**	**High**
	Possible/ frequent	**M**	**Medium**	**Medium**	**High**
	Unlikely/ seldom	**L**	**Low**	**Low**	**Medium**
			L	**M**	**H**
			CONSEQUENCE		

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	**Decision guideline**
High	It would influence the decision regardless of any possible mitigation.
Medium	It should have an influence on the decision unless it is mitigated.
Low	It will not have an influence on the decision.

*H = high, M= medium and L= low and + denotes a positive impact.

APPENDIX D

RECORD OF STAKEHOLDER ENGAGEMENT

STAKEHOLDER ENGAGEMENT RECORD

LIST OF I&APS FOR WEST WITS MINING RIGHT APPLICATION HIA REPORT: CONTACTS AND RESPONSE

NAME AND ADDRESS	COMPANY / ASSOCIATION	TEL / FAX	EMAIL	COMMENTS
Rod Kruger PO Box 1036 Strubensvalley 1735	Private - historian	082 477 0319 / 011 475 1782	krugerrod@gmail.com	Initial comment recorded in Issues and Response report: at Scoping meeting held at Witpoortjie on 4 April 2018 - as a historian in the area he requested to have access to these places to photograph and so on the various things (e.g. Main Reef), especially if old workings are uncovered at the surface? And/or whether we would be permitted to go underground to see anything and whether or not any relics found would become the property of the various museums? Follow-up contact: phone call by PGS on 30 June 2018 –Mr Kruger works at Kloofendal Nature Reserve as the historian (retired). He requested access to be able to photograph the Main Reef in situ if possible, also to have custody of any historical objects or for them to go the Roodepoort Museum.
Sandile Ntawase Resident	Dobsonville Heritage Foundation	081 068 8546 OR Secretary Motsomi		Initial comment recorded in Issues and Response report : at Scoping meeting held in Braamfischerville on 5 April 2018 - I am a representative of the Dobsonville Heritage Foundation. Raising concern (that has been flagged with DMR) that there

		Mokhine on 073 830 9079		are graves in the DRD area. How will these graves be located and will West Wits help in preserving them and not letting them be destroyed by the mining activities? Follow-up contact: phone call by PGS on 30 June 2018 – Mr Ntawase confirmed that there is a burial ground situated within the mining right application area. It was arranged for PGS to undertake a site visit with Mr Ntawase so that the location of the burial ground could be indicated and recorded. The site visit was undertaken on Wednesday 1 August 2018.

RECORD OF SITE VISIT TO BURIAL GROUND IN DURBAN ROODEPOORT DEEP AREA WITH MEMBERS OF DOBSONVILLE HERITAGE FOUNDATION ON WEDNESDAY 1 AUGUST 2018

As part of the HIA report for the mining right application for the West Wits project, PGS Heritage contacted I&APs who had registered comments on heritage issues at the initial public meetings held by SLR in April 2018. One of the issues on heritage was raised by a member of the Dobsonville Heritage Foundation, Mr Sandile Ntawase. He had noted that there are graves in the general area and was concerned about what would happen to them. PGS contacted Mr Ntawase telephonically and arranged to meet him so he could point out the location of the graves.

Two representatives of PGS Heritage met with Mr Ntawase and three other members of the Dobsonville Heritage Foundation in the Roodepoort Durban Deep area on Wednesday 1 August 2018. Mr Ntawase then showed us a location where there is a large expanse of open veld situated between two old tailings dumps which contains a large number of mostly stone-packed graves. There could be between 1500-2000 graves or more. A few graves have formal headstones with inscriptions and dates which include 1929, 1933, 1962, 1972 and 1985. Names from the inscriptions are all black African. One of the graves with a formal inscribed headstone apparently belongs to the grandfather of one of the local councillors. The general area is overgrown with long grass, khakibos, pampas grass and stands of bluegum trees. There area also contains a lot of dumping of building rubble, and general household rubbish. The area is also surrounded by an informal settlement, and the remains of historical residential buildings, as well as the remains of what was apparently an old mine hospital. It is likely that the graves are associated with the mine hospital. (PGS is aware of another burial ground which was uncovered accidentally several years previously in another location south of Main Reef road, was located close to another old mine hospital).

According to one of the other members of the DHF, he used to live in the old houses situated to the immediate north of this burial ground and these graves were already there in 1947. He understood that they were mineworker graves.

GPS coordinates were taken at several points around the edges of the burial ground and photographs were taken of the graves. However, due to the dense and overgrown nature of the vegetation, it was difficult to take clear photos of the graves.

Note: *after the site visit and Investigation of the historical topographic maps for the area confirmed that the remains of the "hospital' building is located in the same position where a compound building is depicted on the 1943 map. A building in the same position is labelled as a hospital on both the 1954 and 1977 maps. The 1954 map also depicts the other residential buildings situated adjacent to the hospital building. However, none of these maps depicts graves in this area.*

PGS HERITAGE
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South Africa

Offices in South Africa, Kingdom of Lesotho and Mozambique

Directors: HS Steyn, PD Birkholtz, W Fourie

Company registration number:
2003/008940/07

APPENDIX E
PROJECT TEAM CV'S

PROFESSIONAL CURRICULUM
FOR JENNIFER KITTO

Name:	Jennifer Kitto
Profession:	Heritage Specialist
Date of Birth:	1966-09-11
Parent Firm:	PGS Heritage (Pty) Ltd
Position in Firm:	Heritage Consultant
Years with Firm:	6 Years
Years experience:	20
Nationality:	South African
HDI Status:	White Female

EDUCATION:

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

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

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

Professional Qualifications:

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

Languages:

English

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

KEY QUALIFICATIONS

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

Summary of Experience

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

Limited involvement in various grave relocation projects in the various provinces of South Africa
Involvement with various Heritage Impact Assessments, within South Africa, including -

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects
- Heritage Audits and subsequent Compilation of Heritage Management Policy for various projects

HERITAGE ASSESSMENT PROJECTS

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

- Heritage Screening Reports for Various Road Routes: Bronkhorstspruit, Carletonville and Randfontein and Eikenhof-Vaal Dam regions, Gauteng Department of Roads and Transport, Gauteng Province
- Heritage Audit and Management Policy, Sibanye Gold, Beatrix Mining area, Lejweleputswa District Municipality, Free State Province
- Heritage Audit and Management Policy, Sibanye Gold, Kloof and Driefontein Mining areas, West Rand District Municipality, Gauteng Province
- HIA Report, Dolos-Giraffe Substation, Hopefield-Bultfontein, Free State Province
- HIA Report and Phase 2 Mitigation Report, AEL Mining Services, Decontamination of AEL Detonator Campus, Modderfontein Factory, Modderfontein, City of Johannesburg Metropolitan Municipality, Gauteng
- HIA Report, Old Rand Leases Hostel redevelopment, Fleurhof Ext 10, Roodepoort, City of Johannesburg Metropolitan Municipality, Gauteng
- HIA Report, Watershed Substation, North-West Province
- HIA Report, Solid Waste Landfill Facility, Rhodes Village, Eastern Cape
- HIA Report, Solid Waste Landfill Facility, Rossouw, Eastern Cape
- Phase 2 Mitigation Report, Cass Farmstead, Optimum Colliery, Mpumalanga
- HIA Report, Kusile Ash Disposal Facility, Witbank, Mpumalanga

- Report on Rand Steam Laundries Background History, City of Johannesburg Metropolitan Municipality, Gauteng
- New Cemetery, Barkly East, Senqu Municipality, Eastern Cape (desktop/archival research for HIA report)
- Lady Slipper Country Estates, Nelson Mandela Metro Municipality, Eastern Cape (desktop/archival research for HIA report)
- Exxaro Resources Paardeplaats Project, Belfast, Mpumalanga (field survey and archival research for HIA report)
- Copperleaf Mixed Use Development, Farm Knoppieslaagte 385/Knopjeslaagte 140, Centurion, Gauteng (field survey and archival research for HIA report)
- Isundu-Mbewu Transmission Line Project, Pietermaritzburg, Kwazulu Natal (Initial Heritage Scan (survey) for Corridor 3 Alternative 1)

GRAVE RELOCATION PROJECTS

Below, a selection of grave relocation projects involvement:

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

EMPLOYMENT SUMMARY:

Positions Held

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

ILAN SMEYATSKY

Professional Archaeologist

Personal Details

Name:	Ilan
Surname:	Smeyatsky
Identity Number:	9109275072080
Date of Birth:	27-09-1991
Citizenship:	South African
Gender:	Male
Marital Status:	Single
Languages Spoken:	English

Education History

2010-2013: **BSc Bachelors Degree**

University of the Witwatersrand, Johannesburg, South Africa

- Archaeology
- Psychology
- Statistics
- Research Design and Analysis
- 67% Pass (**2:1 Qualification**)

2014: **BSc (Hons) in Archaeology**

AWARDS:

- Received the 2014 Center of Excellence in Palaeoscience award - **Bursary to the value of ZAR 30000 ≈ $2500**
- Received the Post-Graduate Merit Award in 2015 for academic merit for my Honours academic results - **Bursary to the value of ZAR 25000 ≈ $1800**

University of the Witwatersrand, Johannesburg, South Africa

- Archaeology
- Excavation techniques
- Theory
- 69% Pass (**2:1 Qualification**)
- **Distinction** received for thesis entitled: "Stylistic variation in Later Stone Age tanged arrowheads: a pilot study using geometric morphometrics"

2015-2017: **MSc by Research (Archaeology)**

University of the Witwatersrand, Johannesburg, South Africa

- Archaeology
- Statistical analysis

- GIS (Geographic Information Systems)
- Thesis entitled: “Discerning and explaining shape variations in Later Stone Age tanged arrowheads, South Africa”

Aug 2016 –
Jan 2017: **Semester of Archaeology Masters**
AWARD: Received the 2016 AESOP+ full Masters scholarship to study at Uppsala University, Uppsala, Sweden – **Scholarship to the value of ZAR 160,000 ≈ $11,000**
Uppsala University, Uppsala, Sweden

- Archaeological theory
- GIS (Geographic Information Systems)
- Invitational research

Employment History

Part time employment as a student:

- **2009-2013**: Part-Time Electrician Apprentice: Assisting in home electrical repair jobs.
- **2014-2015:** Lab Research Assistant: Analysing and classifying lithic artefacts, Data capturing, Mentoring trainee research assistants.

Experience in the field of archaeology:

- **2013-2015: Fieldwork/Excavator - Responsibilities:** Feature detection, excavation, sieving, sorting, analysis, soil sampling, field documentation, ‘dumpy’ operation , Total Station operation, DGPS operation, rock art tracing and photography, engraving tracing and photography.
    - South African excavations:
        - Early Stone Age excavation at Maropeng World Heritage Site in Gauteng (1 Week – August 2015)
        - Pig cadaver exhumation as part of forensic experiment near Pretoria, Gauteng (1 Week – December 2014) - Praised for having the determination of returning for each subsequent excavation day as it was performed on a purely volunteer basis and the work conditions were particularly strenuous - Dr. Coen Nienaber
        - Iron Age excavation at Komati Gorge, Mpumalanga (1 Week – August 2014) - Praised for being exceptionally “methodical and proficient” with my excavation techniques – Dr. Alex Schoeman
        - Rock art fieldwork at Komati Gorge, Mpumalanga (1 Week – August 2014)
        - Underwater archaeology site mapping Komati Gorge, Mpumalanga (1 Week – August 2014)

    - Early Stone Age excavation at Maropeng World Heritage Site in Gauteng (2 Weeks - September 2013) - Personally uncovered some of the only stone tools (~1.8 million years old) found during that digging season.
- **2016: Excavation Supervisor - Responsibilities:** Supervision of two junior excavators, site detection, decision of excavation grid placement, excavation, sieving, sorting, soil sampling, field documentation.
    - Historical (farm site) excavation at Graaff-Reinet, Eastern Cape, South Africa (2 Weeks)
    - Completed dig 1 week ahead of schedule aided by my efficient direction, drive and support to the excavators under my supervision.
- **2017 – PRESENT:** Archaeologist – PGS Heritage: Heritage Impact assessments, background research, report writing, permit applications, collections management, stakeholder engagement and grave relocation.

WOUTER FOURIE

Professional Heritage Specialist and Professional Archaeologist and Director PGS Heritage

Summary of Experience

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

Involvement in various grave relocation projects (some of which relocated up to 1000 graves) and grave "rescue" excavations in the various provinces of South Africa

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

- Archaeological Walkdowns for various projects
- Phase 2 Heritage Impact Assessments and EMPs for various projects
- Heritage Impact Assessments for various projects
- Iron Age Mitigation Work for various projects, including archaeological excavations and monitoring
- Involvement with various Heritage Impact Assessments, outside South Africa, including -
    - Archaeological Studies in Democratic Republic of Congo
    - Heritage Impact Assessments in Mozambique, Botswana and DRC
    - Grave Relocation project in DRC

Key Qualifications

BA [Hons] (Cum laude) - Archaeology and Geography - 1997

BA - Archaeology, Geography and Anthropology - 1996

Professional Archaeologist - Association of Southern African Professional Archaeologists (ASAPA) - Professional Member

Accredited Professional Heritage Specialist – Association of Professional Heritage Practitioners (APHP)

CRM Accreditation (ASAPA) -

Principal Investigator - Grave Relocations

Field Director – Iron Age

Field Supervisor – Colonial Period and Stone Age

Accredited with Amafa KZN

Key Work Experience

2003- current - Director – Professional Grave Solutions (Pty) Ltd

2007 – 2008 - Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand

2005-2007 - Director – Matakoma Heritage Consultants (Pty) Ltd

2000-2004 - CEO– Matakoma Consultants

1998-2000 - Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng

1997-1998 - Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

Worked on various heritage projects in the SADC region including, Botswana, Mozambique and the Democratic Republic of the Congo