

ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME

NORTHAM ZONDEREINDE PLATINUM MINE 3 SHAFT, THABAZIMBI CITY LOCAL MUNICIPALITY

PUBLIC REVIEW

Proponent:

NORTHAM PLATINUM LIMITED

Report Compiled by:



Prism EMS

P.O. Box 1401
Wilgeheuwel
Johannesburg
1736

Tel: 087 985 0951
Fax: 086 601 4800
E-Mail: prism@prismems.co.za

Report Authors:

Miss MC Niehof (*BSc. (Hon).Env. Man.*)

Report Co-Author:

Mr DW. Botha (*MA. Env. Man. (PHED)*)

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT
And
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT: Northam Platinum Limited

TEL NO: 014 784 3000

FAX NO: N/A





POSTAL ADDRESS: PO Box 441, Thabazimbi, 0380, South Africa

PHYSICAL ADDRESS: Main Office, Farm Zondereinde 384KQ, District of Thabazimbi, South Africa

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	Name	Signature	Qualifications and Certifications	Date
Field Assessment	Miss M Niehof		BSc. Hon. Env. Man	December 2018 January 2019 September 2019
	Mr D Botha		M.A. Env. Man. (PHED)	
Document Compilation	Miss M Niehof		BSc. Hon. Env. Man	October 2019
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LIST OF ABBREVIATIONS

BID	Background Information Document
BPEO	Best Practicable Environmental Option
CBA	Critical Biodiversity Area
DEFF	Department of Environment, Forestry and Fisheries
DHSWS	Department of Human Settlements, Water and Sanitation
DMR	Department of Mineral Resources
DRDLR	Limpopo Department of Rural Development and Land Reform
ECO	Environmental Control Officer
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
ESA	Ecological Support Area
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IBA	Important Bird Area
IDP	Integrated Development Plan
IUCN	International Union for Conservation of Nature
LED	Local Economic Development
LEDET	Limpopo Department of Economic Development, Environment and Tourism
LIA	Late Iron Age
LIHRA	Limpopo Heritage Resources Agency
LoM	Life of Mine
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) [as amended]
MRA	Mining Right Area
MSA	Middle Stone Age
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended]
NEMAQA	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act (Act 57 of 2003) [as amended]
NEMWA	National Environmental Management: Waste Management Act, 2008 (Act No. 59 of 2008) [as amended]
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NPAES	National Protected Areas Expansion Strategy
PAR	Protected Areas Register
PCD	Pollution Control Dam

PI	Plasticity Index
PPP	Public Participation Process
RAL	Roads Agency Limpopo
RWD	Return Water Dams
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency Limited
SCSR	Self Contained Self Rescuer
SDF	Spatial Development Framework
SWD	Stormwater Dam
UCS	Uniaxial Compressive Strength
USC	Unified Soil Classification
WMA	Water Management Area
WML	Waste Management Licence

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining “will not result in unacceptable pollution, ecological degradation or damage to the environment”.

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process—

- (a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- (b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- (c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- (d) determine the—
 - (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - (ii) degree to which these impacts—
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources, and
 - (cc) can be avoided, managed or mitigated;
- (e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- (f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- (g) identify suitable measures to manage, avoid or mitigate identified impacts; and
- (h) identify residual risks that need to be managed and monitored.

PART A: SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1 INTRODUCTION

Northam Platinum Limited Zondereinde Division (hereinafter referred to as Northam Platinum) intends to develop a shaft complex on their existing mining right area on a part of the remainder of the Farm Elandsfontein 386 KQ and the remainder of the Farm Zondereinde 384 KQ (hereinafter referred to as ‘the study area’). The study area is situated approximately 16 km Northeast of the town of Northam, approximately 25 km South of the town of Thabazimbi, adjacent to the R510 road within the Thabazimbi Local Municipality, Limpopo Province.

The new shaft complex to be known as 3 Shaft, will allow improved access to the western block of Northam Platinum’s Zondereinde Mine securing economic viability of the Zondereinde Mine and also further extend the Life of Mine (LoM), which will sustain mining related work opportunities associated with maintained production.

Prism Environmental Management Services (hereinafter referred to as Prism EMS) as the independent Environmental Assessment Practitioner (EAP) was appointed to undertake the required environmental authorisation processes required by a host of environmental legislation. Such process referred to as an **Environmental Authorisation process** and the details of which are discussed and described in the contents of this Environmental Impact Assessment Report.

1.1 EIA Report Requirements and Outline

According to Section 2 of Appendix 3 of the 2014 EIA Regulations [as amended in 2017], the objective of the EIA process is to, through a consultative process-

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted scoping report;

(c) identify the location of the development footprint within the approved site as contemplated in the accepted scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) determine the--

(i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and

(ii) degree to which these impacts-

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources, and

(cc) can be avoided, managed or mitigated;

(e) identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;

(g) identify suitable measures to avoid, manage or mitigate identified impacts; and

(h) identify residual risks that need to be managed and monitored.

The EIA process for the Northam Zondereinde 3 Shaft Project aims to ensure that the objectives described above are met. In line with this, an outline of the EIA Report (and its relationship to the requirements to Appendix 3 of 2014 EIA Regulations) is provided in Table 1-1. Please note that the purpose of this table is to show where information required by the EIA Regulations is contained within the report. The aim of which is to assist I&APs and non-technical reviewers. The table does not contain specifics, to prevent duplication, as these are included in the report itself.

Table 1-1: Required contents of the EIA Report

Chapter Number	Chapter Name	Requirements included in Appendix 3 of 2014 EIA Regulations
1.	Introduction	3(1)(u) an indication of any deviation from the approved scoping report, including the plan of study, including- (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation.
1.3	Environmental Assessment Practitioner	3(1)(a) details of- (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae
4.	Legislative Framework	3(1)(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context
3.	Project Description	3(1)(b) the location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including:

Chapter Number	Chapter Name	Requirements included in Appendix 3 of 2014 EIA Regulations
		<p>(i) the 21-digit Surveyor General code of each cadastral land parcel;</p> <p>(ii) where available, the physical address and farm name; and</p> <p>(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;</p> <p>3(1)(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is-</p> <p>(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken;</p> <p>(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;</p> <p>3(1)(d) a description of the scope of the proposed activity, including-</p> <p>(i) all listed and specified activities triggered and being applied for; and</p> <p>(ii) a description of the associated structures and infrastructure related to the development.</p>
6.	Description of the Receiving Environment	<p>3(1)(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report including:</p> <p>(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.</p>
5.	Need and Desirability	<p>3(1)(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report;</p>
6.	Alternatives	<p>3(1)(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including:</p> <p>(i) details of the development footprint alternatives considered;</p>

Chapter Number	Chapter Name	Requirements included in Appendix 3 of 2014 EIA Regulations
6.	Public Participation	3(1)(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including: <ul style="list-style-type: none"> (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.
8.	Summary of Specialist Studies	3(1)(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.
7.	Impact Assessment	3(1)(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including: <ul style="list-style-type: none"> (v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- <ul style="list-style-type: none"> (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) if no alternative development footprints for the activity were investigated, the motivation for not considering such;

Chapter Number	Chapter Name	Requirements included in Appendix 3 of 2014 EIA Regulations
		<p>3(1)(i) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including-</p> <ul style="list-style-type: none"> (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures. <p>3(1)(j) an assessment of each identified potentially significant impact and risk, including-</p> <ul style="list-style-type: none"> (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated.
9.	Environmental Impact Statement	<p>3(1)(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including:</p> <ul style="list-style-type: none"> (x) a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated within the accepted scoping report; <p>3(1)(g) a motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report.</p> <p>3(1)(l) an environmental impact statement which contains-</p> <ul style="list-style-type: none"> (i) a summary of the key findings of the environmental impact assessment:

Chapter Number	Chapter Name	Requirements included in Appendix 3 of 2014 EIA Regulations
		<p>(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the Preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and</p> <p>(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.</p> <p>3(1)(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorization.</p> <p>3(1)(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;</p> <p>3(1)(o) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.</p> <p>3(1)(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;</p> <p>3(1)(q) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;</p> <p>3(1)(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;</p> <p>3(1)(t) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;</p> <p>3(1)(v) any specific information that may be required by the competent authority; and</p> <p>3(1)(w) any other matters required in terms of section 24(4)(a) and (b) of the Act.</p>

Chapter Number	Chapter Name	Requirements included in Appendix 3 of 2014 EIA Regulations
14.	EAP Undertaking	3(1)(s) an undertaking under oath or affirmation by the EAP in relation to: <ul style="list-style-type: none"> (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.
	Appendices	3(1)(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.

In addition to the above, the Regulations also note that the EIA process must be undertaken in line with the approved plan of study for environmental impact assessment. To this end, a summary of how the EIA Process is in line with the Approved Plan of Study is provided in Table 1-2.

Table 1-2: Alignment with Plan of Study

Item	Plan of Study Requirement	Reference in Report
1.	Specialist Studies – <ul style="list-style-type: none"> • Biodiversity Impact Assessment; • In-depth Geotechnical Assessment; <ul style="list-style-type: none"> ○ Including deep drilling • Surface Water Impact Assessment; • Geohydrological Impact Assessment; and • Phase 1 Heritage Impact Assessment. 	Section 8
2.	Impact Assessment Methodology	Section 6
3.	Public Participation	Section 6

Section 3(u) of Appendix 3 of the 2014 EIA Regulations notes that the EIA Report should provide an indication of any deviation from the approved scoping report. This confirms that there are no deviations from the approved scoping report. Although there are minor corrections, which are underlined in the report.

1.2 Authorities

The Department of Mineral Resources (DMR) is the Competent Authority with reference to activities triggered in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA).

1.2.1 DMR Requirements for EIA Report

In addition to the above, the EIA Report aims to ensure that DMR's comments on the Scoping Report (as part of the acceptance of the Scoping Report) are addressed. The table below provide a summary of these comments, as well as where they have been addressed in the report. A copy of the DMR Acceptance letter is included in Appendix 1.

Table 1-3: DMR requirements for the EIA Report

Item	DMR Comment – 16 October 2019	Reference in the Report	EAP Comment
2.	You may proceed with the environmental impact assessment process in accordance with the tasks contemplated in the Plan of Study for Environmental Impact Assessment as required in terms of the NEMA EIA Regulations, 2014.	Appendix 1	Noted
3.	Please ensure that comments from all relevant stakeholders are submitted to the Department with the Environmental Impact Assessment Report (EIAR). This includes but is not limited to the Provincial Environmental Department (LEDET), Department of Agriculture, Forestry and Fisheries (DAFF), Department of Water and Sanitation (DWS) and the local municipality. Proof of correspondence with the various stakeholders must be included in the EIAR. Should you be unable to obtain comments, proof of the attempts that were made to obtain comments should be submitted to the Department.	Appendix 9	All relevant departments were notified and this report made available for comment. The EIR and EMPr will be available for review and comment from 28 October 2019 to 26 November 2019 . Public Meeting: You are also invited to a public meeting on Monday 04 November 2019 from 11h00 – 12h30
4.	In addition, the following information are required for the EIR and EMPr which needs to be submitted to this office as prescribed:		
a)	Consultation with all Interested and affected parties and provide proof that the concerns have been raised, addressed and incorporated into the EIA and EMP. Include the proof of detailed participation and the	Appendix 9	<u>All relevant departments were notified and this report made available for comment.</u> <u>The EIR and EMPr will be available for review and</u>

Item	DMR Comment – 16 October 2019	Reference in the Report	EAP Comment
	<p>results thereof. Notwithstanding the geographical location (i.e. in relation to town and communities/farmlands) and ownership of the area applied for, please note that as part of the results of Public Participation the following details must be indicated:</p> <ul style="list-style-type: none"> ➤ Date of public meetings; ➤ Minutes of the meetings; ➤ Attendance register with name of the organisation, contact number and the signature thereof; ➤ Views and concerns of the interested and affected parties, etc. 		<p><u>comment from 28 October 2019 to 26 November 2019.</u></p> <p><u>Public Meeting:</u> You are also invited to a public meeting on <u>Monday 04 November 2019</u> from 11h00 – 12h30</p>
b)	<p>Also note that you may employ different methods to inform interested and affected parties about the public participation such as newspaper advert, notification letters, public notices, etc. However, these methods shall not be viewed as results of public participation rather means of notifying different parties.</p>	Appendix 9	<u>Noted</u>
c)	<p>A specialist must investigate the impact of the proposed project on surface and groundwater resources and deduce mitigation measures thereof and performance monitoring standards.</p>	Appendix 10	<u>Refer to specialist reports.</u>
d)	<p>An archaeological Impact Assessment must be conducted to determine if there will be any graves, old houses, signs of historical significance and/or materials of archaeological importance. Incorporate recommendations of such report into the EIA and EMP.</p>	Appendix 10	<u>Refer to specialist reports.</u>
e)	<p>Measures to mitigate visual impacts of the activities must be developed.</p>	EMPr section	<u>Refer to Environmental Management Programme (EMPr) for mitigation measures</u>
f)	<p>Commitment on monitoring and indication of the standards, methods and the frequency of</p>	EMPr section	<u>Refer to Environmental Management Programme</u>

Item	DMR Comment – 16 October 2019	Reference in the Report	EAP Comment
	submission of an environmental audit report/performance assessment report to this department.		<u>(EMPr) for mitigation measures</u>
g)	Clear and specific standards for silt, noise and dust levels and commitment to monitoring levels.	EMPr section & Appendix 10	<u>Refer to Environmental Management Programme (EMPr) for mitigation measures.</u> <u>Also refer to the relevant specialist reports.</u>
h)	The inclusion of the procedures that relate to emergencies and proposed remediation hereto, for example: discuss the contingency plans with respect to floods, accidental spills and management of hazardous materials such as oil, diesel, etc; in the proposed mining area.	EMPr section	<u>Refer to Environmental Management Programme (EMPr) for mitigation measures</u>
i)	Details of the future land use for the site and infrastructure after decommissioning in 20-30 years.	Section 1.2.1	<u>The site will be decommissioned and rehabilitated to its pre-development land use as far as possible. Should this be different, the appropriate approvals will be applied for at that stage.</u>
j)	The total footprint of the proposed development should be indicated.	Appendix 8	<u>Refer to the site layout plans</u>
k)	Should a Water Use License be required, proof of application for a license needs to be submitted.	EMPr Section	<u>A Water Use License Application will be submitted in due course. Proof hereof will be submitted to DMR.</u>
l)	Possible impacts and effects of the development on the vegetation ecology with regard to lowland-highland interface in the locality should be indicated.	Section 6.4 Appendix 10	<u>Refer to the relevant specialist reports.</u>
m)	The impacts of the proposed facility on avifauna and bats must be assessed in the EIA.	Section 6.4 Appendix 10	<u>Refer to the relevant specialist reports.</u>

Item	DMR Comment – 16 October 2019	Reference in the Report	EAP Comment
n)	Possible impacts and effects of the development on the surrounding industrial area.		<u>Note that the proposed development is NOT surrounded by an industrial area. Erratum in statement. Same was addressed with DMR.</u>
o)	Information on services required on the site, e.g. sewage, refuse removal, water and electricity. Who will supply these services and has an agreement and confirmation of capacity been obtained?	Section 3	<u>Refer to the project description and scope of overall project.</u>
p)	A construction and operational phase EMP to include mitigation and monitoring measures.	EMPr section	<u>Refer to Environmental Management Programme (EMPr) for mitigation measures</u>
q)	Should blasting be required, appropriate mitigation measures should be provided.	EMPr section	<u>Refer to Environmental Management Programme (EMPr) for mitigation measures</u>
r)	You are advised to also undertake studies which may be relevant during the impact analysis.	Appendix 10	<u>Refer to specialist reports.</u>
5.	The applicant is hereby reminded to comply with the requirements of regulation 3 of the EIA Regulations, 2014 with regards to the time period allowed for complying with the requirements of the Regulations.	Section 1 & 4	<u>Refer to the process description.</u>
6.	Please ensure that the EIAR includes the A3 size locality maps of the area and illustrates the exact location of the proposed development. The maps must be of acceptable quality and as a minimum, have the following attributes: <ul style="list-style-type: none"> ➤ Maps are relatable to one another; ➤ Co-ordinates; ➤ Legible legends; ➤ Indicate alternatives; ➤ Scale; and ➤ Vegetation types of the study area. 	Appendix 4 & 10	<u>Refer to the Appendix 4 for the required locality plans. Also refer to the relevant specialist studies.</u>

Item	DMR Comment – 16 October 2019	Reference in the Report	EAP Comment
7.	Further, it must be reiterated that, should an application for Environmental Authorisation be subjected to any permits or authorisations in terms of the provisions of any Specific Environmental Management Acts (SEMAs), proof of such application will be required.		<u>Noted</u>
8.	<p>You are requested to submit three (3) hard copies of the EIAR and EMPr on prescribed time frames in terms of Regulation with at least one electronic copy (CD/DVD) of the complete EIAR and EMPr to this Regional Office. Please note that such copies are not including the hard copies which to be forwarded to organs of state administering a law relating to matters affecting the environment.</p> <p>You are therefore requested to consult with every organ of state that administers a law relating to a matter affecting the environment relevant to this application of environmental authorisation and submit the comments to this department.</p>	Section 6.2 Appendix 9	<u>Noted</u>
9.	Your attention is brought to Section 24F of the NEMA which stipulates “that no activity may commence prior to an environmental authorisation being granted by the competent authority”.		<u>Noted</u>

1.3 Details of the EAP

Prism EMS have been appointed to undertake the required Environmental Authorisation Application in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA). Details and expertise of the Environmental Assessment Practitioner (EAP) who prepared the scoping report is provided in Table 1-4 and Curriculum Vitae and proof of qualifications is appended in Appendix 2 and 3.

1.3.1 The EAP who prepared the report

Table 1-4: Details of the EAP

EAP:	Monica Niehof			
Company:	Prism Environmental Management Services			
Address:	PO Box 1401, Wilgeheuwel, 1736			
Tel:	087 985 0951			
Fax:	086 601 4800			
Email:	monica@prismems.co.za			
Prism EMS Team				
Contact Details	Post: PO Box 1401, Wilgeheuwel, Johannesburg, 1736		Tel: 087 985 0951 Fax: 086 601 4800 Email: prism@prismems.co.za www.prismems.co.za	
Designation	Name	Qualification	Professional Registration	Experience
Project Director and Principal EAP	De Wet Botha	M.A. (Env.Man.) PHED (<i>Refer to Appendix 3</i>)	Founder Member of Environmental Assessment Practitioners of South Africa (EAPSA) Member of the International Association for Impact Assessors (IAIAsa) (1653) Member of the Gauteng Wetland Forum Member of the South African Wetland Society SACNASP Pr.Sci.Nat. (119979)	16 Years
Senior Environmental Assessment Practitioner	Monica Niehof	BSc. (Hon) (Env.Man) (<i>Refer to Appendix 3</i>)		12 Years

1.3.2 Expertise of the EAP

1.3.2.1 The qualifications of the EAP

(With evidence attached as Appendix 2, 3)

Refer to Table 1-4.

1.3.2.2 Summary of the EAP’s past experience

Table 1-5: EAP’s Experience

Monica Niehof	
Years’ Experience:	12 years in the field of environmental consulting
Work Experience:	Monica Niehof has been involved in the compilation of several Environmental Management Programmes and/or Environmental Management Plans and been involved in the compilation of mining/prospecting permit/rights and environmental authorisation applications. Refer to Appendix 2 for a full description of all experience.
De Wet Botha	
Years’ Experience:	16 years in the field of environmental consulting
Work Experience:	De Wet Botha has been involved in the compilation of several Environmental Management Programmes and/or Environmental Management Plans and been involved in the compilation of mining/prospecting permit/rights and environmental authorisation applications. Refer to Appendix 2 for a full description of all experience.

(Attach the EAP’s curriculum vitae as Appendix 2.)

2 LOCALITY

2.1 Description of the property

Table 2-1: Property Description

Farm Name:	Elandsfontein Zondereinde
Application area (Ha)	<u>Approximately 15 Hectares</u>
Magisterial district:	Waterberg
Distance and direction from nearest town	<u>Approximately 16 km Northeast of Northam</u>
21-digit Surveyor General Code for each farm portion	T0KQ0000000038600000 T0KQ0000000038400000
Coordinates of the boundaries of the properties	24° 50’53.81” S, 27° 18’40.86” E (Centre coordinates)

2.2 Locality map

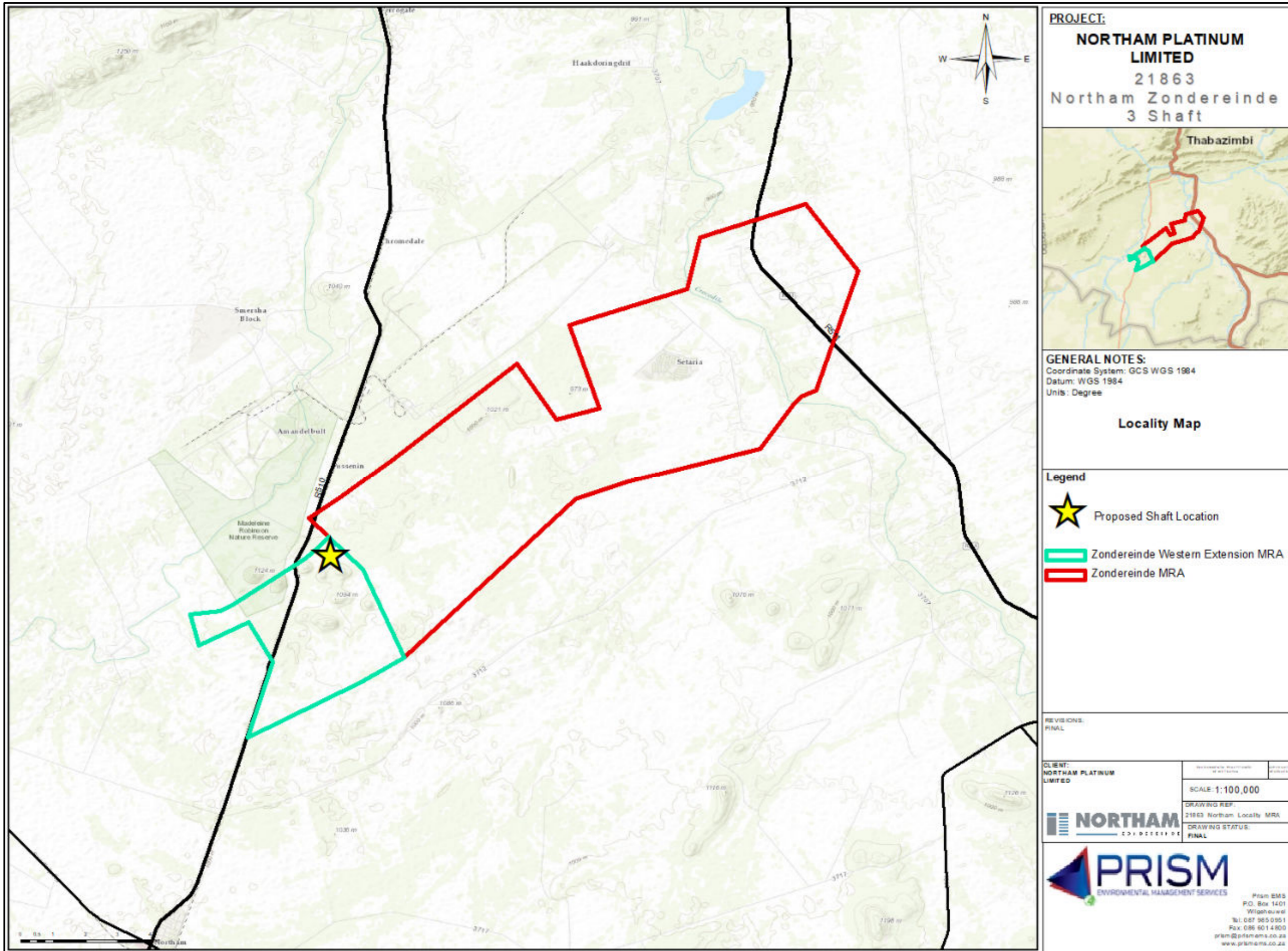
(show nearest town, scale not smaller than 1:250000 attached as Appendix 4)

Figure 2-1 shows the locality of the mining right area and particularly the extended mining right area or Western Block of the Northam Platinum Zondereinde Mine and proposed 3 Shaft complex, in relation to major roads. The yellow star shows the locality of the shaft complex within the Western Block. Figure 2-2 shows the location of the proposed 3 shaft complex within the Western Block overlain onto an aerial photograph and Figure 2-3 shows the preferred layout overlain onto an aerial photograph. Alternatives identified for the proposed activities relate

to layout alternatives and not location alternatives, therefore alternatives are not indicated on the locality map. However, layout alternatives are indicated in Figure 6-29.

Further two locality plans are provided:

- Figure 2-4 (with coordinates);
- Figure 2-5 (showing the provincial boundary).



PROJECT:
NORTHAM PLATINUM LIMITED
 21863
 Northam Zondereinde
 3 Shaft



GENERAL NOTES:
 Coordinate System: GCS WGS 1984
 Datum: WGS 1984
 Units: Degree

Locality Map

- Legend**
- Proposed Shaft Location
 - Zondereinde Western Extension MRA
 - Zondereinde MRA

REVISIONS:
 FINAL

CLIENT:
 NORTHAM PLATINUM LIMITED

SCALE: 1:100,000

DRAWING REF:
 21863 Northam Locality MRA

DRAWING STATUS:
 FINAL

PRISM
 ENVIRONMENTAL MANAGEMENT SERVICES

Posm EMS
 P.O. Box 1401
 Wiggheuwel
 Tel: 087 965 9551
 Fax: 086 601 4800
 prism@prism-ems.co.za
 www.prism-ems.co.za

Figure 2-1: Locality map of the Proposed Shaft Complex Area in relation to major roads

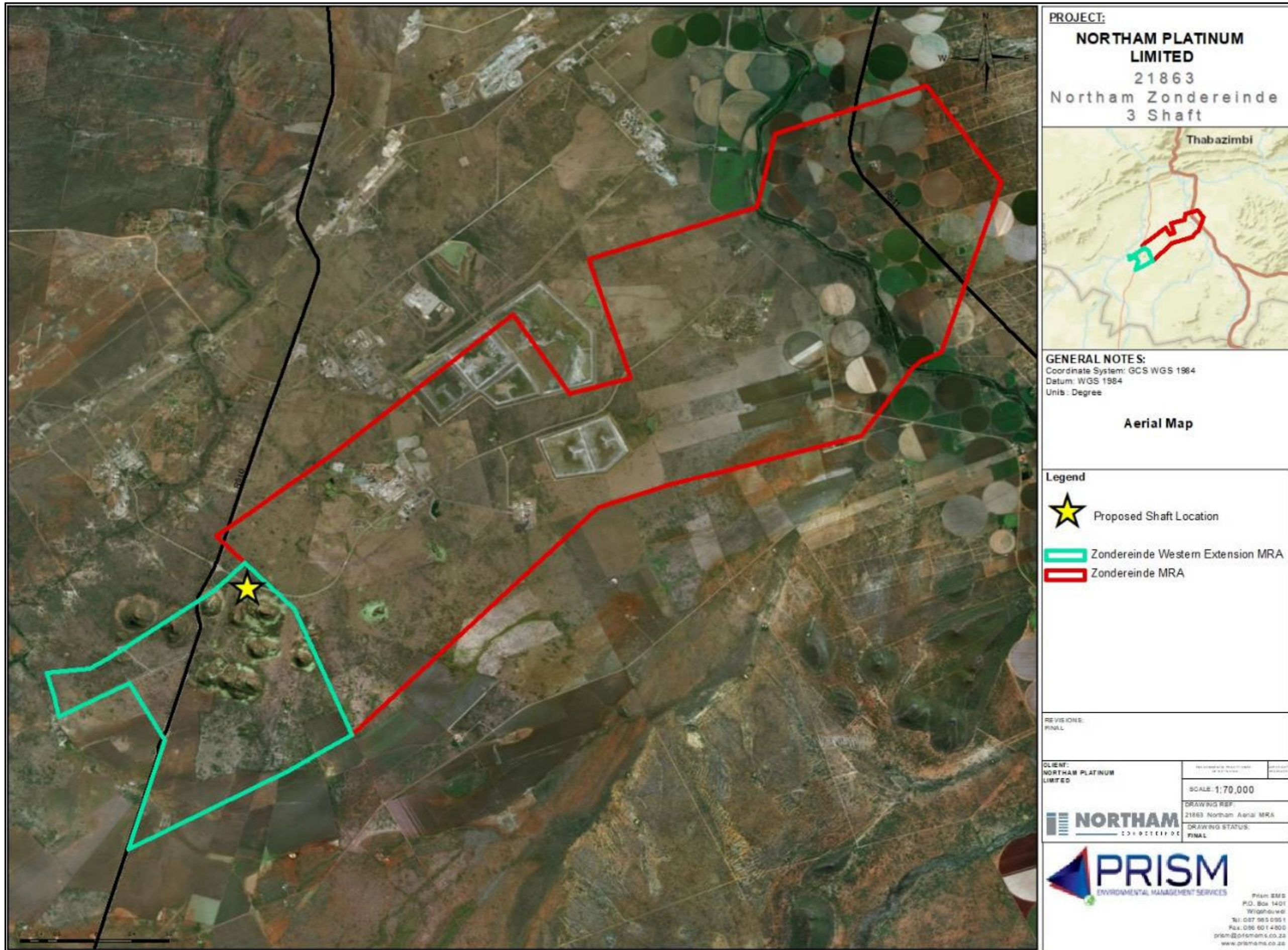


Figure 2-2: Aerial Photograph of the Proposed Shaft Complex Area in relation to major roads

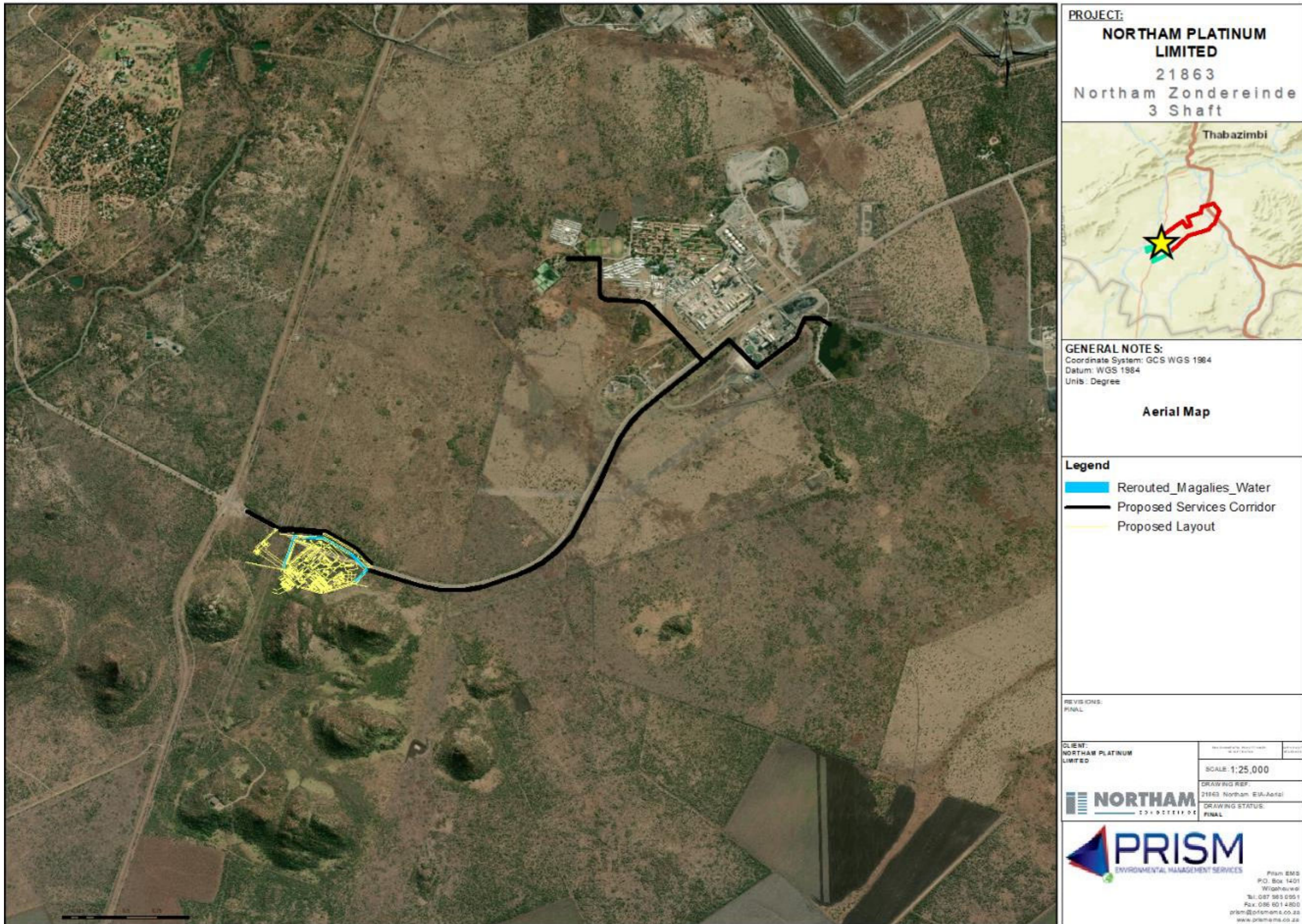
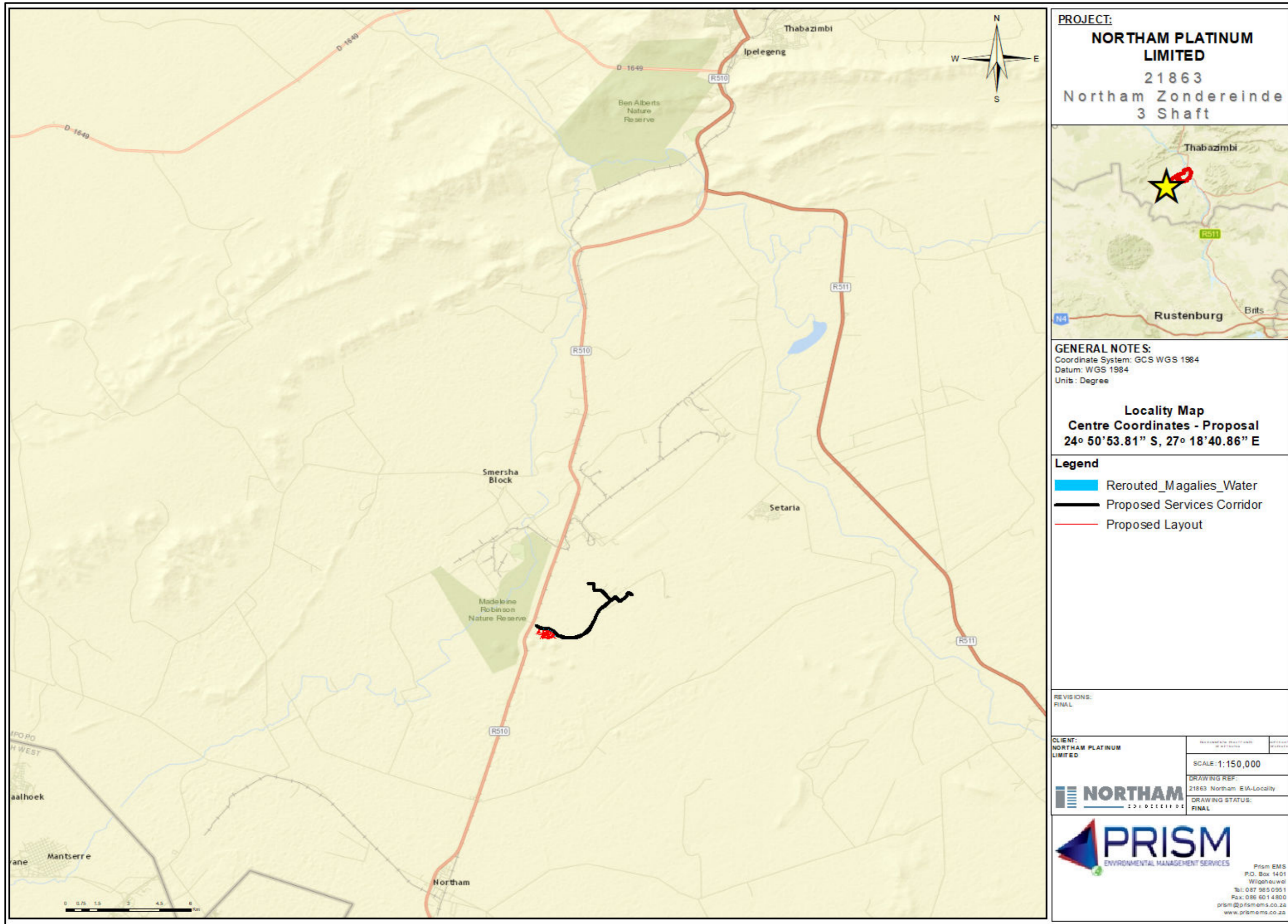
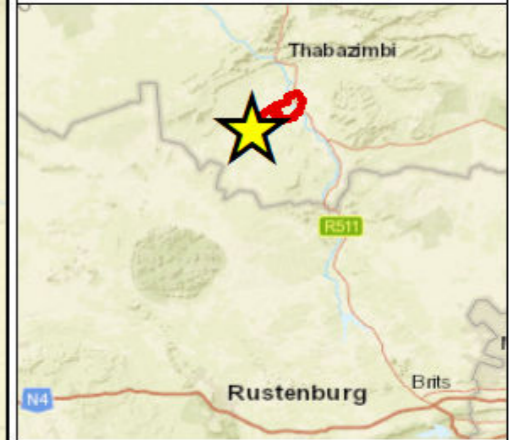


Figure 2-3: Aerial Photograph of the Proposed Shaft Complex Preferred Layout and Services Corridor



PROJECT:
NORTHAM PLATINUM LIMITED
 21863
 Northam Zondereinde
 3 Shaft



GENERAL NOTES:
 Coordinate System: GCS WGS 1984
 Datum: WGS 1984
 Units: Degree

Locality Map
Centre Coordinates - Proposal
 24° 50'53.81" S, 27° 18'40.86" E

- Legend**
- Rerouted_Magalies_Water
 - Proposed Services Corridor
 - Proposed Layout

REVISIONS:
 FINAL

CLIENT:
 NORTHAM PLATINUM LIMITED

SCALE: 1:150,000

NORTHAM
 ENVIRONMENTAL MANAGEMENT SERVICES

DRAWING REF:
 21863 Northam EIA-Locality

DRAWING STATUS:
 FINAL

PRISM
 ENVIRONMENTAL MANAGEMENT SERVICES

Prism EMS
 P.O. Box 1401
 Wilgenheuwel
 Tel: 087 98 5 095 1
 Fax: 086 601 4800
 prism@prismems.co.za
 www.prismems.co.za

Figure 2-4: Locality Map 1

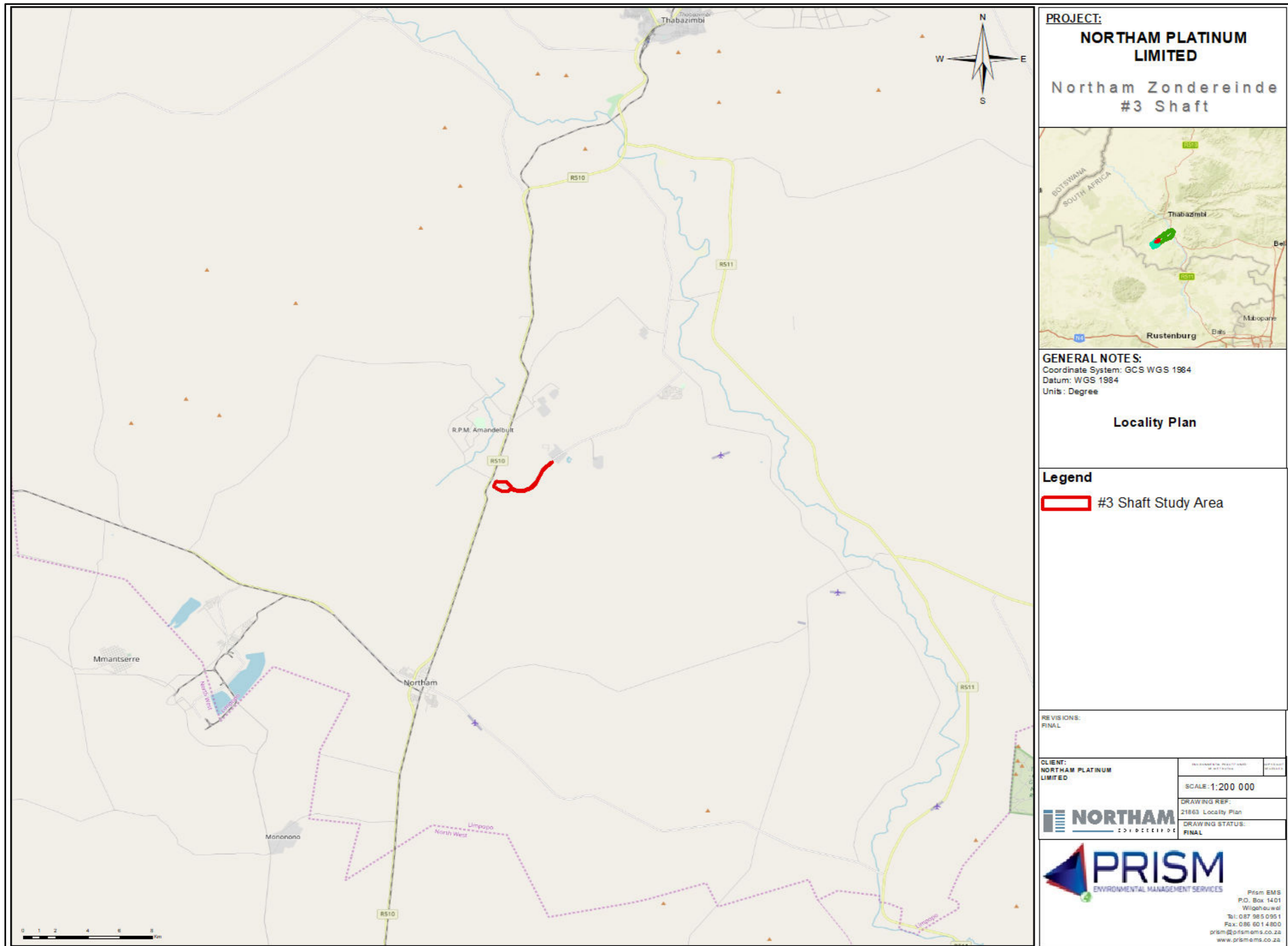


Figure 2-5: Locality Map 2

3 DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

3.1 Listed and specified activities

(Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site and attach as Appendix 4.)

Table 3-1: Listed and specified activities

NAME OF ACTIVITY <i>(All activities including activities not listed: e.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc..)</i>	AERIAL EXTENT OF THE ACTIVITY <i>(Ha or m²)</i>	LISTED ACTIVITY <i>Mark with an X where applicable or affected.</i>	APPLICABLE LISTING NOTICE <i>(GNR 983, GNR 984 or GNR 985)/NOT LISTED)</i>
Establishment of Construction Camp and installation and operation of construction support services, including chemical toilets and water tanks as well as generation of power.	Less than 1 Ha	N/A	N/A
Site preparation: Site clearing, removal of vegetation and topsoil (and stockpiling of topsoil) of the site footprint and for service infrastructure including access and haul roads, raw water and potable water and wastewater pipelines, powerlines and stormwater management infrastructure.	Approximately 5 Ha	X	Listed activity 27 GNR 983 The area that will be cleared from vegetation is bigger than 1 hectare (approximately 5 Ha) in size, but less than 20 Ha, therefore, this listed activity is triggered.
Generation and disposal of domestic waste, construction and hazardous waste.	-	N/A	N/A
Loading/off-loading and transportation of construction materials, machinery, equipment and construction workers.	-	N/A	N/A
Construction: Construction of surface infrastructure including: Terrace 1: In order to effectively utilise the two access shafts and the down cast ventilation shaft the following facilities will be provided for on the terrace:	Approximately 15 Ha	X	GNR 983 (Activity 9) The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; The bulk water pipeline will be rerouted for approximately 1000 metres in length and will be 0.40 metre in diameter.

NAME OF ACTIVITY <i>(All activities including activities not listed: e.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc..)</i>	AERIAL EXTENT OF THE ACTIVITY <i>(Ha or m²)</i>	LISTED ACTIVITY <i>Mark with an X where applicable or affected.</i>	APPLICABLE LISTING NOTICE <i>(GNR 983, GNR 984 or GNR 985)/NOT LISTED)</i>
<ul style="list-style-type: none"> - Shaft bank area - Two headgears - 3 Shafts - Transfer conveyor belt from headgear to silos - Reef silo - Waste silo - Salvage yard - Store yard - Store building - Explosive yard - Compressor house - Two winder houses - Refrigeration plant - Bulk air coolers – 3 off - Potable water tank - Service water tanks - Storm water dam and drainage - Parking - Taxi/bus rank - Gate house - Office blocks - Change houses - Backfill remix tanks - Engineering workshop - Lamp room - Eskom yard - Main consumer substation - Emergency generators - Terraced area - Sewerage sump; - Servitude with raw water pipeline between the new Terrace (1) and the existing evaporation dam adjacent to the existing 			<p>GNR 983 (Activity 11) The development of facilities or infrastructure for the transmission and distribution of electricity-</p> <p>(i) Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</p> <p>The line to be installed for electricity will have a capacity of 132 kilovolts.</p> <p>GNR 983 (Activity 12)</p> <p>The development of infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs within a water course, will occur for the installation of services.</p> <p>GNR 983 (Activity 19)</p> <p>The dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse will occur for the installation of services.</p> <p>GNR 983 Activity 28</p> <p>The proposed activities constitute industrial development where land was used for game farming on or after 01 April 1998 in an area outside an urban area where the total land to be developed is bigger than 1 hectare.</p> <p>GNR 984 Listed activity 6</p>

NAME OF ACTIVITY <i>(All activities including activities not listed: e.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc..)</i>	AERIAL EXTENT OF THE ACTIVITY <i>(Ha or m²)</i>	LISTED ACTIVITY <i>Mark with an X where applicable or affected.</i>	APPLICABLE LISTING NOTICE <i>(GNR 983, GNR 984 or GNR 985)/NOT LISTED)</i>
<p>concentrator, sewage, backfill slurry, power cables and overhead power lines between the current Zondereinde operations and Terrace 1;</p> <ul style="list-style-type: none"> - Servitude between Terrace 1 and 2 with buried power cables from the main consumer substation to the ventilation shafts. <p>Terrace 2:</p> <ul style="list-style-type: none"> - The purpose of Terrace 2 is to house the two up-cast ventilation shafts (3ab and 3cb shafts) each equipped with two ventilation fans. 			<p>The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent.</p> <p>This activity is triggered by the development of the stormwater dam into which waste or water containing waste will be disposed into, for which a water use licence or an amendment to a water use licence will be required in terms of Section 21 of the National Water Act (Act. No 36 of 1998).</p> <p>GNR 984 Activity 17 Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including— (a) associated infrastructure structures and earthworks directly related to the extraction of a mineral resource.</p>
<ul style="list-style-type: none"> • Earthworks – excavations for establishment of site infrastructure, buildings, headgear, shaft box cut, installation of services and construction of access and haul roads. • Stockpiling of construction and excavated materials. 	-	X	<p>Listed activity 12, 19 and 28</p> <p>GNR 984 Activity 17 Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including— (a) associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource.</p>

NAME OF ACTIVITY <i>(All activities including activities not listed: e.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc..)</i>	AERIAL EXTENT OF THE ACTIVITY <i>(Ha or m²)</i>	LISTED ACTIVITY <i>Mark with an X where applicable or affected.</i>	APPLICABLE LISTING NOTICE <i>(GNR 983, GNR 984 or GNR 985)/NOT LISTED)</i>
Sinking of shafts and vent raises.	-	X	Listed activity 17 GNR 984
<ul style="list-style-type: none"> Civil works including establishment of infrastructure on site including the stormwater dam, shaft headgear, conveyor belts and services infrastructure including permanent stormwater management infrastructure, raw water pipeline, potable water pipeline, sewage pipeline, backfill pipeline, electrical substation and powerlines. Construction of buildings and structures including offices, ablution/change house, waste storage area and stores, including cement mixing. 	-	X	Listed activity 12, 19 and 28 GNR 983 and Listed activity 6, 12 & 17 GNR 984
Energy, water, raw materials and fuel consumption.	-	N/A	N/A
<ul style="list-style-type: none"> Demolition and /or removal of temporary construction infrastructure including stormwater drainage structures (e.g. diversion berms), chemical toilets and construction camp. Rehabilitation of construction camp and other construction areas, including along the raw water, potable water, sewage and backfill pipelines and access and haul roads.	-	N/A	N/A
OPERATIONAL PHASE			
Operations linked to the #3 shaft and associated infrastructure.	-	X	Listed activity 17 GNR 984
Loading / off-loading and transportation / hauling of overburden and ore and transportation of construction workers and other traffic.	-	X	Listed activity 17 GNR 984
Dewatering of underground mine, if required.	-	X	Listed activity 17 GNR 984
Operation of conveyor belts	-	X	Listed activity 17 GNR 984
Exhausting of mine ventilation air	-	X	Listed activity 17 GNR 984
Operation and maintenance of the support services infrastructure on the shaft complex	-	X	Listed activity 17 GNR 984

NAME OF ACTIVITY <i>(All activities including activities not listed: e.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc..)</i>	AERIAL EXTENT OF THE ACTIVITY <i>(Ha or m²)</i>	LISTED ACTIVITY <i>Mark with an X where applicable or affected.</i>	APPLICABLE LISTING NOTICE <i>(GNR 983, GNR 984 or GNR 985)/NOT LISTED)</i>
including substation, stormwater dam and stormwater management infrastructure, powerlines, raw water, potable water, sewage and backfill pipelines, access and haul roads etc.			
Energy, fuel, water consumption and depletion of minerals	-	X	Listed activity 17 GNR 984
Operation of the Shaft Complex	-	X	Listed activity 17 GNR 984

3.2 Description of the activities to be undertaken

(Describe Methodology or technology to be employed, including the type of commodity to be mined and for a linear activity, a description of the route of the activity)

Due to Northam Platinum realising that it will be more feasible to sink an additional shaft for various reasons, which is discussed under Section 6.1 of this report, the following shafts and surface infrastructure and associated activities are now required, which also requires environmental authorisation.

The shafts will be positioned on two constructed terraces one for the up-cast ventilation shafts (Terrace 2) and one for the two access shafts and downcast ventilation shaft (Terrace 1). The two terraces will require a servitude between them for services. The servitude will carry buried power cables from the main consumer substation to the ventilation shafts.

A servitude will be required between the current Zondereinde operations and Terrace 1. This servitude will carry service water, sewerage, backfill slurry, power cables, mud return pipeline and overhead power lines.

Overhead power lines will be installed to connect Terrace 1 to the adjacent Eskom high voltage overhead lines. The existing two potable water pipelines will be diverted within the terrace area (1) and an off-take to the new facility will be done from one of the newly installed diversion pipelines.

The current paved road from the R510 to the current shaft and concentrator facility will be diverted around Terrace 1 and an additional unpaved road will be required from the existing paved road to Terrace 2 as indicated in Figure 3-2.

3.2.1 Terrace 1

The purpose of Terrace 1 is to house a full shaft infrastructure that supports the downcast and access shafts.

The terrace will be constructed by excavating and removing the heaving clay layer of approximately 2 m and filling and compacting graduated fill to provide a stable base for the mounting of the facilities (The clay will be stored for rehabilitation on a topsoil storage facility and the fill material will be sourced from waste rock available on the mine site).

A stormwater collecting, and evaporation dam will be provided adjacent to the terrace. The storm water will be collected from a series of storm water drains on and around the periphery of the terrace.

The terrace will be secured with fencing and will have two entrance/exit points namely for pedestrians and for delivery and commercial vehicles. Personnel will enter the shaft complex from either the parking area or from the designated bus and taxi rank. Each of the entry points will be controlled from the main security gate house.

In order to effectively utilise the two access shafts and the down cast ventilation shaft the following facilities will be provided for on the terrace:

- Shaft bank area
- Two headgears
- 3 Shafts
- Transfer conveyor belt from headgear to silos
- Reef silo
- Waste silo
- Salvage yard
- Store yard
- Store building
- Explosive yard
- Compressor house
- Two winder houses
- Refrigeration plant
- Bulk air coolers – 3 off
- Potable water tank
- Service water tanks
- Storm water dam and drainage
- Parking

- Taxi/bus rank
- Gate house
- Office blocks
- Change houses
- Backfill remix tanks
- Engineering workshop
- Lamp room
- Eskom yard
- Main consumer substation
- Emergency generators
- Terraced area
- Sewerage sump

Figure 2-3 and Figure 3-2 shows the conceptual layout of the terrace incorporating the facilities listed.

The proposed project will provide access to the reef horizon for men, material and mining services as well as ore removal to surface. This section provides a functional description of the infrastructure that will be installed on Terrace 1

3.2.2.1 No 3 Shaft

No 3 Shaft is a men and material hoisting shaft that will transport men and material to and from 3 level (1,320 m below collar) to surface. The shaft is 4.6 m diameter, equipped with a steel headgear, and will be lined with shotcrete and equipped with steel shaft guides.

Hoisting will be done with a ground mounted double drum winder housed in a winder house adjacent to the shaft and headgear.

The shaft will be equipped with a single conveyance and a counterweight and various mining services will be installed into the shaft.

The shaft will be an intake shaft for ventilation and air will be cooled by passing it through a bulk air cooler via a ventilation duct into the shaft.

3.2.2.2 No 3c Shaft

No 3c shaft is a bald downcast shaft. The shaft is 4.6 m diameter and will be unlined. The shaft will be equipped with a cover connected to a ventilation duct. The shaft will be an intake shaft for ventilation and air will be cooled by passing it through a bulk air cooler via a ventilation duct into the shaft.

3.2.2.3 No 4 Shaft

No 4 Shaft is a rock hoisting shaft that will hoist rock from 4 level (1,380 m below collar) to surface. The shaft is 4.6 m diameter and will be lined with shotcrete and equipped with steel shaft guides. Various mining services will also be installed into the shaft. The shaft will be equipped with a steel headgear which allows for the discharge of rock from underground into a headgear bin from where it will be discharged onto an overland conveyor belt and transported to surface reef and waste silos. The ore and waste will be trucked from the silos to the existing concentrator and existing waste rock dump (No new waste rock dump will be required). Hoisting will be done with a ground mounted double drum winder housed in a winder house adjacent to the shaft and headgear. The shaft will be equipped with two conveyances mounted in bridles. The shaft will be an intake shaft for ventilation and air will be cooled by passing it through a bulk air cooler via a ventilation duct into the shaft. Cooled air will be pumped underground in this shaft. The air cooled by refrigeration plants will pass through a bulk air cooler via a ventilation duct into the shaft.

3.2.2.4 Shaft Bank Area

An open area around No 3 and 4 Shafts is utilised for the staging of men and material that is to go underground via the shafts and to handle empty material cars from underground. The area has a series of rails that lead into No 3 and No 4 shafts for material car handling and maintenance of the conveyances.

The bank area is concreted and sloped away from the shafts to prevent storm water running into the shaft.

3.2.2.5 Transfer Conveyor Belt

Rock hoisted to surface is tipped into the headgear bin of No 4 Shaft. The bin in turn feeds a conveyor belt that transfers the rock to two storage silos. The silos are situated side by side (Could be one big silo, trade-off study to be done to confirm). The conveyor is equipped with a tripper car that allows the rock to be deposited in either silo. The silos store reef and waste respectively and are situated outside of the shaft security area to allow easy access by road. The rock in the silos is then transferred by road to the concentrator plant and existing waste rock dump.

3.2.2.6 Reef Storage Silo

The reef storage silo will store reef rock from underground. It is sized to hold 1-day hoisting capacity of approximately 4,500 tons. Hydraulically operated discharge chutes will be fitted below the silo. The chutes will discharge into road trucks that transfer the reef to the concentrator.

3.2.2.7 Waste Storage Silo

The waste storage silo will store waste rock from underground. It is sized to hold 2-days hoisting capacity of approximately 1,500 tons. Hydraulically operated discharge chutes will be fitted below the silo. The chutes will discharge into road trucks that transfer the reef to the existing waste dump.

3.2.2.8 Salvage Yard

The shaft salvage yard will be a fenced off area with one vehicle gate. The area will be left unpaved except for a concrete area of 20 m × 30 m. There will be no buildings in the salvage yard.

3.2.2.9 Store Yard

The store yard will be a fenced area with one pedestrian gate and one double vehicle gate. The yard will include two buildings. The first 50 m × 20 m will be a roofed area with concrete floor for storage of bulk supplies, the second a closed steel and brick clad building with three offices and racking inside for storage of small and security sensitive equipment.

3.2.2.10 Explosive Transfer Bay

The explosive transfer bay will be a fenced area with one pedestrian gate and two vehicle gates. The area of 30 m × 30 m will have a concrete floor. There will be rail and road access to the bay and a roof structure of approximately 8m wide x 10m long.

3.2.2.11 Compressor House

The compressor house is a concrete floored and steel roofed structure that will house the compressors (20 m × 10 m).

3.2.2.12 Winder Houses

There are two winder houses, one for the men and material winder and one for the rock winder. The winders will be housed separately. The buildings will be steel clad.

3.2.2.13 Refrigeration Plant

The refrigeration plant feeds cold air via BAC ventilation ducts to No 3, 4 and 3c Shafts. The refrigeration plant will consist of three bulk air coolers, refrigeration machines, hot, cold and service water tanks, condenser water cooling towers and fans and ancillaries as indicative in Figure 3-1 below).

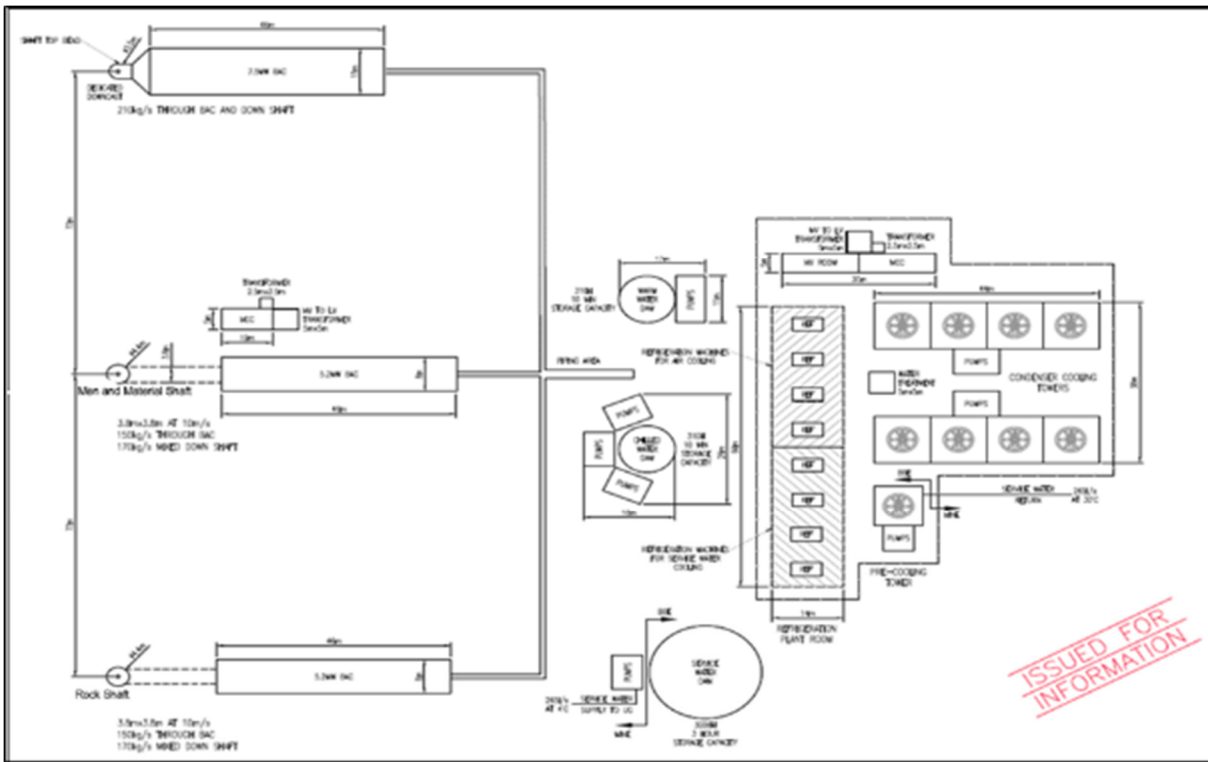


Figure 3-1: Conceptual Layout of Refrigeration Plant

3.2.2.14 Potable Water Tank

An Erickson or Braithwaite type water storage reservoir for potable water storage with a capacity of 5MI will be supplied.

3.2.2.15 Service Water Dams

Four Erickson type water storage dams are constructed on the terrace. The capacity of each will be 5 MI. These reservoirs will be used as hot and cold wells for the service water management

3.2.2.16 Stormwater Dam

Stormwater will be collected in drains and gravity fed to a stormwater dam for evaporation or to be used as top up for the service water on the shaft. The dam will be excavated from the heaving clay layer and lined with PVC sheeting. The dam will be approximately 30 m × 50 m.

3.2.2.17 Parking

A parking area will be laid out with approximately 200 covered parking bays and approximately 200 uncovered parking bays. The area will be unpaved and access control will be provided.

3.2.2.18 Taxi and Bus Rank

A taxi and bus rank will be provided.

3.2.2.19 Security Gate House

Security gate house will be constructed at the shaft entrance and will cater for controlling of pedestrians and vehicle access to the shaft complex

3.2.2.20 Office Blocks

An office block will be constructed to provide the following facilities:

- Male and female bathrooms;
- Kitchens;
- Meeting/boardrooms;
- Management offices; and
- Supervisor and general offices.

3.2.2.21 Change Houses

A double story change house will be provided as follows:

- Male - Management and Visitors – 20 People;
- Female – Management and Visitors – 20 People;
- Male – Mine Overseer – 20 People;
- Female – Mine Overseer – 10 People;
- Male – Foreman and Shift Overseer – 40 People;
- Female – Foreman and Shift Overseer – 20 People;
- Male – Tradesmen and Miners – 100 People;
- Female – Tradesmen and Miners – 100 People;
- Male – Industrial facility – 600 People; and
- Female – Industrial facility – 200 People.

Space have been reserved for a second change house for possible future.

3.2.2.22 Backfill Remix Tanks

Approximately 4 Steel backfill remix tanks adjacent to the No 3 and 4 Shafts will be installed on the concreted terrace.

3.2.2.23 Engineering Workshop

One general engineering workshop approximately 60 m × 20 m will be constructed. All heavy engineering work will be carried out at the central facilities.

3.2.2.24 Lamp Room

A lamp room with issuing cubicles, repair stations and racks to house 1,200 lamps and Self Contained Self Rescuers (SCSRs), will be supplied.

3.2.2.25 Eskom Substation

The Eskom substation will be positioned on the terrace perimeter closest to the existing Eskom power lines. This will house the bulk supply transformers and switching yards.

3.2.2.26 Main Consumer Substation

Mine substation will be positioned adjacent to the Eskom substation and will provide switching for the mine. The main consumer substation will feed the surface distribution substation located centrally at the main loads

3.2.2.27 Emergency Generator Building

A building to house two emergency generators and diesel storage facility not exceeding 30kl will be supplied.

3.2.2.28 Sewerage Reticulation

Sewerage from the shaft facilities will be gravity fed to a transfer sump from where it will be pumped to the central (existing) sewerage plant.

3.2.2.29 Services Corridor

The new shaft complex will be linked to the existing operations via a servitude. This servitude runs along the existing road servitude and will house the following pipelines:

- The sewerage line to the existing sewerage facility
- The primary and secondary backfill supply lines, (Design to confirm, but should be in the region of 2 x 6-inch pipelines)
- The backfill return line, (Should also be in the region of a 6-inch pipeline)
- The primary and secondary mud line (mud from underground), (Design to confirm, but should be in the region of 2 x 4-inch pipelines)
- The service water line to pump water to the existing evaporation facility. (Design to conform 1x 8- or 10-inch pipeline)

3.2.2 Terrace 2

The purpose of Terrace 2 is to house the two up-cast ventilation shafts (3a and 3b shafts) each equipped with two ventilation fans. The shafts will be positioned 75 m apart. The ventilation shafts will be raise-bored, unlined and will be 4.6 m diameter holes once completed. The fans are connected to the shafts by means of steel ventilation ducts. The fans will discharge the underground air vertically from the fan chambers. The fan power will be fed from the main shaft consumer substation via buried cables to not interfere with the existing Eskom power lines.

The terrace will be constructed by excavating and removing the heaving clay layer of approximately 2 m and filling and compacting graduated fill to provide a stable base for the mounting of the fans and substation.

(The clay will be stored for rehabilitation on a topsoil storage facility and the fill material will be sourced from waste rock available on the mine site). The terraced area will be secured with fencing and a gate to prevent

unauthorised entry to the machinery. Access to the terrace will be by unpaved road from the existing mine paved road as shown in Figure 3-2. The storm water runoff will be collected in a drain system and channelled along the access road to the main road storm water disposal drains.

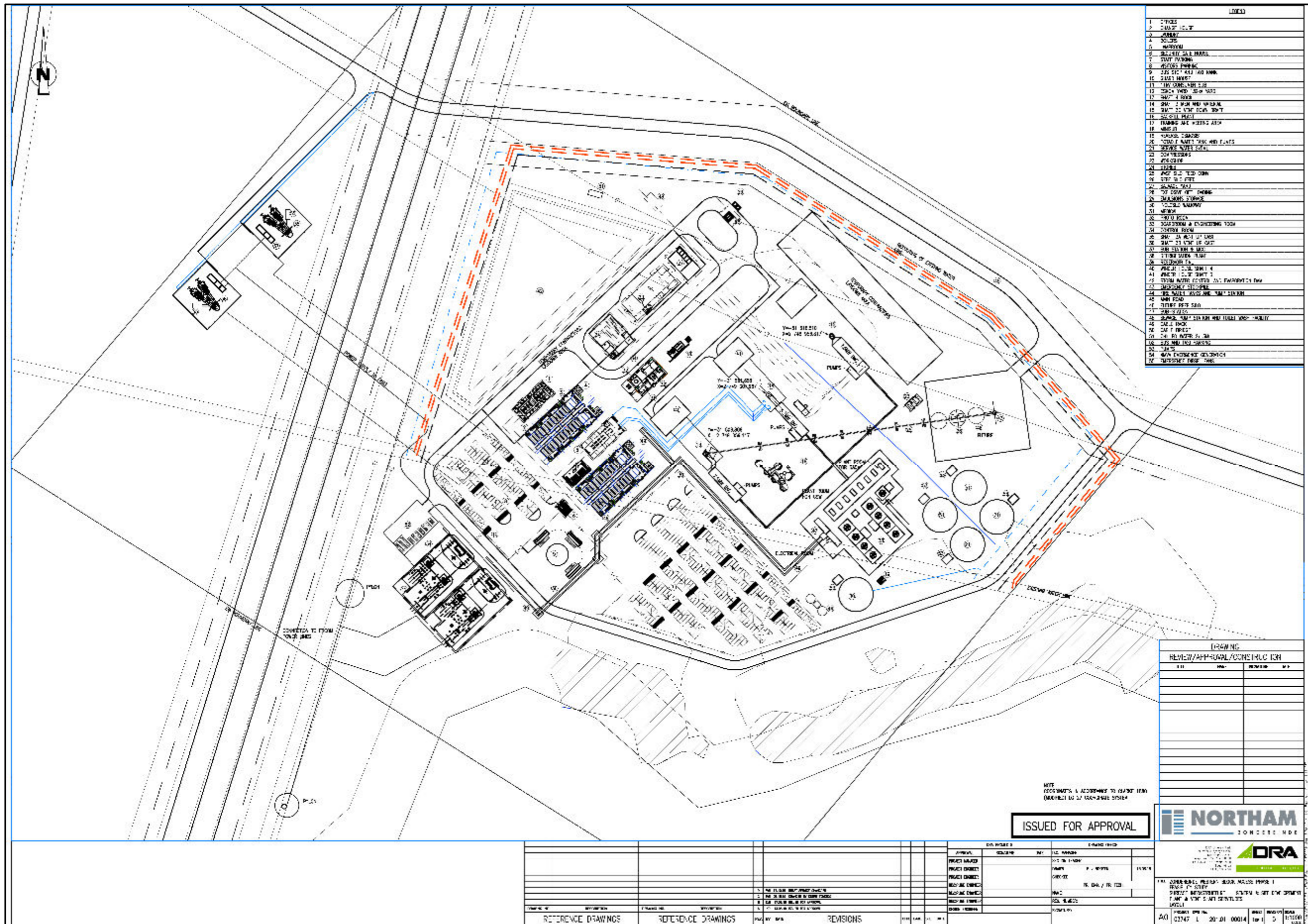


Figure 3-2: Northam Zondereinde 3 Shaft Proposed Layout

4 POLICY AND LEGISLATIVE CONTEXT

This section provides a description of the policy and legislative context within which the triggered activities form part of the environmental authorisation application (i.e. the Shaft Complex). The legislative context detailed below is only applicable to the activities proposed at and associated with the Shaft Complex and does not include the legislation relating to any existing activities at the Zondereinde Mine.

Table 4-1: Policy and Legislative Context for the Shaft Complex

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</i>	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT <i>(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)</i>
<p>Constitution of the Republic of South Africa, 1996</p> <p>Section 24</p> <p>Everyone has the right to:</p> <ol style="list-style-type: none"> a. an environment that is not harmful to their health or well-being; and b. have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: <ol style="list-style-type: none"> i. prevent pollution and ecological degradation; ii. promote conservation; and iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. 	<p>Full report</p>	<p>This basic environmental right contained in the Constitution is included throughout environmental legislation. The particulars regarding the impact assessment process is described in Section 6 and 7 of this Report. To give effect to Section 24 of the Constitution, an application for environmental authorisation is being made in terms of reasonable legislative and other measures.</p>
<p>National Environmental Management Act (NEMA), Act No. 107 of 1998</p> <p>Sections 24(2), 24(5), 24D and 44</p> <p>Regulations pertaining to identification of activities which may not commence without authorisation and procedures to be followed. NEMA is the umbrella legislation for which all environmental principles, concerns, issues or impacts must be addressed including:</p>	<p>Full report</p>	

<p>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</i></p>	<p>REFERENCE WHERE APPLIED</p>	<p>HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT <i>(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)</i></p>
<p><i>Environmental Impact Assessment Regulations, GN R 982 of 4 December 2014</i> <i>Regulation 21 – 26 and Regulation 39 – 44</i></p> <p>These Regulations set out the process required to undertake the scoping and EIA process, including the public participation process that must be undertaken as part of the EIA.</p> <p><i>The Financial Provision Regulations</i> were published under NEMA on 20 November 2015 (in GN R1147 of <i>Government Gazette</i> 39425 of 20 November 2015. The regulations replace section 41 of the MPRDA and Regulations 53 and 54 of the Mineral and Petroleum Resources Development Regulations (published in GN R527 of <i>Government Gazette</i> 26275 on 23 April 2004). The purpose of these regulations is to regulate the determination and furnishing of financial provision for the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts through the lifespan of such operations and latent or residual environmental impacts that may become known in the future. Under Regulation 5, financial provision must be made for: (a) rehabilitation and remediation; (b) decommissioning and closure activities at the end of <i>inter alia</i> mining operations; and (c) remediation and management of latent or residual environmental impacts which may</p>	<p>Section 6, 9</p> <p>Section 12</p>	<p>A scoping and EIA process is being followed in terms of the EIA Regulations for an activity listed under Listing Notice 2 (2014), as amended. This report constitutes the EIA/EMPR report circulated to Interested and Affected Parties and Organs of State, in the EIA process being undertaken.</p> <p>The Applicant updated the closure cost assessment for the Zondereinde Mine, which will be included in the Final EIR to be submitted to the Competent Authority.</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</i>	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT <i>(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)</i>
<p>become known in future, including the pumping and treatment of polluted or extraneous water.</p> <p>Section 28(1) of NEMA states that <i>“every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring”</i> (“Duty of Care”). If such degradation / pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:</p> <ul style="list-style-type: none"> • assessing the environmental impact; • informing and educating employees about the environmental risks of their work and ways of minimising these risks; • ceasing, modifying or controlling actions which cause pollution/degradation; • containing pollutants or preventing movement of pollutants; • eliminating the source of pollution; and • remedying the effects of the pollution. <p>The applicant has a responsibility to ensure that the proposed activities and the EIA process conform to NEMA's principles and is required to take actions to prevent pollution or environmental degradation, in terms of section 28 of NEMA</p>	<p>Part B: EMPR</p>	<p>Northam Platinum Limited will be obliged to comply with the Duty of Care throughout all phases of the Project.</p>

<p>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</i></p>	<p>REFERENCE WHERE APPLIED</p>	<p>HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT <i>(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)</i></p>
<p>and ensure that the environmental impacts associated with the proposed activities are considered and mitigated where possible.</p>		
<p>National Environmental Management: Waste Management Act (NEM:WA), 2008 (Act No. 59 of 2008)</p> <p>The NEM:WA aims to regulate waste management in South Africa in order to protect health and the environment through the provision of reasonable measures for the prevent pollution and ecological degradation.</p> <p>The Act includes regulations which provide a list of waste management activities that require a waste management licence terms of NEM:WA (GN 921 of 29 November 2013). Activities related to treatment of effluent, wastewater or sewage are however excluded and do not require a waste management licence.</p> <p>Where a WML is not required, the National Norms and Standards for the Storage of Waste (published in Government Gazette 37088 of 29 November 2013) ("Waste Norms and Standards") must be complied with.</p>	<p>Part B: EMPR</p>	<p>No waste management licence is required for the proposed Shaft Complex. Waste will be collected and disposed of at the Zondereinde Mine.</p> <p>The general principles of responsible waste management are incorporated into the requirements in the EMPr, to be implemented for the proposed development.</p> <p>The Applicant will be required to comply with the Waste Norms and Standards for waste that is stored on the site.</p>

<p>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</i></p>	<p>REFERENCE WHERE APPLIED</p>	<p>HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT <i>(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)</i></p>
<p>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA)</p> <p>NEMBA aims to provide for the management and conservation of South Africa’s biodiversity within the framework of NEMA. The purpose of NEMBA is to protect ecosystems and the species within as well as the promoting of sustainable use of indigenous biodiversity. During any environmental authorisation process the following regulations are considered and researched if at any stage the following regulations promulgated in terms of NEMBA are applicable:</p> <ul style="list-style-type: none"> • The identification, control and eradication of declared weeds and alien invaders in South Africa are categorised in and controlled through the Alien and Invasive Species Regulations (published in GN R151 of Government Gazette 29657 of 23 February 2007) and the Alien and Invasive Species Lists (published in GN R864 of Government Gazette 40166 on 29 July 2016), • GN 1002 of 9 December 2012 containing the National List of Ecosystems that are threatened and in need of protection, promulgated in terms of section 52(1)(a) of NEM:BA; • GN R152 of 23 February 2007 which are the Regulations regarding Threatened or Protected Species ("TOPS List"). The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and 	<p>Section 6 Appendix 10</p>	<p>The provisions of NEMBA have been considered during the EIA Phase and, where relevant, are incorporated into the proposed mitigation measures and requirements of the EMP. No permits in terms of NEMBA is required for this application.</p> <p>A Biodiversity Impact Assessment (BIA) was undertaken to confirm the presence of any threatened species. No threatened species was identified in the study area.</p> <p>The control of alien and invasive species forms part of the obligations in the EMP.</p>

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<p>species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems and preserving sites of exceptionally high conservation value; and</p> <ul style="list-style-type: none"> • GNR151 of 23 February 2007 containing the List of Critically Endangered, Endangered, Vulnerable and Protected Species. <p>Under NEM:BA, if any listed ecosystems, threatened, endangered or vulnerable species or protected species will have to be removed or will be disturbed, a permit will be required.</p>		
<p>National Forests Act, 1998 (Act No. 84 of 1998) (NFA)</p> <p>Section 12 of the NFA gives power to the Environment Minister to declare certain trees as protected species. The latest list has been promulgated under GN 182 in GG 41100 of 8 September 2017</p> <p>Section 15 of the NFA indicates that no protected species may be cut, disturbed, damaged or destroyed without a licence granted by the DEFF.</p>	<p>Section 6 Appendix 10</p>	<p>A BIA was undertaken, and one protected tree was identified. The tree falls outside of the footprint of the proposed development and will not be affected.</p>

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<p>National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPAA)</p> <p>The protection and management of South Africa’s protected areas are controlled by the NEMPAA.</p> <p>NEMPAA provides for <i>inter alia</i>:</p> <ul style="list-style-type: none"> • the declaration of nature reserves and determination of the type of reserve declared; • cooperative governance in the declaration and management of nature reserves; • a system of protected areas to manage and conserve biodiversity; and • the utilization and participation of local communities in the management of protected areas. <p>It provides that, despite other legislation, no person may conduct <i>inter alia</i> mining activities in special nature reserves or protected areas without the prior consent of the Minerals Minister and Environment Minister. NEMPAA binds all state organs and trumps other legislation, including the MPRDA, in the event of a conflict concerning the development of protected areas.</p>	<p>Section 6 Appendix 10</p>	<p>The study area is not declared under NEMPAA and the nearest declared protected area according to the Protected Area Register (PAR) of the Department of Environment, Forestry and Fisheries, is the Sharpe Private Nature Reserve, which is located approximately 5 km to the south-west of the study area (Refer to Figure 6-28/ Figure 6-29).</p>

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<p>National Environmental Management: Air Quality Act (NEMAQA), 2004 (Act No. 39 of 2004) and the National Dust Control Regulations, 2013</p> <p>The aim of NEMAQA is to regulate air quality to protect the environment from pollution and ecological degradation.</p> <p>The objectives of NEMAQA are to protect the environment by providing reasonable measures for-</p> <ul style="list-style-type: none"> • the protection and enhancement of air quality in South Africa; • the prevention of air pollution and ecological degradation; • securing ecologically sustainable development, while promoting justifiable economic and social development; and • generally, to give effect to section 24(b) of the Constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and wellbeing of people. <p>Atmospheric emission licences (AELs) are required for certain listed activities under NEMAQA</p>	<p>Section 7</p>	<p>No AEL will be required for any of the proposed activities.</p> <p>The NDC regulations will be applicable mainly during the construction phase of the project. Dust control measures will be included in the Environmental Management Programme.</p>

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<p>The National Dust Control Regulations ("NDC Regulations") were promulgated on 1 November 2013 in GNR 827 and provide dust standards and measures for dust control.</p> <p>The development itself will not impact on air quality, however, the surrounding land uses such as old mine tailings, quarrying and landfill sites, might have an impact on the proposed development.</p>		
<p>National Water Act (NWA), Act No. 36 of 1998</p> <p>Section 21 water uses</p> <p>The NWA also has a role to play in regulating mining. Mining almost always uses water and/or has an impact on a water resource such as a stream, wetland, river or drainage line. The DHSWS administers the NWA.</p> <p>The NWA provides for fundamental reform of the law relating to water resources, where the ultimate aim of water resource management is to achieve the sustainable use of water for the benefit of all users.</p>	<p>Section 6 Appendix 10.3</p>	<p>The shaft complex triggers the following water uses: c) and i) for the crossings of the natural surface water features identified (Refer to Figure 6-18) by the services infrastructure including:</p> <ul style="list-style-type: none"> ➤ The sewerage line to the existing sewerage facility; ➤ The primary and secondary backfill supply lines, (design to confirm, but should be in the region of 2 x 6-inch pipelines) ➤ The backfill return line, (should also be in the region of a 6-inch pipeline); ➤ The primary and secondary mud line (mud from underground), (design to confirm, but should be in the region of 2 x 4-inch pipelines); and ➤ The service water line to pump water to the existing evaporation facility. (Design to conform 1x 8- or 10-inch pipeline).

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<p>Section 21 of the NWA defines eleven water uses that require an integrated WUL or another authorisation:</p> <ul style="list-style-type: none"> • 21 (a): taking water from a water resource; • 21 (b): storing water; • 21 (c): impeding or diverting the flow of water in a watercourse; • 21 (d): engaging in a stream flow reduction activity contemplated in section 36; • 21 (e): engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1); • 21 (f): discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit; • 21 (g): disposing of waste in a manner which may detrimentally impact on a water resource; • 21 (h): disposing in any manner of water, which contains waste from, or which has been heated in, any industrial or power generation process; • 21 (i): altering the bed, banks, course or characteristics of a watercourse; 		<p>The Applicant will apply for a Water Use Licence and proof thereof will be submitted to DMR with the Final EIA/EMPR report.</p>

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<ul style="list-style-type: none"> • 21 (j): removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and • 21 (k): using water for recreational purposes. <p>Where a water use cannot be authorised as a Scheduled 1 Use (permissible use without an authorisation requirement), a permissible water use in terms of section 22 of the NWA; or as a General Authorisation, a WUL must be obtained and an application in terms of sections 40 and 42 of the NWA submitted.</p>		
<p>National Heritage Resources Act (Act No. 25 of 1999 (NHRA))</p> <p>The purpose of the NHRA is to ensure that the heritage resources which are of cultural significance, as described in section 3 of the NHRA, will be protected. The protection of heritage resources is overseen by the South African Heritage Resources Agency (SAHRA) and provincial heritage resources authorities, dependant on the heritage resources in question.</p> <p>Under section 34 of the NHRA structures which are older than 60 years may not be demolished without a permit issued by the relevant heritage resources authority.</p>	<p>Section 6 Appendix 10.4</p>	<p>Due to the size of the development, a Heritage Impact Assessment (HIA) was undertaken to determine the impact to heritage resources. SAHRA was notified and the scoping report was uploaded to the SAHRIS online system. Comments from SAHRA indicates that they will require a Phase 1 HIA be conducted and the report, together with the EIAR and EMPR and appendices to be uploaded onto the SAHRIS system in order for them to provide final comments on the application. SAHRA also indicated that no palaeontological studies are required as part of the EIA phase.</p> <p>The specialist identified high and medium sensitivity archaeological finds, and these are indicated on the Sensitivity Map in and described in Section. The specialist recommended that the</p>

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<p>Section 35 of the NHRA deals with archaeological, paleontological and meteorite heritage resources and requires that any archaeological or paleontological objects that are found on site must be reported to the competent heritage resources authorities. The discovered archaeological or paleontological objects may not be removed, damaged or destroyed without obtaining a permit from the heritage resources authority.</p> <p>Section 38 of the NHRA requires that SAHRA must be informed of any proposed development that exceeds 5000m² and changes the character of the site, prior to undertaking the development. SAHRA may then require an HIA to be conducted before it consents to the development.</p> <p>Where an HIA is undertaken as part of the EIA process and an applicant for an EA complies with the requirements of the relevant heritage authorities, then such an applicant is exempted from having to comply with the other provisions in Part 2 of Chapter 2 of the NHRA, including the requirement to obtain permits for the: alteration or demolition of any structure or part of a structure which is older than 60 years; destruction, damage, excavation, alteration, sale or disturbance of any archaeological and palaeontological artefacts or meteorites: or destruction, damage, alteration, exhumation or removal from its original position or disturbance of any grave or burial ground older than 60 years which</p>		<p>development may proceed, provided that the proposed mitigation measures and recommendations are implemented.</p>

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<p>is situated outside a formal cemetery administered by a local authority as contemplated in section 36 of the NHRA.</p> <p><u>Chance finds subsequent to the EIA Process:</u></p> <p>The NHRA states that human remains older than 60 years and younger than 100 years are protected by the NHRA. Procedures for the removal of graves are set out in section 36(5) of the NHRA, including procedures for consultation regarding burial grounds and graves, where such graves are situated outside a formal cemetery administered by a local authority. 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.</p> <p>Human remains that are younger than 60 years are protected under section 2(1) of the Removal of Graves and Dead Bodies Ordinance, No. 7 of 1925, and are under the jurisdiction of the National and Provincial Department of Health. Final approval for removal of human remains must be submitted to the office of the relevant Provincial Premier. This function is generally delegated to the Provincial MEC for Local Government and Planning or, in some cases, the MEC</p>		

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<p>for Housing and Welfare. Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated and the relevant local or regional council to where the grave is being relocated. To handle and transport human remains, the institution conducting the relocation must be authorised under the National Health Act and the Regulations relating to the Management of Human Remains (Published under Government Notice R363 in Government Gazette 36473 of 22 May 2013).</p> <p>For this, a specific procedure should be followed which includes social consultation. For graves younger than 60 years, only an undertaker is needed. For those older than 60 years and unknown graves</p>		
<p>Mineral and Petroleum Resources Development Act (MPRDA), Act No. 28 of 2002</p> <p>The MPRDA makes provision for equitable access to and sustainable development of the nation's mineral and petroleum resources. The recent amendments to NEMA and the MPRDA resulted in changes to align specific environmental legislation associated with mining activities and sections of NEMA and MPRDA to provide for one environmental management system. NEMA is now the primary legislation for the environmental regulation of mining and associated activities.</p>		<p>Northam already holds the Zondereinde Mining Rights granted and approved under the MPRDA and Environmental Authorisation (EA) under NEMA.</p> <p>Stemming from the one environmental management system, the decision of the EA application will be decided by the Minister of Mineral Resources, or a delegated authority.</p>

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<p>Mine Health and Safety Act, 1996 (Act No. 29 of 1996) (MHSA)</p>	<p>Part B: EMPR</p>	<p>Northam Platinum Limited: Zondereinde Division already complies with the Mine Health and Safety Act, 1996 (Act No. 29 of 1998) and the complete act will be applicable to the new Shaft Complex.</p>
<p>Environment Conservation Act, 1989 (Act No. 73 of 1989) – Noise Control Regulations</p> <p>In 1994, with the devolution of regulatory power from national government to provincial government, the authority to promulgate noise regulations was ceded to provinces. Each province could henceforth decide whether to develop their own regulations, or to adopt and adapt existing regulations. Some provinces (e.g. Gauteng, Free State and Western Cape) have promulgated such provincial regulations. Elsewhere, including Limpopo Province, no provincial noise regulations have been put in place.</p> <p>In noise studies undertaken in provinces lacking official noise regulations, the Regulations in terms of Section 25 - Noise Control published in terms of ECA (Noise Regulations) apply. Noise criteria in all previous national and current provincial regulations, as well as current metropolitan noise policies, are derived from SANS 10103. SANS 10103 defines the relevant acoustic parameters that should be measured, gives guidelines with respect to</p>	<p>Section 6</p>	<p>The Noise Regulations are considered in relation to the potential noise that may be generated mainly during the construction and decommissioning phases of the proposed activities. The two key aspects of the Noise Regulations relate to disturbing noise and noise nuisance.</p> <p>Noise impacts were assessed in the EIA and appropriate mitigation measures are included in the EMPR.</p> <p>Northam Platinum will need to comply with the Noise Regulations and standards set out in SANS10103.</p>

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<p>acceptable levels and assessment criteria and specifies test methods and equipment requirements.</p> <p>Section 4 of the Noise Regulations prohibits a person from making, producing or causing a disturbing noise; or allowing it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof. A disturbing noise is defined in the Noise Regulations as "a noise level which exceeds the zone sound level or, if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7dBA or more".</p> <p>Section 5 of the Noise Regulations prohibits the creation of a noise nuisance. A noise nuisance is defined as "any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person".</p> <p>There are a few South African Bureau of Standards (SABS) standards relevant to noise from mines, industry and roads. They are:</p> <ul style="list-style-type: none"> • South African National Standard (SANS) 10103:2008. 'The measurement and rating of environmental noise with respect to annoyance and to speech communication'; • SANS 10210:2004. 'Calculating and predicting road traffic noise'; 		

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<ul style="list-style-type: none"> • SANS 10328:2008. 'Methods for environmental noise impact assessments'; • SANS 10357:2004. 'The calculation of sound propagation by the Concave method'; • SANS 10181:2003. 'The Measurement of Noise Emitted by Road Vehicles when Stationary'; and • SANS 10205:2003. 'The Measurement of Noise Emitted by Motor Vehicles in Motion'. <p>The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account but single event noise by itself does not determine whether noise levels are acceptable for land use purposes. With regards to SANS 10103:2008, the recommendations are likely to inform decisions by authorities but non-compliance with the standard will not necessarily render an activity unlawful per se.</p>		
<p>Explosives Act, 1956 (Act No 26 of 1956)</p> <p>A licence is required for the storage and use of explosives on the study area. The licence is issued by the Chief Inspector of Explosives or his delegate.</p>	<p>Part B: EMPR</p>	<p>Northam Platinum will apply for a licence in respect of the storage and use of explosives, if required.</p> <p>The storage and use of explosives are also governed by the MHSA, which Northam Platinum is obliged to comply with.</p>

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<p>Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013 (SPLUMA))</p> <p>SPLUMA is a framework law, which means that the law provides broad principles for a set of provincial laws that will regulate planning for South Africa. It introduces provisions to cater for development principles; norms and standards; inter-governmental support; Spatial Development Frameworks (SDFs) across national, provincial, regional and municipal areas; land use schemes; and municipal planning tribunals.</p> <p>SPLUMA also provides clarity on how planning law interacts with other laws and policies. It is a uniform, recognisable and comprehensive system that addresses the past spatial and regulatory imbalances; and promotes optimal exploitation of mineral resources. It achieves this by strengthening the position of mining right holders when land needs to be rezoned for mining purposes. SPLUMA's impact on optimal exploitation is particularly evident where conflict exists between mining right holders and landowners. Economic and policy considerations, as well as practical necessities, often motivate the State to grant mining rights to entities other than landowners. SPLUMA is a new national framework Act that provides clear principles and standards for provincial and local governments to formulate their own new spatial planning and land use</p>	<p>Section 5</p>	<p>The study area is zoned as agricultural.</p> <p>Application will be made for rezoning or a special land use consent under SPLUMA, read with the Thabazimbi Land Use Management By-Law, 2015 once the properties is transferred to the Applicant.</p>

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<p>policies. The new provincial legislation can regulate, among other things, land development, land use management, spatial planning and municipal planning.</p>		
<p>The National Development Plan 2030 (NDP)</p> <p>The NDP is a long-term development framework and plan for South Africa and was released in August 2012. All major development policies and strategies of district and local municipalities find expression in the NDP. The NDP must be referred to when determining the socio-economic impacts of a development or project on the surrounding area.</p>	<p>Section 5</p>	<p>The proposed activities will not only sustain current contributions of the Zondereinde Mine directly to the South African economy but will also sustain contributions of the Zondereinde Mine to the development and growth of other industries supporting the mining sector. The proposed activities thus, aligns with the NDP.</p>
<p>Thabazimbi Local Municipality 2017/18 – 2021/22 Integrated Development Plan (IDP)</p> <p>The IDP is the document through which the Thabazimbi Local Municipality prepares its strategic development plans for a five-year period.</p> <p>The IDP speaks to the rich platinum resources located in the Thabazimbi Local Municipality and recognises that mining is one of the key economic sectors that has, and continues to be, one of the key sources of economic growth.</p> <p>It further recognises that mining has a major impact on the status of the local economy, presents significant employment opportunities, and can also serve as a catalyst for the development of other economic activities.</p>	<p>Section 5</p>	<p>The proposed activities is aligned with the IDP's objective to promote access to mineral resources, and is also well-placed to redress the impact of the economic decline in recent years by providing socio-economic opportunities within the Thabazimbi Local Municipality due to the extension of the LoM that will result from the Project.</p> <p>It is therefore clear that the proposed activities accord with the IDP.</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</i>	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT <i>(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)</i>
<p>Waterberg District Municipality 2019/2020 Integrated Development Plan (Waterberg IDP)</p> <p>As the Thabazimbi Local Municipality is located within the broader Waterberg District Municipality, the Waterberg IDP finds application to the proposed activities.</p> <p>The Waterberg IDP states that the Waterberg district is one of the major mining regions in South Africa in which platinum is mined and recognises that mining is the biggest contributor towards the provincial economy.</p> <p>The Waterberg IDP further considers the future mining projects envisaged for the district and highlights the significant investment and job opportunities that will result therefrom.</p>	<p>Section 5</p>	<p>As above.</p>
<p>Provincial legislation and other guidelines considered by the specialists include amongst others:</p> <ul style="list-style-type: none"> • Limpopo Environmental Act 7 of 2003 – makes provision for the protection of terrestrial and aquatic biodiversity; • Limpopo Conservation Plan of 2013 was designed to support integrated development planning; 	<p>Section 5, 6</p>	<p>NEMA and the EIA Regulations highlight specific considerations that must be taken into account for every application for an EA, including the principles set out in section 2 of NEMA, the general objectives of Integrated Environmental Management set out in section 23 of NEMA, minimum requirements set out in section 24(4) of NEMA and criteria set out in section 24O of NEMA and in Regulation 18 of the EIA Regulations.</p>

<p>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</i></p>	<p>REFERENCE WHERE APPLIED</p>	<p>HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT <i>(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)</i></p>
<ul style="list-style-type: none"> • Limpopo Environmental Implementation Plan 2015 - 2020 (published under PN 64 of PG 2715 on 10 June 2016) - describes policies, plans and programs of different state departments (such as LEDET) that perform functions that may impact on the environment and how the departments' plans should comply with NEMA's principles and national environmental norms and standards; • International Finance Corporation Environmental, Health and Safety Guidelines for Mining - the IFS guidelines recommended noise levels for noise sensitive areas is 55.0dBA during the day and 45.0dBA during the night; • United States Bureau of Mines – USBM (1980) Structure response and damage produced by ground vibration from surface mine blasting - USBM 1980, provides limits for ground vibration levels resulting from blasting. Ground vibration levels as a result of blasting should not exceed 10,0m/s for clay huts and 25.0mm/s for brick or formally constructed buildings; • NEMA Implementation Guidelines: Sector Guidelines for Environmental Impact Assessment Regulation (published in GN 654 of Government Gazette 33333 on 29 June 2010) - this guideline provides guidance on how to compile EIAs containing information and analysis of a high quality and which is sufficiently comprehensive to enable the decision-maker to make a well-informed decision. It explains the 		<p>In terms of the EIA Regulations, when considering an application, the relevant competent authority must have regard to various specific relevant considerations, including specifically having to consider “the need for and desirability of the activity”. The EIA Regulations appendices specify that the Scoping Report and EIAR provide a motivation for a proposed development's need for and desirability, including the need and desirability of the activity in the context of the preferred location. It requires that both the “need” and “desirability” must be considered by the developer, his/her independent EAP, the specialists, and the competent authority. I&APs must also be afforded an opportunity to make representation in terms of their views in terms of the need and desirability considerations.</p> <p>The project's need and desirability has been addressed throughout the Scoping Report and the EIA/EMPR report.</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</i>	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT <i>(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)</i>
<p>requirements in the EIA Regulations and provides practical guidance and tools for the EIA process;</p> <ul style="list-style-type: none"> • DEAT (2004); Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria - this guideline provides information on cumulative effect assessments, integrated environmental management, and highlights the potential approaches for incorporating cumulative effects into EIAs; • DEA (2011); A User-Friendly guide to the National Environmental Management: Waste Act, 2008. South Africa, Pretoria - this guide gives a simplified overview of the contents and application of NEM:WA. It also covers processes or directions on how to manage polluted land and develop industry waste management plans. It provides guidance and information on the licensing of waste management activities, waste information, compliance and the consequences for non-compliance NEM: WAA; • DEAT (2004): Criteria for determining Alternatives in EIA, Integrated Environmental Management, Information Series 11 - this document provides an overview of the key criteria for determining project alternatives, in the EIA Process; 		

<p>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</i></p>	<p>REFERENCE WHERE APPLIED</p>	<p>HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT <i>(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)</i></p>
<ul style="list-style-type: none"> • Guideline for Implementation: Public Participation in the EIA Process (published in GN 807 of Government Gazette 35769 on 10 October 2012) - assists applicants, I&APs and EAPs to understand their roles in the Public Participation Process (PPP). It provides information on the benefits of the PPP and guidance on conducting the PPP; and • DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs Integrated Environmental Management, Information Series 11 (Guideline) - This guideline contains information on best practice and how to meet the peremptory requirements prescribed by legislation. It sets out both the strategic and statutory context for the consideration and of the need and desirability of a development. 		
<p>The Mining and Biodiversity Guidelines (2013) was developed by the Department of Mineral Resources, the Chamber of Mines, the South African National Biodiversity Institute and the South African Mining and Biodiversity Forum, with the intention to find a balance between economic growth and environmental sustainability. The Guideline is envisioned as a tool to “foster a strong relationship between biodiversity and mining which will eventually translate into best practice within the mining sector. In identifying biodiversity priority areas which have different levels of risk against mining, the Guideline categorises biodiversity priority areas into four categories of biodiversity priority</p>	<p>Section 6, 7 Appendix 10.2</p>	<p>According to these guidelines, the proposed project area falls within an area which is considered the ‘highest risk for mining’ and of ‘high biodiversity importance’. Based on this information, the project area will most likely have an impact on this area and its associated activity and thus the specialist studies should focus on confirming the presence and significance of these biodiversity features, and to provide site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making for mining, water use licences, and environmental authorisations. If they are confirmed, the likelihood of a fatal flaw for new mining projects is very high because</p>

<p>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</i></p>	<p>REFERENCE WHERE APPLIED</p>	<p>HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT <i>(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)</i></p>
<p>areas in relation to their importance from a biodiversity and ecosystem service point of view as well as the implications for mining in these areas:</p> <p>A) Legally protected areas, where mining is prohibited;</p> <p>B) Areas of highest biodiversity importance, which are at the highest risk for mining;</p> <p>C) Areas of high biodiversity importance, which are at a high risk for mining; and</p> <p>D) Areas of moderate biodiversity importance, which are at a moderate risk for mining.</p> <p>The Guideline provides a tool to facilitate the sustainable development of South Africa’s mineral resources in a way that enables regulators, industry and practitioners to minimise the impact of mining on the country’s biodiversity and ecosystem services. It provides the mining sector with a practical, user- friendly manual for integrating biodiversity considerations into the planning processes and managing biodiversity during the operational phases of a mine, from exploration through to closure. The Guideline provides explicit direction in terms of where mining-related impacts are legally prohibited, where biodiversity priority areas may present high risks for mining projects, and where biodiversity may limit the potential for mining.</p> <p>Overall, proponents of a mining activity in biodiversity priority areas should demonstrate that:</p>		<p>of the significance of the biodiversity features in these areas and the associated ecosystem services. These areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being.</p> <p>For Category B areas:</p> <p>An EIA should include the strategic assessment of optimum, sustainable land use for a particular area and will determine the significance of the impact on biodiversity. This assessment should fully take into account the environmental sensitivity of the area, the overall environmental and socio-economic costs and benefits of mining, as well as the potential strategic importance of the minerals to the country.</p> <p>Refer to Section 7 for a detailed impact assessment that considered all of the above aspects.</p>

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT <i>(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)</i>	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT <i>(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)</i>
<ul style="list-style-type: none"> • There is significant cause to undertake mining by commenting on whether the biodiversity priority area coincides with mineral or petroleum reserves that are strategically in the national interest to exploit. Reference should also be made to whether alternative deposits or reserves exist that could be exploited in areas that are not biodiversity priority areas or are less environmentally sensitive areas. • Through the process of a rigorous EIA and associated specialist biodiversity studies the impacts of the proposed mining are properly assessed following good practice. It is critical that sufficient time and resources are budgeted to do so early in the planning and impact assessment process, including appointing appropriate team of people with the relevant skills and knowledge as required by legislation. • Cumulative impacts have been taken into account. • The mitigation hierarchy has been systematically applied and alternatives have been rigorously considered. • The issues related to biodiversity priority areas have been incorporated into a robust EMP as the main tool for describing how the mining or prospecting operation’s environmental impacts are to be mitigated and managed. • Good practice environmental management is followed, and monitoring and compliance enforcement is ensured. 		

5 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

5.1 Need of the Proposed Activity

Northam Platinum Limited (Northam Platinum) plans to sustain its production from the Zondereinde Western Block that has been acquired and recently included in their mining rights.

The Zondereinde Western Block is situated to the west of the original mining right and adds approximately 4 km of strike to the Merensky and UG2 ore reserve of Zondereinde Mine.

Due to its distance from the existing 1 and 2 Shaft which access the ore body it was decided to provide additional access to the ore body nearer to the mining operations. This access will be via two raise bored shafts from surface to 5 level which is 1,520 m below collar. In addition, these new mining areas will require additional ventilation which will be provided by a downcast ventilation shaft and 2 up-cast ventilation shafts; five vertical shafts in total.

5.2 Desirability of the Proposed Activity

The proposed shaft complex will have several socio-economic benefits including, but not limited to:

- it will secure economic viability of the mine (300kozpa PGM and 9 200 current staff);
- it will further extend Zondereinde LoM with approximately 35 years;
- it will ensure that the current employment trend will be sustained; and
- it will ensure continuation of the social and economic contributions made by the mine to its employees and the local community.

5.3 Environmental Impact

Most environmental impacts will be associated with activities within the boundary of the proposed Shaft Complex. Some linear activities were investigated as part of the impact assessment. Refer to Section 7 for a description of potential environmental impacts that may occur as a result of the proposed development. These impacts were assessed in detail by specialists and the EAP.

The questions in Table 5-1 have also been addressed in line with the Guideline for Need and Desirability (Notice 891 of 2014).

Table 5-1: Need and Desirability Assessment

Questions from the Need and Desirability Guideline	Response
Securing ecological sustainable development and use of natural resources	
<p>How will this development (and its separate elements / aspects) impact on the ecological integrity of the area?</p>	<p>A site assessment and preliminary desktop assessment was undertaken during the scoping phase, and no ecological sensitivities were identified. A Biodiversity Impact Assessment (BIA), Surface Water Impact Assessment and Geohydrological Impact Assessment were undertaken.</p> <p>The biodiversity, aquatic and geohydrology specialists concluded that the proposed development can be considered for authorisation, provided that the recommendations and the mitigation measures provided are implemented. Refer to Section 8 for a summary of the specialist studies.</p> <p>Based on this, it is not expected that the proposed development will significantly impact on the ecological integrity of the area, provided that all the recommendations and mitigation measures provided by the specialists and the EAP are implemented.</p>
<p>How were the following ecological integrity considerations taken into account?</p> <ul style="list-style-type: none"> • Threatened Ecosystems; • Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure; • Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”); • Conservation targets; • Environmental Management Framework (EMF); • Spatial Development Framework (SDF); and 	<p>Throughout the Scoping and EIA process the ecological integrity of the area was considered in the following way:</p> <ul style="list-style-type: none"> • An initial sensitivity map was compiled to identify potential ecological sensitivities. This map considers CBAs, ESAs, watercourses, Important Bird Areas (IBAs) etc.; • Based on the initial sensitivity map, it was determined that a Biodiversity Impact Assessment (BIA) and a Surface Water Impact Assessment were required; • A BIA and Surface Water Impact Assessment were therefore undertaken which considered aspects such as threatened and sensitive ecosystems etc. A detailed final sensitivity map was compiled

Questions from the Need and Desirability Guideline	Response
<ul style="list-style-type: none"> Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.). 	<p>based on the findings of the specialist studies.</p> <ul style="list-style-type: none"> The findings of the BIA and the Surface Water Impact Assessment were used to determine and assess potential ecological impacts related to the development. A detailed impact assessment which assessed the proposal, alternative and no-go option was compiled. In terms of the Waterberg EMF (2010), the study area falls within a mining focus area (Zone 4) and within a Lower Priority (0) protected and conservation planning priority area. In terms of the Waterberg SDF (2009), the study area falls within a mining area, specifically an area with platinum potential and not within any existing conservation or future conservation areas or transition and / or buffer zones of conservation areas. The site does not fall in any area of international importance in terms of ecology, currently. In terms of climate change, the proposed activities are related to the existing mine and there will not be an increase in production and only a minor increase in air quality - and other impacts can be mitigated to a low significance - at the mine as a result of the proposed activities. The proposed activities are planned in order to sustain current production.
<p>How will this development disturb or enhance ecosystems and / or result in the loss or protection of biological impacts that could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>The findings of the BIA, Surface Water Impact Assessment, Geohydrological Impact Assessment and In-depth geotechnical investigation were used to determine and assess ecological impacts related to the development. A detailed impact assessment, that assessed the proposal, alternative and no-go option, was compiled.</p>

Questions from the Need and Desirability Guideline	Response
	<p>Please refer to Section 7 and Appendix 5 for the detailed impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for was compiled during the EIA phase that include mitigation measures (refer to PART B of this report). Including measures to enhance benefits (i.e. such as the use of local labour where possible).</p> <p>In brief, the proposed activities will result in minimal loss of biodiversity and disturbance to ecosystems, including terrestrial and aquatic systems. The main potential impacts identified include:</p> <ul style="list-style-type: none"> • The loss of habitat, fauna and flora as a result of site and vegetation clearing; • Spreading of alien vegetation as a result of site and vegetation clearing and decommissioning and rehabilitation of the construction camp, as well as the operation and maintenance of support infrastructure; • Degradation of ecological systems; • Disruption of natural corridors; • Fauna mortalities as a result of improper waste management and increased traffic; • Failure of re-vegetation; • No surface water ecosystems were identified on the study area, however inappropriate or a lack of stormwater management may have a negative ecological impact. <p>All negative impacts can be mitigated to acceptable levels (low significance after mitigation). Mitigation include:</p> <ul style="list-style-type: none"> • Keeping site and vegetation clearance strictly to the approved footprint of the site and within road reserves; • Removing and controlling alien vegetation;

Questions from the Need and Desirability Guideline	Response
	<ul style="list-style-type: none"> • Strict traffic rules; • Correct waste management; • Correct rehabilitation; • Correct stormwater management; • BPEOs implemented throughout the construction and operational phases.
<p>How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>The findings of the BIA, Surface Water Impact Assessment, Geohydrological Impact Assessment and In-depth geotechnical investigation were used to determine and assess ecological impacts related to the development. A detailed impact assessment, that assessed the proposal, alternative and no-go option, was compiled.</p> <p>Please refer to Section 7 and Appendix 5 for the detailed impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for the proposed development was compiled during the EIA phase that include mitigation measures (refer to PART B of this report). Including measures to enhance benefits.</p> <p>In brief, the proposed activities will result in minimal impacts on the biophysical environment. The main potential impacts that may cause degradation or pollution of the biophysical environment identified include:</p> <ul style="list-style-type: none"> • Spreading of alien vegetation as a result of site and vegetation clearing and decommissioning and rehabilitation of the construction camp, as well as the operation and maintenance of support infrastructure; • Degradation of ecological systems; • Failure of re-vegetation;

Questions from the Need and Desirability Guideline	Response
	<ul style="list-style-type: none"> • No surface water ecosystems were identified on the study area, however inappropriate or a lack of stormwater management may cause pollution and degradation of the biophysical environment; • Soil may be compacted, contaminated or lost through inappropriate or a lack of wastewater and hazardous material storage management on site; • Dust emissions altering air quality and visibility on nearby roads and emissions from vehicles and machinery (CO², NO_x, SO_x, VOC's etc.) due to site clearing, stockpiling, establishment of construction camp; increased vehicle trips, transportation and loading, off-loading of ore, construction materials etc., and civil works, • Groundwater quality may be impacted by spillage of hydrocarbons, oils, cement, sewage and other chemical materials if allowed to permeate groundwater. <p>All negative impacts can be mitigated to acceptable levels (low significance after mitigation). Mitigation includes</p> <ul style="list-style-type: none"> • Removing and controlling alien vegetation; • Correct rehabilitation practices; • Correct waste management; • Correct rehabilitation; • Correct water and spill management; • Correct storage of hazardous material; • Good housekeeping practices; • Correct soil management; • BPEOs implemented throughout the construction and operational phases.

Questions from the Need and Desirability Guideline	Response
<p>What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimize, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?</p>	<p>Please refer to Section 7 and Appendix 5 for the detailed impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for was compiled during the EIA phase that include mitigation measures (refer to PART B of this report), which include a waste management plan to reduce and recycle waste.</p> <p>It should be noted that the activity may increase generation of waste temporarily during the construction phase, however, since there will not be an increase in production at the Zondereinde Mine, there will be no increase in waste generation during the operational phase. Waste will be managed according to existing approved waste management practices at the Zondereinde Mine according to relevant legislation and guidelines (refer to Section 4).</p>
<p>How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>The findings of the BIA, Surface Water Impact Assessment, Geohydrological Impact Assessment and In-depth geotechnical investigation were used to determine and assess ecological impacts (including impacts on non-renewable natural resources) related to the development. A detailed impact assessment, that assessed the proposal, alternative and no-go option, was compiled.</p> <p>Please refer to Section and Appendix 5 for the detailed impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for was compiled during the EIA phase that include mitigation measures (refer to PART B of this report). The assessment included an assessment of the impact on non-renewable natural resources including fuel to generate energy (i.e.</p>

Questions from the Need and Desirability Guideline	Response
	<p>coal), fuel and raw minerals and materials (e.g. sand, iron, platinum, chrome).</p> <p>It should be noted that the activity may increase the use of non-renewable natural resources temporarily during the construction phase (i.e. fuel (i.e. coal) for energy generation and use of minerals and raw materials), however, since there will not be an increase in production at the Zondereinde Mine, there will be no increase in the use of fuel (i.e. coal) for energy generation and minerals and raw materials during the operational phase. However, in terms of fuel (e.g. petroleum, diesel), there might be a slight increase in the use thereof by trucks transporting ore, due to the further distance of the shaft from the plant. Mitigation measures, such as reducing unnecessary vehicle trips and proper maintenance of vehicles are included in the EMPR to reduce the impact.</p>
<p>How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?</p> <ul style="list-style-type: none"> Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. dematerialized growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount 	<p>The findings of the BIA, Surface Water Impact Assessment, Geohydrological Impact Assessment and In-depth geotechnical investigation were used to determine and assess ecological impacts (including impacts on renewable natural resources) related to the development. A detailed impact assessment, that assessed the proposal, alternative and no-go option, was compiled.</p> <p>Please refer to Section 7 and Appendix 5 for the detailed impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr was compiled during the EIA phase that include mitigation measures (refer to PART B of this report). The assessment included an assessment of the impact on renewable natural resources including fauna, flora, water, soil, and air.</p>

Questions from the Need and Desirability Guideline	Response
<p>of waste they generate, without compromising their quest to improve their quality of life).</p> <ul style="list-style-type: none"> • Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?). • Do the proposed location, type and scale of development promote a reduced dependency on resources? 	<p>It should be noted that the activity may increase the use of renewable natural resources (e.g. water), temporarily during the construction phase, however, since there will not be an increase in production at the Zondereinde Mine, there will be minimal increase in the use of renewable natural resources (e.g. water) during the operational phase.</p> <p>In brief, the proposed activities will result in minimal impacts on renewable natural resources. The main potential impacts that may cause an impact include:</p> <ul style="list-style-type: none"> • Spreading of alien vegetation as a result of site and vegetation clearing and decommissioning and rehabilitation of the construction camp and the operation and maintenance of support infrastructure; • Degradation of ecological systems, including a drainage line and wetland; • Failure of re-vegetation; • Soil may be compacted, contaminated or lost through inappropriate or a lack of wastewater and hazardous material storage management on site; • Air quality; Dust emissions altering air quality and visibility on nearby roads and emissions from vehicles and machinery (CO², NO_x, SO_x, VOC's etc.) due to site clearing, stockpiling, establishment of construction camp; increased vehicle trips, transportation and loading, off-loading of ore, construction materials etc., and civil works, • Groundwater quality may be impacted by spillage of hydrocarbons, oils, cement, sewage and other chemical materials if allowed to permeate groundwater. <p>All negative impacts can be mitigated to acceptable levels (low significance after mitigation). Mitigation include:</p> <ul style="list-style-type: none"> • Removing and controlling alien vegetation; • Correct rehabilitation practices;

Questions from the Need and Desirability Guideline	Response
	<ul style="list-style-type: none"> • Correct waste management; • Correct rehabilitation; • Correct water and spill management; • Correct storage of hazardous material; • Good housekeeping practices; • Correct soil management; • BPEOs implemented throughout the construction and operational phases. <p>Further, the proposed activities:</p> <ul style="list-style-type: none"> • will secure economic viability of the Zondereinde mine (300kozpa PGM and 9200 current staff); • will further extend Zondereinde LoM to approximately 35 years; • The proposed project will ensure that the current employment trend will be sustained; and • it will ensure continuation of the social and economic contributions made by the mine to its employees and the local community. <p>As the site is in parts impacted by previous activities and is located close to available services (roads, water, sanitation etc.), it is a good site for the proposed development, as it will not cause any additional impacts on renewable natural resources.</p> <p>Lastly:</p> <ul style="list-style-type: none"> • The option of trucking of ore was chosen as the current road infrastructure can be used; • 4-6 trips per shift equates to a minimal impact on the road infrastructure. • The routing for services includes shortest routes and already existing servitudes and use of existing sewerage treatment plant and evaporation dam;

Questions from the Need and Desirability Guideline	Response
	<ul style="list-style-type: none"> • Change houses. The option chosen was double story change houses to minimise the use of land. • Mine stores and engineering workshops: the options considered were the establishment of a full mine store and engineering workshop or the provision of a small satellite store and workshop with utilisation of the existing stores and workshop at existing mine. The smaller satellite options were selected thereby utilising less surface area and natural resources. • Salvage yard. The options considered were full salvage yard or a dispatch bay. The dispatch bay was chosen where salvage is transported for sorting and processing to the existing salvage yard.
<p>How were a risk-averse and cautious approach applied in terms of ecological impacts?</p> <ul style="list-style-type: none"> • What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? • What is the level of risk associated with the limits of current knowledge? • Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development? 	<p>A risk-averse and cautious approach was undertaken throughout the EIA process including the compilation of specialist studies, the impact assessment and the EMPr. In particular, it was incorporated in the following ways:</p> <ul style="list-style-type: none"> • The specialists identified limits of current knowledge including gaps, uncertainties and assumptions, which are clearly stated in both the specialist reports and EIA Report (refer to Appendix 10). The specialists evaluated the level of risk associated with the limits of current knowledge and all specialists concluded that the development may go ahead with implementation of recommended mitigation measures. High sensitive areas (heritage and biodiversity) were recommended to be avoided, and the layout was amended to exclude these areas; • The detailed impact assessment specifically dealt with limits of knowledge identified by

Questions from the Need and Desirability Guideline	Response
	<p>specialists and/or lack of information through the assessment of ‘Level of Confidence’.</p> <ul style="list-style-type: none"> The EMPr provides numerous mitigation measures to ensure that even impacts that will be identified to be a ‘low’ risk would be further mitigated. <p>In all cases, the level of risk associated with the current knowledge (based on site visits and desktop studies and site assessments by the biodiversity, surface water, geohydrology and geotechnical specialists and the EAP), was deemed sufficient for providing a recommendation. It is therefore the EAP’s opinion that a risk averse and cautious approach was applied to the development.</p>
<p>How will the ecological impacts resulting from this development impact on people’s environmental right in terms of the following:</p> <ul style="list-style-type: none"> Negative impacts e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts? 	<p>The findings of the BIA, Surface Water Impact Assessment, Geohydrological Impact Assessment and In-depth geotechnical investigation were used to determine and assess negative and positive impacts (including impacts on people’s environmental right) related to the development. A detailed impact assessment, that assessed the proposal, alternative and no-go option, was compiled.</p> <p>Please refer to Section and Appendix 5 for the detailed impact assessment which identified the potential impacts on people’s environmental rights as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr was compiled during the EIA phase that include mitigation measures (refer to PART B of this report).</p> <p>In terms of negative impacts that may impact on people’s environmental rights the following were identified:</p> <ul style="list-style-type: none"> No health and safety impacts other than risks associated with normal construction were identified;

Questions from the Need and Desirability Guideline	Response
	<ul style="list-style-type: none"> • Health impacts during the operational phase as a result of mining will not increase significantly as there will not be an increase in production at the Zondereinde Mine. There will be a slight increase in the risk of health and safety impacts (e.g. increased risk of accidents on the road due to the further distance of the shaft to the mining operations). • There will be an increase in the visual impact of the Zondereinde Mine due to the Shaft, however, the mine is located within a mining area in terms of national, local and provincial planning documents and does not occur in or within 5 km from any national protected area or expansion area or tourism areas. It might have an impact on tourists travelling on the R510 and R511 to their destination within the tourism and conservation precinct; • No significant noise or odour impacts have been identified; (refer to). • Air quality; Dust emissions will not alter air quality and visibility on nearby roads significantly due to the nature of the soil. Emissions from vehicles and machinery (CO², NO_x, SO_x, VOC's etc.) will not impact on people's health as it will not increase significantly as a result of the proposed activity. • Groundwater and surface water quality may be impacted by spillage of hydrocarbons, oils, cement, sewage and other chemical materials if allowed to permeate groundwater or into stormwater runoff into natural systems, but will not be significant; • Land capability – minor loss of opportunity costs as the majority of the mining right area can still be used for agriculture and all efforts

Questions from the Need and Desirability Guideline	Response
	<p>were made to keep the surface disturbance to a minimum;</p> <ul style="list-style-type: none"> Improved access to resources as there will be an extended life of mine to sustain the local economy with multiplier effects. <p>Mitigation include all measures included in the EMPR (refer to Part B).</p>
<p>Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development’s ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?</p>	<p>In terms of linkages and dependencies between human wellbeing, livelihoods and ecosystem services, the following is applicable in the area where the development is proposed:</p> <ul style="list-style-type: none"> Livelihoods – mining: the proposed activities will sustain employment and the economy and will indirectly sustain current human wellbeing in terms of providing continued employment and all the benefits associated with the Social and Labour Plan (SLP) of the Northam Zondereinde Mine (refer to Appendix 6 for the SLP that was updated to include the proposed activities). The findings of the specialist studies and the detailed impact assessment indicated that there will not be a significant increase in existing impacts on human wellbeing as a result of any negative biophysical or socio-economic activities associated with the proposed activities, provided that the EMPr is strictly implemented and enforced. The findings of the specialist studies and detailed impact assessment indicated that ecosystem services will not be impacted on significantly. All negative impacts on clean water, air and biodiversity can be mitigated to acceptable levels (low to very low significance) (refer to Appendix 5). The heritage specialist identified features that may be impacted on. The specialist provided recommendations and mitigation

Questions from the Need and Desirability Guideline	Response
	<p>measures that if implemented, the impacts can be mitigated to acceptable levels.</p> <ul style="list-style-type: none"> • The area does not fall within a sensitive palaeontological area, as indicated by SAHRA in their comments (refer to Appendix 9.5); • The surface water specialist identified two aquatic resources that will be impacted on by the services corridor. The specialist concluded that the impacts can be mitigation to acceptable levels. • The geohydrological specialist concluded that no significant impacts on groundwater or surface water resources from the sinking of the shaft will caused by the proposed development, as long as mitigation measures are implemented. • In terms of the geotechnical information received (Appendix 7) it was confirmed that the shaft position and proposed technology used is the BPEO and most cost-effective option, due to the underlying geotechnical conditions and the location of the proposed facilities being closest to the current mining operations.
<p>Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?</p>	<p>Since the specialists and detailed impact assessment by the EAP found that the site is not sensitive, after mitigation, it was concluded that the proposed development will not negatively impact on the ecological targets of the area.</p> <ul style="list-style-type: none"> • No threatened ecosystems identified; • No species of conservation concern fauna and flora; • No sensitive aquifer systems were identified and the risk for groundwater pollution and / or depletion is low; • All ecological impacts identified can be mitigated to acceptable levels (low significance rating);

Questions from the Need and Desirability Guideline	Response
	<ul style="list-style-type: none"> • In terms of planning and conservation documents of international, national, provincial, regional and local importance no conservation objectives/targets/considerations for the specific area was identified, other than BPEO and mitigation measures included in the EMPr. <p>Please refer to Section 7 and Appendix 5 for the detailed impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr was compiled during the EIA phase that include mitigation measures (refer to PART B of this report).</p> <p>The EIAR/EMPR was informed by all the specialist studies conducted for the proposed activities.</p> <p>Positive impacts: Further, the proposed activities:</p> <ul style="list-style-type: none"> • will secure economic viability of the Zondereinde mine (300kozpa PGM and 9200 current staff); • will further extend Zondereinde LoM to approximately 35 years; • The proposed project will ensure that the current employment trend will be sustained; and • it will ensure continuation of the social and economic contributions made by the mine to its employees and the local community.
Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of	Two layouts were assessed, namely: <ul style="list-style-type: none"> • The Proposal; and • Alternative 1.

Questions from the Need and Desirability Guideline	Response
<p>the “best practicable environmental option” in terms of ecological considerations?</p>	<p>The following was considered during the alternative assessment:</p> <ul style="list-style-type: none"> • The findings of the specialist studies undertaken; • The results of the impact assessment; and • The need for the project. <p>Based on the findings of the specialist studies and impact assessment and considering the successful implementation of the EMPr, a recommendation as to the preferred alternative was made. The Proposed layout is the preferred alternative based on the fact that a part of the area is already disturbed. The proposed layout does not encroach onto any high sensitive areas (high sensitive heritage area and Koppie and buffer). All effort was made by the project team to develop the proposed alternative which only encroach onto the medium sensitivity heritage areas and low sensitive ecological areas.</p> <p>The detailed alternative assessment is described in Section 6.1</p>
<p>Promoting justifiable economic and social development</p>	
<p>What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?</p> <ul style="list-style-type: none"> • The IDP (and its sector plans’ vision, objectives, strategies, indicators and targets) and any strategic plans, frameworks or policies applicable to the area. • Spatial priorities and desired spatial patterns (e.g. need for integration of segregated communities, need to upgrade informal settlements, need for densification, etc.). • Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and 	<p>Please see Section 6 of the EIA Report which provides an overview of the socio-economic context of the area.</p> <p>Thabazimbi Local Municipality 2017/18 – 2021/22 Integrated Development Plan (IDP) and Waterberg District Municipality 2019/2020 Integrated Development Plan (Waterberg IDP)</p> <p>The proposed activities is aligned with the IDPs's objective to promote access to mineral resources, and is also well-placed to redress the impact of the economic decline in recent years by providing socio-economic opportunities within the Thabazimbi Local Municipality due to the extension of the LoM that will result from the Project. It is therefore clear that the</p>

Questions from the Need and Desirability Guideline	Response
<ul style="list-style-type: none"> Municipal Economic Development Strategy (“LED Strategy”). 	<p>proposed activities accord with the local and district IDPs.</p> <p>In terms of the Waterberg SDF (2009), the study area falls within a mining area, specifically an area with platinum potential and prioritised for mining.</p> <p>The Waterberg SDF is aligned with the Provincial Spatial Rationale and attempts to ensure alignment and integration between the six local municipalities, including Thabazimbi LM. The following proposal emanated from the District SDF that particularly affect the Thabazimbi municipal area: The south-eastern part of the LM, between Thabazimbi and Northam, was reserved for mining purposes (Draft Thabazimbi SDF Report (2014). The Thabazimbi SDF Map (2008) indicates that the study area is located within an active mining area and not within any other priority development node.</p> <p>The proposed activity is also in line with the Local Economic Development (LED) Strategies of both the Waterberg District and the Thabazimbi Local municipality. The strategies include unlocking the mineral resources including Platinum, the development will provide access to platinum ore, which will extend the LoM of the Zondereinde Mine and ensure sustained employment at the mine.</p> <p>The Thabazimbi Council adopted the LED Strategy 2015 with the intention to provide economic direction, growth and development, and to address issues of poverty and unemployment within its communities.</p> <p>In summary, the proposed development is in line with the planning of the area.</p>
<p>Considering the socio-economic context, what will the socio-economic impacts be of the development (and</p>	<p>Please refer to Section 7 and Appendix 5 for the detailed impact assessment which identified the potential impacts as well as the recommended and</p>

Questions from the Need and Desirability Guideline	Response
<p>its separate elements/aspects), and specifically also on the socio-economic objectives of the area?</p> <ul style="list-style-type: none"> • Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs? 	<p>suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for was compiled during the EIA phase that include mitigation measures (refer to PART B of this report). The assessment included an assessment of the socio-economic impacts of the development.</p> <p>As mentioned above, the proposed development is in line with the LED strategy of the District and Local Municipality. The SLP of the mine was also updated to include the proposed development (refer to Appendix 6). The SLP include plans and provision for skills development, assistance with home ownership, nutrition, employment security, local economic development internally and externally. Some initiatives include contributing to infrastructure development and maintenance, investing in education, contributing to income generation and poverty alleviation. Examples of opportunities and projects identified include:</p> <ul style="list-style-type: none"> • Building infrastructure to develop computer literacy skills for learners and teachers; • Complete phased infrastructure project at Mabogopedi Secondary School in Thabazimbi; • Partnership with Anglogold Ashanti in the development of an Agricultural project in OR Tambo labour sending District; • Thabang feeding scheme; and • Lunch packs for school children in the Northam area. <p>The implementation of the development will result in the extension of the LoM of the Zondereinde Mine and therefore the socio-economic benefits of the mine will also be extended.</p>
<p>How will this development address the specific physical, psychological, developmental, cultural and</p>	<p>As above.</p>

Questions from the Need and Desirability Guideline	Response
social needs and interests of the relevant communities?	
Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	<p>The proposed development sustain employment during construction and operation, which will result sustaining of economic multiplier effects and social upliftment in the local community as a result of the Mine. The establishment of the Shaft Complex will provide access to the Western Block of the Zondereinde Mine, which will result in the extension of the LoM of the Zondereinde Mine to approximately 35 Years. This extended LoM will sustain the current associated socio-economic benefits of the Zondereinde Mine and its Social and Labour Plan (SLP).</p> <p>The benefits of the SLP also include skills development to ensure sustainable income generation, even after the LoM as it is assisting not only employees in the mine, but also in the local communities. For example, the Zondereinde Mine will contribute to a computer literacy for teachers and learners and will also supply lunch packs, which enables learning in the short term and the skills learned, will improve chances of employment in the long term.</p> <p>Specialist studies concluded that any long term or permanent impact on the ecological services of the study area and its surroundings, on which the local community is dependent, can be mitigated to be within acceptable limits.</p>
In terms of location, describe how the placement of the proposed development will: <ul style="list-style-type: none"> • Result in the creation of residential and employment opportunities in close proximity to or integrated with each other; • Reduce the need for transport of people and goods; 	In determining the proposed location of the proposed development, a number of aspects have been considered including: <ul style="list-style-type: none"> • The need for access to the approved extended Mining Right Area i.e. the 'Western Block'; • Local spatial priorities and policies;

Questions from the Need and Desirability Guideline	Response
<ul style="list-style-type: none"> • Result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport); • Compliment other uses in the area; • Be in line with the planning for the area for urban related development; • Make use of underutilised land available with the urban edge; • Optimise the use of existing resources and infrastructure opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement); • Discourage “urban sprawl” and contribute to compaction/densification; • Contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs; • Encourage environmentally sustainable land development practices and processes; • Take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.); • The investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential); • Impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area; and 	<ul style="list-style-type: none"> • The ecological sensitivity (or lack thereof) of the site; • Geological conditions; • Location of heritage features and significance of the cultural aspects of the area; • Services required for the development; • Proximity to the existing mining infrastructure and major roads; • Existing and future Sense of Place of the area; • BPEOs; and • Access roads required for the development. <p>The following can also be noted:</p> <ul style="list-style-type: none"> • The proposed development will sustain current employment at the Zondereinde Mine during construction and operation; • Sustained employment will result in sustained economic multiplier effects and social upliftment in the local community; • It will extend the life of mine and socio-economic benefits of Zondereinde Mine and its SLP, which include provision for contribution towards the Northam Integrated Human Settlement Programme.

Questions from the Need and Desirability Guideline	Response
<ul style="list-style-type: none"> In terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement? 	
<p>How were a risk-averse and cautious approach applied in terms of socio-economic impacts?</p> <ul style="list-style-type: none"> What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge? Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development? 	<p>A risk-averse and cautious approach was undertaken throughout the EIA process including the compilation of specialist studies, the impact assessment and the EMPr. In particular, it was incorporated in the following ways:</p> <ul style="list-style-type: none"> The specialists identified limits of current knowledge including gaps, uncertainties and assumptions, which are clearly stated in both the specialist reports and EIA Report (refer to Appendix 10). The specialists evaluated the level of risk associated with the limits of current knowledge and all specialists concluded that the development may go ahead with implementation of recommended mitigation measures. The detailed impact assessment specifically dealt with limits of knowledge identified by specialists and/or lack of information through the assessment of 'Level of Confidence'. The EMPr provides numerous mitigation measures to ensure that even impacts that will be identified to be a 'low' risk would be further mitigated. <p>In all cases, the level of risk associated with the current knowledge (based on site visits and desktop studies and site assessments by the biodiversity, surface water, geohydrology and geotechnical specialists and the EAP), was deemed sufficient for providing a recommendation. It is therefore the EAP's opinion that a risk averse and cautious approach can be applied to the development.</p>
<p>How will the socio-economic impacts resulting from this development impact on people's environmental right in terms of the following:</p>	<p>Please refer to Section 7 and Appendix 5 for the detailed impact assessment which identified the potential impacts as well as the recommended and</p>

Questions from the Need and Desirability Guideline	Response
<ul style="list-style-type: none"> • Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimize, manage and remedy negative impacts? • Positive impacts. What measures were taken to enhance positive impacts? 	<p>suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for was compiled during the EIA phase that includes all mitigation measures. Including measures to enhance benefits. (Refer to Part B of this report).</p> <p>Northam Platinum have invested heavily in the conversion and upgrading of hostels through a structured Hostel Refurbishment Programme. In addition, several home ownership initiatives have been implemented to the benefit of the employees. Northam Platinum will comply fully with the Mining Charter scorecard element of housing and living conditions by on completion of the final single person accommodation units.</p> <p>A high-quality nutrition plan in conjunction with a consulting dietician has been developed, implemented and monitored. The plan includes three well balanced meals in in 24-hour cycle to employees residing at the mine’s hostels and is fully subsidised. Refer to the approved Social and Labour Plan in Appendix 6.</p>
<p>Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development’s socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?</p>	<p>Please refer to Section 7 and Appendix 5 for the detailed impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for was compiled during the EIA phase that include mitigation measures (refer to PART B of this report). The assessment included an assessment of the socio-economic impacts of the development.</p>
<p>What measures were taken to pursue the selection of the “best practicable environmental option” in terms of socio-economic considerations?</p>	<p>Orebody Access Options: Various main access options and sub options were investigated to arrive at the recommendations. These main options that were investigated were:</p>

Questions from the Need and Desirability Guideline	Response
	<ul style="list-style-type: none"> • Access via the existing shaft complex and westerly footwall haulages; • A new bratticed downcast and upcast vertical shaft for men and material; • New downcast vertical shaft for men, material and rock with upcast raisebore shafts; • Modification to the existing No 2 Shaft to utilise the upcast bratticed area for additional hoisting; • A combination of raisebored vertical shafts incorporating hoisting facilities from surface and a decline system to working levels. (The best option in terms of technology, time management and costs, as explained in detail in section 6.1). <p>Ten positions for the placement of new vertical main and raisebore shafts were investigated. Underground access, surface features and other land considerations indicated the current position as the only feasible raiseboring site.</p> <p>Two layouts were assessed, namely: The Proposal; and Alternative 1.</p> <p>The following was considered during the alternative assessment:</p> <p>The findings of the specialist studies undertaken; The results of the impact assessment; and The need for the project.</p> <p>Based on the findings of the specialist studies and impact assessment and considering the successful implementation of the EMPr, a recommendation as to the preferred alternative was made. The Proposed layout is the preferred alternative based on the fact</p>

Questions from the Need and Desirability Guideline	Response
	<p>that a part of the area is already disturbed. All effort was made by the project team to develop the proposed alternative which only encroach onto the medium sensitivity heritage areas and low sensitive ecological areas. Other alternatives as described above were all chosen for the least impact on the environment and natural resources.</p> <p>The detailed alternative assessment is described in Section.6.1.</p>
<p>What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the “best practicable environmental option” to be selected, or is there a need for other alternatives to be considered?</p>	<p>Please refer to Section 7 and Appendix 5 for the detailed impact assessment which identified the potential impacts, as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for was compiled during the EIA phase that includes all mitigation measures. Including measures to enhance benefits. (Refer to Part B of this report).</p> <p>The alternative assessment concluded that the BPEO has been selected as the preferred alternative and that all potentially feasible options have been assessed. The preferred activity, technology, location, layout and other alternatives will balance the impacts with the benefits, including impacts on and benefits to vulnerable and disadvantaged persons as described in this report and in the SLP.</p>
<p>What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?</p>	<p>The proposed development will sustain employment during construction and operation, which will result in sustaining economic multiplier effects and social upliftment in the local community and the continued implementation of the SLP that include benefits and services to meet basic human needs and to ensure human wellbeing and access thereto.</p>
<p>What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development’s life cycle?</p>	<p>In identifying the impacts associated with the development as well as the development of the EMPr, informed by specialist studies as listed in the</p>

Questions from the Need and Desirability Guideline	Response
	<p>Plan of Study for EIA (Section 7), the full lifecycle of the proposed development was assessed.</p> <p>Further, the full EMPr includes the roles and responsibilities for the development and will ensure that the responsibility of the implementation of the EMPr falls to the developer.</p>
<p>What measures were taken to:</p> <ul style="list-style-type: none"> • ensure the participation of all interested and affected parties; • provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation; • ensure participation by vulnerable and disadvantaged persons; • promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means; • ensure openness and transparency, and access to information in terms of the process; • ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge; and • ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were promoted? 	<p>A detailed public participation process is being undertaken as part of the EIA process. Please see Section 6.2 for more information on this process, which will include a public meeting to be held on 04 November 2019.</p>
<p>Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the</p>	<p>The proposed development will sustain employment of numerous individuals and it is not expected that</p>

Questions from the Need and Desirability Guideline	Response
<p>segments of the community (e.g. a mixture of low-middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area).</p>	<p>any categories of people will be disadvantaged by the development.</p>
<p>What measures have been taken to ensure that current and / or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?</p>	<p>The Mine has a Health and Safety Programme and is required by law to comply with the Mine Health and Safety Act. Some health and safety mitigation measures are also included in the EMPr.</p>
<p>Describe how the development will impact on job creation in terms of, amongst other aspects:</p> <ul style="list-style-type: none"> • the number of temporary versus permanent jobs that will be created; • whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area); • the distance from where labourers will have to travel; • the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits); and • the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.). 	<p>The following can be noted in regard to this:</p> <ul style="list-style-type: none"> • The access to the Western Block is essential to ongoing LoM at Zondereinde Mine; • It will secure economic viability (300KOZPA pgm and 9 200 current staff); • It will further extend LoM to approximately 35 years; • The proposed development will not result in any losses of any jobs and job-related opportunity costs are not expected.
<p>What measures were taken to ensure:</p> <ul style="list-style-type: none"> • That there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment; and • That actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures? 	<p>National Legislation i.e. NEMA, NWA, NHRA, NEMWA, NEMBA were consulted in the preparation of this Scoping Report and the EIA/EMPR report. Provincial guidelines also formed part of the literature review. Spatial development tools also aided the EAP to assess and provide information pertaining to the proposed development.</p> <p>Any comments received from I&APs or organs of state listed in the Table 6-1 are and will be included in the comments and response register.</p>

Questions from the Need and Desirability Guideline	Response
<p>Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?</p>	<p>The EMPr are site specific and include realistic and achievable mitigation measures which aim to reduce any negative impacts as well as to enhance any benefits associated with the project.</p>
<p>What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?</p>	<p>A detailed EMPr were compiled and includes detailed roles and responsibilities. In addition, a penalty system for contractors will also be included.</p> <p>Northam will also be required to make financial provision under the Financial Provision Regulations for rehabilitation, closure and any latent environmental impacts post -closure caused by the proposed activities. The updated closure cost assessment and proof of financial provision will be submitted to the Competent Authority.</p>
<p>Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?</p>	<p>Two layouts were assessed, namely:</p> <ul style="list-style-type: none"> • The Proposal; and • Alternative 1. <p>When assessing these alternatives, the following was assessed:</p> <ul style="list-style-type: none"> • The findings of the specialist studies to be undertaken; • The results of the impact assessment during the EIA phase; and • The need for the project. <p>The results of the impact assessment indicated that the Proposed layout is the preferred alternative as its impacts can be mitigated to acceptable levels. Mitigation measures are also achievable in terms of practicality and costs. Whereas Alternative 1 cannot be mitigated to acceptable levels and mitigation measures are extreme.</p>

6 MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE INCLUDING A FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE

(NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.)

6.1 Details of the development footprint alternatives considered

(With reference to the site plan provided as Appendix 8 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

- (a) the property on which or location where it is proposed to undertake the activity;*
- (b) the type of activity to be undertaken;*
- (c) the design or layout of the activity;*
- (d) the technology to be used in the activity;*
- (e) the operational aspects of the activity; and*
- (f) the option of not implementing the activity.)*

According to the 2014 EIA Regulations, alternatives are defined as:

“Different means of meeting the general purpose and requirements of the activity, which may include alternatives to the-

- property on which or location where the activity is proposed to be undertaken;
- type of activity to be undertaken;
- design or layout of the activity;
- technology to be used in the activity; or
- operational aspects of the activity;

-and includes the option of not implementing the activity.”

6.1.1 The type of activity to be undertaken

Various options to access the Zondereinde Western Block have been identified and analysed at a desktop study level.

- **Production Profile**

Only Merensky mining has been considered although UG2 mining will take place once the Merensky reserve has been depleted.

Two Merensky production profiles were considered in studies namely 150ktpm and 75ktpm although mine planning has dictated a final hoisting capacity of 115ktpm (Reef and waste).

- **Orebody Access Options**

Various main access options and sub-options were investigated to arrive at the recommendations. These main options that were investigated were:

- Access via the existing shaft complex and westerly footwall haulages;
- A new bratticed downcast and upcast vertical shaft for men and material;
- New downcast vertical shaft for men, material and rock with upcast raisebore shafts;
- Modification to the existing No 2 Shaft to utilise the upcast bratticed area for additional hoisting; and
- A combination of raisebored vertical shafts incorporating hoisting facilities from surface and a decline system to working levels.

- **Access via the existing shaft complex and westerly footwall haulages**

Access via the existing shaft complex and westerly footwall haulages was investigated and rejected due to the lack of additional capacity in the current shafts and excessive travelling distance from the existing infrastructure.

- **A new bratticed downcast and upcast vertical shaft for men and material**

Access for men, material and rock can be gained to the ore body via an 8.5m (Minimum) diameter bratticed downcast and upcast shaft, 2013m deep. The shaft will provide access to a mid-shaft pump station, production levels, a loading station and shaft bottom. The cost of a single large shaft of this type was considered excessive and the time to complete this shaft is too long being in excess of 10 years.

- **New downcast vertical shaft for men, material and rock with upcast raisebore shafts**

Access for men, material and rock can be gained to the ore body via a 7.5m (Minimum) diameter 2013m deep downcast shaft in combination with two 4.1m diameter upcast raisebore holes. The main shaft will provide access to a mid-shaft pump station, production levels, a loading station and shaft bottom. The cost of a single large shaft of this type was considered excessive and the time to complete this shaft is too long being in excess of 10 years.

- **Modification to the existing No 2 shaft to utilise the upcast bratticed area for additional hoisting**

Access for men, material and rock can be gained to the ore body via the existing No 2 Shaft. This can be done by equipping the upcast section of No 2 shaft with additional hoisting facilities and utilising existing haulages to access the ore body. The upcast section of No 2 Shaft will be replaced by 3 off 4.1m upcast ventilation shafts. The concern with excessive travelling distance from the existing infrastructure remains.

- **A combination of raisebored vertical shafts with hoisting facilities and a decline system to the working levels**

Access for men, material and rock can be gained to the ore body via raisebored shafts into the new mining block. Three downcast and two upcast shafts are required. A decline system will be developed from these shaft bottoms to access the production levels.

This option provides access to the ore body on time and in the most economical way.

6.1.2 Property on which or location where the activity is proposed to be undertaken

- **Position of new Shafts**

Ten positions for the placement of new vertical main and raisebore shafts were investigated. Underground access, surface features and other land considerations indicated the current position as the only feasible raiseboring site.

6.1.3 Technology to be used in the activity

- **Shaft Sinking Methods**

Various sinking methods were investigated. Shafts up to a diameter of 4.6m can be raisebored which allows access to upper levels of the mine. The depths in the region of 1350m are yet untested.

Blind sinking of shafts of diameters and depths proposed in the options are commonplace.

6.1.4 Design or layout of the activity

In line with the Regulations, the following alternatives have been assessed for the proposed development:

One layout alternative to the Proposed layout (Figure 3-2) was developed and both options are assessed in detail in the impact assessment (Table 7-1). In order to understand the development of the proposed site layout and the alternative site layout, a summary of the site constraints identified by the professional team (and then considered in the layouts) are provided.

The following was considered during the alternative assessment:

- The findings of the specialist studies undertaken;
- The results of the impact assessment; and
- The need for the project.

Based on the findings of the specialist studies and impact assessment and considering the successful implementation of the EMPr, a recommendation as to the preferred alternative was made. The Proposed layout is the preferred alternative since the proposed layout avoids encroachment onto any high sensitive areas (high sensitive heritage area and Koppie and buffer). All effort was made by the project team to develop the proposed

alternative which only encroach onto the medium sensitivity heritage areas and low sensitive ecological areas (Refer to Figure 6-30, Figure 6-31 and Figure 6-29).

6.1.5 The No -Go Option

The option of not establishing the Shaft Complex, also known as the “No-go option” will result in the Western Block of the Mining Right Area not being as accessible as it could be and may potentially decrease the LoM of the Zondereinde Mine. The Zondereinde Western Block will also require additional ventilation, which can be provided by the proposed activity.

Should the LoM decrease, the benefit of not securing the economic viability of the Zondereinde Mine (300kozpa PGM and 9200 current staff) through the Zondereinde Western Block may not be realised, including the socio-economic benefits arising from the Zondereinde Mine and its SLP.

6.2 Details of the Public Participation Process Followed

(Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.)

6.2.1 Objectives and Purpose of Public Participation

The purpose of the public participation process is to provide information regarding the proposed project to any potentially interested and/or affected person for use and consideration throughout the environmental assessment process. The information usually involves a combination of the technical project scope, environmental attributes and sensitives, cultural and heritage aspects as well as socio-economic factors that may be potentially beneficial or problematic to various role players.

The dissemination of such information is intended to assist the public with understanding how the proposed project and/or development may impact them and the environment in either a positive and/or negative manner, and especially where impacts are determined or perceived as significantly high, how such impacts may be influenced by project changes (layout or design aspects) or management measures may be implemented to reduce or minimise the significance of any identified impacts.

As a registered I&AP, members of the public of any affiliation are awarded the opportunity to remain informed of the steps, actions and decisions made within the environmental impact assessment process and are able to actively participate by reviewing all information provided by the EAP to the I&AP's in a reasonable period in order to provide comments, objections, suggestions or any other information that will assist the project to develop in a favourable for all manner or contribute to the competent authority's knowledge in order to make an informed decision on the application for environmental authorisation.

6.2.2 Notification Phase of Public Participation

The public participation process commenced with identifying and notifying all potential Interested and Affected Parties (I&AP's). Background information documents and comment forms were provided as a basic source of information or notices were viewed and potential interested and/or affected members of the public were invited to register as I&AP's for the remainder of the Scoping and Environmental Impact Reporting phases of the process.

6.2.2.1 Identified I&AP's

The following potential I&AP's were identified:

- Department of Mineral Resources;
- Department of Human Settlements, Water and Sanitation;
- Thabazimbi Local Municipality;
- Ward Councillors (Wards 5, 6, 8 & 11);
- South African Heritage Resources Agency (SAHRA);
- Limpopo Heritage Resources Agency (LIHRA);
- Limpopo Department of Economic Development, Environment and Tourism (LEDET);
- Limpopo Department of Rural Development and Land Reform (DRDLR);
- Limpopo Department of Public Works, Roads and Infrastructure;
- Roads Agency Limpopo (RAL);
- South African National Roads Agency Limited (SANRAL);
- Department of Environment, Agriculture, Forestry and Fisheries (DEAFF) (previously known as The Department of Agriculture, Forestry and Fisheries (DAFF));
- Surrounding Landowners / Occupiers; and
- Other interested and affected parties

6.2.2.2 Newspaper Notice

A notice was published in the following newspaper on the specified date during the application and scoping phase of the authorisation process: Local: The Platinum Bushvelder newspaper published on 28 June 2019. Please refer to Appendix 9.2 for proof of the newspaper notice that was published on 28 June 2019.

6.2.2.3 Site Notice

Three site notices were placed on the boundary or close to the study area on 01 July 2019:

- On the northern boundary of the study area; and
- Off the R510 at the intersection with the unnamed road leading to the entrance of the Northam Zondereinde Mine.

Please refer to Appendix 9.3 for proof of Site Notices placed on or close to the study area on 01 July 2019.

6.2.2.4 Written Notifications

The landowners of the property on which the shaft complex is proposed was notified in writing in the form of a letter and attached BID, containing information on the activities and process to be undertaken.

The surrounding landowners and/or occupiers and organs of state were notified of the proposed development and environmental application in writing via email on 01 July 2019.

Proof of Written Notification to landowners, surrounding landowners, organs of state and other I&AP's are included in Appendix 9.4.

6.2.2.5 Comments Raised by Interested and Affected Parties

Comments received to date are summarised in the Comments and Response table attached in Appendix 9.5. Copies of comments are included in Appendix 9.6

6.2.3 Scoping Phase Comment Period

The Scoping Report was made available for comment to all registered interested and affected parties and relevant organs of state for a period of 30 days from 10 July 2019 to 11 August 2019.

All I&AP's were notified via email and provided with access to the Scoping Report. Proof of delivery and notification is included in Appendix 9.7.

All comments received during this period were considered and incorporated into the Final Scoping Report and documented in the Comments and Response Report attached in Appendix 9.5.

6.2.4 Impact Assessment Phase Notification and Comment Period

Upon acceptance of the scoping report by DMR on 16 October 2019, the applicant/EAP proceeded and continued with the tasks contained in the plan of study.

6.2.4.1 Newspaper Notice

Due to the inclusion of some activities and the exclusion of some activities and amended application form submitted to the department, a notice was published in the following newspaper on the specified date during the EIA Phase of the authorisation process: Local: The Platinum Bushvelder newspaper published on 18 October 2019. Please refer to Appendix 9.2 for proof of the newspaper notice that was published on 18 October 2019.

6.2.4.2 Site Notice

Two site notices were placed on the boundary or close to the study area:

- On the northern boundary of the study area; and
- Off the R510 at the intersection with the unnamed road leading to the entrance of the Northam Zondereinde Mine.

Please refer to Appendix 9.3 for proof of Site Notices placed on or close to the study area.

6.2.4.3 Written Notifications

The landowners of the property on which the shaft complex is proposed was notified in writing in the form of an email and / or sms of the amended listed activities.

The surrounding landowners and/or occupiers and organs of state were notified of the proposed development and environmental application in writing via email or sms on 18 October 2019.

Proof of Written Notification to landowners, surrounding landowners, organs of state and other I&AP's are included in Appendix 9.4.

6.2.4.4 EIA/EMPR Report Comment Period

Subsequently an impact assessment an Environmental Management Programme report (this report) was compiled and are made available to all registered interested and affected parties and relevant organs of state for a period of 30 days. **This comment period is from 28 October 2019 to 26 November 2019.** The notice above included the information on the commenting period. Comments received and responses to comments will be included in the final EIA/EMPR report to be submitted to DMR.

6.2.5 Public Meeting

A public meeting will be held at **11h00 on 04 November** at the Recreational Hall of the Setaria Village at the Northam Zondereinde Mine, to ensure the local community is involved. The date was chosen to ensure the Interensted and Affected Parties receive the EIA/EMPR report prior to the meeting.

During the Public Meeting a presentation including a summary of the Scoping /EIA process will be delivered. All comments and or concerns raised at the meeting will be minuted and incorporated into the final Comments and Responses report to be submitted with the Final EIA/EMPR to be submitted to the Competent Authority for decision making.

6.2.6 Outcome of the Decision

Registered I&AP's will be notified in writing of the outcome of the decision that the environmental authorisation is refused/granted at the end of the impact assessment phase. The notification will include details of the process and timeframes in which to appeal the outcome of the decision made by the competent authority, DMR.

6.3 Summary of issues raised by I&As

(Complete the table summarising comments and issues raised, and reaction to those responses)

Table 6-1: Summary of issues raised by I&As

Interested and Affected Parties <i>(List the names of persons consulted in this column, and mark with an X where those who must be consulted were in fact consulted.)</i>		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status <i>(consensus dispute, not finalised, etc)</i>
<u>AFFECTED PARTIES</u>					
Landowner/s	X				
Lawful occupier/s of the land – Details provided in the Interested and Affected Parties Database (Appendix 9.1)	X		Northam Platinum Limited. No comments received to date.		
Landowners or lawful occupiers on adjacent properties – Details provided in the Interested and Affected Parties Database (Appendix 9.1)	X		No comments received to date.		
Municipal councillor	X		No comments received to date.		
Local Municipality	X	24/07/2019	Acknowledges the Draft Scoping Report and will not be objecting any aspect of the report, however, a copy of the Final Scoping Report must be made available to the Municipality, as well as other engagement processes and information as the processes continue. Further comments to be	Thank you for your interest and comments. A copy of the Final Scoping Report will only be made available electronically, however, a copy of the Draft Environmental Impact Assessment Report will be delivered to your offices. Comments have been received from LEDET.	Consensus

Interested and Affected Parties <i>(List the names of persons consulted in this column, and mark with an X where those who must be consulted were in fact consulted.)</i>	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status <i>(consensus dispute, not finalised, etc)</i>
		furnished by the Limpopo Department of Economic Development, Environment and Tourism (LEDET).		
District Municipality	X	No comments received to date.		
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DHSWS etc.	X			
Department of Human Settlements, Water and Sanitation	X	The draft scoping report was delivered to the Department proof hereof is included in Appendix 9.7 No comments have been received to date.		
Limpopo Road Agency	X	No comments received to date.		
South African Roads Agency Limited	X	No comments received to date.		
Eskom	X	No comments received to date.	Confirmation of services from Eskom will be included in the Final EIR.	
South African Heritage Resources Agency	X	08/08/2019 The SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit notes that several archaeological sites are known to exist and are on record for the larger study area. These sites consist of Middle Stone Age (MSA) open air sites, Late Iron Age (LIA) stone walled settlements and	A Phase 1 HIA will be conducted during the EIA phase of the application and will be uploaded onto the SAHRIS system for review by SAHRA.	Not finalised

Interested and Affected Parties <i>(List the names of persons consulted in this column, and mark with an X where those who must be consulted were in fact consulted.)</i>		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status <i>(consensus dispute, not finalised, etc)</i>
			<p>graves. The APM unit therefore requests that a Heritage Impact Assessment (HIA) be conducted, by a suitably qualified archaeologist, in terms of section 38(3) and 38(8) of the National Heritage Resources Act (NHRA), Act 25 of 1999 as part of the EA process.</p> <p>No palaeontological studies are required as the development area is of insignificant palaeontological sensitivity according to the SAHRIS PalaeoMap.</p> <p>The draft Environmental Impact Assessment (EIA), when it is made available for public review, must be submitted with its appendices to the case on SAHRIS. Further comments will be made when the requested HIA report and environmental documents have been attached to the case for review.</p>	<p>Noted.</p> <p>Noted. The EIAR with its appendices will be uploaded onto the SAHRIS system.</p>	
Limpopo Heritage Resources Agency	X		No comments received to date.		
Communities			No comments received to date.		
Dept. Land Affairs	X		No comments received to date.		

Interested and Affected Parties <i>(List the names of persons consulted in this column, and mark with an X where those who must be consulted were in fact consulted.)</i>		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status <i>(consensus dispute, not finalised, etc)</i>
Department of Rural Development and Land Reform					
Traditional Leaders			The ward councillor was informed, and no comments received to date from traditional leaders in the area.		
Dept. Environmental Affairs – Limpopo Department of Economic Development, Environment and Tourism (LEDET)	X	02/08/2019	The headings in Table 5 (3.1 Listed Activities) lists 2010 EIA Regulations Listing Notices. Kindly amend to reflect correct listing notices as reflected elsewhere in the table.	The headings in the table were amended.	Resolved
			The project description should be detailed to clearly illustrate why the listed activities indicated, are relevant. Kindly clarify which aspects of the project triggers activity 6 of Listing Notice 2 of 2014. Also indicate which other permits or licenses are required and whether or not they have been applied for.	The project description has been updated in the final report. Activity 6 of Listing Notice 2 is relevant to the disposal of waste or water containing waste into pollution control dams, for which a water use licence or an amendment to a water use licence will be required. The amendment of the Northam Zondereinde Mine Integrated Water Use Licence, will be applied for during the EIA phase of the application, when detailed information is available. No other licences or permits in terms of any environmental legislation are required for the proposed activities.	Resolved
			Please note that in terms of regulation 7 (Q of the Environmental Impact Assessment (EIA) Regulations of 2014, as amended, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, it is required that	The amendment of the Northam Zondereinde Mine Integrated Water Use Licence, will be applied for during the EIA phase of the application, when detailed information is available. No other licences or permits in terms of environmental legislation are required for the proposed activities.	Resolved

Interested and Affected Parties <i>(List the names of persons consulted in this column, and mark with an X where those who must be consulted were in fact consulted.)</i>	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status <i>(consensus dispute, not finalised, etc)</i>
		application for, if any, atmospheric emission license required in terms of the National Environmental Management: Air Quality Act, 2004 (Act N0.39 of 2004), water use license in terms of National Water Act, 1998 (Act n0.36 of 1998), etc. be run concurrently with the EA application process.		
		In order to confirm whether Listing Notice 3 activities may be applicable, it may have to be established if the Madeleine Robinson Nature Reserve was proclaimed as such or not.	In terms of the Limpopo Conservation Plan the Madeleine Robinson Nature Reserve is not proclaimed as a protected area (refer to Figure 14 of the Scoping Report). Further, the Department of Environmental Affairs (DEA) maintains a Protected Areas Register (PAR) as required by the National Environmental Management: Protected Areas Act (Act 57 of 2003) [as amended] (NEMPAA). In order to confirm that the aforementioned reserve was not proclaimed, the PAR was assessed (https://portal.environment.gov.za/portal/apps/webappviewer/index.html?id=54487a82babf4a7e9ab3a42aacabdf84). In terms of the PAR, the Madeleine Robinson Nature Reserve is not a proclaimed protected area in terms of NEMPAA. The PAR did however indicate that the Sharpe Private Nature Reserve, located approximately 5 km south-east of the study area, is a proclaimed protected area in terms of NEMPAA. Based on this information, an assessment was undertaken to confirm whether any listed activities in	Resolved

Interested and Affected Parties <i>(List the names of persons consulted in this column, and mark with an X where those who must be consulted were in fact consulted.)</i>		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status <i>(consensus dispute, not finalised, etc)</i>
				<p>Listing Notice 3 would be triggered. This assessment indicated that no further activities (than those already identified and included in the Application form) are triggered by the proposed development:</p> <ul style="list-style-type: none"> • The only listed activity that the proposed development may potentially trigger is Activity 4 of Listing Notice 3 (GNR 985) (LN3), which involves the development of a road wider than 4 m. • Based on the layout and desktop information available, that the proposed road does not fall within any National Protected Areas Expansion Strategy focus area or within the 5 km buffer of a protected area (please note that as the reserve is not a national park, only the 5km buffer applies). • Whilst part of the footprint of the proposed development and/or service installations (other than the road) may fall within the 5 km buffer, these activities are not listed in LN3. • Please refer to the attached figure which indicates Protected areas, the associated 5km buffers as well as the NPAES areas in relation to the proposed road. This figure will be included in the Final Scoping Report. Please note that the sensitivity assessment will be updated during the EIA phase once the layout has been finalised and all specialist studies completed. 	

Interested and Affected Parties <i>(List the names of persons consulted in this column, and mark with an X where those who must be consulted were in fact consulted.)</i>	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status <i>(consensus dispute, not finalised, etc)</i>
		It appears as though there is evidence of disturbance of the site. Has the mine commenced with construction?	The disturbance is part of specialist investigations - required for the EIA phase - involving geo-technical drilling and deep geological drilling for which platforms had to be built. This information is imperative to the EIA and will inform the impact assessment. It will also inform whether the project will be feasible and practically executable. The area of disturbance is less than 1 hectare and does not fall within any areas listed in notice 3.	Resolved
Other Competent Authorities affected		No comments have been received to date. The department of Environment, Forestry and Fisheries in Limpopo was notified of the application and will be provided with a copy of this report for review.		
<u>OTHER AFFECTED PARTIES</u>				
No comments received to date.				
<u>INTERESTED PARTIES</u>				
No comments received to date.				

6.4 The environmental attributes associated with the development footprint alternatives

(The environmental attributes described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

6.4.1 Biophysical environmental attributes

6.2.1.1 Climate

This section was updated from the Scoping Report with information contained in the Geohydrological Report from the Specialist attached in Appendix 10.1.

The study area is situated in the Limpopo Province, a semi-arid rainfall region which is characterised by cool, dry winters (May to August) and warm, wet summers (October to March). Temperatures vary from an average monthly maximum and minimum of 31.8°C and 19.4°C for January to 23.7°C and 2.7°C for June respectively.

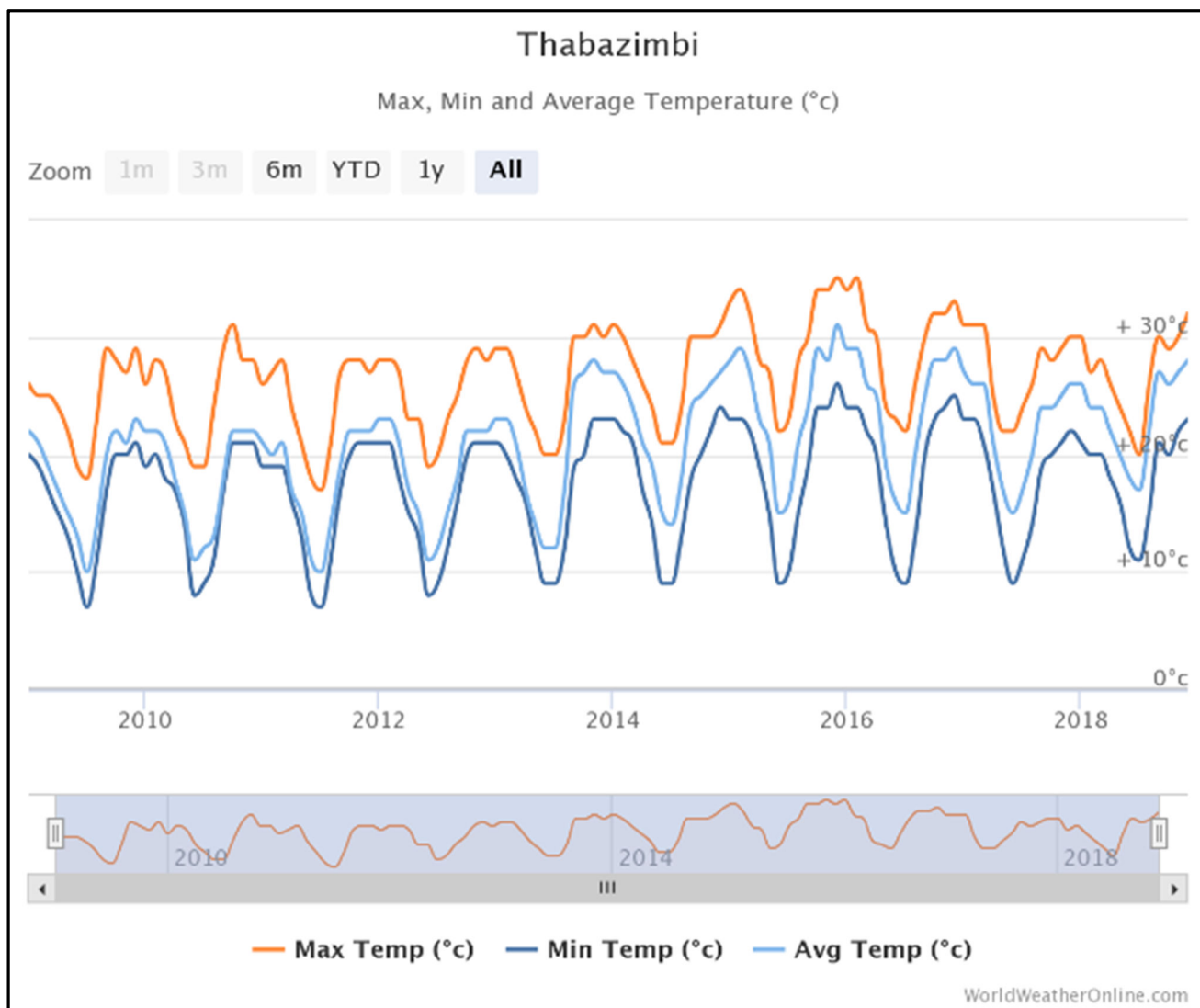


Figure 6-1: Maximum, minimum and average temperatures for Thabazimbi over a 10-year period (reproduced from www.worldweatheronline.com)

The wind rose for Thabazimbi shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from South-West (SW) to North-East (NE). The wind blows for an average of 553 hours/year at >1 km/hour, 863 hours/year at >5 km/hour, 385 hours/year at >12 km/hour, 90 hours/year at >19 km/hour and 4 hours/year at >28 km/hour in Thabazimbi.

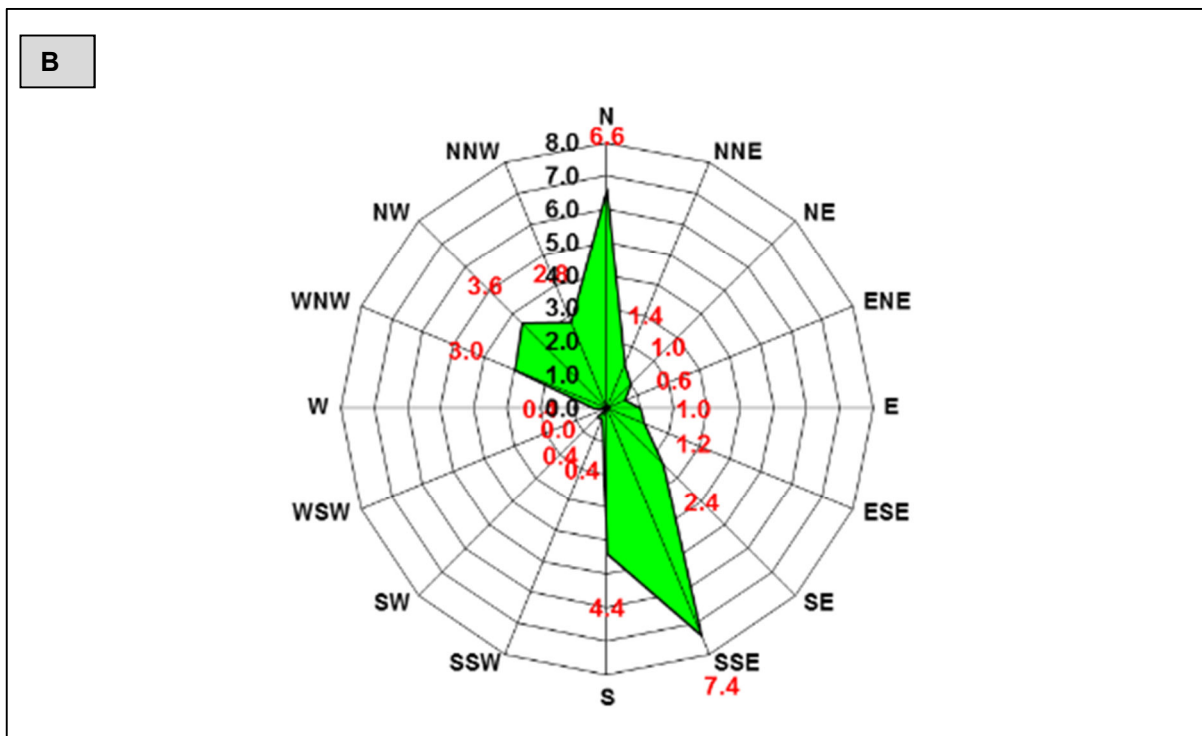
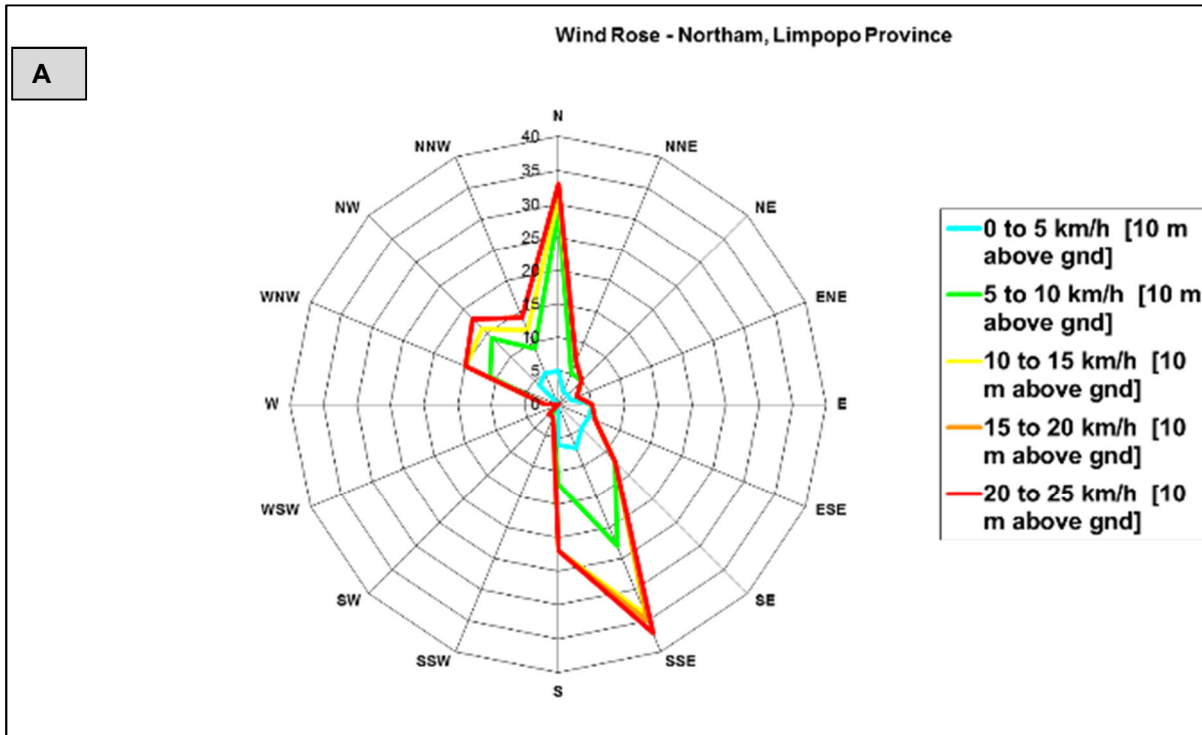


Figure 6-2: Wind rose for Limpopo Province based on hour sum; B. Average Wind Speed for Limpopo Province (reproduced from www.meteoblue.com, 2017)

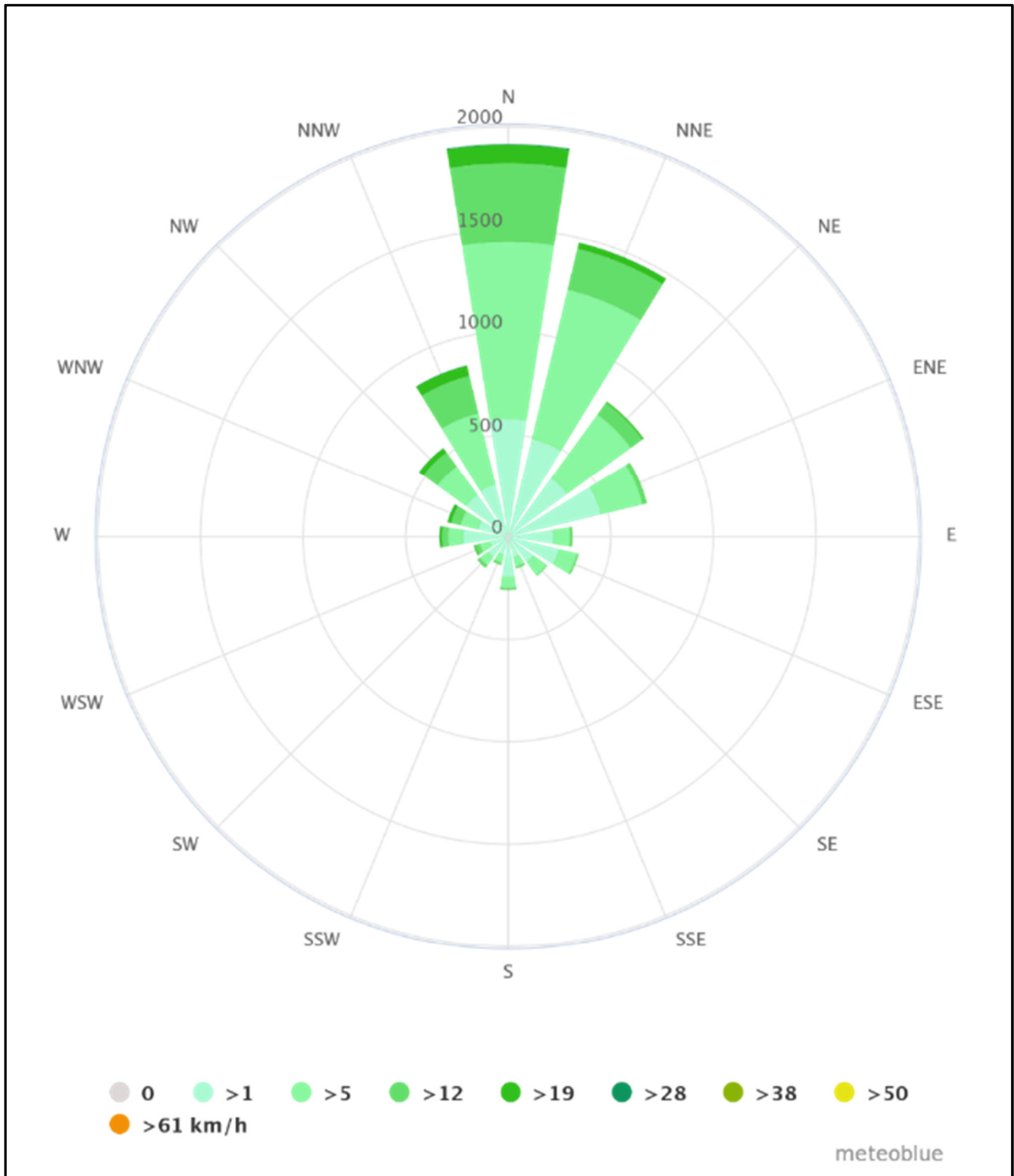


Figure 6-3: Wind rose for Thabazimbi (reproduced from www.meteoblue.com, 2017)

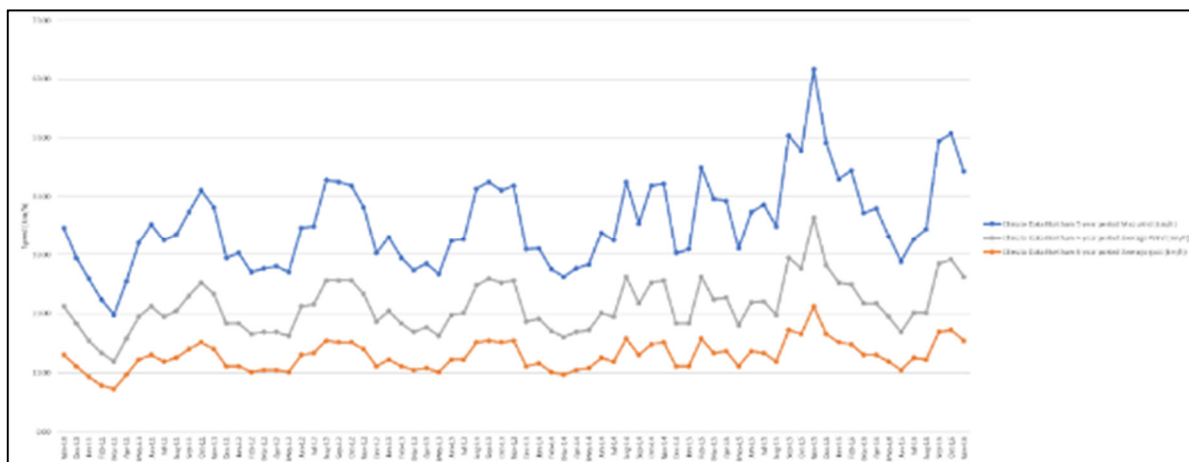


Figure 6-4: Gusts, average wind and maximum wind speeds recorded over a 5-year period for Limpopo (reproduced from www.worldweatheronline.com)

Winds are variable both in terms of the time of day as well as seasons. Wind (10m) blows mostly from the SSE with a 5%, while for 20 to 25 km/h (10m) 1%. In comparison, winds based on the hourly sum blow from the SSE and secondary wind blows from N and NW. The predominant wind direction for the project area is N and SSE (www.meteoblue.com) [Date accessed: 13 June 2017].

When comparing the average wind, gusts and maximum wind speeds for Northam, it is evident that for the 5-year period the trend is that the average winds, gusts and maximum wind blows predominantly during October months. March months tend to indicate the lowest wind days (www.worldweatheronline.com) [Date accessed: 12 June 2017].

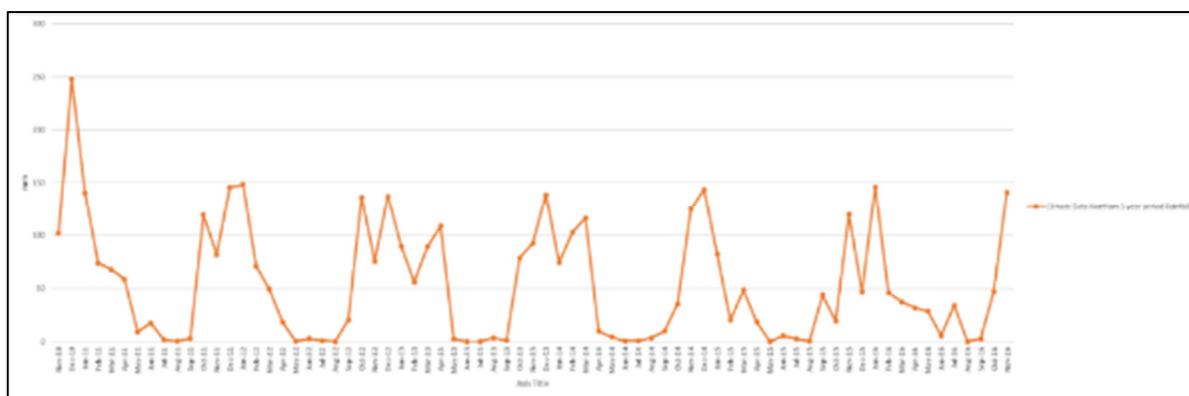


Figure 6-5: Average rainfall for Limpopo in millimetres for a period of 5 years (reproduced from www.worldweatheronline.com)

Rainfall: Due to the warmer season, rainfall is usually in the form of convective thunderstorms, which are usually accompanied by thunder and lightning, strong winds, heavy rainfall and the occasional hail. Rainfall varies significantly over short distances because of uneven surface heating and upward atmospheric streams. Figure 6-5 shows the average rainfall for Limpopo in millimetres for a period of 5 years. This figure clearly indicates that rainfall mainly occurs during the summer months in Northam, Limpopo Province (www.worldweatheronline.com) [Date accessed: 12 June 2017].

According to the rainfall data available for Northam, Limpopo Province for the above 5-year period, 2010 was recorded as the wettest year with 248.12mm rainfall. The driest year was 2013 when only 661.07mm rainfall was recorded (www.worldweatheronline.com) [Date accessed: 12 June 2017].

Rainfall station data for Northam indicate average annual rainfall of between 500 and 550 mm/a. However, the evapotranspiration in the study area is expected to be relatively high compared to the average annual rainfall, thereby reducing the gross recharge from rainfall. Effective recharge to the aquifers ranges between 1 and 2 % of the mean annual rainfall.

Figure 6-6 shows the average rainfall and temperature data for Northam.

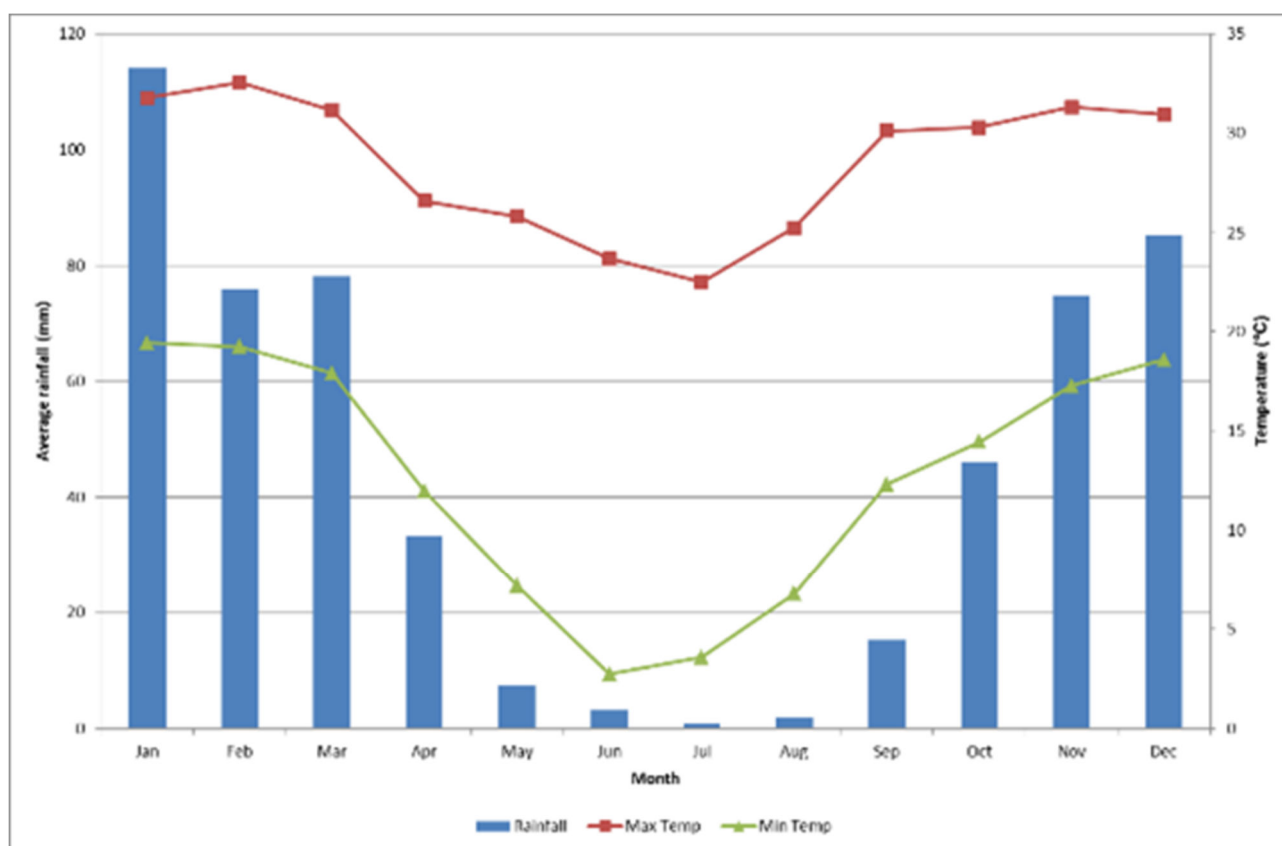


Figure 6-6: Rainfall and temperature distribution in Northam

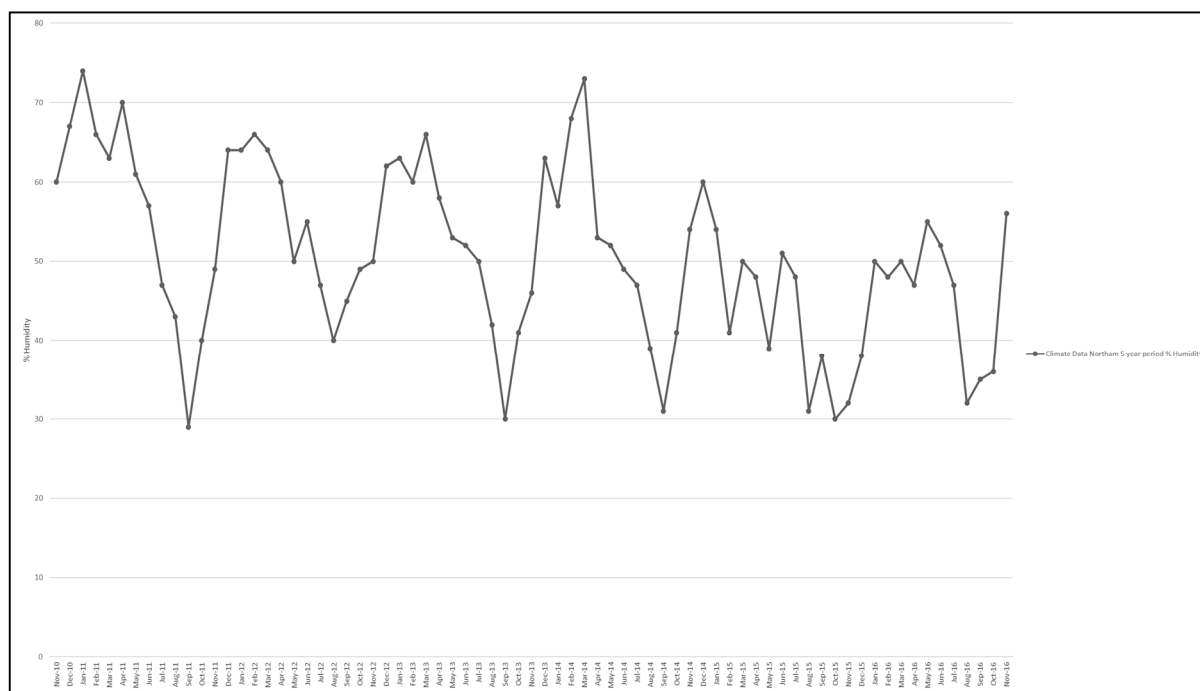


Figure 6-7: Percentage humidity for Limpopo Province for a 5-year period (reproduced from www.worldweatheronline.com)

Humidity: The humidity in Limpopo Province for a 5-year period from November 2011 to November 2016 is illustrated in Figure 6-7. The humidity peaked every year during December/January, with lowest humidity percentages during the September months of each year (www.worldweatheronline.com) [Date accessed: 12 June 2017].

Evaporation: Evaporation data for the area is recorded at Thabazimbi, which is located approximately 35km north of Zondereinde Mine. Gross annual ‘A’ pan evaporation is 2 479.1mm/a. If this is compared with the average annual rainfall, it is obvious that Zondereinde Mine is located in an extreme water deficit area, with average evaporation exceeding rainfall 4.4 times. A summary of the climate data for the Zondereinde Mine and surrounding areas is presented in Table 6-2. This information is sourced from the 1998 EMP and the Northam Weather Station data (up until 2012).

Table 6-2: Temperature, rainfall and evaporation data summary

MONTH	AVERAGE RAINFALL (mm)	MAX RAINFALL IN 24HRS mm (date)	MEAN MONTHLY TEMP °C	AVERAG DAILY TEMPERATURES °C		MEAN MONTHLY EVAPORATION (mm)
				MAX	MIN	
Jan	110.0	69 (31/01/1955)	25.0	31.3	18.8	247.3
Feb	95.5	75 (13/02/1955)	24.3	31.0	17.7	213.1
Mar	80.5	73 (21/03/1956)	22.8	29.3	16.4	195.7
Apr	36.4	46 (03/04/1938)	19.6	27.6	11.6	182.6
May	9.39	32 (07/05/1952)	15.6	25.0	6.2	152.6
Jun	6.45	31 (10/06/1957)	12.6	22.6	2.6	152.6
Jul	2.59	14 (16/07/1939)	12.8	23.1	2.6	146.1

MONTH	AVERAGE RAINFALL (mm)	MAX RAINFALL IN 24HRS mm (date)	MEAN MONTHLY TEMP °C	AVERAG DAILY TEMPERATURES °C		MEAN MONTHLY EVAPORATION (mm)
				MAX	MIN	
Aug	4.14	21 (24/08/1957)	16.5	27.3	5.8	220.9
Sep	10.6	38 (25/09/1942)	20.4	29.1	11.7	219.4
Oct	51.9	62 (17/10/1944)	23.4	31.2	15.7	276.5
Nov	86.3	185 (29/11/1939)	24.0	31.2	16.9	217.5
Dec	109.8	133 (30/12/1955)	24.4	31.1	17.8	254.8

6.2.1.2 Topography and Drainage

The study area lies within the Bushveld Igneous Complex that is characterised by a relative flat landscape, with intermittent typical hills and torso.

Maps relevant to the study area include:

- 1: 50 000 scale topographical maps (2427CC and 2427CD);
- 1: 250 000 scale geological map (2426 - Thabazimbi);
- Surface layouts provided by Northam;
- Satellite image of the area (Google Earth); and
- Other published data on the study area.

The proposed 3 shaft development study area is situated in a relatively flat area with an elevation that ranges between 960 and 980 mamsl. It slopes gently to the north and the northwest. There is a cluster of low hills located to the south.

The 3 Shaft study area falls within the A24F Quaternary Catchment, within the Limpopo Water Management Area (WMA). The immediate 3 Shaft area drains into the Bierspruit, located west of the study area, via unnamed, non-perennial tributaries. There are a number of non-perennial rivers that are seasonal and flow only after periods of rainfall.

6.2.1.3 Geology

Regional Geology: The information gathered from the Geotechnical Report (a Geotechnical Report for Northam Platinum Limited: Northam Zondereinde, Raisebore Surface Infrastructure, Jones & Wagener, 2019 (Appendix 7.1), indicates that the site is underlain by gabbro, noritic at base and locally anorthositic, belonging to the Bushveld Igneous Complex.

Local Geology and Soils: The report is a result of a preliminary geotechnical investigation that was conducted in May 2019. The report indicates that very soft to soft rock norite is present across the site from a depth of between 1.6 m and 2.2 m. The profile as encountered in the borehole indicates that soft to medium hard rock norite extends to a depth of 4.37 m. This is underlain by very hard rock norite that extends

to a depth of at least 51.82 m. A layer of very hard rock anorthosite is present from a depth of 23.96 m to 24.56 m. Groundwater seepage was not encountered in any of the test pots excavated during the investigation. The standing groundwater level in the borehole couldn't be determined at the time of the investigation. The borehole was terminated at a depth of 51.82 m in very hard rock norite.

The laboratory test results of the samples taken indicated the following:

Residual Norite

- According to the Unified Soil Classification (USC) the residual norite is classified CH, indicating that the material is a clay with high plasticity.
- The tested material has a Plasticity Index (PI) ranging between 45 to 49 and has a very high potential expansiveness rating.
- The silty clay, residual norite, is not classifiable as per the COLTO specifications and the material is considered as worse than G9 quality material.
- The residual norite has a PRA classification of A-7-5 which indicates that the material is a highly compressible silty clay, with a fair to poor subgrade rating.
- The specific gravity of the silty clay residual norite ranges between 2.727 and 2.762.

Crushed soft rock norite

- According to the Uniaxial Compressive Strength (UCS), the crushed soft rock norite is classified SC-SM, indicating that the crushed rock material is a clayey sand or silty sand.
- The tested material has a Plasticity Index of 8 and a low potential expansiveness rating.
- The crushed soft rock norite is classified as G6 quality material according to COLTO specifications.
- The crushed soft rock norite has a PRA classification of A-2-4 which indicates that the material is a sand and gravel with low plasticity silty fines and has an excellent to good subgrade rating.
- The specific gravity of the crushed soft rock norite is 2.814.

It must be noted that the UCS testing was carried out on intact sections of rock taken from the corebox. The results, therefore, reflect the strength of the more competent and harder sections of the rock material and do not reflect the strength of the rock mass. The rock mass strength is influenced by the rock mass properties such as the presence of discontinuities and weaker layers.

Geotechnical evaluation:

Founding Conditions

The general profile across the site comprises firm becoming stiff, shattered and slickensided, silty clay residual norite that contains occasional hard rock norite corestones up to 1.2m in diameter.

The residual norite extends to a depth of between 1.6m and 2.2m.

The laboratory test results indicate that the silty clay, residual norite is highly expansive. Assuming a scenario with a 2.2m thick layer of highly expansive residual norite, the estimated heave is calculated as approximately 120mm, using the method suggested by Van der Merwe (1964).

The residual norite is therefore not considered a suitable founding medium due to the high clay content and the highly expansive nature of the material. Furthermore, consolidation settlement is also expected in the silty clay, residual norite.

Very soft to soft rock norite is present across the site from a depth of between 1.6m and 2.2m.

Medium hard rock norite was generally encountered from a depth of between 1.8m and 2.7m.

The following allowable bearing pressures can be assigned to varying degrees of rock hardness:

- Very soft rock norite – 500kPa
- Soft rock norite – 1MPa
- Medium hard rock norite – 5MPa

Refusal of the tracked excavator occurred in all the test pits at a depth of between 1.8m and 2.7m on medium hard rock norite. The norite rock is considered a competent founding medium.

Groundwater

Groundwater seepage was not encountered in any of the test pits excavated during the investigation. The standing groundwater level in the borehole was not recorded on completion of drilling.

The sidewalls appeared stable in all of the test pits and in-situ profiling was conducted.

Excavation Conditions

Based on the SABS 1200 excavation classifications, 'soft' excavation conditions can generally be expected across the site in the residual norite and very soft to soft rock norite to a depth of between 1.8m and 2.7m.

'Hard' excavation conditions can be expected beyond these depths within the medium hard rock to very hard rock norite.

'Soft' excavation is that in which material can be easily removed by conventional excavation plant.

'Hard' excavation is that in which material is removed with heavy ripping, use of power tools and/or blasting being necessary.

Stability of Sidewalls for Deep Excavations

No deep excavations are expected for the establishment of the proposed surface infrastructure. However, for any excavation up to a depth of 3.0m, a batter of 1:1 (V:H) is recommended in soil for temporary slopes.

For permanent slopes in soil, a batter of 1:1.5 (V:H) is recommended. Should seepage be encountered, slopes are to be flattened to 1:2 (V:H) or flatter.

Material Usage

Structural fill material should conform to at least G7 quality as per the COLTO specifications.

The laboratory test results indicate that the silty clay, residual norite, is not classifiable as per the COLTO specifications and is considered as worse than G9 quality material. Therefore, the residual norite is not suitable for use as either structural or general fill due to the high clay content.

The crushed soft rock norite classifies as G6 quality material according to COLTO specifications and the material is suitable for use as both general and structural fill.

It is recommended that all foundation excavations are inspected by a suitably qualified and experienced geotechnical engineer/engineering geologist to ensure that the in-situ geotechnical conditions are not at variance to those described herein.

Deep Drilling Information

Deeper geotechnical drilling was conducted as part of geotechnical investigations to inform the positioning of the shaft, the layout, the design and the feasibility of the shaft. The results hereof are attached in Appendix 7.2.

6.2.1.4 Soil, Land use and Soil Potential

With regards to the EIA/EMPR for the extended Mining Right Area (MRA) (Western Block), a desktop study was conducted to identify the soil description of the surrounding area using ENPAT data-layer. The majority of the Extended MRA (Western Block) is situated on one or more of a vertic, melanic and red structured diagnostic horizons, which are undifferentiated. The northern section of the Western Block is situated on Glenora and Mispah forms (this is where the proposed 3 Shaft Complex is planned).

Lime is generally present within low-lying soils but rare or absent within the upland soils. The desktop study reveals that the soil depth in and around the Western Block is relatively even and ranges between 450 mm and 750 mm (ENPAT, 2001).

Most of the soil in and around the Western Block is classified as intermediately suitable for arable agriculture, where climate permits. The north-eastern section of the site contains soils which are not suitable for arable agriculture but are suitable for forestry or grazing, where the climate permits. This is mainly due to the topography of the northern section of the Western Block.

6.2.1.5 Biodiversity

The following section have been updated from the Scoping Report with the information from the Biodiversity Impact Assessment attached in Appendix 10.2.

The Biodiversity specialist conducted a desktop and field survey. The field survey for the project area was conducted on the 12th of December 2018 by two terrestrial ecologists.

Biome: The site is situated in the Savanna biome. The savanna vegetation of South Africa represents the southernmost extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the Savanna biome include:

- Seasonal precipitation; and
- (Sub) tropical thermal regime with no or usually low incidence of frost (Mucina & Rutherford, 2006).

Most savanna vegetation communities are characterised by an herbaceous layer dominated by grasses and a discontinuous to sometimes very open tree layer (Mucina & Rutherford, 2006). The savanna biome is the largest biome in South Africa, extending throughout the east and north-eastern areas of the country.

Vegetation Type: The Savanna biome comprises many different vegetation types. The project area falls within Mucina & Rutherford's (2006) Dwaalboom thornveld (SVcb1) vegetation type. Dwaalboom Thornveld is restricted to and is distributed in Limpopo and North-West Provinces within flats north of the Dwarsberge and associated ridges mainly west of the Crocodile River in the Dwaalboom area but including a patch around Sentrum. South of the ridges it extends eastwards from the Nietverdiend area, north of the Pilanesberg to the Northam area at an altitude range of between 900 and 1,200m AMSL. Its main vegetation and landscape features include plains with a layer of scattered, low to medium high, deciduous microphyllous trees and shrubs with a few broad-leaved tree species. There is almost a continuous herbaceous layer dominated by grass species.

Important taxa: Based on Mucina & Rutherford's (2006) vegetation classification, important plant taxa are those species that have a high abundance, a frequent occurrence (not being particularly abundant) or are prominent in the landscape within a particular vegetation type. They note the following species are important taxa in the Dwaalboom Thornveld vegetation type:

- Trees: *Vachellia erioloba*, *Vachellia erubescens*, *Vachellia nilotica*, *Vachellia tortilis* subsp. *heteracantha*, *Senegalia fleckii*, *Senegalia burkei*, *Searsia lancea* (Mucina & Rutherford, 2006).
- Shrubs: *Diospyros lycioides* subsp. *lycioides*, *Grewia flava*, *Mystroxyton aethiopicum* subsp. *burkeanum*, *Agathisanthemum bojeri* (Mucina & Rutherford, 2006).
- Graminoids: *Aristida bipartite*, *Bothriochloa insculpta*, *Digitaria eriantha* subsp. *eriantha*, *Ischaemum afrum*, *Panicum maximum* and *Cymbopogon pospischilii* (Mucina & Rutherford, 2006).

Conservation Status: According to Mucina & Rutherford (2006) Dwaalboom Thornveld is classified as Least Threatened. Although the target for conservation is 19%, only 6% of this vegetation type is currently under statutory conservation in reserves such as the Madikwe Game Reserve (approximately 150km west of the project area). Cultivation and to a lesser extent urbanisation have resulted in the transformation of approximately 14% of Dwaalboom Thornveld and exotic invasive plants are present. Incidences of erosion are low to very low (Mucina & Rutherford, 2006).

Based on the Plants of Southern Africa (POSA, 2017) database, 200 plant species are expected to occur in topographical grid square 2527CB.

Plant Species of Conservation Concern: Based on the Plants of Southern Africa (BODATSA-POSA, 2016) database, 192 plant species are expected to occur in the project area. Of the 192-plant species, two (2) species are listed as being Species of Conservation Concern (SCC) (Table 6-3).

Table 6-3: Plant Species of Conservation Concern

Family	Taxon	Author1	IUC N	Habitat Preference	Likelihood of occurrence
Scrophulariaceae	<i>Jamesbrittenia bergae</i>	Lemmer	VU	Mixed bushveld, in crevices on ferricrete outcrops with a southern aspect, 1056-1106m.	Moderate
Apocynaceae	<i>Stenostelma umbelluliferum</i>	(Schltr.) Bester & Nicholas	NT	Deep black turf in open woodland mainly in the vicinity of drainage lines.	Moderate

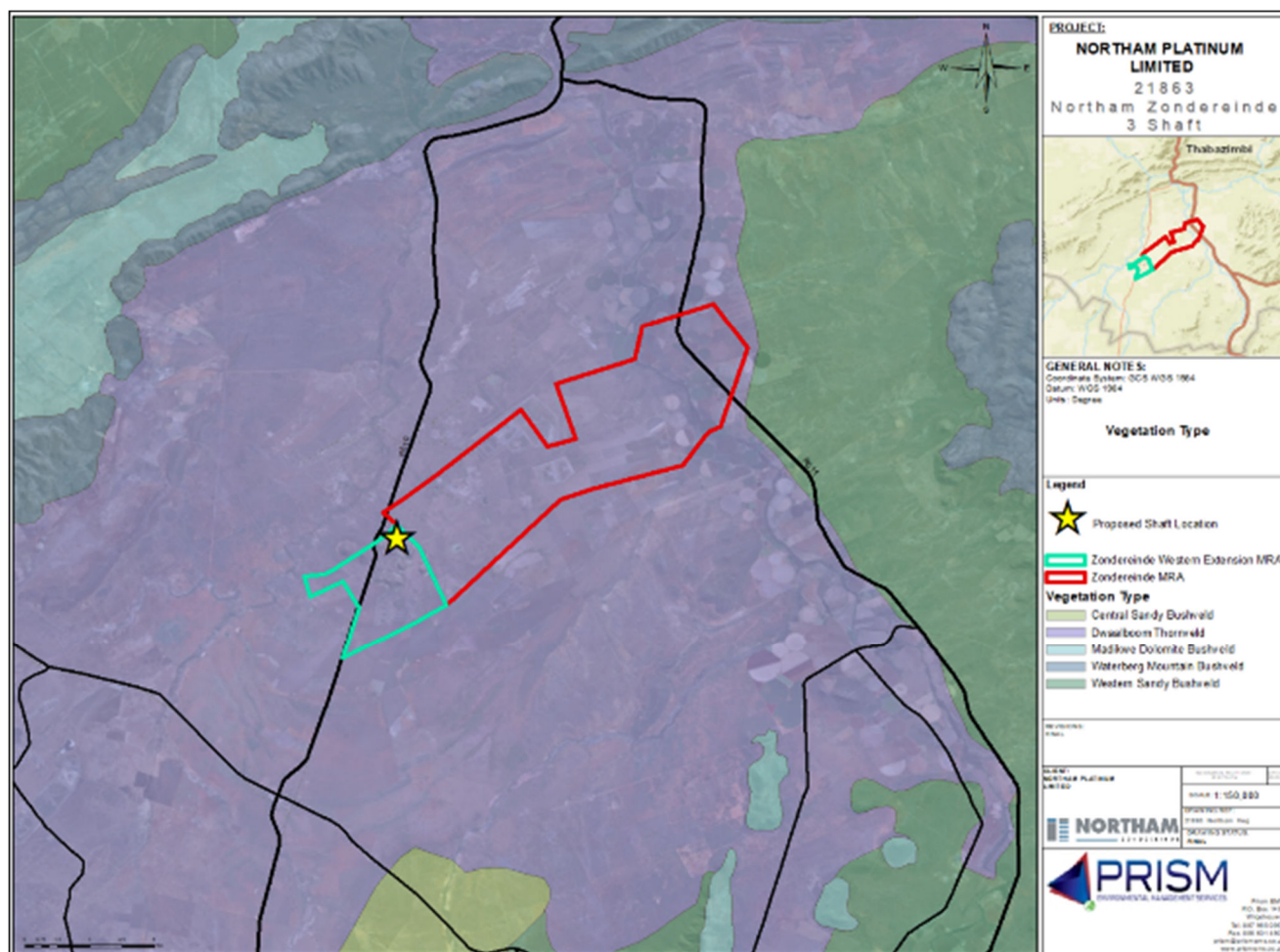


Figure 6-8: Vegetation Map

Vegetation assessment: The vegetation assessment was conducted throughout the extent of the project area.

A total of 34 tree, shrub and herbaceous plant species were recorded in the project area during the field assessment.

According to the list of protected tree species under the National Forests Act, 1998 (Act NO.84 of 2014) in terms of section 15 (1) of the Forests Act, 1998 (DAFF, 2014), no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate, or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a license or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. Contravention of this declaration is regarded as a first category offence. One individual *Boscia albitrunca* (Shepard's Tree) was observed within the property (). Should the proposed development impact on these areas, then application for a relocation or destruction permit needs to be made OR to move the proposed development footprint in order to avoid the trees currently present.

Declared weeds and invader plant species have the tendency to dominate or replace the canopy or herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of these systems. Therefore, it is important that these plants are controlled and eradicated by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species. The National Environmental Management: Biodiversity Act (NEMBA) is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 78 of 2014). The Alien and Invasive Species Regulations were published in the Government Gazette No. 37886, 1 August 2014, and was amended in February 2018 in the Government Gazette No. 41445. The legislation calls for the removal and / or control of alien invasive plant species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse. Below is a brief explanation of the three categories in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA):

- Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.

- Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

One (1) Category 1b invasive plant species *Flaveria bidentis* were recorded within the project area.

Note that according to the regulations, a person who has under his or her control a category 1b listed invasive species must immediately:

- Notify the competent authority in writing
- Take steps to manage the listed invasive species in compliance with:
 - Section 75 of the Act;
 - The relevant invasive species management programme developed in terms of regulation 4; and
 - Any directive issued in terms of section 73(3) of the Act.

Avifauna: Based on the South African Bird Atlas Project, Version 2 (SABAP2) database, 356 bird species are expected to occur in the vicinity of the project area. Of the expected bird species, twenty-three (23) species are listed as SCC either on a regional scale or international scale. The SCC include the following:

- One species which is listed as Critically Endangered (CR) on a regional basis;
- Five (5) species that are listed as Endangered (EN) on a regional basis;
- Six (6) species that are listed as Vulnerable (VU) on a regional basis; and
- Nine (9) species that are listed as Near Threatened (NT) on a regional basis.

Twenty-five (25) bird species were recorded in the project area during the December 2018 survey based on either direct observation, vocalisation, or the presence of visual tracks & signs. One avifaunal SCC were recorded during the survey, namely, Cape Vulture (*Gyps coprotheres*). The species is unlikely to be a resident and was most likely foraging.

Important Bird and Biodiversity Areas: Important Bird and Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by BirdLife International. These sites are also all Key Biodiversity Areas; sites that contribute significantly to the global persistence of biodiversity (Birdlife, 2017). One significant IBA occurs within the proposed project area, namely the Northern Turf Thornveld IBA and the project area falls entirely within this IBA (Figure 6-28). The area is well known for holding the core of the remaining resident South African population of Yellow-throated Sandgrouse (*Pterocles gutturalis*). The sandgrouse inhabit short, open grasslands, fallow fields and recently burnt veld, especially on black clay soils near water. Other important

birds in the IBA include Secretarybird, Kori Bustard, Lanner Falcon and Black-winged Pratincole (Birdlife, 2017).

Mammals: The IUCN Red List Spatial Data (IUCN, 2017) lists 99 mammal species that could be expected to occur within the vicinity of the project area. Of these species, 7 are medium to large conservation dependent species, such as *Ceratotherium simum* (Southern White Rhinoceros) and *Equus quagga* (Plains Zebra) that, in South Africa, are generally restricted to protected areas such as game reserves. These species are not expected to occur in the project area and are removed from the expected SCC list. Of the remaining 92 small to medium sized mammal species, thirteen (13) are listed as being of conservation concern on a regional or global basis). The list of potential species includes:

- Two (2) that is listed as Endangered (EN) on a regional basis;
- Three (3) that are listed as Vulnerable (VU) on a regional basis; and
- Eight (8) that are listed as Near Threatened (NT) on a regional scale

Overall, mammal diversity in the project area was moderate to low, with three mammal species being recorded during the December 2018 survey based on direct observations and/or the presence of visual tracks & signs (Table 6-4).

Table 6-4: Mammal species recorded in the project area during the December 2018 survey

Species	Common name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2017)
<i>Cynictis penicillata</i>	Yellow Mongoose	LC	LC
<i>Lepus sp.</i>		LC	LC
<i>Papio ursinus</i>	Chacma Baboon	LC	LC

Herpetofauna (Reptiles & Amphibians): Herpetofauna diversity was considered to be low with one reptile and no amphibian species observed or recorded in the project area during the December 2018 survey. Based on the IUCN Red List Spatial Data (IUCN, 2017) and the ReptileMap database provided by the Animal Demography Unit (ADU, 2017) 81 reptile species are expected to occur in the project area. One (1) reptile specie of conservation concern is expected to be present in the project area i.e. the *Crocodylus niloticus* (Nile Crocodile), although it has a low likelihood of occurrence.

Based on the IUCN Red List Spatial Data (IUCN, 2017) and the AmphibianMap database provided by the Animal Demography Unit (ADU, 2017) thirty-one (31) amphibian species are expected to occur in the project area. One (1) amphibian species of conservation concern could be present in the project area according to the above-mentioned sources. Giant Bull Frog (*Pyxicephalus adspersus*) is a species of conservation concern that will possibly occur in the project area. The Giant Bull Frog is listed as Near Threatened on a regional scale. There appears to be minimal suitable habitat for this species in the project area and therefore the likelihood of occurrence is regarded as low.

Invertebrates: Invertebrates are animals that neither possess nor develop a vertebral column (commonly known as a backbone or spine), derived from the notochord. Invertebrates play an important role in the ecosystem, they function as:

- Pollinators;
- Food for other species;
- Pest control;
- Decomposers; and
- Aerators of soil.

The invertebrates recorded within the project area include *Colotis* sp. and Green Milkweed Locust (*Phymateus viridipes*).

Habitat Assessment: Three primary habitats were delineated for this assessment, namely: Koppie, Degraded and secondary Savanna (Figure 6-9) and Figure 6-10). Disturbed habitats are those which were considered to have been extensively altered from their natural state and no longer provide ecosystem services or suitable habitat for indigenous species. This area had been cleared of trees and vegetation and was covered by an introduced layer of soil.

Secondary savanna occurred was identified within the project area. These areas are considered to have been altered in the recent past and are still recovering from the disturbance. The primary disturbance is most likely overgrazing due to the presence of cattle as well as encroachment by *Dichrostachys cinerea*. This habitat functions as a refuge area as well as an ecological support area for the surrounding habitat, especially supporting the rocky ridges to the south of the project area.

The “koppie” habitat refer to the rocky hill habitats that exist in close proximity to the south of the project area. The koppies have an inherent high sensitivity due to the uniqueness of the habitat within the landscape and the role as habitat for various species of fauna and flora.

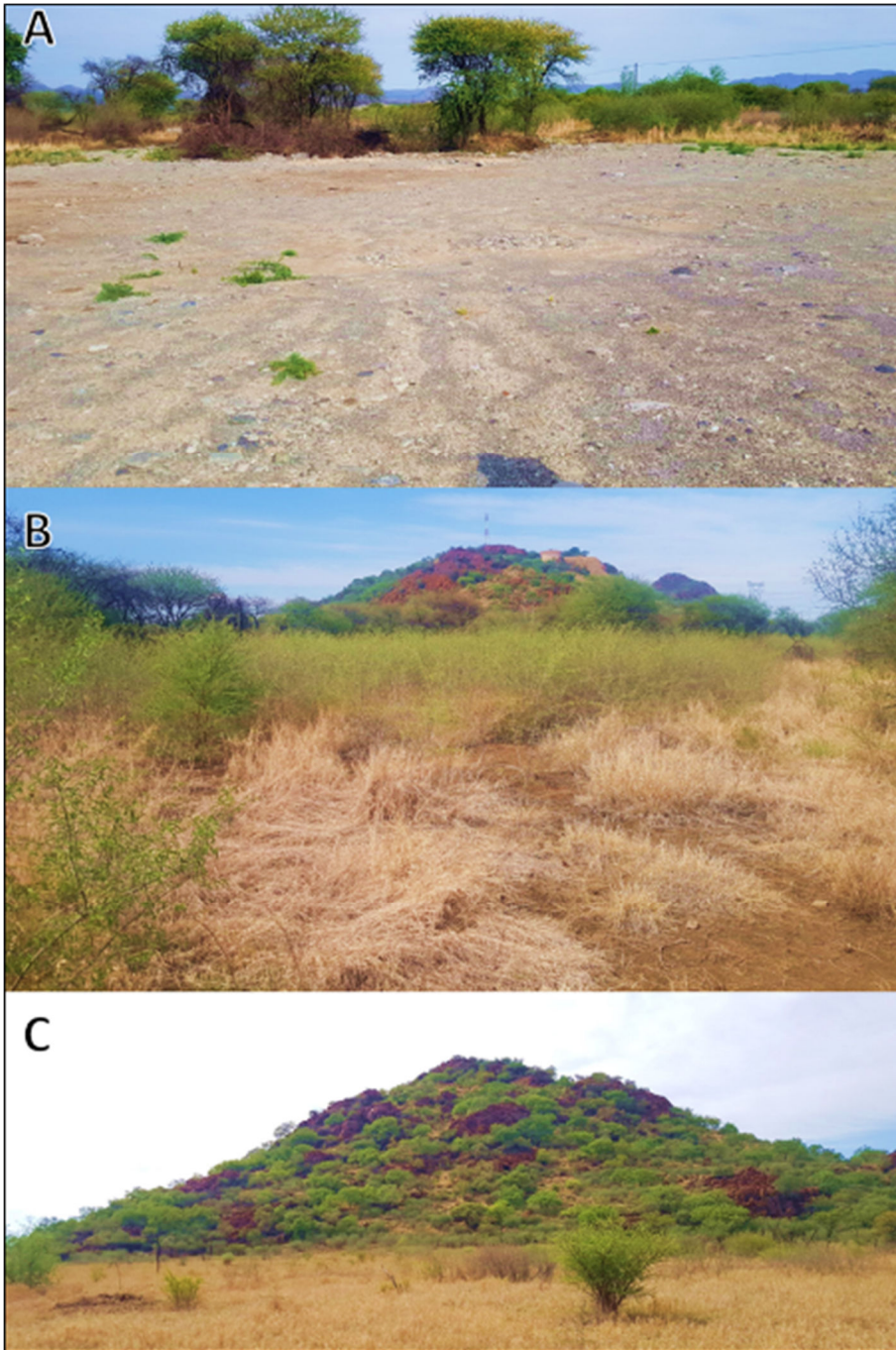


Figure 6-9: Habitats within the project area; A) Cleared and introduced soil area, B) Semi-natural habitat, C) Koppie habitat

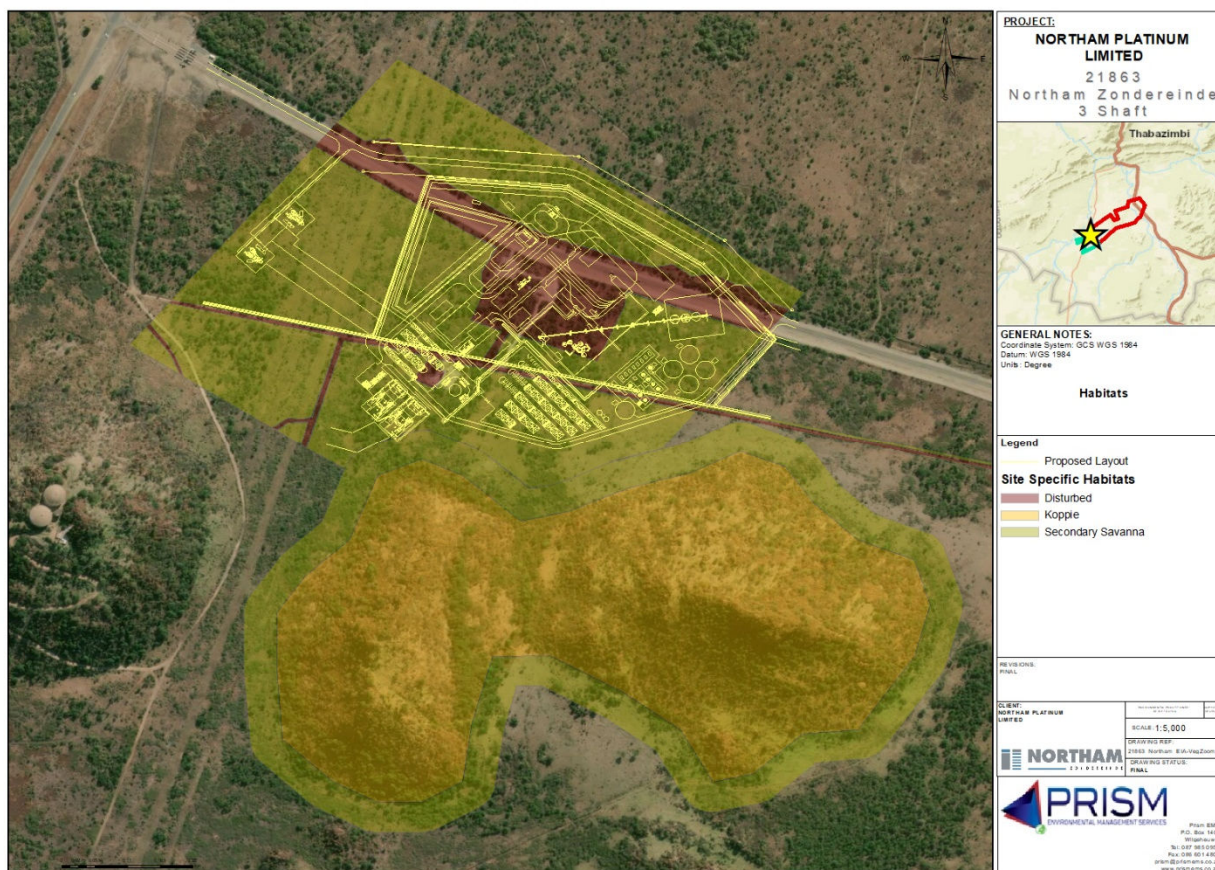


Figure 6-10: Habitats identified in the general project area

Sensitivity Assessment: As per the terms of reference for the project, a GIS sensitivity map is required in order to identify sensitive features in terms of the relevant specialist discipline/s within the project area, especially in reference to the development, and in this case the project area created which surrounds the proposed activity (Figure 6-11 Figure 6-11).

Areas that were classified as having low or moderate sensitivities are those areas which were deemed by the specialists to have been most impacted upon and/or were modified from their original condition due to factors such as over-grazing, human activity and/or presence of alien invasive species.

A portion (green) of the of the project area (shaft platform) is highly disturbed and encroached due to clearing of vegetation, and associated activities of human activity such as litter and roads and therefore these areas are given a low sensitivity rating. The remaining portion (orange) of the project area are less disturbed and more natural, however this portion has also been previously disturbed and also doesn't have a 'sensitivity' allocated by the NBA or LCPv2, thus a low-moderate sensitivity was allocated.

The moderate and high sensitivity areas are the koppie (high) and the 50 meter buffer around the koppie (moderate).It is important to note that this map does not replace any local, provincial or government legislation relating to these areas or the land use capabilities or sensitivities of these environments.

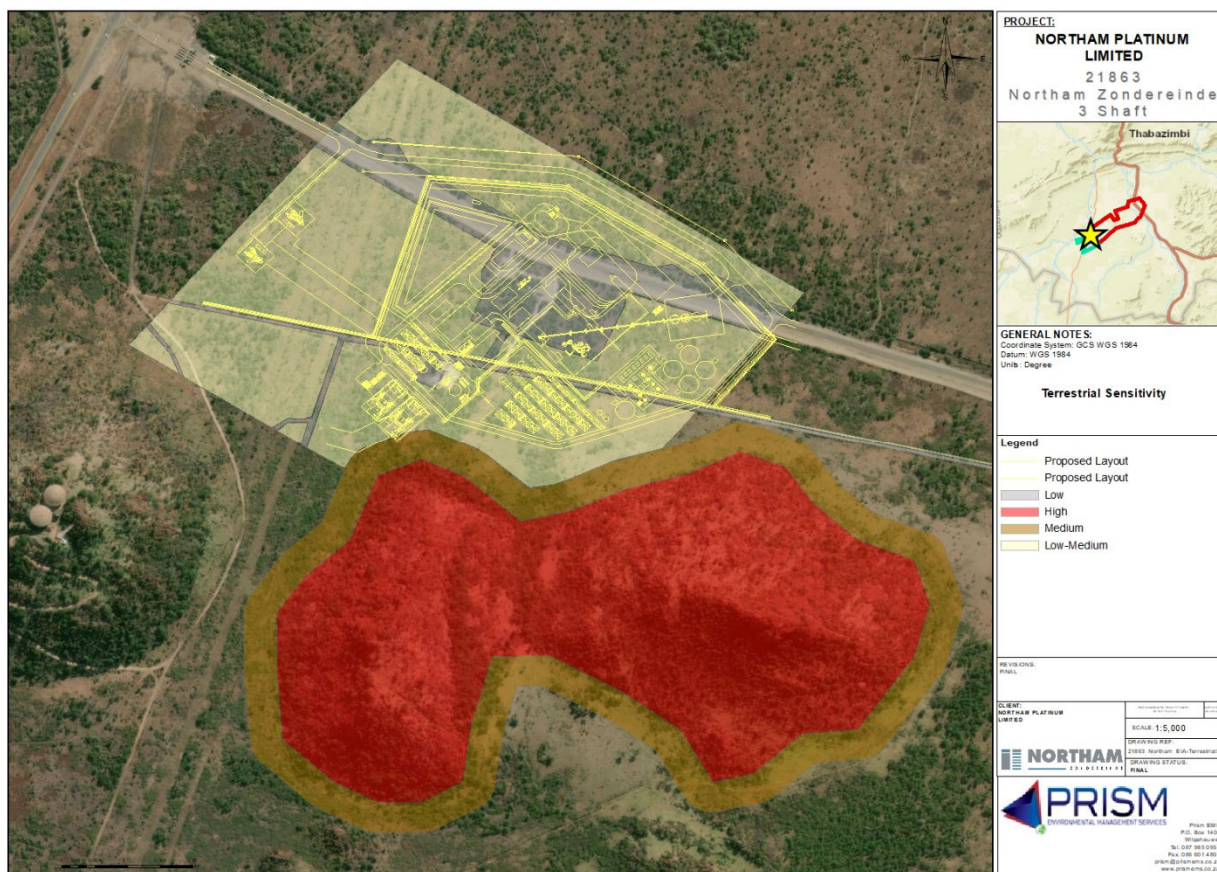


Figure 6-11: Habitat sensitivity map of the project area

6.2.1.6 Surface Water

This section was updated with the findings of the aquatic specialist in the Surface Water Assessment attached in Appendix 10.3.

The study site is located in quaternary catchment A24F in the Limpopo Water Management Area (WMA1) (Figure 6-16).

During the desktop investigation, one (1) possible area where wetlands could occur was identified on or in close proximity to the study area that would be affected by the proposed development activities. From the National Wetland Map version 5 (NWM5) as presented by SANBI an artificial wetland areas were identified (refer to Figure 6-17) on or in close proximity to the study area that could be affected by the proposed activities.

The field investigations were undertaken during December 2018 and September 2019 to assess and confirm the delineated Aquatic Resource Zones present on the survey area. The field investigations concluded that two (2) natural aquatic systems could be affected by the activities. Same is draining into the Bierspruit Spruit. Figure 6-18 serves to conceptually present the location of the aquatic resources that could be affected by the proposed development activities on the site.

Figure 6-19 presents the aquatic resource buffer zones that are applicable and should be considered during the development to ensure appropriate mitigation and management of the activities. A 32m buffer was applied to all the aquatic resources, this in accordance with the National Environmental Management Act (NEMA) listed activities and the biodiversity and mapping requirements.

The NP#3_UCVB1 wetlands are fairly disturbed due to historical impacts (mostly upstream) and are of low ecological importance. NP#3_DL is a drainage line and is less sensitive to impacts and of low ecological importance.

- **Wetland Classification**

SANBI's classification for wetlands was used to classify the wetland units within the study area (SANBI, 2009). The wetland units were classified up to level four, which includes the system, regional setting, landscape unit and Hydrogeomorphic (HGM) unit. Figure 6-12 conceptually present the HGM units (Marneweck and Batchelor, 2002) and Figure 6-13 illustrates the HGM units (SANBI; 2013).

The following Hydrogeomorphic wetlands were identified during the site evaluation:

- NP#3_UCVB1 –Un-Channelled Valley Bottom Wetland

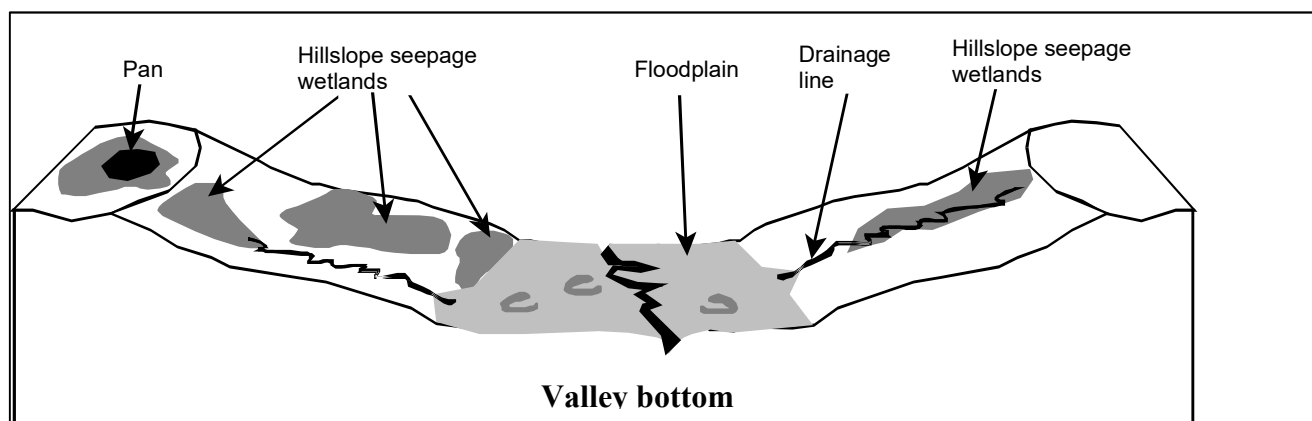


Figure 6-12: Wetland hydrogeomorphic (HGM) classification (Marneweck and Batchelor, 2002)

- NP#3_DL – Drainage line

A drainage line was also identified. The drainage line is palustrine of nature and is bearing some wetland conditions due to non-natural input from the Magalieswater scour valve overtopping into the drainage.

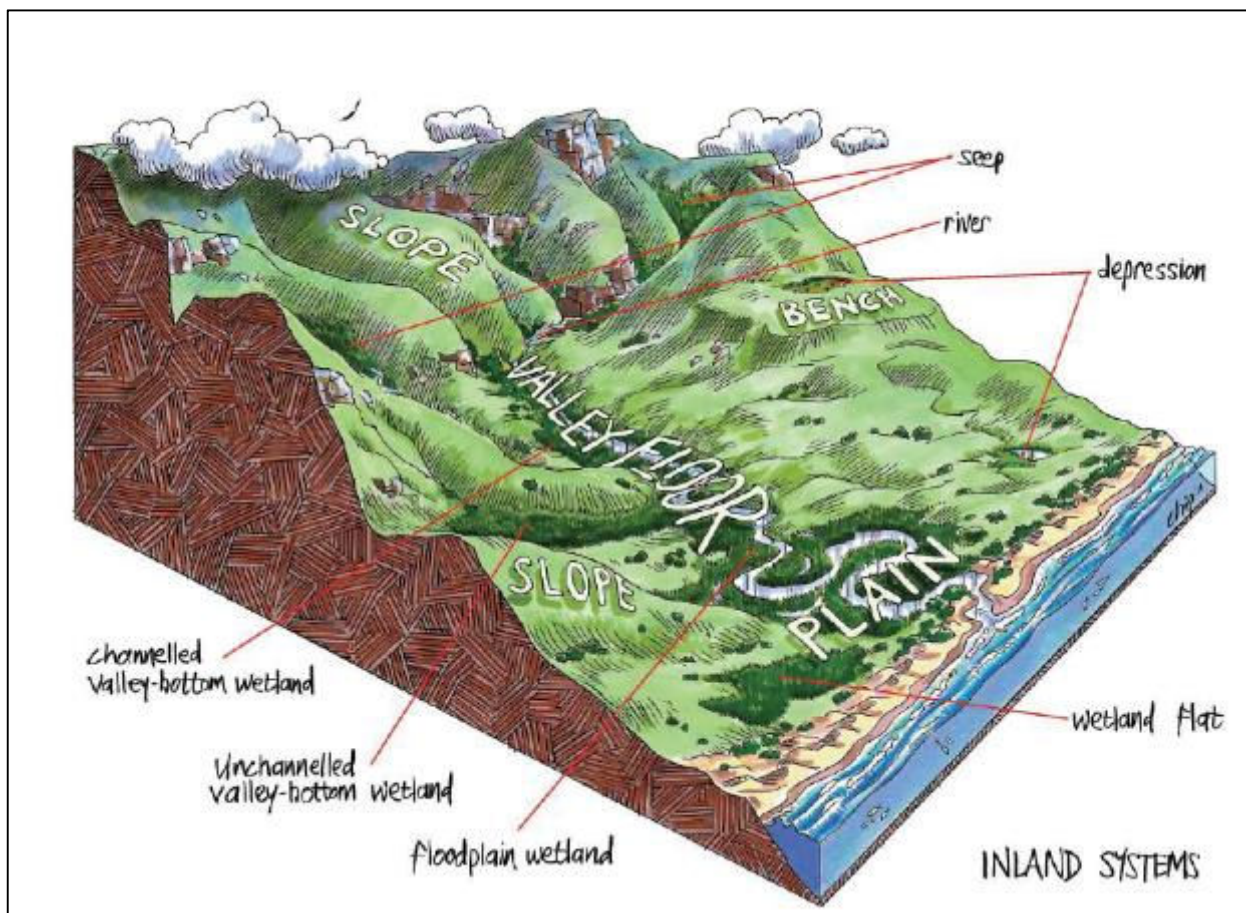


Figure 6-13: Wetland hydrogeomorphic (HGM) classification illustrated (SANBI; 2013)

Figure 6-14 diagrammatically illustrates the HGM unit of the Un-Channelled Valley Bottom Wetland identified (NP#3_UCVB1).

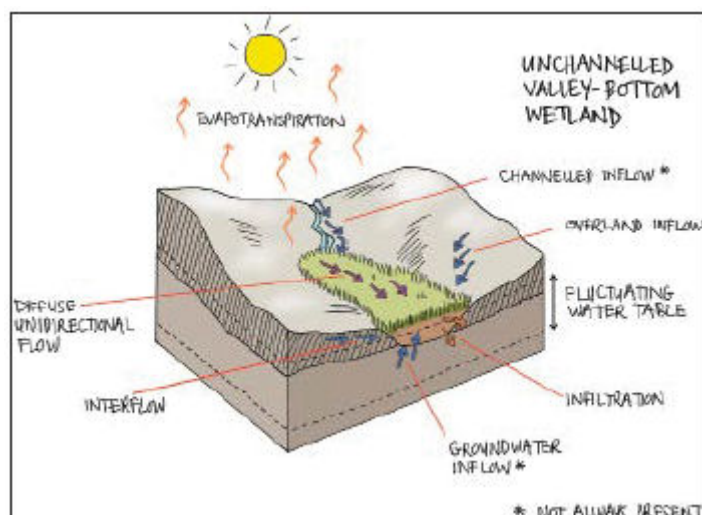


Figure 6-14: Un-Channelled Valley Bottom Wetland (SANBI; 2013)

- Drainage line

A drainage line is classified as a watercourse in the National Water Act (NWA):

Water course: (b) a natural channel in which water flows regularly or intermittently;

Figure 6-15 diagrammatically illustrates the HGM unit of the drainage line identified (NP#3_DL).

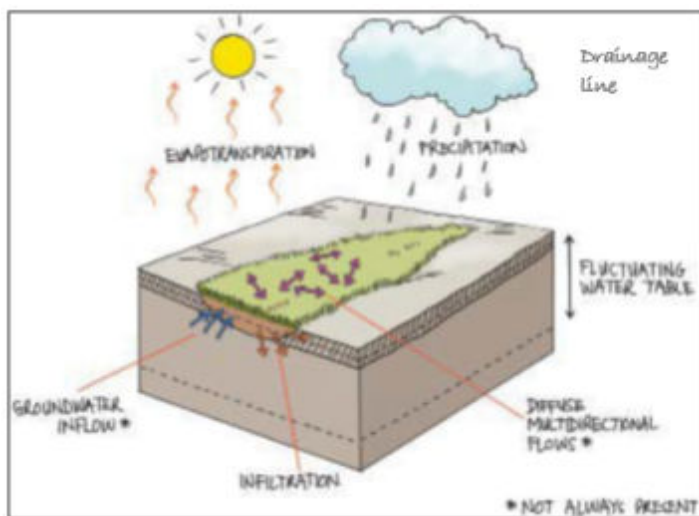


Figure 6-15: Drainage Line (adapted from SANBI; 2013)

- **Wetland Unit classification**

SANBI’s “Further development of a proposed National Classification System for South Africa” was used to verify the classification of the wetlands within the study area (SANBI, 2009). The wetlands were classified up to level four, which includes the system, regional setting, landscape unit and hydrogeomorphic unit.

The wetlands were classified as per Table 6-5.

Table 6-5: Wetland Units classification

Unit	System	Regional setting	Landscape unit	Hydrogeomorphic unit
NP#3_UCVB1	INLAND	Bushveld Basin	Plain	Un-Channelled Valley Bottom Wetland
NP#3_DL	INLAND	Bushveld Basin	Plain	Drainage line

The wetland and drainage line have low ecological value and was degraded due to historical activities and ongoing anthropogenic activities.

Figure 6-20 indicates the surface water sensitivity of the project area.

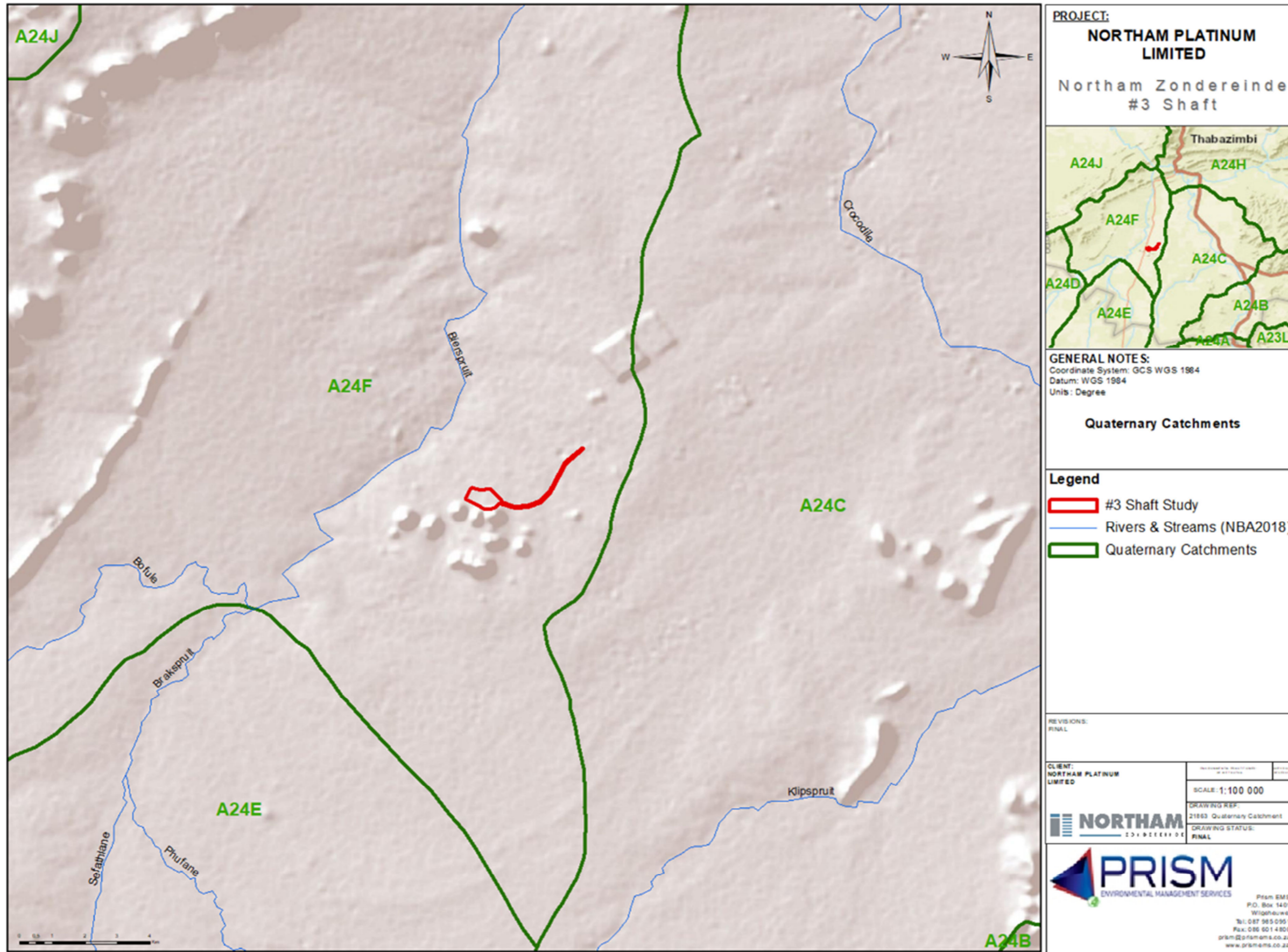


Figure 6-16: Map of the Catchment Areas

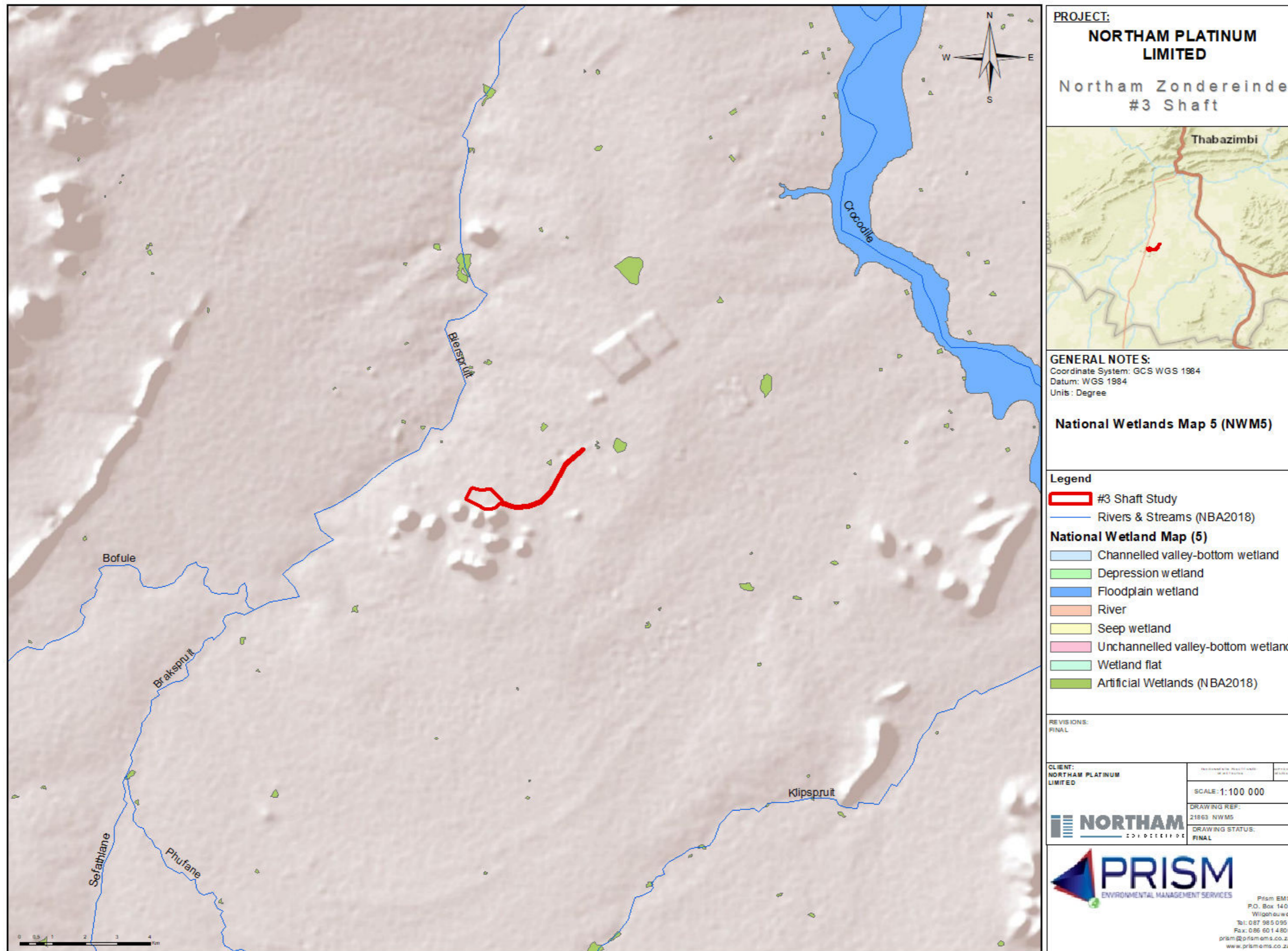
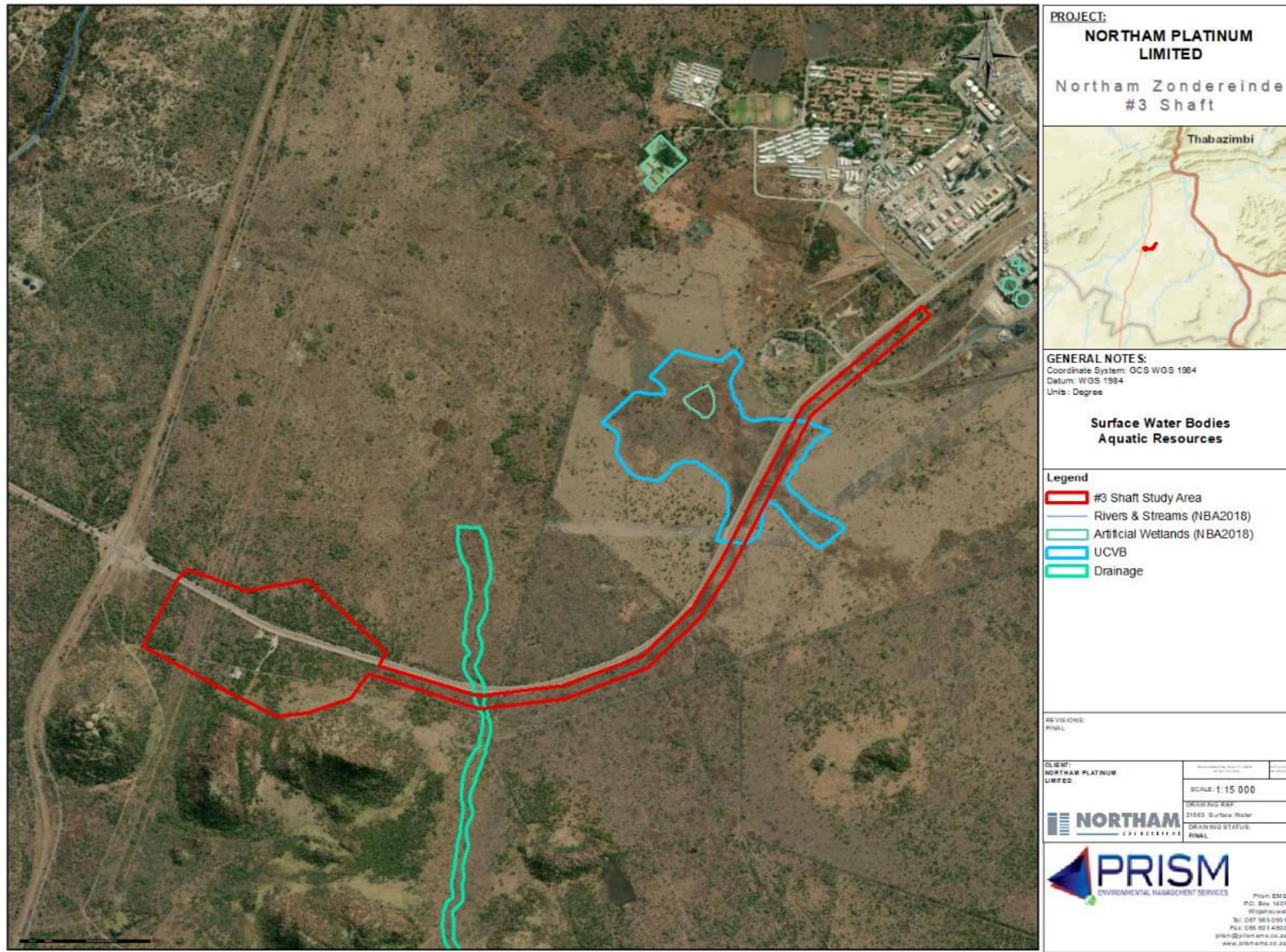


Figure 6-17: National Wetlands Map 5 (NWM5) (Van Deventer et al; 2019)



PROJECT:
NORTHAM PLATINUM LIMITED
 Northam Zondereinde #3 Shaft



GENERAL NOTE S:
 Coordinate System: GCS WGS 1984
 Datum: WGS 1984
 Units: Degree

**Surface Water Bodies
 Aquatic Resources**

- Legend**
- #3 Shaft Study Area
 - Rivers & Streams (NBA2018)
 - Artificial Wetlands (NBA2018)
 - UCVB
 - Drainage

REVISIONS:
 FINAL

CLIENT: NORTHAM PLATINUM LIMITED	SCALE: 1:15 000
	DRAWING REF: 21863 Surface Water
DRAWING STATUS: FINAL	

NORTHAM
 CONSTRUCTION

PRISM
 ENVIRONMENTAL MANAGEMENT SERVICES

PRISM EMS
 P.O. Box 1401
 Wigganville
 Tel: 087 985 0951
 Fax: 056 001 4800
 prism@pfaemsa.co.za
 www.pfaemsa.co.za

Figure 6-18: Aquatic Resource Delineation

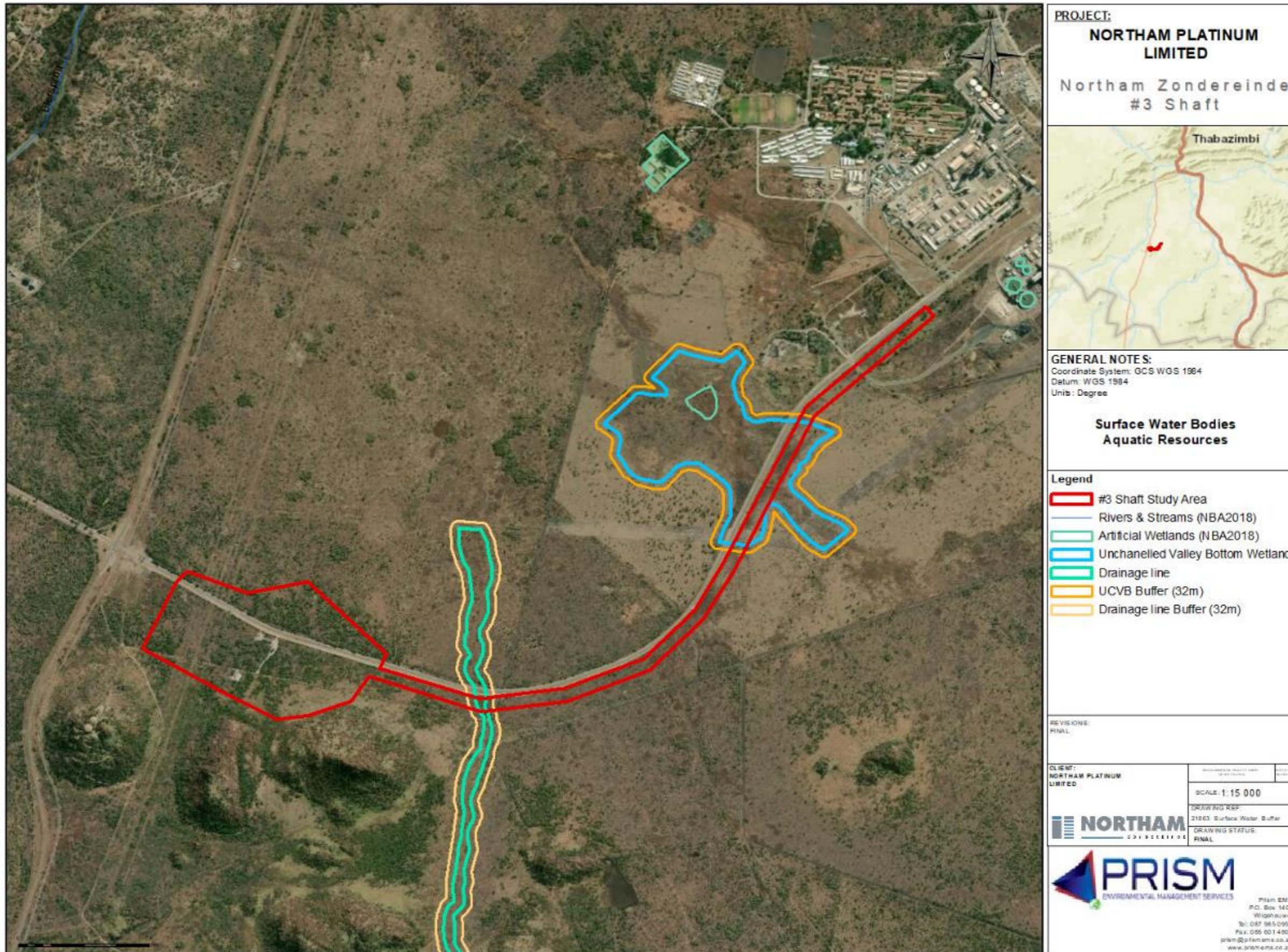


Figure 6-19: Aquatic Resource Buffer Zones

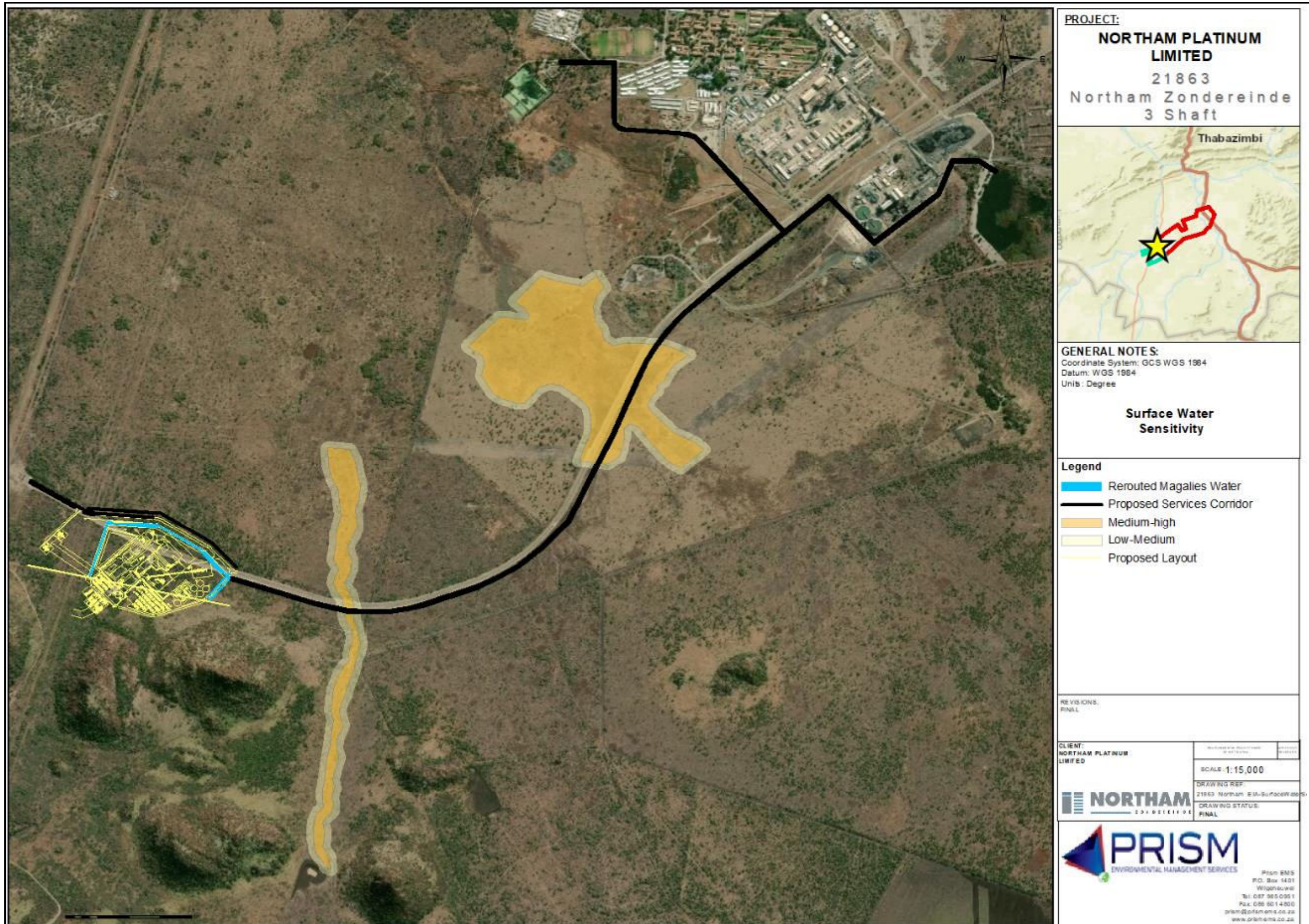


Figure 6-20: Surface Water Sensitivity Map

6.2.1.7 Groundwater:

The following section was updated from the Scoping Report with the Geohydrological Specialist Study attached in Appendix 10.1.

- **Hydrogeology:**

Three aquifers occur in the study area. These three aquifers are associated with a) the alluvial aquifer material; b) shallow weathered fractured material; and c) the underlying competent and fractured rock material.

- **Alluvial Aquifer**

The alluvial aquifer is composed of unconsolidated layers of sand and silt deposits. The aquifer is unconfined and laterally discontinuous, localised within the immediate vicinity of the riverbanks and floodplains, and therefore does not extend regionally throughout the total study area. These aquifers are usually fairly high yielding due to their interaction with the surface water bodies, coupled with the relatively high storage capacity of the unconsolidated sediments. The interaction between the alluvial aquifer and the river depends on the differences between the surface water and groundwater levels and the presence or absence of an impervious streambed, which would affect the hydraulic connection.

- **Shallow Weathered Material Aquifer**

The upper aquifer forms due to the vertical infiltration of recharging rainfall through the weathered material being retarded by the lower permeability of the underlying competent rock material. Groundwater collecting above the weathered / unweathered material contact migrates down-gradient along the contact to lower lying areas. Based on data collected from the geotechnical drilling program conducted within the Shaft 3 footprint area, it is concluded that the upper 2 m of the soil consists of the semi-confining black turf layer. The Bushveld Igneous Complex norite weathers to form a dark brown to black, very clayey vertisol soil horizon. During dry weather the soil forms deep open fissures or shrinkage cracks, while the soil becomes sticky and slow draining during wet weather. This results in varying hydraulic conductivities in the expansive clay layer. When saturated the clays are highly impermeable but allow for infiltration and recharge, through the surface cracks during dry conditions. The upper weathered aquifer is below the turf layer and has an average depth of approximately 9 to 12 m. These average values are not absolute values for the entire study area. Deeper weathering can also occur. However, the mentioned values are considered to provide a good general indication of the study area's conditions. The borehole yields in this aquifer are seasonally variable, due to the strong dependence on rainfall recharge. The groundwater quality in undisturbed areas is good because of the dynamic recharge from rainfall. This aquifer is, however, more likely to be affected by contaminant sources situated on surface.

- **Fractured Rock Aquifer**

Although the lower permeability of the unweathered rock material will retard vertical infiltration of groundwater, a percentage of the water in the shallow aquifer will recharge the fractured rock aquifer.

The ultramafic / mafic Rustenburg Layered Suite consists of relatively low permeability sediments that have been subjected to extensive faulting associated with the intrusion of the Bushveld sediments. Groundwater flows in the fractured rock aquifer are associated with the secondary fracturing in the competent rock and, as such, will be along discrete pathways associated with the fractures. Faults and fractures in the competent rock can be a significant source of groundwater, depending on whether the fractures have been filled with secondary mineralisation.

- **Groundwater Levels**

None of the geotechnical pits within the Shaft 3 footprint area, which in general were dug to between 2 and 3 m depth before refusal occurred, intercepted the groundwater level. Therefore, reference was made to the groundwater monitoring program that is in place for the wider Northam Zondereinde MRA. The monitoring is conducted on a monthly basis. A total of 40 monitoring borehole points was found from the latest Zondereinde Aquatico monitoring report for April 2019.

The groundwater levels vary throughout the area. The deepest groundwater levels are observed in borehole NPG13, which is located east of the Smelter area. There is no certainty around the reason for the low groundwater level in borehole NPG13. The depth to groundwater levels in the other monitoring boreholes are shallower, ranging between 1.02 and 23.09 metre below ground level (mbgl).

The changes in groundwater levels over time between July 2016 and April 2019 are shown graphically in Figure 6-21. From the figure it can be seen that the groundwater levels within individual boreholes remained within a similar range over time, indicating that the underground mine dewatering has no impact on the near surface groundwater levels.

In areas where there are no large-scale external impacts on the groundwater environment, such as the lowering of groundwater level through dewatering, it is expected that the groundwater level contours will reflect topographical contours. Plotting groundwater level elevation versus topographical elevation yields an 85.7 % correlation as shown in Figure 6-22. From this it is concluded that the groundwater levels generally mimic topography in the areas where the boreholes are located and there is no indication of the aquifers being dewatered.

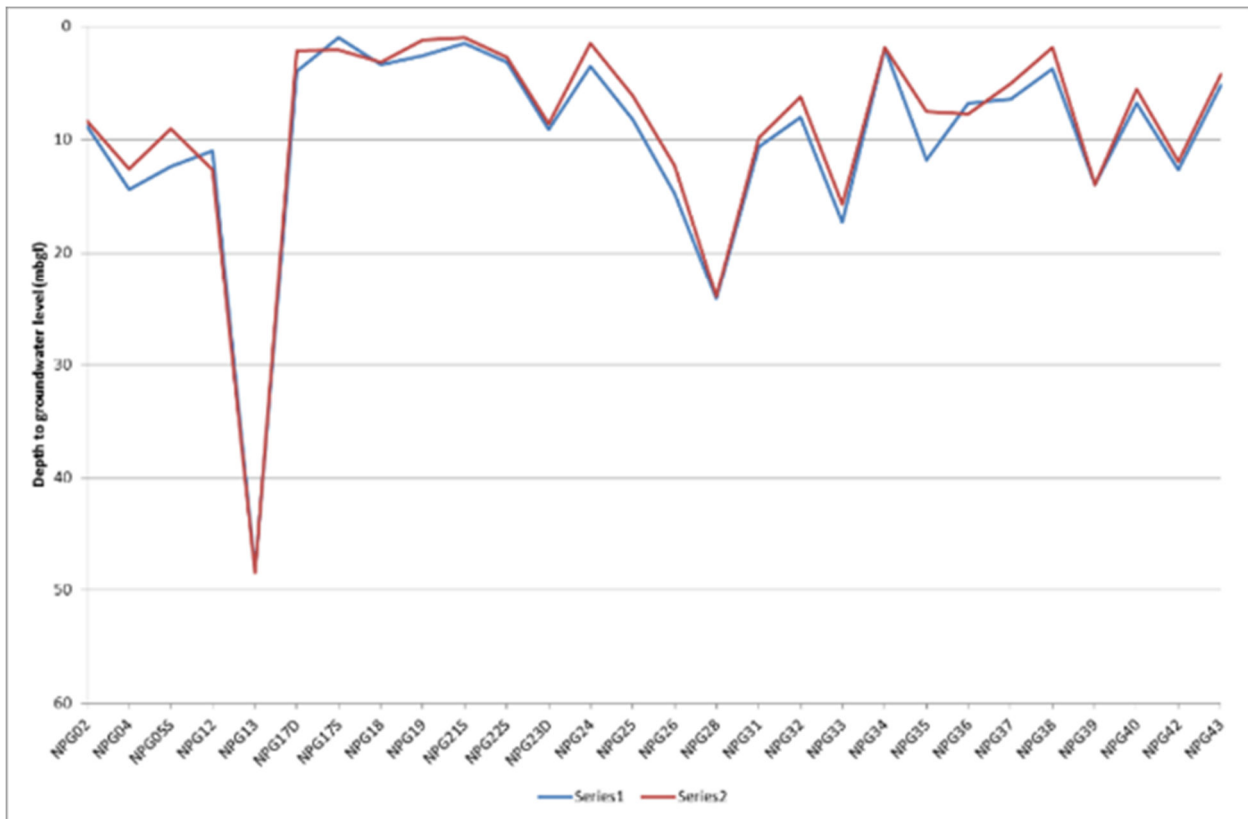


Figure 6-21: Groundwater levels over time (July 2016 and April 2019)

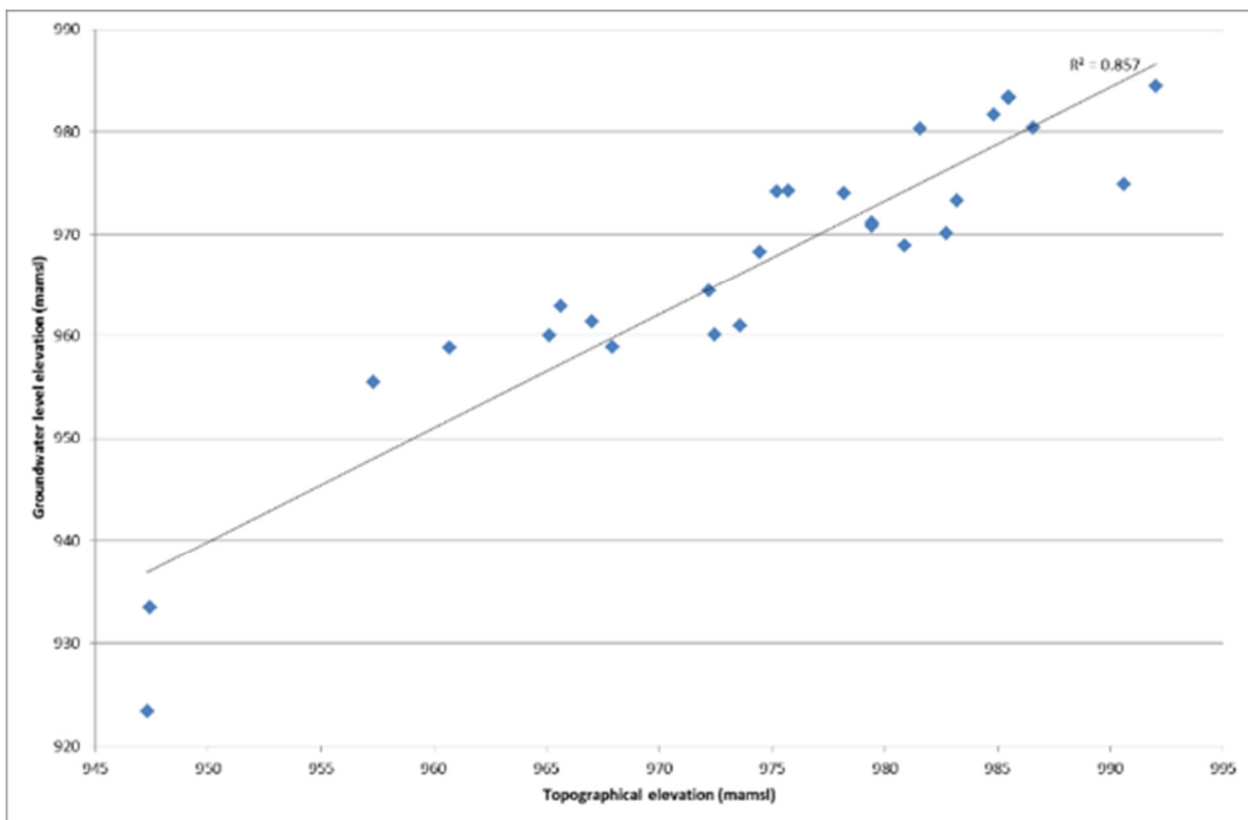


Figure 6-22: Topographical versus groundwater level elevation plot

- **Groundwater Quality**
 - Groundwater Potential Contaminants

Underground Mining Area

The existing underground workings are located at depths of 1 294 to 2 300 mbgl. The underground workings in the Western Block will be at similar and greater depths. It is not expected that there will be an active aquifer at those depths. The No 3 Shaft and No 4 Shaft will be lined, and it is not expected that there will be significant seepage from the No 3 and No 4 Shaft areas into the surrounding aquifers during the construction and operational phases.

The No 3a, 3b and 3c shafts will be unlined. Seepage into the shafts will be dewatered and groundwater flow patterns around the shafts will be directed towards the shafts during the construction and operational phases. No contamination is expected to migrate away from the shafts.

Surface Infrastructure

As mentioned previously in the report, the fact that the life of mine, as well as the volume of material handled on site, does not increase compared to the originally approved EMP specifications, no significant increase in the impacts at the existing infrastructure is expected.

However, there are new infrastructure areas associated with the proposed Shaft 3 development that could act as pollution sources. These include the reef and waste storage silos as well as the storm water dam.

Reef storage silo: The Reef disposal site will store reef rock from underground. It will hold 1-day hoisting capacity that is 4 500 tons. Hydraulically operated discharge chutes will be fitted below the silo. The chutes will discharge into road trucks that transfer the reef to the concentrator.

The material stored within the silo will not be in contact with open ground and therefore, there is no risk of contamination to the underlying aquifers.

Waste storage silo: The Waste storage silo will store waste rock from underground. It will hold 2 days hoisting capacity that is 1 500 tons. Hydraulically operated discharge chutes will be fitted below the silo. The chutes will discharge into road trucks that transfer the reef to the existing waste dump.

The material stored within the silo will not be in contact with open ground and therefore, there is no risk of contamination to the underlying aquifers.

Storm water dam: Storm water will be collected in drains and gravity fed to a storm water dam for evaporation or to be used to top up the service water on the shaft. The dam will be excavated from the heaving clay layer and lined with PVC sheeting. The dam will be approximately 50 m x 30 m.

It is assumed that the lining of the dam will be maintained. In addition, the dam will be sized by a competent person to be able to contain runoff during rainfall event without accidental spillage. Therefore, there is no risk of contamination to the underlying aquifers.

- Existing Groundwater Quality

There is no information available on the groundwater qualities within the proposed Shaft 3 development footprint area. However, there are no known pollution sources nearby, and it is accepted that the groundwater quality in this area reflects the background groundwater quality seen from the Zondereinde groundwater quality monitoring program.

The monitoring data indicates that there is no widespread contamination in the mining rights area (MRA). General background groundwater quality trends as seen from the existing groundwater monitoring program can be summarised:

- Background chloride concentrations in monitoring boreholes range within 100 – 250 mg/L:
 - Borehole NPG24;
 - NPG32 and NPG36; and
 - NPG33.
- Background sulphate concentrations in monitoring boreholes range within 10 – 100 mg/L:
 - NPG24;
 - NPG17D, NPG25 and NPG35;
 - NPG12;
 - NPG22S, NPG32 and NPG36;
 - NPG13; and
 - NPG33.

- **Aquifer Characterisation**

- Groundwater Vulnerability

For aquifer vulnerability reference is made to the aquifer vulnerability map of South Africa, which shows a low aquifer vulnerability for the study area.

- Aquifer Classification

The aquifers present in the study area are classified as minor aquifers but of high importance to the local landowners, as it is their sole source of water for domestic and agricultural (stock watering and irrigation) purposes.

6.2.1.8 Noise

The proposed site is partially disturbed, but with some natural vegetation in undisturbed areas, and is surrounded by ridges and koppies and the Madeleine Robinson Nature Reserve to the north-west.

The existing noise levels within the study area are generally quiet. Even though there are many intruding noise sources (use of the main road and agricultural practises to the southwest), these are not perceived to be particularly disturbing.

6.2.1.9 Visual

- **In relation to the Existing MRA**

- a visual assessment was undertaken as part of the 1998 EMP. Since then no other intrusive infrastructure has been constructed and, as such, the visual intrusion (with the exception of the tailings storage facility (TSF)) has not changed. Zondereinde Mine's location between the R510 and R511 makes it visible for road users. From the south, the view of Zondereinde Mine is mainly obscured by the Tors Hills' low range. Once past the hills the view is Amandelbult Mine and TSF with the addition of Zondereinde Mine mining infrastructure.
- Due to the distance to the R510, the view is limited. From the R511 and D56 side, it is mainly the smokestack of the Smelter Plant, which is visible, together with Setaria Village from a closer distance. Emissions from the Stack are visible in the form of a white smoke. Setaria Village is visually less intrusive, as it mainly consists of one-story housing and commercial development. The trees and gardens associated with the Village serve as a visual mitigation. Even though the water tower is relatively high, the natural topography ensures that it is not intrusive in the skyline from the access roads. The TSF is mainly obscured as a result of the Amandelbult TSF from the R510.

- **In relation to the proposed 3 Shaft Development**

- Due to the distance of the study area from the R511, the proposed 3 Shaft Complex will not have a significant visual impact on road users. However, due to its proximity to the R510, the 3 Shaft Complex will have an impact on road users utilising the R510. The study area is however located within a mining area according to local planning documents and therefore, the impact is not expected to be significant in the context of the wider area and surrounding land uses. The sense of place will not be altered as the area is known as a mining area.

6.4.2 Socio-economic environmental attributes

The Thabazimbi IDP indicates that *“Thabazimbi lies within the southern African bushveld eco region of Limpopo, renowned for cattle ranching and game farming. Platinum and iron ore mining are major contributors to the economy of the region. The total area of the Thabazimbi Local Municipality is approximately 986 264.85 ha. It consists mainly of commercial farms, game farming, etc. but a few towns and informal settlements are found in the area. There are no former homeland areas located within the municipal area.”* The unemployment rate is at around 20%.

The information below has been obtained from the StatsSa website. The information provided is divided for Northam A and B local regions.

Population and Demographics: Northam A has a total population of 4259 people, while Northam B contains 27 611 people. The majority of the population in both areas is Black African, 86% (Northam A) and 95% (Northam B). Setswana is more prevalent in Northam A (25%) followed by Xhosa (21%). In Northam B, Xhosa is more prevalent (32%) proceeded by Setswana (26%).

Table 6-6: Comparison of the population and demographics between Northam A and B

	Northam A	Northam B
Population Groups		
Black African	86.1	95.6
Coloured	0.9	0.6
Indian/Asian	0.4	0.3
White	12.0	2.8
Other	0.7	0.7
Languages		
Afrikaans	17.5	3.6
English	4.3	2.6
IsiNdebele	0.4	0.9
IsiXhosa	21.1	32.1
IsiZulu	2.5	2.9
Sepedi	5.3	5.9
Sesotho	8.5	6.8
Setswana	25.2	26.3
Sign Language	0.5	0.5
SiSwati	1.7	1.6
Venda	0.6	1
Xitsonga	11.6	13.3
Other	0.8	2.7
Higher Education		
No Schooling	8.6	7.4
Some Primary	8.7	14.4
Completed Primary	3.5	7.1
Some Secondary	29.6	41.5
Matric	36	26.1
Higher Education	13.5	3.4

Source: Statistics South Africa (Stats SA) 2011

Living Conditions: are explained in terms of the type of energy used/accessible to use for cooking, heating and lighting, refer to Table 6-7.

Table 6-7: Comparison of general living conditions between Northam A and B

	Northam A	Northam B
Energy for Fuel for Cooking		
Electricity	76.2	51.9
Gas	0.5	1.3
Paraffin	20.5	44.2
Solar	0.2	0.1
Candles	0	0
Wood	2.4	2.2
Coal	0	0.2
Animal Dung	0.1	0
None	0.2	0.1
Energy for Fuel for Heating		
Electricity	74.3	50
Gas	0.7	1
Paraffin	17.6	21.4
Solar	0.5	0.2
Candles	0	0
Wood	5.4	22.4
Coal	0.1	0.2
Animal Dung	0.1	0.1
None	1.2	4.7
Energy for Fuel for Lighting		
Electricity	74.3	50
Gas	0.7	1
Paraffin	17.6	21.4
Solar	0.1	0.2
Candles	5.4	22.4
Wood	0	0
Coal	0	0
Animal Dung	0	0
None	0.1	0.1
Access to Internet		
Home	11.5	3.2
Cellphone	18.7	18.3
Work	13.6	2.9
Elsewhere	1.1	3.5
No Access	55.1	72.1
Settlement Type		

	Northam A	Northam B
Rented	54.5	41.7
Owned (not yet paid off)	0	8.3
Occupied (rent free)	18.2	16.7
Owned (paid off)	9.1	8.3
Other	9.1	0
Owned (fully paid off/paying off)	9.1	25
Source of Water		
Regional	71.2	52.2
Borehole	3.5	4.4
Spring	0.1	0.2
Rain Water Tank	0.1	0.2
Dam Pool Stagnant Water	0.3	0.1
River / Stream	0	0.1
Water Vendor	10.7	1.1
Water Tanker	9.9	39.7
Other	4.1	1.9
Toilet Facilities		
None	4.8	1.8
Flush Toilet (sewerage)	75.3	47.9
Flush Toilet (septic)	0.7	1.1
Chemical	0	1
Pit Toilet (ventilation)	0.3	2
Pit Toilet (no ventilation)	18.4	38.2
Bucket	0.2	1.2
Other	0.2	6.8
Refuse Disposal		
Removal (at least once/week)	74.6	48.3
Removal (less often)	0.8	1.7
Communal Refuse Dump	0.2	1.3
Own Refuse Dump	13.9	40.2
No Rubbish Disposal	9	6.8
Other	1.4	1.6

Source: Statistics South Africa (Stats SA) 2011

Economy: the economic contribution is described by the average household income (refer to Table 6-8).

Table 6-8: Average household income for Northam A and B

	Northam A	Northam B
No Income	9.2	20.1
R1 – R4 800	0.6	2.7
R4 800 – R 9 600	1.3	3.9
R 9 601 – R 19 600	7.1	5.6
R 19 601 – R 38 200	6.7	14.3
R 38 201 - R 76 400	17.6	29.5
R 76 401 – R 153 800	20.2	16.5
R 153 801 – R 307 600	22.8	5.3
R 307 601 – R 614 000	11.1	1.5
R 614 001 – R 1 228 800	2.8	0.4
R 1 228 801 – R 2 457 600	0.4	0.2
R 2 457 601 +	0.1	0.1

Source: Statistics South Africa (Stats SA) 2011

6.2.1.10 Cultural Heritage Resources

The following section was updated with the information provided by the heritage specialist study for the proposed development that is attached in Appendix 10.4.

- **Archaeology of the area**

South Africa has one of the longest archaeological sequences in the world because humanity evolved in the area stretching from the Cape to Ethiopia. Most of this sequence covers the times when our ancestors used stone tools. It is worthwhile, thus, to review the archaeological record for southern Africa and to place in context the known occurrences. The archaeology of the area can be divided into the Stone Age, Iron Age and Historical timeframe.

Stone Age

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For Cultural Resources Management (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases. Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable (Lombard 2011). The three main phases can be divided as follows;

- Later Stone Age; associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago;

- Middle Stone Age; associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago;
- Earlier Stone Age; associated with early Homo groups such as Homo habilis and Homo erectus. 400 000-> 2 million years ago.

- *Early Stone Age:*

The Early Stone Age in southern Africa is defined by the Oldowan complex, primarily found at the sites Sterkfontein, Swartkrans and Kromdraai, situated within the Cradle of Humankind, just outside Johannesburg (Kuman, 1998). Within this complex, tools are more casual and expediently made and tools consist of rough cobble cores and simple flakes. The flakes were used for such activities as skinning and cutting meat from scavenged animals. This industry is unlikely to occur in the study area.

The second complex is that of the more common Acheulean, defined by large handaxes and cleavers produced by hominids at about 1.4 million years ago (Deacon & Deacon, 1999). Among other things these Acheulian tools were probably used to butcher large animals such as elephants, rhinoceros and hippopotamus that had died from natural causes. Acheulian artefacts are usually found near the raw material from where they were quarried, at butchering sites, or as isolated finds. No Acheulian sites are on record near the project area, but isolated finds are possible. However, isolated finds have little value. Therefore, the project is unlikely to disturb a significant site. The closest Stone Age terrain to the study area is located a small distance to the west thereof. This Early Stone Age terrain is situated near the Rooiberg Hill and the Blaauwberg Stone Age Terrain. (Bergh 1999: 4)

- *Middle Stone Age:*

During the Middle Stone Age, significant changes start to occur in the evolution of the human species. These changes manifest themselves in the complexity of the stone tools created, as seen in the diversity of tools, the standardisation of these tools over a widespread area, the introduction of blade technology, and the development of ornaments and art. What these concepts ultimately attest to is an increase or development of abstract thinking. By the beginning of the Middle Stone Age (MSA), tool kits included prepared cores, parallel-sided blades and triangular points hafted to make spears (Volman, 1984). MSA people had become accomplished hunters by this time, especially of large grazing animals such as wildebeest, hartebeest and eland.

These hunters are classified as early humans, but by 100,000 years ago, they were anatomically fully modern. The oldest evidence for this change has been found in South Africa, and it is an important point in debates about the origins of modern humanity. In particular, the degree to which behaviour was fully modern is still a matter of debate. The repeated use of caves indicates that MSA people had developed the concept of a home base and that they could make fire. These were two important steps in cultural evolution (Deacon & Deacon, 1999). Accordingly, if there are caves in the study area, they may be sites of archaeological significance. MSA artefacts are common throughout southern Africa, but unless they occur in undisturbed deposits, they have little significance. Some MSA sites are on record close to the study area.

- *Later Stone Age:*

By the Late Stone Age, human beings are anatomically and culturally modern. Tools associated with this time period are specialised, and commonly associated with hunter-gatherer groups. It is also within this period that contacts with migrating groups occur throughout southern Africa. Initial contact was between hunter-gatherer groups and expanding Bantu farming societies, and secondly with the arrival of colonist along the coast.

San rock art has a well-earned reputation for aesthetic appeal and symbolic complexity (Lewis-Williams, 1981). Several rock art sites are on record to the north and east of the general project area.

In addition to art, LSA sites contain diagnostic artefacts, including microlithic scrapers and segments made from very fine-grained rock (Wadley, 1987). Spear hunting probably continued, but LSA people also hunted small game with bows and poisoned arrows. Sites in the open are usually poorly preserved and therefore have less value than sites in caves or rock shelters. If there are rock shelters or caves in the study area, they may contain LSA sites of significance.

Iron Age (general)

The Iron Age represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. It can be divided into three distinct periods:

- The Early Iron Age: Most of the first millennium AD;
- The Middle Iron Age: 10th to 13th centuries AD; and
- The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living.

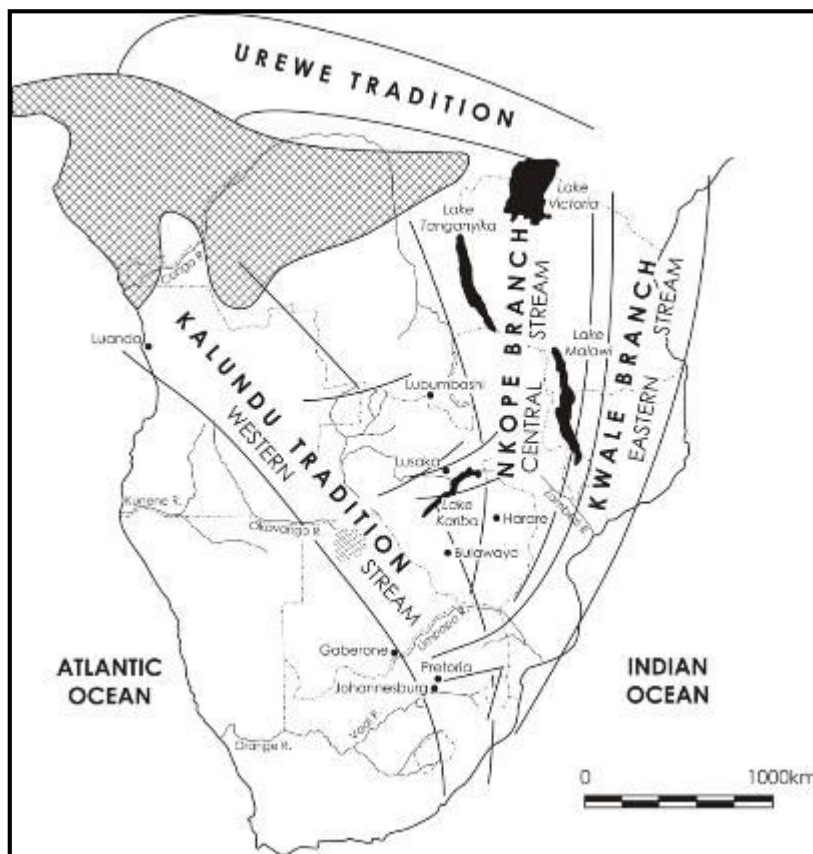


Figure 6-23: Movement of Bantu speaking farmers (Huffman 2007)

- *Early Iron Age*

Early in the first millennium AD, there seem to be a significant change in the archaeological record of the greater part of eastern and southern Africa lying between the equator and Natal. This change is marked by the appearance of a characteristic ceramic style that belongs to a single stylistic tradition. These Early Iron Age people practised a mixed farming economy and had the technology to work metals like iron and copper. A meaningful interpretation of the Early Iron Age has been hampered by the uneven distribution of research conducted so far; this can be partly attributed to the poor preservation of these early sites.

Sites belonging to the EIA consisting of *Happy Rest and Mzonjani facies* have been recorded to the north of the project area. Happy Rest and Mzonjani pottery form part of two traditions (Kalundu and Urewe) that represent the spread of mixed farmers into southern Africa during the Early Iron Age. This find is important as it provides evidence for early interaction between these groups. Later, by the 8th and 9th centuries, the two merged to form a new facies, *Doornkop*.

- *Middle Iron Age*

No sites dating to this period are on record close to the study area.

- *Late Iron Age*

For the area in question the history and archaeology of the Sotho Tswana are of interest. The ceramic sequence for the Sotho Tswana is referred to as Moloko and consists of different facies with origins in either the Icon facies or a different branch associated with Nguni speakers. Several sites belonging to the Madikwe and Olifantspoort facies (from Icon) have been recorded close to the project area. These sites date to between AD 1500 and 1700 and predate stone walling ascribed to Sotho-Tswana speakers. Sotho Tswana stonewalled sites with Uitkomst pottery have been found close to the study area and dates to the seventeenth to nineteenth centuries. Stone walled sites belonging to the LIA have also been identified next to the study area but so far have not been linked to a cultural group.

Late Iron Age peoples were attracted to the area because of the relatively fertile soils around the hills and valleys, and because of the iron ore and red ochre. Mining techniques associated with the ancient mine workings are the same as those found in the Rooiberg area some 30km from Thabazimbi (Huffman 2006). Three groups are found in the Rooiberg area, specifically Madikwe, Melora and Rooiberg groups. Stratigraphically, the relationship between Madikwe and Rooiberg is evident where the Madikwe site 20/85 lies underneath the Rooiberg site 11/85, suggesting that Rooiberg is the more recent (Mason 1986). Ceramic evidence suggests then that Sotho-Tswana people were mining at Rooiberg. The ceramic evidence from the Rhino Andalusite Mine shows that the Sotho-Tswana people living there were directly related to the miners at Rooiberg: both belonged to the Western Sotho-Tswana cluster. Therefore, the relationship, between the ochre mine and Madikwe settlements, is of importance. Associated with the Madikwe settlements, in addition to the ochre mine is the several maize grindstones found.

Trade connections for ochre and tin have a bearing on the presence of maize. Trade networks spanned a wide area, up to the Zimbabwe culture area in the north, and as far as Maputo in the east before the arrival of the Dutch (Friede & Steel 1976). Maize came to Maputo sometime after the early 16th century through Portuguese trade with the New World. The grindstones found at the site CB14 in the Rhino Andalusite Mine indicate that maize was grown in the Thabazimbi area during the 17th century (Huffman 2006). If one accepts the grindstone as diagnostic, then maize was cultivated some 150 years earlier than in Kwazulu-Natal.

Evidence for Iron Age activity will most likely be concentrated along water courses and rocky outcrops marked by ceramic clusters or dry-stone walling.

- **Archaeology of the study area**

The study area is impacted on by gravel and tar roads, earthworks as part of exploration activities and transmission power lines. The study area has been fallow for a number of years resulting in dense vegetation that hampers archaeological visibility.

No major topographical features exist in the study area that would have attracted human occupation in antiquity however a set of hills that contain Late Iron Age (LIA) settlements occur adjacent and to the east of the study area. This area is highly overgrown, and it is not possible to accurately determine the site extent

or all the site features. The area is mostly void of trees with different grass cover than the surrounding area and is characteristic of vegetation on an Iron Age archaeological site in this area. The change in vegetation marking the site extent is clearly visible on google earth imagery of the area and the area is been divided into high and medium significance areas (Figure 6-24). During the field survey these areas of medium and high significance was visited, and the division proved to be accurate with features (middens and stone walled enclosures (Figure 6-26) mostly found in areas with high sensitivity with few visible surface features found in the low sensitivity areas (Figure 6-25). Outside of the areas marked as sensitive, lower grinding stones and undecorated ceramics were recorded, relating to the wider landscape use by the Iron Age settlement a few isolated Middle Stone Age lithics were also recorded Figure 6-26. These find spots do not constitute archaeological sites and are of no heritage significance.

Although no diagnostic ceramics was recorded at the current site reported on, other sites in the area with decorated ceramics represent stamped ware and could possibly be related to the Rooiberg ceramic facies, although a bigger ceramic sample is needed to confirm this (van der Walt 2010). These sites are important because of the alternative stone walled settlement layout observed at these sites. These sites consist of several kraals clustered together without an outer wall. These sites have research potential that could clarify the new stone walled arrangement represented in the area that has not yet been identified and could hold clues to the interaction between the Uitkoms ceramic facies and Madikwe that formed Rooiberg. The recorded LIA settlement is assumed to conform to this pattern but due to the low archaeological visibility in the study area this assumption is tentative at least.

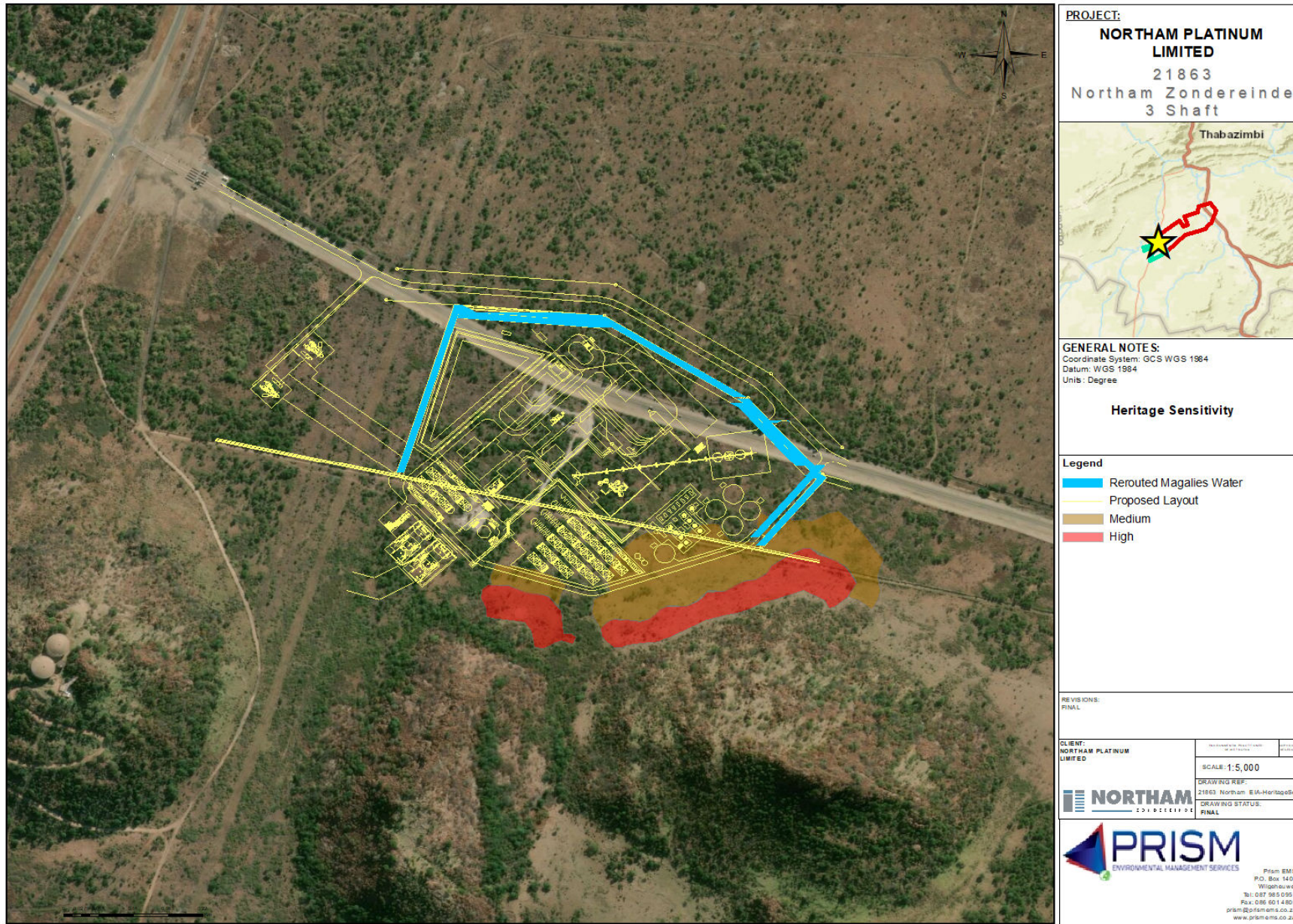


Figure 6-24: Sensitivity map indicating the extent of Late Iron Age site visible on areal imagery

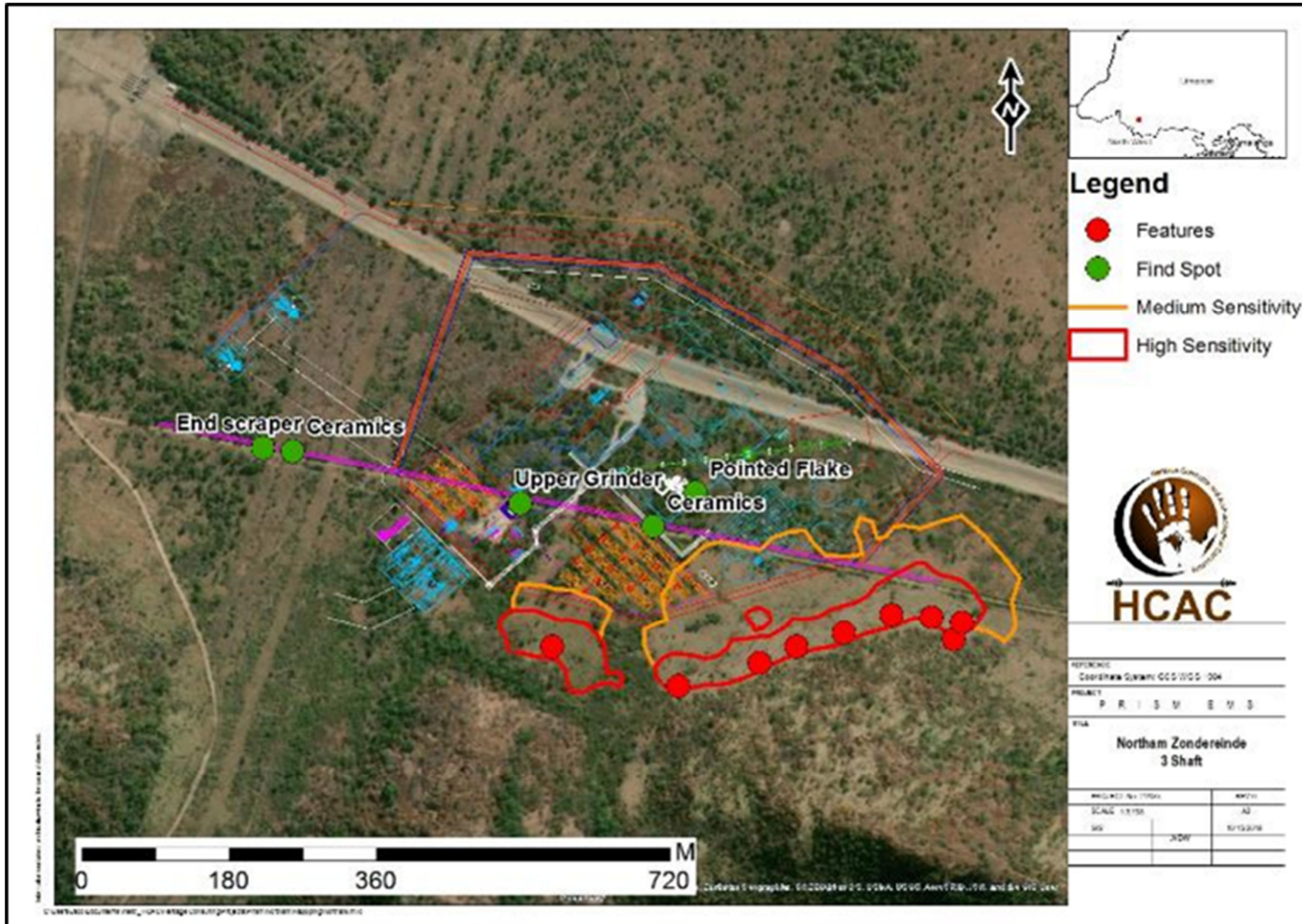


Figure 6-25: Recorded features and sensitivity mapping in relation to the development layout

- **Built Environment (Section 34 of the NHRA)**

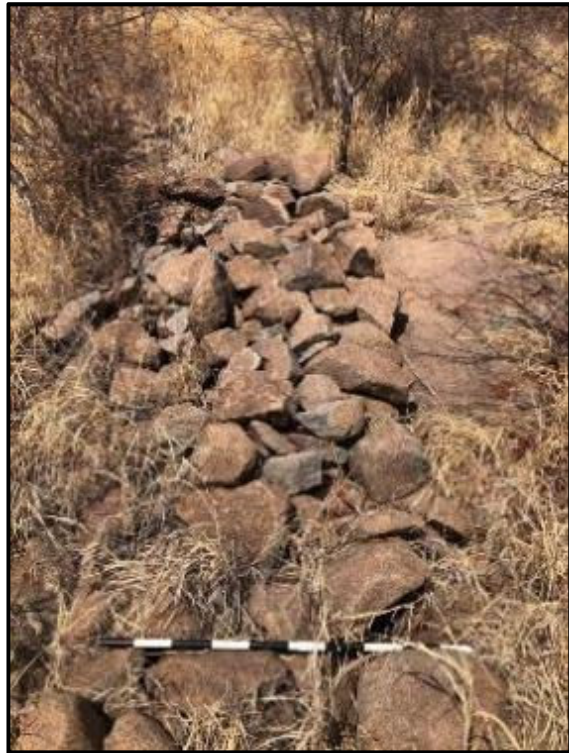
No standing structures older than 60 years occur in the study area.

- **Archaeological resources (Section 35 of the NHRA)**

Site Number	Feature 1	1:50 000 map nr	2427CD
Description	Late Iron Age Site		
Longitude and Latitude	-24,8507	27,31347	
Topographical location	Base of a hill		
Site Condition	Site is overgrown, Visibility - Low		
Description of the site	Very extensive Iron Age stonewalled settlement marked by change in vegetation. The area has been fallow for a number of years and is totally overgrown. Site features are not visible due to the vegetation cover, but several stone packed kraals measuring approximately 20 meters in diameter were noted as well as widespread middens often deflated. Existing road cuts through the northern section of the site exposing kraal/ midden deposit in the road cutting.		
Artefacts	Bone, Midden, Stone Walling, Undiagnostic Ceramics		
Estimation or measurement of the extent	Spatially very large site. Refer to sensitivity maps for areas relevant to the development		
Depth and stratification of the site	Top stratum visible		
Impact	The site has been impacted on by road construction and future impact includes destruction due to mining activities. Impacts on the site by the proposed project will be direct and irreversible.		
Significance	Generally Protected A (GP. A) - High/medium significance. Mitigation before destruction		
Recommendation and mitigation	The high significant areas should be avoided and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan.		



Lower grinding stone



Stone walling



Undecorated ceramics.



Exposed midden/kraal deposit.



Midden/kraal deposit exposed in road cutting.



Grass cover on accumulated deposit within enclosure

Figure 6-26: Archaeological features identified on the study area

- **Burial Grounds and Graves (Section 36 of the NHRA)**

In terms of Section 36 of the Act no burial sites were recorded. If any graves are located in future they should ideally be preserved in-situ or alternatively relocated according to existing legislation.

- **Cultural Landscapes, Intangible and Living Heritage**

The cultural landscape of the greater study area is characterised by mining developments and the project will not impact on significant viewsapes.

6.2.2 Land Use and Environmental Features

6.2.2.1 Description of the current land uses

A desktop assessment of the land use within and around the Mining Right Area (MRA) illustrates a conservation area and cultivated land on the northern and far southern side of the Western Block respectively. The remainder of the Western Block is situated within unspecified land. The land cover of the Western Block is dominated by thicket and bushland vegetation, with a portion of the land covered by cultivated land (ENPAT, 2001). The aerial imagery indicates that the cultivated boundary has expanded along the R510 since the data survey. The remainder of the Western Block is currently used for grazing purposes. Refer to Figure 6-27 for current land uses.

Land Capability and Land Use: The soil and land types identified in the Western Block can be classified into four (4) different land capability classes as summarised in Table 6-9. The majority of the Western Block has arable land capability (82.6%) and only 1.3% has grazing land capability. The areas where mining has already taken place and housing constructed has industrial land capability (13.9% of the Western Block). Land with wetland land capability is associated with the Rensburg soil form and is situated around the river (2.1% of the Western Block).

Table 6-9: Summary of Land Capability Classes within the Western Block of the MRA

LAND CAPABILITY CLASS	AREA (ha)	% OF STUDY AREA (%)
Grazing land capability	106.4	1.3
Industrial land capability	1102.7	13.9
Wetland land capability	169.3	2.1
Arable land capability	6534.8	82.6
TOTALS	7913.2	100.0

6.4.2.1 Description of specific environmental features and infrastructure on the site

The study area where the shaft complex (including service infrastructure) is proposed is approximately 15 hectares in extent and the majority of the study area is already disturbed by previous activities. Temporary infrastructure was established on site for drilling purposes as part of the specialist studies. Currently, the site falls into a natural area, but not within any biodiversity conservation areas when overlain onto the Limpopo Province Conservation Plan. The site is also not situated within any threatened ecosystems. However, the site is occurring within an Important Bird Area (IBA) i.e. the Northern Turf Thornveld IBA. A

biodiversity impact assessment was conducted and the majority of the site is either disturbed or have a low-moderate sensitivity (Figure 6-11). The Koppie and a buffer of 50 m was identified by the biodiversity specialist as having a high sensitivity rating and indicated that this area should be excluded from the development as it is not possible to mitigate the impact that the proposed activities will have to acceptable levels (Figure 6-11). The heritage specialist identified medium and high sensitive archaeological areas on and around the study area (Figure 6-24). The recommendation was to avoid the high sensitive areas or implement extensive Phase 2 mitigation and the medium sensitive areas can be encroached on with some mitigation measures implemented. The Applicant assessed the impact of the extensive Phase 2 mitigation required for the high sensitive archaeological areas and decided to work towards a solution to avoid the sensitive areas. The alternative layout encroached onto the high sensitive areas (Figure 6-29) whereas the proposed layout avoids high sensitive areas (Figure 6-30 and Figure 6-31).

6.4.2.2 Environmental and current land use map

- **Land use map**

Refer to Figure 6-27 for an illustration of the current land use map of the mining right area and surrounding area and for an illustration of the current land use map of the study area and surrounding area. Figure 6-28 indicates Protected Areas and National Protected Areas Expansion Strategy (NPEAS) Focus Areas in relation to the study area. The site itself does not infringe on the 5km buffer of any protected area, however, the services corridor does. No listed activities in terms of Listing Notice 3 are triggered by the installation of services in the services corridor.

- **Environmental features map**

Refer to Figure 6-30 and Figure 6-31 an illustration of the spatial sensitivity areas of the environmental features observed on the study and surrounding area with the proposed layout and of the sensitivity areas with the alternative layout (Figure 6-29).

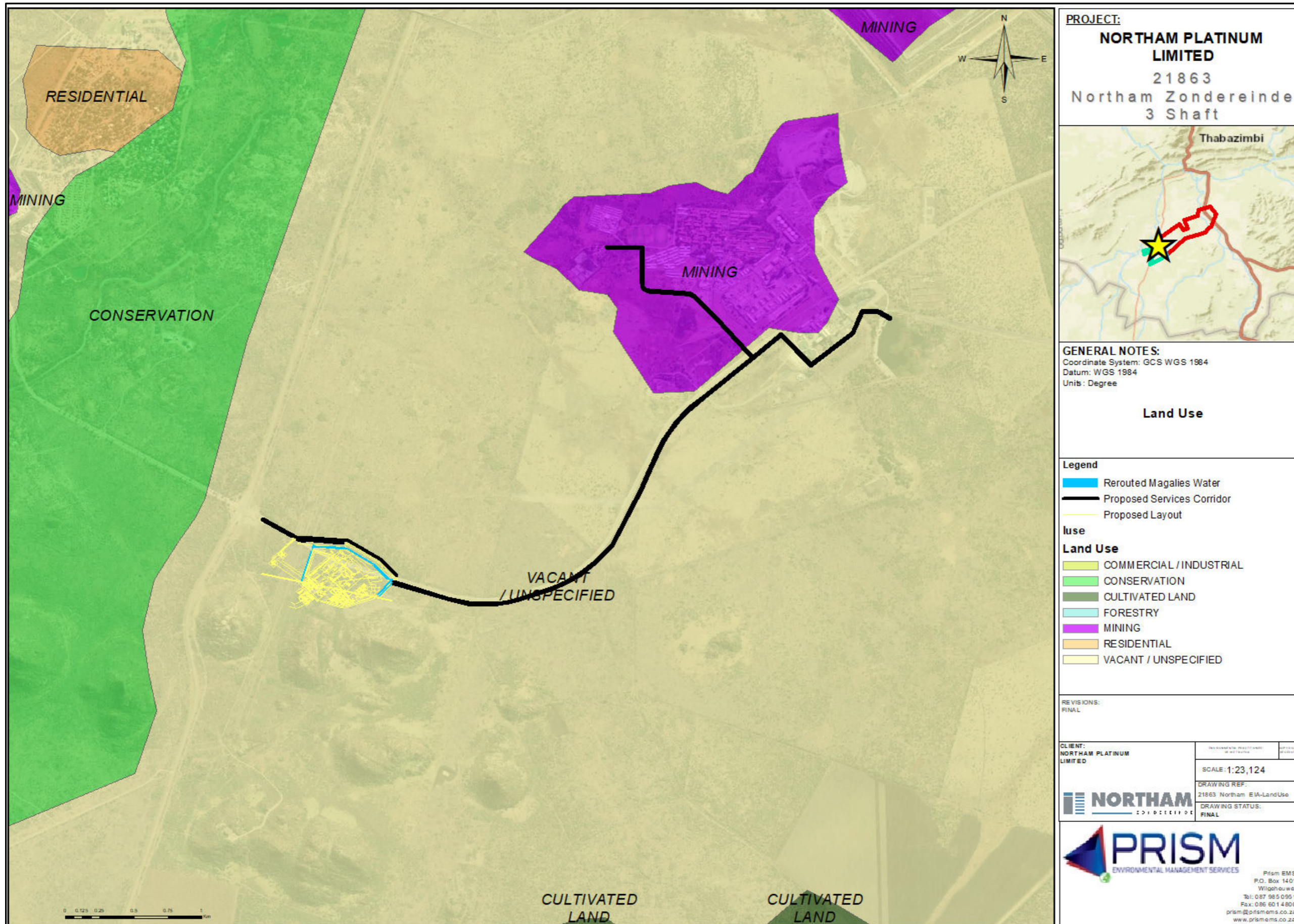


Figure 6-27: Land Use Map

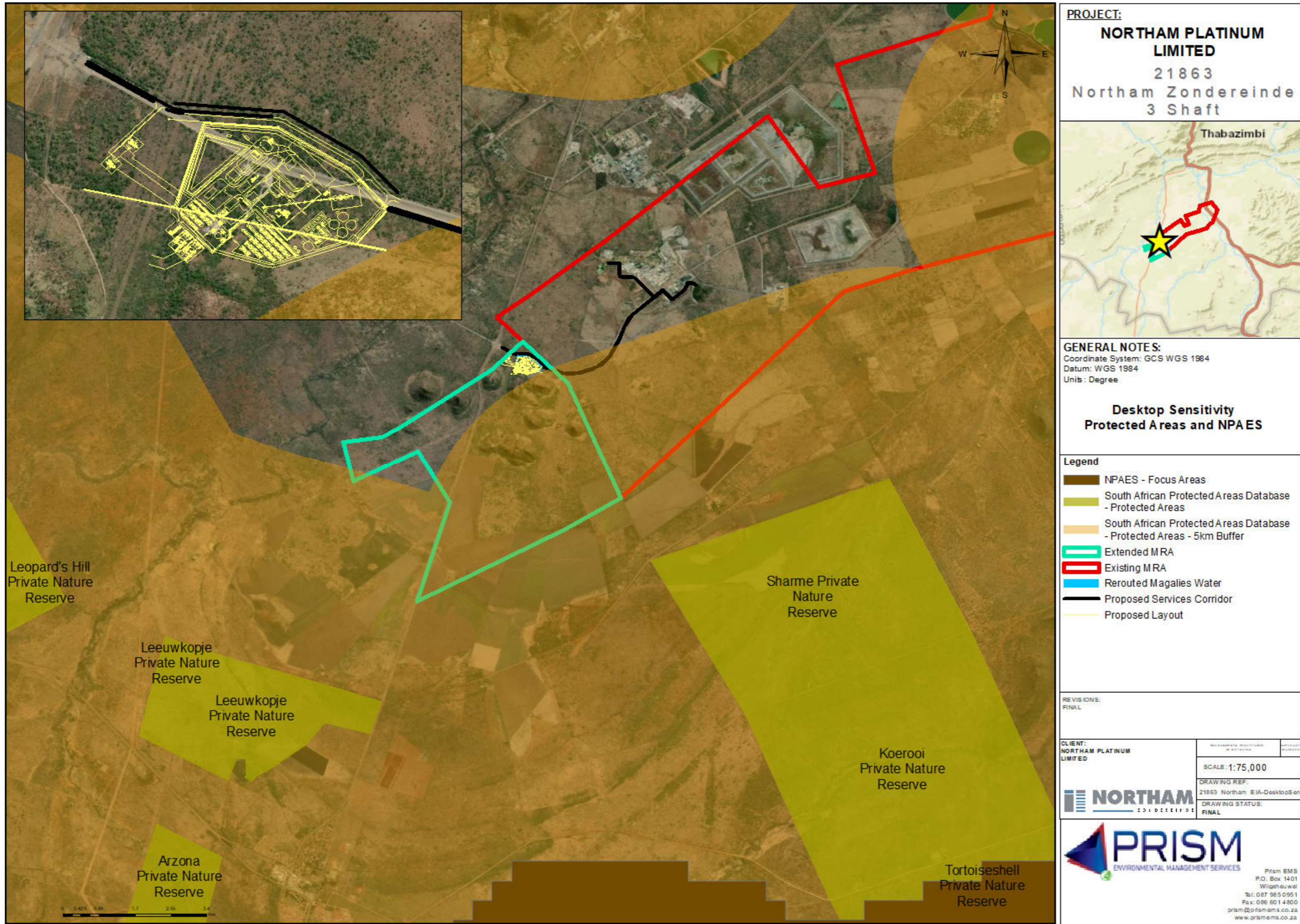


Figure 6-28: Protected Areas and buffer in relation to the study area

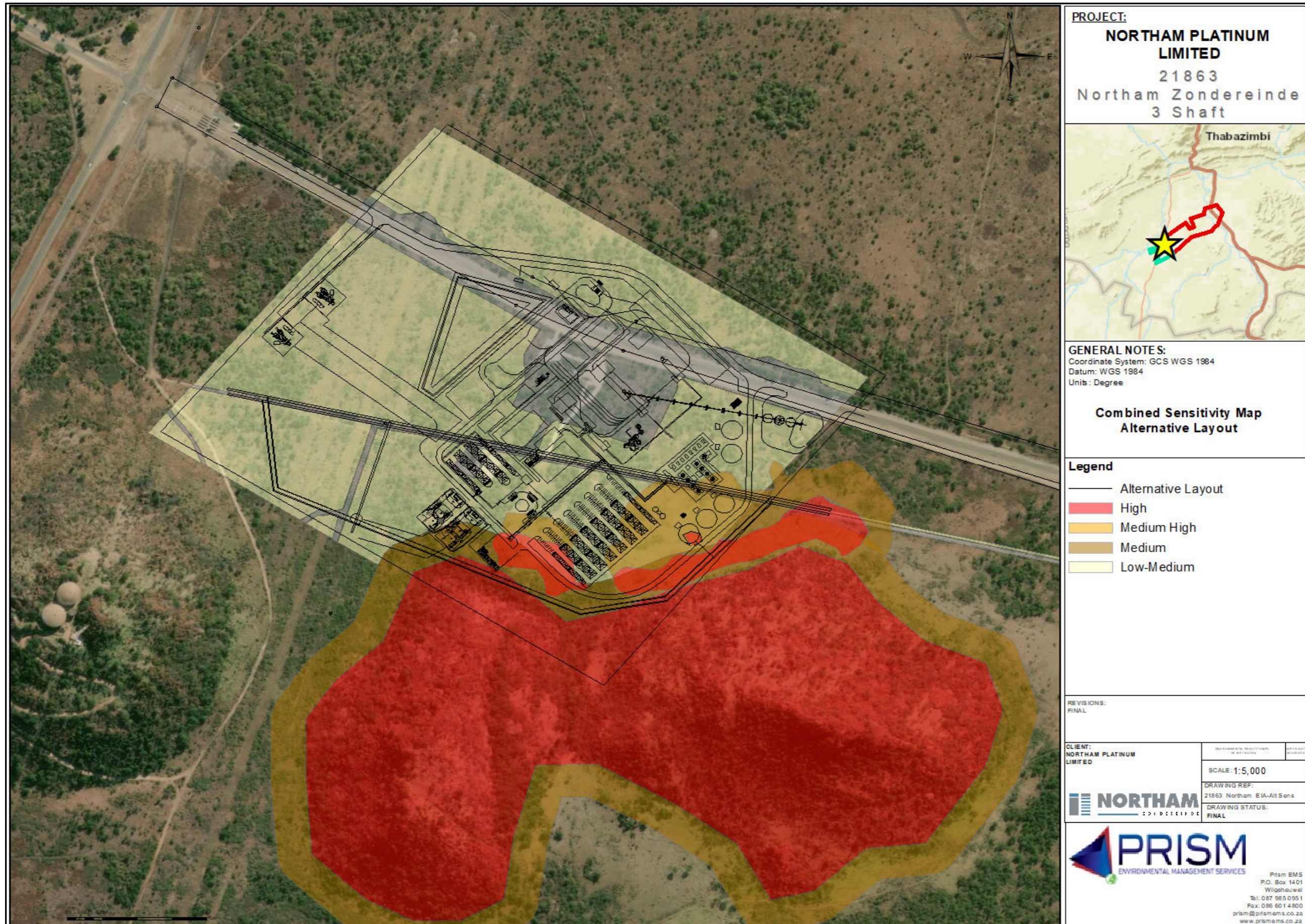


Figure 6-29: Combined Sensitivity Map and Alternative Layout

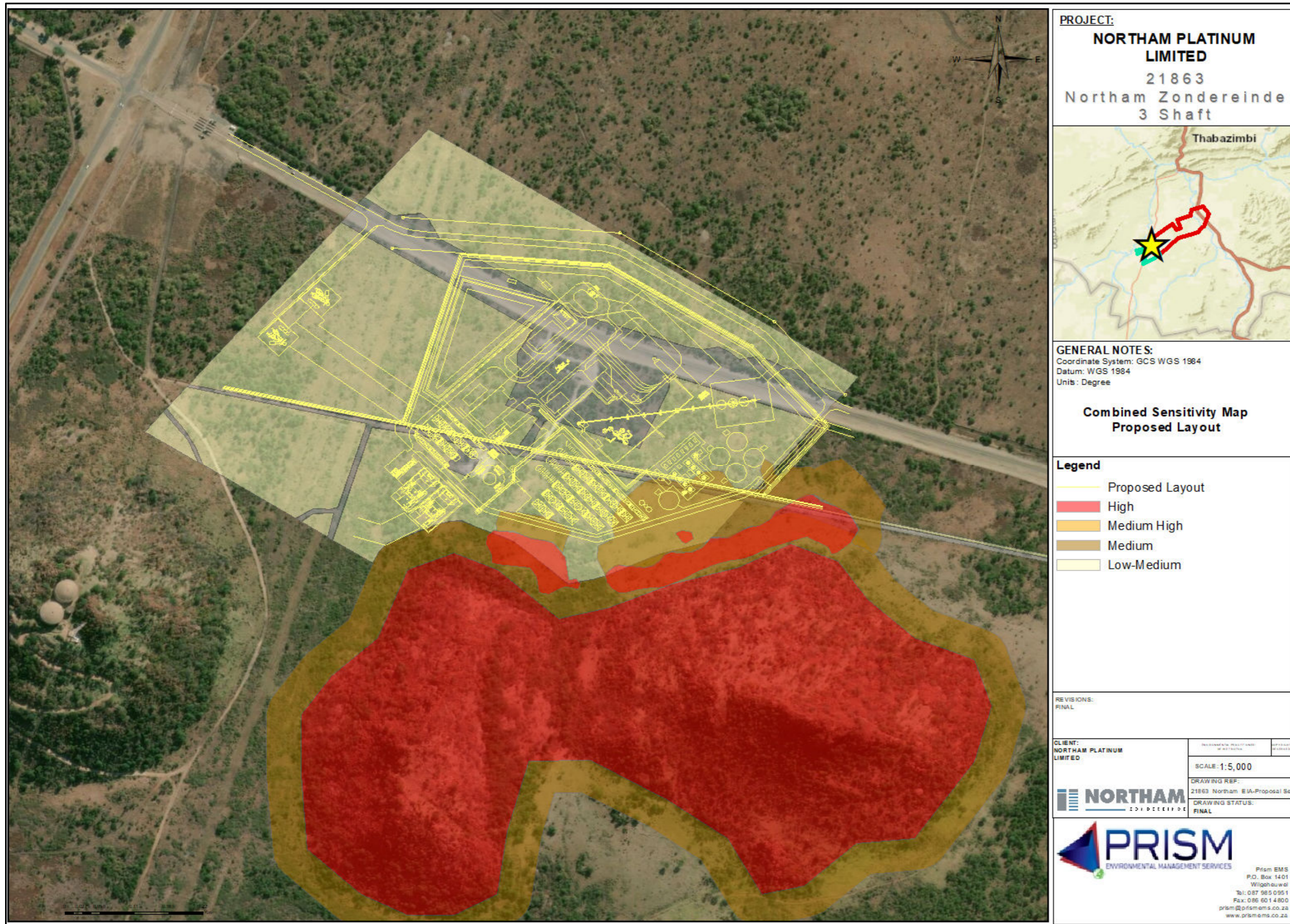


Figure 6-30: Zoomed in Combined Sensitivity Map and Proposed Layout

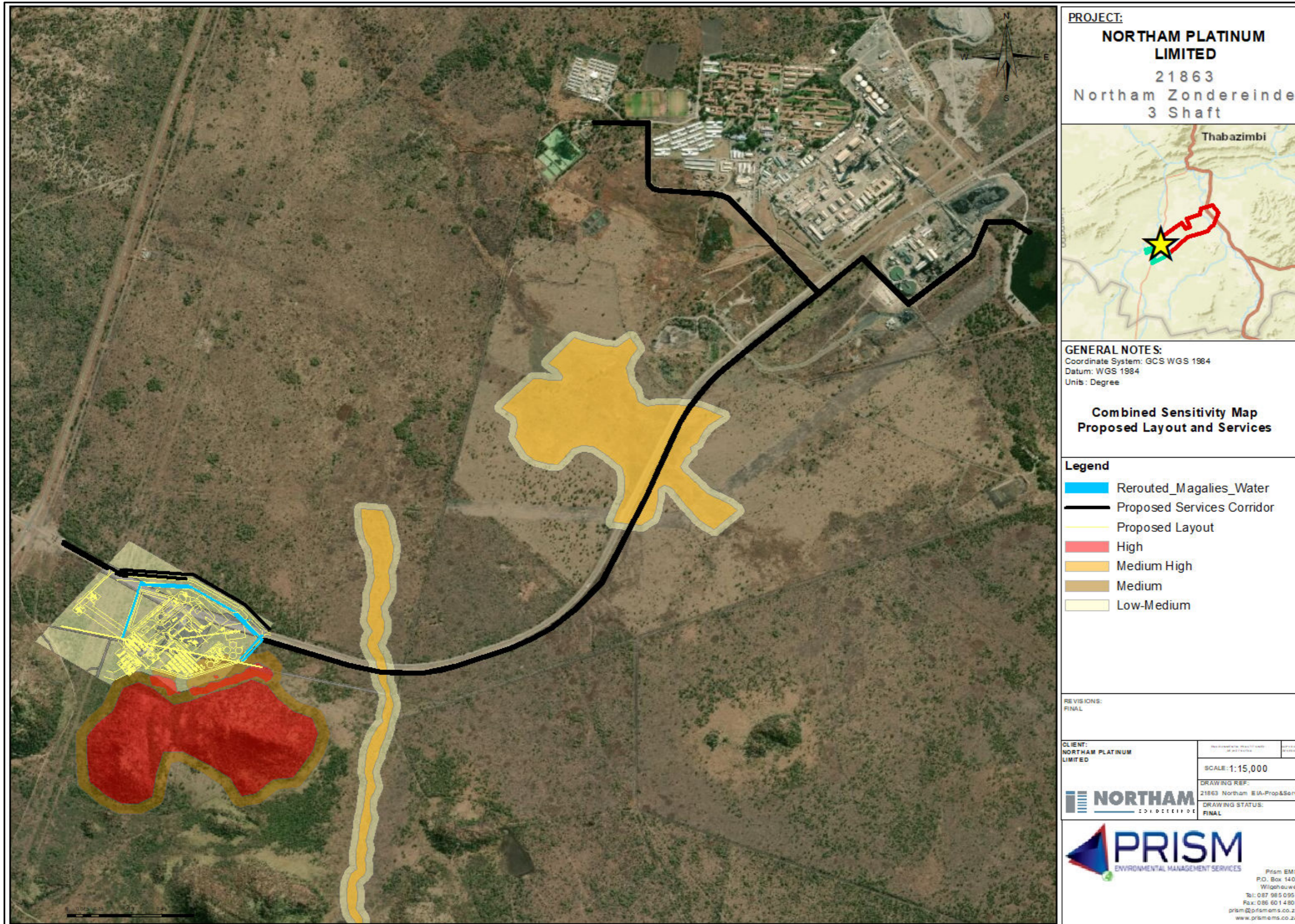


Figure 6-31: Combined Sensitivity Map and Proposed Layout and Servitudes

6.5 Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

Refer to Table 7-1 for a summary of the quantitative impact assessment conducted. Also refer to Appendix 5 for the detailed impact assessment table.

6.6 Methodology used in determining the significance of environmental impacts

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision.)

The standard methodology used in the environmental impact assessment to determine the significance rating of the potential impacts are outlined in this section.

6.6.1 Significance

The **significance** of an impact is defined as the combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The nature and type of impact may be direct or indirect and may also be positive or negative, refer to Table 6-10 for the specific definitions.

Table 6-10: Nature and type of impact

Nature and Type of Impact:		
IMPACT	Direct	Impacts that are caused directly by the activity and generally occur at the same time and place as the activity
	Indirect	Indirect or induced changes that may occur because of the activity. These include all impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity
	Cumulative	Those impacts associated with the activity which add to, or interact synergistically with existing impacts of past or existing activities, and include direct or indirect impacts which accumulate over time and space
	Positive	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes will benefit significantly, and includes neutral impacts (those that are not considered to be negative)
	Negative	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will be comprised

Table 6-11 presents the defined criteria used to determine the **consequence** of the impact occurring which incorporates the extent, duration and intensity (severity) of the impact.

Table 6-11: Consequence of the Impact occurring

CONSEQUENCE	Extent of Impact:	
	Site	Impact is limited to the site and immediate surroundings, within the study site boundary or property (immobile impacts)
	Neighbouring	Impact extends across the site boundary to adjacent properties (mobile impacts)
	Local	Impact occurs within a 5km radius of the site
	Regional	Impact occurs within a provincial boundary
	National	Impact occurs across one or more provincial boundaries
	Duration of Impact:	
	Incidental	The impact will cease almost immediately (within weeks) if the activity is stopped, or may occur during isolated or sporadic incidences
	Short-term	The impact is limited to the construction phase, or the impact will cease within 1 - 2 years if the activity is stopped
	Medium-term	The impact will cease within 5 years if the activity is stopped
	Long-term	The impact will cease after the operational life of the activity, either by natural processes or by human intervention
	Permanent	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient
	Intensity or Severity of Impact:	
	Low	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are not affected
	Low-Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are modified insignificantly
	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are altered
	Medium-High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are severely altered
	High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes will permanently cease

The probability of the impact occurring is the likelihood of the impacts actually occurring and is determined based on the classification provided in

Table 6-12.

Table 6-12: Probability and confidence of impact prediction

PROBABILITY	Probability of Potential Impact Occurrence:	
	Improbable	The possibility of the impact materialising is very low either because of design or historic experience
	Possible	The possibility of the impact materialising is low either because of design or historic experience
	Likely	There is a possibility that the impact will occur
	Highly Likely	There is a distinct possibility that the impact will occur
	Definite	The impact will occur regardless of any prevention measures

The **significance** of the impact is determined by considering the consequence and probability without taking into account any mitigation or management measures and is then ranked according to the ratings listed in Table 6-13. The level of confidence associated with the impact prediction is also considered as low, medium or high and is described in Table 6-14.

Table 6-13: Significance rating of the impact

SIGNIFICANCE	Significance Ratings:	
	Low	Neither environmental nor social and cultural receptors will be adversely affected by the impact. Management measures are usually not provided for low impacts
	Low-Medium	Management measures are usually encouraged to ensure that the impacts remain of Low-Medium significance. Management measures may be proposed to ensure that the significance ranking remains low-medium
	Medium	Natural, cultural and/or social functions and processes are altered by the activities, and management measures must be provided to reduce the significance rating
	Medium-High	Natural, cultural and/or social functions and processes are altered significantly by the activities, although management measures may still be feasible
	High	Natural, cultural, and/or social functions and processes are adversely affected by the activities. The precautionary approach will be adopted for all high significant impacts and all possible measures must be taken to reduce the impact

Table 6-14: Level of confidence of the impact prediction

CONFIDENCE	Level of Confidence in the Impact Prediction:	
	Low	Less than 40% sure of impact prediction due to gaps in specialist knowledge and/or availability of information
	Medium	Between 40 and 70% sure of impact prediction due to limited specialist knowledge and/or availability of information
	High	Greater than 70% sure of impact prediction due to outcome of specialist knowledge and/or availability of information

Once significance rating has been determined for each impact, management and mitigation measures must be determined for all impacts that have a significance ranking of Medium and higher in order to attempt to reduce the level of significance that the impact may reflect.

The EIA Regulations, 2014 specifically require a description is provided of the degree to which these impacts:

- can be reversed;
- may cause irreplaceable loss of resources; and
- can be avoided, managed or mitigated.

Based on the proposed mitigation measures the EAP will determined a mitigation efficiency (Table 6-15) whereby the initial significance is re-evaluated and ranked again to effect a significance that incorporates the mitigation based on its effectiveness. The overall significance is then re-ranked, and a final significance rating is determined.

Table 6-15: Mitigation efficiency

Mitigation Efficiency		
MITIGATION EFFICIENCY	None	Not applicable
	Very Low	Where the significance rating stays the same, but where mitigation will reduce the intensity of the impact. Positive impacts will remain the same
	Low	Where the significance rating reduces by one level, after mitigation
	Medium	Where the significance rating reduces by two levels, after mitigation
	High	Where the significance rating reduces by three levels, after mitigation
	Very High	Where the significance rating reduces by more than three levels, after mitigation

The reversibility is directly proportional the “Loss of Resource” where no loss of resource is experienced, the impact is completely reversible; where a substantial “Loss of resource” is experienced there is a medium degree of reversibility; and an irreversible impact relates to a complete loss of resources, i.e. irreplaceable (Table 6-16).

Table 6-16: Degree of reversibility and loss of resources

DEGREE REVERSABILITY & LOSS OF RESOURCES	Loss of Resources:	
	No Loss	No loss of social, cultural and/or ecological resource(s) are experienced. Positive impacts will not experience resource loss
	Partial	The activity results in an insignificant or partial loss of social, cultural and/or ecological resource(s)
	Substantial	The activity results in a significant loss of social, cultural and/or ecological resource(s)
	Irreplaceable	The activity results in the complete and irreplaceable social, cultural and/or ecological loss of resource(s)
	Reversibility:	
	Irreversible	Impacts on natural, cultural and/or social functions and processes are irreversible to the pre-impacted state in such a way that the application of resources will not cause any degree of reversibility
	Medium Degree	Impacts on natural, cultural and/or social functions and processes are partially reversible to the pre-impacted state if less than 50% resources are applied
	High Degree	Impacts on natural, cultural and/or social functions and processes are partially reversible to the pre-impacted state if more than 50% resources are applied
	Reversible	Impacts on natural, cultural and/or social functions and processes are fully reversible to the pre-impacted state if adequate resources are applied

6.6.2 Cumulative Impacts

It is important to assess the natural environment using a systems approach that will consider the cumulative impact of various actions. Cumulative impact refers to the impact on the environment, which results from the incremental impact of the actions when added to other past, present and reasonably foreseeable future actions regardless of what agencies or persons undertake such actions. Cumulative impacts can result from individually minor, but collectively significant actions or activities taking place over a period. Cumulative effects can take place frequently and over a period that the effects cannot be assimilated by the environment.

6.7 The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties.)

To date, no concerns have been raised by any interested or affected parties. No concerns have been received by Interested and Affected Parties to date. A detailed impact assessment was conducted and is summarised in Table 7-1 and attached to Appendix 5.

6.8 The possible mitigation measures that could be applied and the level of risk

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

No concerns have been received by Interested and Affected Parties to date. A detailed impact assessment was conducted and mitigation measures identified and is summarised in Table 7-1 and attached to Appendix 5 .

6.9 Motivation where no alternative sites were considered

The location to establish the shaft complex has been chosen by considering the following factors:

- Favourable underlying geological conditions;
- Location close to the Zondereinde Western Block where access is required;
- Location close to existing roads and services and the existing Zondereinde mine complex; and
- Environmental conditions on the study area.

Ten positions for the placement of new vertical main and raisebore shafts were investigated. Underground access, surface features and other land considerations indicated the current position as the only feasible raiseboring site. The outcome of the specialist studies and impact assessment indicated that with the final layout (proposed layout), all environmental and socio-economic impacts can be mitigated to acceptable levels (Table 7-1).

6.10 Statement motivating the preferred site

(Provide a statement motivating the final site layout that is proposed.)

The proposed layout of the shaft complex (Figure 3-2) has been chosen by considering the following factors:

- Favourable underlying geological conditions;
- Topography of the area (koppies to the south of the study area);
- Location of existing roads and services;
- Environmental conditions on and around the study area.

Based on the findings of the specialist studies and impact assessment and considering the successful implementation of the EMPr, a recommendation as to the preferred alternative was made. The Proposed layout is the preferred alternative since the proposed layout does not encroach onto any high sensitive areas (high sensitive heritage area and Koppie and buffer). All effort was made by the project team to develop the proposed alternative which only encroach onto the medium sensitivity heritage areas and low sensitive ecological areas (Refer to Figure 6-30 and Figure 6-31).

7 FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS AND RISKS THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE

(In respect of the final site layout plan) through the life of the activity. (Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)

7.1 Overall Impact Assessment

This section focuses on the potential environmental impacts that could be caused by the proposed development.

An ‘impact’ refers to the change to the environment resulting from an environmental aspect (or activity), whether desirable or undesirable. An impact may be the direct or indirect consequence of an activity. From a qualitative perspective, impacts were identified as follows:

- Impacts associated with listed activities contained in GN 983-984 of 4 December 2014 (Listing Notice, 1 and 2) [as amended in 2017], for which authorisation has been applied for;
- An assessment of the project activities and components; and
- Issues highlighted by I&APs (both the general public and authorities).

A detailed quantitative assessment of impacts is provided and specifically considers impacts to the receiving environment and the findings from Specialist Studies. This quantitative impact assessment uses the impact assessment methodology discussed in the approved Scoping Report and Plan of Study for the EIA. A summary of the methodology is provided in Section 6.6.

7.2 Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties).

Table 7-1 provides a summary of the identified impacts and significance ranking (WOM = Without Mitigation) for the construction and operational phases of development. Impacts for each alternative (both layout and treatment alternatives) are also provided. Brief management measures have been provided for the purposes of assessing whether the implementation of recommended management measures may be sufficient to decrease the significance ranking (WM = With Mitigation). The full impact assessment is provided in Appendix 5.

Table 7-1: Summary of the identified impacts and significance ranking

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY
CONSTRUCTION PHASE											
All activities during the pre-construction and construction phases.	WETLAND AND DRAINAGE LINE	Direct	Water quality	Layout 1	Yes	Negative	Medium	<p>Stockpiling outside the wetland area, stormwater management, dry season construction, coffer damming, filtration, sub-surface drains, velocity dissipation structures (such as reno mattresses);</p> <p>'Limited use of machinery in the wetland area. No servicing of vehicles and equipment on site.</p> <p>It is recommended that a WULA be submitted to the Department of Water Affairs/Human Settlements, Water and Sanitation (DHSWS), as the proposed activities will trigger sections of Section 21 of the National Water Act [NWA], 1998 (Act No. 36 of 1998) that will require such an application;</p> <p>Together with the WULA, a rehabilitation and monitoring plan will have to be compiled and approved;</p> <p>Approved stormwater management plan must be implemented.</p> <p>Wetland monitoring occurring on a quarterly basis should be conducted by a skilled professional qualified in assessing and understanding the complex nature of wetlands and their associated drivers;</p> <p>Wetland drivers should be protected as far as possible. Wetland release into downstream aquatic resources should be rehabilitated, enhanced and monitored. Water quality preservation is key. Monitoring should take place during the construction phase as per the Water Use License (WUL) requirements.</p> <p>Enhance wetland integrity.</p>	Low-Medium	Partial	Medium Degree
				Layout 2			Medium		Low-Medium	Partial	Medium Degree
		Indirect	Silt	Layout 1	Yes	Negative	Low-Medium		Low	Minimal	High Degree
				Layout 2			Low-Medium		Low	Minimal	High Degree
		Direct	Surface water run-off	Layout 1	Yes	Negative	Low-Medium		Low	Minimal	High Degree
				Layout 2			Low-Medium		Low	Minimal	High Degree
		Indirect	Contamination of water from hazardous substances	Layout 1	Yes	Negative	Low		Low	Minimal	High Degree
				Layout 2			Low		Low	Minimal	High Degree
		Direct	Disturbance of natural system	Layout 1	Yes	Negative	Medium		Low-Medium	Partial	Medium Degree
				Layout 2			Medium		Low-Medium	Partial	Medium Degree
		Direct	Disturbance/pollution of sub-surface flow	Layout 1	Yes	Negative	Medium		Low-Medium	Minimal	High Degree
				Layout 2			Medium		Low-Medium	Minimal	High Degree
		Direct	Disturbance of aquatic ecological systems	Layout 1	Yes	Negative	Medium		Low-Medium	Minimal	High Degree
				Layout 2			Medium		Low-Medium	Minimal	High Degree
Establishment of Construction Camp and installation and operation of construction support services including chemical toilets and water tanks and generation of power.	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Low	Low	No Loss	Reversible	
				Layout 2			Low	Low	No Loss	Reversible	
	Direct	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.)	Layout 1	Yes	Negative	Medium	Low-Medium	Minimal	High Degree		
			Layout 2			Medium	Low-Medium	Minimal	High Degree		
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna	Layout 1	Yes	Negative	Low-Medium	Low	No Loss	Reversible	
							Low-Medium	Low	No Loss	Reversible	

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE		
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY	
Site clearing, removal of vegetation and topsoil (and stockpiling of topsoil) of the site footprint and for service infrastructure including access and haul roads, raw water and waste water pipelines and stormwater management infrastructure.	SOIL	Direct	and surrounding land uses.	Layout 2			Low-Medium	Noise monitoring should be undertaken as spot checks; When required noise mufflers should be utilised to reduced noise; It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Low	No Loss	Reversible	
			Soil alteration including compaction, contamination and pollution and erosion.	Layout 1		Yes	Negative	Medium	Control and stop through mitigation measures including: Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required. To reduce the loss of material by erosion, disturbance must be kept to a minimum. If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area. Where possible, natural vegetation should be retained to reduce the risk of erosion. Should erosion occur due to negligence on the part of the Contractor, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor. Waste, including solid and liquid waste and ablution facilities m.st be appropriately managed to prevent contamination of soil	Low	Minimal	High Degree
	HERITAGE	Direct		Destruction or partial destruction of non-renewable heritage resources.	Layout 1		Yes	Negative	Medium-High	The high significant areas should be avoided and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan.	Low	Minimal
			Layout 2					High	Medium-High		Partial	Medium Degree
	VISUAL	Direct	Visual impact	Layout 1		Yes	Negative	Low-Medium	Control measures to reduce visual impact including: Suitable screening to be put in place during construction to minimise visual impacts; No littering to be allowed; Good housekeeping practices to be followed.	Low	No Loss	Reversible
				Layout 2				Low-Medium		Low	No Loss	Reversible
	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1		Yes	Negative	Low-Medium	Control through dust control measures including: A speed limit of 20km/h must be maintained on all dirt roads; Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	Low	No Loss	Reversible
				Layout 2				Low-Medium		Low	No Loss	Reversible
		Direct	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.).	Layout 1		Yes	Negative	Medium	Control through mitigation measures including: All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; All vehicles used during the project should be properly maintained and in good working order; All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	Low-Medium	Minimal	High Degree
				Layout 2				Medium		Low-Medium	Minimal	High Degree
NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1		Yes	Negative	Low-Medium	Control through noise control measures including: The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; Construction activities should be limited to daytime only; Noise monitoring should be undertaken as spot checks;	Low	Minimal	High Degree	

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY
				Layout 2			Low-Medium	When required noise mufflers should be utilised to reduced noise; It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Low	Minimal	High Degree
	SOIL	Direct	Loss of topsoil and erosion	Layout 1	Yes	Negative	Low-Medium	Avoid through control measures including: During clearing of vegetation, topsoil and subsoil must be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase. Topsoil should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater. Topsoil stockpiles should be checked on a monthly basis to ensure that this is the case. Topsoil should be used in landscaping and rehabilitation where possible.	Low	Minimal	High Degree
				Layout 2			Low-Medium		Low	Minimal	High Degree
	SOIL	Direct	Soil alteration including contamination and compaction	Layout 1	No	Negative	Low-Medium	Control and stop through mitigation measures including: • Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required. • To reduce the loss of material by erosion, disturbance must be kept to a minimum. If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area. Where possible, natural vegetation should be retained to reduce the risk of erosion. Should erosion occur due to negligence on the part of the Contractor, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor. Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil. Hazardous materials (Hydrocarbon) storage areas to be installed and managed appropriately and spill procedures in place and implemented.	Low	Minimal	High Degree
				Layout 2			Low-Medium		Low	Minimal	High Degree
	LAND CAPABILITY	Direct	Loss of land capability	Layout 1	Yes	Negative	Low-Medium	None	Low-Medium	Minimal	High Degree
				Layout 2			Low-Medium		Low-Medium	Minimal	High Degree
	BIODIVERSITY	Direct	Destruction, further loss and fragmentation of the vegetation community	Layout 1	Yes	Negative	Medium-High	High sensitive areas (koppie and buffer) to be demarcated and avoided completely; All dumping and storage during the construction phase must be within the existing infrastructure footprint and the low sensitivity areas; All laydown, storage areas etc. should be restricted to transformed areas during construction, close to the preferred option and existing roads should be used; The number (and size) of laydown, storage and staff facilities must be kept to a minimum; Building materials may not be stored for extended periods of time and must be removed from the site once the project has been concluded; Dust-reducing mitigation measures; A spill management plan must be put in place; All rubble generated must be removed from the site;	Low	Partial	Medium Degree

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY
				Layout 2			High	Keep storm water away from the working/mining areas; Prevent rainwater and the process water that has fallen on site from leaving the site in an uncontrolled and unregulated fashion. Implementation of a fire management plan; Environmental awareness training; Rehabilitation and re-vegetation.	Medium-High	Irreplaceable	Irreversible
		Direct	Destruction of protected tree species	Layout 1	Yes	Negative	Medium	No person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate, or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a license or exemption. Environmental awareness training Fire management plan	Absent	No Loss	Reversible
				Layout 2			Medium-High		Medium	Partial	Medium Degree
		Direct	Displacement of faunal community (including threatened and protected species) due to habitat loss, direct mortalities and disturbance (noise, dust and vibration).	Layout 1	Yes	Negative	Medium-High	High sensitive areas (koppie and buffer) to be demarcated and avoided completely; Construction activities should be limited during summer when the risk of disturbing sensitive life history stages (e.g. nesting) is lowest; Where possible, work should be restricted to one area at a time; If any faunal are recorded during construction, activities should temporarily cease, and time permitted for the species to move away. In the event the species does not move away (voluntarily), the species must be removed safely from the area and relocated to a suitable area that will not be directly disturbed by the project;	Low	Minimal	High Degree
				Layout 2			Medium-High		Medium	Partial	Medium Degree
		Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	Low-Medium	Avoid through control measures including: Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Low	Minimal	High Degree
				Layout 2			Low-Medium		Low	Minimal	High Degree
		VISUAL	Visual impact	Layout 1	Yes	Negative	Low-Medium	Control measures to reduce visual impact including: Suitable screening to be put in place during construction to minimise visual impacts.	Low	No Loss	Reversible
				Layout 2			Low-Medium		Low	No Loss	Reversible
		HERITAGE	Destruction or partial destruction of non-renewable heritage resources.	Layout 1	Yes	Negative	Medium-High	The high significant areas should be avoided, and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan.	Low	Minimal	High Degree
				Layout 2			High		Medium-High	Partial	Medium Degree

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE		
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY	
Generation and disposal domestic waste, construction and hazardous waste	SERVICES	Direct	Additional burden on existing landfill.	Layout 1	Yes	Negative	Low-Medium	Waste minimisation strategies to be included in the EIA/EMPR and implemented.	Low	Minimal	High Degree	
				Layout 2			Low-Medium					
	SOIL, WATER	Direct	Potential pollution of soil, surface and groundwater due to indiscriminate disposal of waste.	Layout 1	No	Negative	Low	Control and stop through mitigation measures including: Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil.	Low	Minimal	High Degree	
				Layout 2			Low					
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	Low	Control measures to reduce visual impact including: Suitable screening to be put in place during construction to minimise visual impacts; No littering to be allowed; Good housekeeping practices to be followed.	Low	No Loss	Reversible	
				Layout 2			Low					
	BIODIVERSITY	Direct	Mortalities of fauna caused by ingestion of plastic and potentially toxic materials, or they may suffocate on plastic, if waste is not disposed of correctly. They can also become stuck in waste and may die of hunger and or dehydration as a result.	Layout 1	No	Negative	Medium	Control measures to reduce visual impact including: No littering to be allowed; Waste management strategies to be included in the EIA/EMPR and implemented; Good housekeeping practices to be followed.	Low	Minimal	High Degree	
				Layout 2			Medium					
	Loading/off-loading and transportation of construction materials, machinery, equipment and construction workers.	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Low-Medium	Control through dust control measures including: A speed limit of 20km/h must be maintained on all dirt roads; Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	Low	No Loss	Reversible
					Layout 2			Low-Medium				
NOISE		Indirect	Noise generation by increased traffic on the roads and construction vehicles.	Layout 1	Yes	Negative	Low-Medium	Control through noise control measures including: Construction activities should be limited to daytime only; Noise monitoring should be undertaken as spot checks; Road users should adhere to speed limits; Construction vehicles to be serviced at appropriate intervals to reduce unnecessary noise; It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Low	No Loss	Reversible	
				Layout 2			Low-Medium					
SOIL		Direct	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained construction vehicles; and spillages of construction materials etc.	Layout 1	Yes	Negative	Low-Medium	Control and stop through mitigation measures including: Construction vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; Construction vehicles to keep to the designated roads; Construction vehicles carrying materials to be appropriately covered as to reduce loss of materials.	Low	Minimal	High Degree	
				Layout 2			Low-Medium					

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY
	HEALTH AND SAFETY	Direct	Potential for accidents due to increased traffic and construction vehicles not keeping to traffic rules and speed limits and reckless driving.	Layout 1	No	Negative	Medium	Control through mitigation measures including: Enforce speed limits; Penalties or fines for reckless driving.	Low	Minimal	High Degree
				Layout 2			Medium		Low	Minimal	High Degree
	NATURAL RESOURCES	Direct	Increased fuel consumption	Layout 1	Yes	Negative	Low-Medium	Reduce unnecessary trips through efficient planning.	Low	Minimal	High Degree
				Layout 2			Low-Medium		Low	Minimal	High Degree
Earthworks – excavations for establishment of site infrastructure, buildings, headgear, shaft box cut, installation of services and construction of access and haul roads. Stockpiling of construction and excavated materials	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Low	Control through dust control measures including: A speed limit of 20km/h must be maintained on all dirt roads; Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	Low	No Loss	Reversible
				Layout 2			Low		Low	No Loss	Reversible
	AIR QUALITY	Direct	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.).	Layout 1	Yes	Negative	Low-Medium	Control through mitigation measures including: • All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; • In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; • All vehicles used during the project should be properly maintained and in good working order; • All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	Low	Minimal	High Degree
				Layout 2			Low-Medium		Low	Minimal	High Degree
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	Low-Medium	Control through noise control measures including: • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Construction activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Low	No Loss	Reversible
				Layout 2			Low-Medium		Low	No Loss	Reversible
	TOPOGRAPHY	Direct	Temporary alteration of topography	Layout 1	Yes	Negative	Low	None	Low	No Loss	Reversible
				Layout 2			Low		Low	No Loss	Reversible
	SOIL	Direct	Stockpiling of materials may cause soil compaction.	Layout 1	Yes	Negative	Low-Medium	Control and stop through mitigation measures including: • Stockpiling only to be done on designated approved areas.	Low	No Loss	Reversible
				Layout 2			Low-Medium		Low	No Loss	Reversible
	HEALTH AND SAFETY	Direct	Health and safety impacts e.g. accidents causing injury to workers or visitors to the site when falling into excavation.	Layout 1	No	Negative	Low-Medium	Prevent through: • Complying with legislation and best practice health and safety standards.	Low	Minimal	High Degree
				Layout 2			Low-Medium		Low	Minimal	High Degree
	HERITAGE	Direct	Destruction or partial destruction of non-renewable heritage resources.	Layout 1	Yes	Negative	Medium-High	The high significant areas should be avoided, and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan.	Low	Minimal	High Degree
				Layout 2			High		Medium-High	Partial	Medium Degree

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	Low-Medium	Control measures to reduce visual impact including: • Suitable screening to be put in place during construction to minimise visual impacts; • No littering to be allowed; • Good housekeeping practices to be followed.	Low	No Loss	Reversible
				Layout 2			Low-Medium		Low	No Loss	Reversible
	TOPOGRAPHY	Direct	Temporary alteration of topography caused by drill rig.	Layout 1	Yes	Negative	Low-Medium	None	Low-Medium	No Loss	Reversible
				Layout 2			Low-Medium		Low-Medium	No Loss	Reversible
	NOISE	Direct	Noise impact	Layout 1	Yes	Negative	Low-Medium	Control through noise control measures including: • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Where possible, drilling and mining activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Low	No Loss	Reversible
				Layout 2			Low-Medium		Low	No Loss	Reversible
	HEALTH AND SAFETY	Direct	Health and safety impacts	Layout 1	No	Negative	Low-Medium	Prevent through: • Complying with legislation and best practice health and safety standards.	Low	Minimal	High Degree
				Layout 2			Low-Medium		Low	Minimal	High Degree
		Direct	Impacts on groundwater volumes due to dewatering of the lined No 3 and No 4 shafts	Layout 1	Yes	Negative	Low-Medium	Lining of shaft Maintenance of lining Installation of monitoring boreholes and monitoring	Low	No Loss	Reversible
				Layout 2			Low-Medium		Low	No Loss	Reversible
		Direct	Impacts on groundwater volumes due to dewatering of the unlined No 3A, 3B, and 3C Shafts	Layout 1	Yes	Negative	Medium	Lining / sealing off of individual inflow areas Maintenance of lining Installation of monitoring boreholes and monitoring	Low	No Loss	Reversible
				Layout 2			Medium		Low	No Loss	Reversible
	GROUNDWATER	Direct	Impacts on groundwater qualities due to construction of the lined No 3 and No4 shafts	Layout 1	Yes	Negative	Low	Lining of shaft Maintenance of lining Installation of monitoring boreholes and monitoring	Low	No Loss	Reversible
				Layout 2			Low		Low	No Loss	Reversible
		Direct	Impacts on groundwater qualities due to construction of the unlined No 3A, 3B and 3C Shafts	Layout 1	Yes	Negative	Low	Lining / sealing off of individual inflow areas Maintenance of lining Installation of monitoring boreholes and monitoring	Low	No Loss	Reversible
				Layout 2			Low		Low	No Loss	Reversible
		Direct	Impacts on groundwater qualities due to seepage from the SWD	Layout 1	Yes	Negative	Low	Proper construction and maintenance Regular inspection of the lining system Installation of monitoring boreholes and monitoring	Low	No Loss	Reversible
				Layout 2			Low		Low	No Loss	Reversible

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE		
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY	
Civil works including establishment of infrastructure on site including the stormwater dam, shaft headgear, conveyor belts and services infrastructure including permanent stormwater management infrastructure, raw water pipeline, potable water pipeline, mud pipeline, sewage pipeline, backfill pipeline, electrical substation and powerlines. Construction of buildings and structures including offices, ablution/change house, waste storage area and stores, including cement mixing.	AIR QUALITY	Direct	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.).	Layout 1	Yes	Negative	Low-Medium	Control through mitigation measures including: • All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; • In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; • All vehicles used during the project should be properly maintained and in good working order; • All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	Low	Minimal	High Degree	
				Layout 2			Low-Medium		Low	Minimal	High Degree	
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	Low-Medium		Control through noise control measures including: • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Construction activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Low	No Loss	Reversible
				Layout 2			Low-Medium			Low	No Loss	Reversible
	SOIL AND WATER	Direct	Contamination of soil and surface and ground water through cement mixing and spillages of hydrocarbons.	Layout 1	No	Negative	Low	Control and stop through mitigation measures including: • Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil. • Appropriate installation and maintenance of temporary and permanent ablution facilities sanitation infrastructure. • No cement mixing may occur on open ground. • Drip trays to be used under stationary vehicles.		Low	Minimal	High Degree
				Layout 2			Low			Low	Minimal	High Degree
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	Low-Medium		Control measures to reduce visual impact including: • Suitable screening to be put in place during construction to minimise visual impacts; • No littering to be allowed; • Good housekeeping practices to be followed.	Low	No Loss	Reversible
				Layout 2			Low-Medium			Low	No Loss	Reversible
	NATURAL RESOURCES	Direct	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, raw materials and fuel.	Layout 1	Yes	Negative	Low-Medium	Control through minimisation strategies: • Reduce consumption of water by reusing water where possible; • Water and energy minimisation strategies to be included in the EIA/EMPR and implemented.		Low	Minimal	High Degree
				Layout 2			Low-Medium			Low	Minimal	High Degree
	SOILS	Direct	Soil erosion, compaction and contamination, as well as loss of topsoil.	Layout 1	Yes	Negative	Low		Prevent and control through appropriate rehabilitation techniques recommended by biodiversity specialists.	Low	Minimal	High Degree
				Layout 2			Low			Low	Minimal	High Degree
BIODIVERSITY	Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	Low-Medium	Avoid through control measures including: • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Low		Minimal	High Degree	
			Layout 2			Low-Medium		Low		Minimal	High Degree	
HEALTH AND SAFETY	Direct	Health and safety impacts e.g. accidents causing injury to workers or	Layout 1	No	Negative	Low-Medium		Prevent through: • Complying with legislation and best practice health and safety standards.	Low	Minimal	High Degree	

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE			
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY		
camp and other construction areas, including along the raw water, potable water, sewage, mud and backfill pipelines and access and haul roads.			visitors to the site when falling into excavations to be backfilled.	Layout 2			Low-Medium		Low	Minimal	High Degree		
	SOILS AND WATER	Direct	Contamination of surface and ground water through spillages of hydrocarbons and wastewater.	Layout 1	No	Negative	Low	Prevent through control measures: • Waste, including solid and liquid waste and ablation facilities must be appropriately managed to prevent contamination of soil; • Drip-trays to be used underneath stationary vehicles and machinery.	Low	Minimal	High Degree		
				Layout 2			Low		Low	Minimal	High Degree		
	BIODIVERSITY	Direct	Failure of re-vegetation efforts due to insufficient seeding and monitoring of vegetation establishment.	Layout 1	Yes	Negative	Low-Medium		Prevent and control through appropriate rehabilitation techniques and monitoring recommended by biodiversity specialists.	Low	Minimal	High Degree	
				Layout 2			Low-Medium			Low	Minimal	High Degree	
	Creation of employment opportunities throughout the construction phase.	SOCIO-ECONOMIC	Direct	Decreased unemployment in the area and economic multiplier effects may improve the socio-economic circumstances of the local community.	Layout 1	Yes	Positive			Medium-High	Use of local labour force. Implement approved Social and Labour Plan	High	No Loss
Layout 2					Medium-High					High		No Loss	Reversible
OPERATIONAL PHASE													
Operation of shaft complex and removal of ore.	NOISE	Direct	Noise impact	Layout 1	Yes	Negative	Low-Medium	Control through: • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Where possible, drilling and mining activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.		Low	No Loss	Reversible	
				Layout 2			Low-Medium		Low	No Loss	Reversible		
	TOPOGRAPHY/ VISUAL	Direct	Temporary alteration of topography caused by drill rig causing visual impact.	Layout 1	Yes	Negative	Low-Medium		None	Low-Medium	No Loss	Reversible	
				Layout 2			Low-Medium			Low-Medium	No Loss	Reversible	
	SOILS	Direct	Soil alteration through soil erosion and compaction on the surface, as well as contamination through spillages of hydrocarbons.	Layout 1	No	Negative	Low		Control and stop through mitigation measures including: • To reduce the loss of material by erosion, disturbance must be kept to a minimum. • Waste, including solid and liquid waste and ablation facilities must be appropriately managed to prevent contamination of soil. • Spillages of hydrocarbons to be prevented.	Low	Minimal	High Degree	
				Layout 2			Low			Low	Minimal	High Degree	
	HEALTH AND SAFETY	Direct	Health and safety impacts	Layout 1	No	Negative	Low-Medium			Prevent through: • Complying with legislation and best practice health and safety standards.	Low	Minimal	High Degree
				Layout 2			Low-Medium				Low	Minimal	High Degree
	BIODIVERSITY	Direct	Continued disturbance and degradation of the vegetation community and	Layout 1	No	Negative	Medium-High			High sensitive areas (koppie and buffer) to be demarcated and avoided completely; Dust-reducing mitigation measures; A spill management plan must be put in place; All rubble generated must be removed from the site; Keep storm water away from the working/mining areas;	Low	Minimal	High Degree

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY
WETLAND AND DRAINAGE LINE			encroachment by alien invasive plant species.	Layout 2			Medium-High	Prevent rainwater and the process water that has fallen on site from leaving the site in an uncontrolled and unregulated fashion. Implementation of a fire management plan; Environmental awareness training.	Low-Medium	Minimal	High Degree
		Direct	Continued displacement and fragmentation of the faunal community due to ongoing anthropogenic disturbances (noise, traffic and dust).	Layout 1	No	Negative	Medium-High	High sensitive areas (koppie and buffer) to be demarcated and avoided completely; If any faunal are recorded during operation, activities should temporarily cease, and time permitted for the species to move away. In the event the species does not move away (voluntarily), the species must be removed safely from the area and relocated to a suitable area that will not be directly disturbed by the project; Waste management; Inspection of pipelines for leaks; Transmission lines should be fitted with bird diverters; Lighting should be kept to a minimum; Implementation of a fire management plan; Environmental awareness training.	Absent	No Loss	Reversible
				Layout 2			Medium-High		Low-Medium	Minimal	High Degree
		Direct	Loss of faunal species (road mortalities and/or poaching)	Layout 1	No	Negative	Medium-High	Implementation of a fire management plan; Environmental awareness training. No killing of animals; Speedbumps;	Low	Minimal	High Degree
				Layout 2			Medium-High		Low	Minimal	High Degree
		Direct	Infringement by humans into the few remaining natural grassland and wetlands areas, with associated impacts such as poaching, litter as well as introduction of pests, diseases and feral species such as cats.	Layout 1	No	Negative	Medium-High	High sensitive areas (koppie and buffer) to be demarcated and avoided completely; Waste management; Inspection of pipelines for leaks; Transmission lines should be fitted with bird diverters; Lighting should be kept to a minimum; Implementation of a fire management plan; Environmental awareness training; No domesticated animals or feral species allowed at the site.	Absent	No Loss	Reversible
				Layout 2			Medium-High		Absent	No Loss	Reversible
		Direct	Water quality	Layout 1	Yes	Positive	Medium	Rehabilitation of construction impacted area, continuous monitoring.	Medium	No Loss	Reversible
				Layout 2			Medium		Medium	No Loss	Reversible
			Indirect	Silt	Layout 1	Yes	Positive	Medium	Rehabilitation of construction impacted area, continuous monitoring and maintenance.	Medium	No Loss
	Layout 2				Medium			Medium		No Loss	Reversible
	Direct	Surface water run-off	Layout 1	Yes	Positive	Medium	'Rehabilitation of construction impacted area, continuous monitoring, storm water management, and silt management; Together with the WULA, a rehabilitation and monitoring plan will have to be compiled and approved; Approved stormwater management plan must be implemented.	Medium	No Loss	Reversible	
			Layout 2			Medium		Medium	No Loss	Reversible	
	Indirect	Contamination of water from hazardous substances	Layout 1	Yes	Negative	Low	Wetland monitoring occurring on a quarterly basis should be conducted by a skilled professional qualified in assessing and understanding the complex nature of wetlands and their associated drivers; Wetland drivers should be protected as far as possible. Wetland release into downstream aquatic resources should be rehabilitated, enhanced and monitored. Water quality preservation is key. Monitoring should take place during the construction phase as per the Water Use License (WUL) requirements.	Low	Minimal	High Degree	
Layout 2			Low			Low		Minimal	High Degree		
Direct	Disturbance of natural system	Layout 1	Yes	Negative	Low		Low	Minimal	High Degree		

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY
Loading / off-loading and transportation / hauling of overburden and ore and transportation of construction workers and other traffic.	AIR QUALITY	Direct	Disturbance/pollution of sub-surface flow	Layout 2	Yes	Negative	Low	Enhance wetland integrity.	Low	Minimal	High Degree
				Layout 1			Low		Minimal	High Degree	
		Layout 2	Low	Minimal	High Degree						
		Direct	Disturbance of aquatic ecological systems	Layout 1	Yes	Negative	Low-Medium		Low	Minimal	High Degree
				Layout 2			Low-Medium		Low	Minimal	High Degree
		Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Medium		Control through dust control measures including: • A speed limit of 20km/h must be maintained on all dirt roads; • Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	Low	Minimal
	Layout 2			Medium			Low	Minimal		High Degree	
	Direct	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.)	Layout 1	Yes	Negative	Medium	Control through mitigation measures including: • All vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; • In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; • All vehicles used during the project should be properly maintained and in good working order; • All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	Low-Medium	Minimal	High Degree	
Layout 2			Medium			Low-Medium		Minimal	High Degree		
NOISE	Indirect	Noise generation by increased traffic on the surrounding roads.	Layout 1	Yes	Negative	Medium	Control through noise control measures including: • Where possible, mining activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • Road users should adhere to speed limits; • Mining vehicles to be serviced at appropriate intervals to reduce unnecessary noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Low-Medium	No Loss	Reversible	
			Layout 2			Medium		Low-Medium	No Loss	Reversible	
	Direct	Generation of noise through heavy vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	Medium		Low	No Loss	Reversible	
			Layout 2			Medium		Low	No Loss	Reversible	
SOILS	Direct	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained heavy vehicles; and spillages of construction materials etc.	Layout 1	No	Negative	Low	Control and stop through mitigation measures including: • Mining vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; • Mining vehicles to keep to the designated roads; • Mining vehicles carrying materials to be appropriately covered as to reduce loss of materials.	Low	Minimal	High Degree	
			Layout 2			Low		Low	Minimal	High Degree	
BIODIVERSITY	Direct	Increase in fauna mortalities on the roads.	Layout 1	No	Negative	Low-Medium	Control through mitigation measures including: • Enforce speed limits; • Penalties or fines for reckless driving.	Low	Minimal	High Degree	
			Layout 2			Low-Medium		Low	Minimal	High Degree	
HEALTH AND SAFETY	Direct	Potential for accidents due to increased traffic and heavy vehicles not keeping to traffic rules and speed	Layout 1	No	Negative	Low-Medium	Control through mitigation measures including: • Enforce speed limits; • Penalise or fines for reckless driving.	Low	Minimal	High Degree	
			Layout 2			Low-Medium		Low	Minimal	High Degree	

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY
			limits and reckless driving.								
	TRAFFIC	Direct	Increased traffic on adjacent roads and access issues.	Layout 1	Yes	Negative	Medium	Reduce unnecessary trips through efficient planning.	Low	Minimal	High Degree
				Layout 2			Medium		Low	Minimal	High Degree
	NATURAL RESOURCES	Direct	Increased fuel consumption.	Layout 1	Yes	Negative	Medium	Reduce unnecessary vehicle trips through efficient planning.	Low-Medium	Minimal	High Degree
				Layout 2			Medium		Low-Medium	Minimal	High Degree
GROUNDWATER	Direct	Impacts on groundwater volumes due to dewatering of the lined No 3 and No 4 shafts	Layout 1	Yes	Negative	Low-Medium	Lining of shaft Maintenance of lining Installation of monitoring boreholes and monitoring	Low	No Loss	Reversible	
			Layout 2			Low-Medium		Low	No Loss	Reversible	
	Direct	Impacts on groundwater volumes due to dewatering of the unlined No 3A, 3B, and 3C Shafts	Layout 1	Yes	Negative	Medium	Lining / sealing off of individual inflow areas Maintenance of lining Installation of monitoring boreholes and monitoring	Low	No Loss	Reversible	
			Layout 2			Medium		Low	No Loss	Reversible	
	Direct	Impacts on groundwater qualities due to operation of the lined No 3 and No4 shafts	Layout 1	Yes	Negative	Low	Lining of shaft Maintenance of lining Installation of monitoring boreholes and monitoring	Low	No Loss	Reversible	
			Layout 2			Low		Low	No Loss	Reversible	
	Direct	Impacts on groundwater qualities due to seepage from the SWD	Layout 1	Yes	Negative	Low	Lining / sealing off of individual inflow areas Maintenance of lining Installation of monitoring boreholes and monitoring	Low	No Loss	Reversible	
			Layout 2			Low		Low	No Loss	Reversible	
	Direct	Impacts on groundwater qualities due to seepage from the Reef and Waste Storage Silos	Layout 1	Yes	Negative	Low	Proper construction and maintenance Regular inspection of the lining system Installation of monitoring boreholes and monitoring	Low	No Loss	Reversible	
			Layout 2			Low		Low	No Loss	Reversible	
	Direct	Decrease in water availability to persons dependent on ground water such as farmers and local communities.	Layout 1	Yes	Negative	Low-Medium	Lining of shafts 3 and 4 Lining / sealing off of individual inflow areas of ventilation shafts Maintenance of lining Maintenance of lining	Low	Minimal	High Degree	
			Layout 2			Low-Medium		Low	Minimal	High Degree	
Operation of conveyor belts	NOISE	Direct	Noise impact	Layout 1	Yes	Negative	Control through: • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Conveyor belts, if any, which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Where possible, operation activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	Low	No Loss	Reversible	
				Layout 2				Low	Low	No Loss	Reversible
Operation and maintenance of the support services	SOILS	Direct	Soil erosion, compaction and contamination.	Layout 1	No	Negative	Low-Medium	Control and stop through mitigation measures including: • Mining vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; • Mining vehicles to keep to the designated roads;	Low	Minimal	High Degree

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MANAGEMENT & MITIGATION MEASURES	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE				LOSS RESOURCE	REVERSABILITY
infrastructure on the shaft complex including substation, pollution control dam and stormwater management infrastructure, powerlines, raw water pipelines, sewage, backfill and mud pipelines, access and haul roads.	BIODIVERSITY	Direct	Spreading of alien vegetation	Layout 2	Yes	Negative	Low-Medium	<ul style="list-style-type: none"> Mining vehicles carrying materials to be appropriately covered as to reduce loss of materials; Spill procedures to be approved and implemented and included in the EIA/EMPR. 	Low	Minimal	High Degree
				Layout 1			Low-Medium		Low	Minimal	High Degree
				Layout 2			Low-Medium		Low	Minimal	High Degree
							Low-Medium		Low	Minimal	High Degree
Energy, fuel, water consumption and depletion of minerals	NATURAL RESOURCES	Direct	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, minerals and fuel.	Layout 1	Yes	Negative	Low-Medium	Control through minimisation strategies: <ul style="list-style-type: none"> Reduce consumption of water by reusing water where possible; Water and energy minimisation strategies to be included in the EIA/EMPR and implemented. 	Low	Minimal	High Degree
				Layout 2			Low-Medium		Low	Minimal	High Degree
Creation of new employment opportunities and sustaining existing employment at the mine.	SOCIO-ECONOMIC	Direct	Decreased unemployment in the area and economic multiplier effects will improve the socio-economic circumstances of the local community and wider region.	Layout 1	Yes	Positive	High	Use of local labour. Implementation of Social and Labour Plan	High	No Loss	Reversible
				Layout 2			High		High	No Loss	Reversible
Operation of the shaft complex	SOCIO-ECONOMIC	Indirect	Decline/increase in property value	Layout 1	Yes	Negative	Low-Medium	Implementation of all the mitigation measures in the EMPR.	Low	No Loss	Reversible
				Layout 2			Low-Medium		Low	No Loss	Reversible
		Indirect	Loss of Sense of Place	Layout 1	Yes	Negative	Low-Medium	Implementation of all the mitigation measures in the EMPR.	Low-Medium	Partial	Medium Degree
				Layout 2			Low-Medium		Low-Medium	Partial	Medium Degree

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked **Appendix 5**

7.3 Mitigation

According to the EIA Regulations, 2014, “mitigation” means to “*anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible*”. Based on this definition, it possible to see that a mitigation hierarchy exists.

At the bottom of this hierarchy is the most preferred option which includes **prevention (1)**. These mitigation measures aim to avoid impacts completely.

The second level of mitigation is **reduction (2)** which involves mitigation measures that minimise impacts. Most of the mitigation measures suggested for the proposed development fall into this level.

Mitigation measures for the proposed development also include **remediation measures (3)** for environmental impacts. These measures focus on remediating or rehabilitating areas after they have been impacted.

Compensation (4) involves compensating the loss of an entire feature. In the case for the environment, this usually means consideration of an off-set associated with rehabilitation and mitigation. No offsets or compensation measures are included in the mitigation measures for the proposed development.

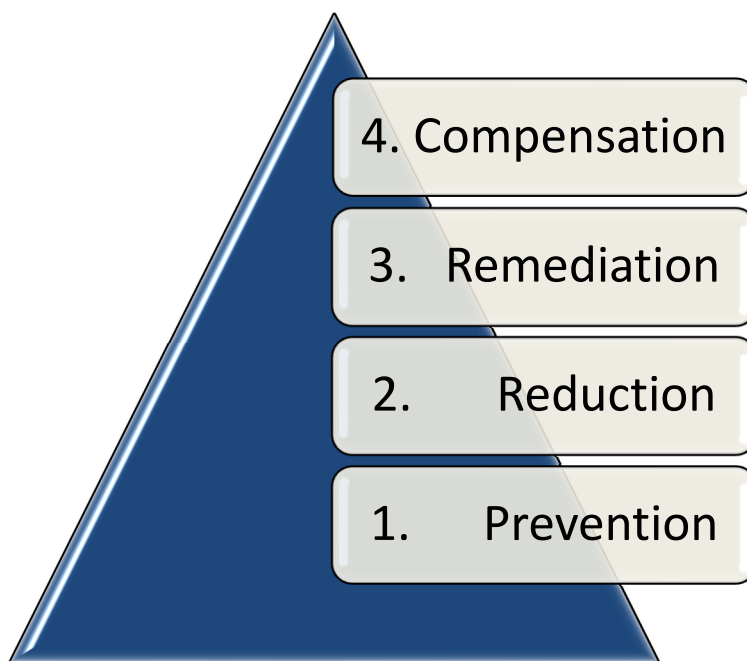


Figure 7-1: Mitigation Hierarchy

An EMPr was developed based on the findings of the impact assessment of the EIA and in line with the requirements of Appendix 4 of GN 982 of 4 December 2014 [as amended in 2017]. The EMPr represents a detailed plan of action and includes site-specific mitigation measures for all medium to high (significant) impacts. The mitigation and management measures include a combination of the following:

- Physical environmental management structures.
- Monitoring and compliance of pollution and regulatory requirements.

All liability for the implementation of the EMPr (as well as the EIA findings and environmental authorisation) lies with the project applicant which in this case is Northam Platinum Limited.

8 SUMMARY OF SPECIALIST REPORTS

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):

Table 8-1: Summary of Specialist Reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Biodiversity Impact Assessment	<ul style="list-style-type: none"> It is recommended that a comprehensive baseline study is conducted of the koppie habitat in order to be able to create an ecological baseline for this habitat. This will assist in future monitoring the koppie throughout the life of the project; The mitigation actions provided below are important to consider with other specialist assessments. These mitigation measures should be implemented in the Environmental Management Plan (EMP) should the project go-ahead. The focus of mitigation measures is to reduce the significance of potential impacts associated with the development: As far as possible, the proposed developments should be placed in areas that have already been disturbed (low-moderate sensitivity areas). No further loss of the koppie areas or the buffer should be permitted as construction of the infrastructure and roads should only take place in the transformed areas. It is recommended that areas to be developed be specifically 	X	Table 7-1

<p style="text-align: center;">LIST OF STUDIES UNDERTAKEN</p>	<p style="text-align: center;">RECOMMENDATIONS OF SPECIALIST REPORTS</p>	<p style="text-align: center;">SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)</p>	<p style="text-align: center;">REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.</p>
	<p>demarcated so that during the construction phase, only the demarcated areas be impacted upon (including fencing off the defined project area);</p> <ul style="list-style-type: none"> • The primary mitigation measure recommended for the project area is for there to be no new development in remaining koppie areas including the buffer; • All dumping and storage during the construction phase must be within the existing infrastructure footprint and the low sensitivity areas; • Construction activities should be limited during summer when the risk of disturbing sensitive life history stages (e.g. nesting) is lowest; • Where possible, work should be restricted to one area at a time. This will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories. • All laydown, storage areas etc should be restricted to transformed areas during construction, close to the preferred option and existing roads should be used as far as possible; • The number (and size) of laydown, storage and staff facilities must be kept to a minimum for the duration of the project. These 		

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	<p>areas must be designated in already disturbed areas, adhering to the avoidance of moderately and highly sensitive areas;</p> <ul style="list-style-type: none"> • Building material must be stored in areas that has previously been disturbed and is classified as a low risk according to the sensitivity map in this report; • Building materials may not be stored for extended periods of time and must be removed from the site once the project has been concluded; • Dumping in moderate and highly sensitive areas must be prevented; • Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces; • A spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas and particularly the savanna and koppie; • During construction activities, all rubble generated must be removed from the site; 		

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	<ul style="list-style-type: none"> • No vehicles or activities, dumping or clearing is permitted within the moderate to high sensitive areas as defined in this report; • The contractors used for the construction should have spill kits available prior to construction to ensure that any fuel, oil or hazardous substance spills are cleaned-up and discarded correctly; • Environmental protection activities during the reclamation process are; • Keep storm water away from the working/mining areas; • Prevent rainwater and the process water that has fallen on site from leaving the site in an uncontrolled and unregulated fashion; and • Prevent dust pollution during dry, windy conditions. • If any faunal are recorded during construction, activities should temporarily cease, and time permitted for the species to move away. In the event the species does not move away (voluntarily), the species must be removed safely from the area and relocated to a suitable area that will not be directly disturbed by the project; • Fauna species that have not moved away should be carefully and safely removed to a suitable location beyond the extent of the 		

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	<p>development footprint by a suitably qualified ECO trained in the handling and relocation of animals;</p> <ul style="list-style-type: none"> • Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site; • The intentional killing of any animals including snakes, insects, lizards, birds or other animals should be strictly prohibited; • Inspections and monitoring of the pipelines for leaks must be done on a regular basis for the life of the project; • Speedbumps as well as regulated slow speeds need to be enforced on all the roads especially the servitude that will be close to the koppie habitat; • The transmission lines should be fitted with bird diverters. These relatively inexpensive flappers will drastically reduce the potential for collision by avifauna, including the recorded CR Cape Vulture; • Lighting should be kept to a minimum to avoid disturbing crepuscular and nocturnal species. Lighting fixtures should be fitted with hoods and directed downward, to minimize light pollution; 		

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	<ul style="list-style-type: none"> • A site plan of the area must be made available onsite for all contractors and personnel indicating parking & storage areas, site offices and placement of ablution facilities. If a sewerage network is available, preference is that this be tied into for this project; • The Operator should inform all site staff to the use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities. A minimum of one toilet must be provided per 10 persons; • Where a registered disposal facility is not available close to the site, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site. Temporary storage of domestic waste shall be in covered waste skips; • Fire management plan must be in place for the areas surrounding the project area and the road to restrict the impact from fire on the natural flora and fauna communities; • Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use; • Dust monitoring must be done on a continued basis for the life of the project; 		

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	<ul style="list-style-type: none"> • Monitoring of Alien Invasive Plant species and their presence, in conjunction with the alien invasive plant management plan for the life of the project; • The collecting and/or destruction of plants in the surrounding area by unauthorized persons must be prevented; • Leaking equipment must be repaired immediately or be removed from site to facilitate repair; and • All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area; • The avoidance and protection of the sensitive CBA areas and ridges must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the sensitive areas to be avoided. • If possible, access to the surrounding areas should be prevented. Human encroachment into this area will most likely severely alter the state of this important area. The feasibility of fencing this area off to prevent access is strongly encouraged and should be investigated; 		

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	<ul style="list-style-type: none"> • The surrounding areas should be declared a ‘no-go’ area during the construction and operational phases and all efforts must be made to prevent access to this area from construction workers, machinery, domestic animals and the general public. This should be implemented with the exception of those areas in which authorisation for development has been granted; • Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoils must also be utilised as soon as possible, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type; • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species 		
<p>Surface Water Impact Assessment</p>	<ul style="list-style-type: none"> • The required buffers must be maintained, and the resource drivers preserved. The rehabilitation of the wetland is vital to recover the required ecological function. The wetland drivers must be enhanced as part of the rehabilitation of the affected areas. In respect of the construction phase, it is important to ensure that the required erosion protection measures linked to the crossing 	<p>X</p>	<p>Table 7-1</p>

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	<p>sections be carefully designed and installed. Silt transportation to the downstream system must also be carefully managed;</p> <ul style="list-style-type: none"> • It is recommended that a WULA be submitted to the Department of Human Settlements, Water and Sanitation (DHSWS), as the proposed activities will trigger sections of Section 21 of the National Water Act [NWA], 1998 (Act No. 36 of 1998) that will require such an application; • Together with the WULA, a rehabilitation and monitoring plan will have to be compiled and approved as supporting documents to the application; • A wetland monitoring programme should be developed based on this baseline assessment and audited against post the rehabilitation activities. Feedback from the monitoring should be used to measure and mitigate further negative impacts, if found; • The wetland monitoring occurring on a quarterly basis should be conducted by a skilled professional qualified in assessing and understanding the complex nature of wetlands and their associated drivers; • It should be attempted to preserve complete wetland function (current status) if at all possible. <ul style="list-style-type: none"> ○ Wetland drivers should be protected as far as possible. 		

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	<ul style="list-style-type: none"> ○ Wetland release into downstream aquatic resources should be rehabilitated, enhanced and monitored. ○ Water quality preservation is key. Monitoring should take place during the construction phase as per the Water Use License (WUL) requirements. ● Mitigation measures for the proposed development activities should be implemented, managed and monitored according to: <ul style="list-style-type: none"> ○ The following wetland ecosystem impact assessment conclusions, based on the results of the baseline survey: <ul style="list-style-type: none"> ▪ Runoff from the construction areas may result in contamination of wetland and downstream aquatic habitat; ▪ On site storm water management, must be implemented. ○ The following impacts may result in changes to the soil structure: <ul style="list-style-type: none"> ▪ Heavy construction vehicles moving within the wetland areas; <ul style="list-style-type: none"> ● Ingress and Egress must be managed to minimise impacts in respect of compaction of the wetland soils. 		

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	<ul style="list-style-type: none"> • Single entry and exit points must be established. ▪ Stockpiling; <ul style="list-style-type: none"> • As first option - Stockpiling must be located outside the delineated wetland and buffer boundaries. • Dedicated laydown and stockpiling areas should be identified. Some might be within the buffer areas, but same is associated with already transformed areas. Special management rules will apply for same. ▪ Spills from machinery; ▪ The mixing of concrete; and ▪ Clearing of vegetation for construction, and associated sedimentation and siltation. ○ The following aspects may result in reduction of ecosystem habitat integrity: <ul style="list-style-type: none"> ▪ Dust and sediment runoff from construction activities; 		

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	<ul style="list-style-type: none"> ▪ Diesel and oil spill from equipment and machinery; and ▪ Higher and faster water flow from the site that could cause soil erosion. ○ The following aspects may result in sedimentation of the associated aquatic systems: <ul style="list-style-type: none"> ▪ Sedimentation due to increase runoff and dispensed soil particles and runoff from the affected areas; and ▪ Increase in the velocity of the runoff from the exposed soil, due to construction. ○ The proposed activities must be initiated and constructed in such a way to prevent the reduction of natural water flow into the wetland and downstream which, in essence, is the driving factor in terms of water provision. <ul style="list-style-type: none"> ▪ An approved stormwater management plan must be implemented. ▪ Subsurface drains must be installed to assist in the aquatic driver sustainability across the full width of the wetland. 		

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	<ul style="list-style-type: none"> ▪ Velocity dissipation structures (such as reno mattresses) must also be installed to prevent water flowing through culverts to gain velocity. An increase in velocity will lead to channelisation of the wetland and soil erosion. • The wetland integrity should be improved during the rehabilitation phase. This may entail the following: <ul style="list-style-type: none"> ○ Removal of alien and invasive plant species during the construction and operational phases. ○ Re-vegetation and landscaping the wetland and buffer areas with indigenous wetland plant species. ○ Stabilisation of gullies and drainage lines to prevent erosion. ○ Planting of indigenous herbaceous plants on shallow banks and indigenous woody vegetation on steep banks to increase stability of banks, thereby preventing erosion. ○ Implementation of topsoil management (stockpiling, topography shaping) and erosion control (berms, geotextiling, silt fences, hay bales and gabion structures). 		

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<p>Groundwater Impact Assessment</p>	<p>It is recommended that monitoring boreholes be installed:</p> <ul style="list-style-type: none"> • Down gradient of the storm water dam; • Down gradient of the Reef and waste storage silos. <p>These boreholes should be monitored quarterly for the parameters listed in the existing WUL.</p> <ul style="list-style-type: none"> • Mitigation Measures <p><i>Lowering of Groundwater Level during Facility Construction</i></p> <p>Drawdown in groundwater level around the unlined shafts (No 3A, No 3B, and No 3c) is expected to be around 150 m to the limit of the active aquifer, while the zone of influence of the groundwater level drawdown cone is expected to be in the order of 175 m. The drawdown in groundwater level can be mitigated by sealing off individual seepage zones along the shaft lengths.</p>	<p>X</p>	<p>Table 7-1</p>

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	<p>Lining of the No 3 and No 4 shaft, as well as any lining of the No 3A, 3B, and 3C Shafts should be inspected on a regular interval and maintained / repaired as required.</p> <p><i>Lowering of Groundwater Levels during Facility Operation</i></p> <p>Drawdown in groundwater level around the unlined shafts (No 3A, No 3B, and No 3c) is expected to be around 150 m to the limit of the active aquifer, while the zone of influence of the groundwater level drawdown cone is expected to be in the order of 175 m. The drawdown in groundwater level can be mitigated by sealing off individual seepage zones along the shaft lengths.</p> <p>Lining of the No 3 and No 4 shaft, as well as any lining of the No 3A, 3B, and 3C Shafts should be inspected on a regular interval and maintained / repaired as required.</p> <p><i>Spread of Groundwater Pollution during Facility Construction</i></p> <p>The groundwater flow directions around the No 3A, 3B, and 3C Shafts will be directed towards the individual shafts due to drawdown of the groundwater levels in the shafts preventing contaminant migration away</p>		

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	<p>from these 3 shafts. Lining of the No 3 and No 4 shafts will also prevent contaminant migration away from those 2 shafts.</p> <p>The storm water dam will be lined. Therefore, no impacts on the underlying aquifers from the SWD on the underlying groundwater qualities are expected assuming the dam will be constructed correctly and maintained properly.</p> <p><i>Spread of Groundwater Pollution during Facility Operation</i></p> <p>The material excavated from the underground mine via the proposed No 3 and No 4 shaft development area during the operational phase will be stored in the Reef and Waste storage silos before being moved to the existing concentrator and waste rock dump areas. The material stored in these silos is not in direct contact with the soil or underlying aquifers and is not expected to have an impact on the groundwater qualities as long as the silos are properly maintained. It is recommended that the silos be inspected on a regular basis and repaired as required.</p> <p>Lining of the No 3 and No 4 shafts will prevent contaminant migration away from the 2 shafts. It is recommended that the lining of the No 3 and No 4,</p>		

<p>LIST OF STUDIES UNDERTAKEN</p>	<p>RECOMMENDATIONS OF SPECIALIST REPORTS</p>	<p>SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)</p>	<p>REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.</p>
	<p>as well as the No 3A, 3B, and 3C Shafts (where applicable) be inspected and maintained on a regular basis.</p> <p>The storm water dam will be lined. It is recommended that the structure and the lining of the dam be inspected and maintained on a regular basis to prevent contamination of the underlying aquifers.</p> <ul style="list-style-type: none"> • Post Closure Management Plan <p><i>Remediation of Physical Activity</i></p> <p>The shaft excavations cannot be remediated. Closure of the shaft entrances will take place.</p> <p><i>Remediation of Storage Facilities</i></p> <p>Surface storage facilities should be cleared and remediated in accordance with the Zondereinde Mines approved EMP and WUL. An application for decommissioning will be required in terms of NEMA and the rehab and closure plan should be amended to include the shaft area.</p>		

<p style="text-align: center;">LIST OF STUDIES UNDERTAKEN</p>	<p style="text-align: center;">RECOMMENDATIONS OF SPECIALIST REPORTS</p>	<p style="text-align: center;">SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)</p>	<p style="text-align: center;">REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.</p>
	<p><i>Remediation of Environmental Impacts</i></p> <p>The groundwater monitoring program should be continued for a period of at least 5 years after mine closure to monitor the contaminant migration, in accordance with the Zondereinde Mines approved EMP and WUL. Based on these results remediation requirements can be identified and a remediation plan put in place.</p> <p><i>Remediation of Water Resources Impacts</i></p> <p>Groundwater qualities should be managed and remediated in accordance with the Zondereinde Mines approved EMP and WUL.</p> <ul style="list-style-type: none"> • <i>The specialist recommended that the project be authorised. This recommendation is based on:</i> <ul style="list-style-type: none"> ○ The impact assessment shows that it not expected that there will be any measurable impact on the groundwater levels in the area. No privately-owned boreholes around the proposed No 3 shaft development area will be impacted by the groundwater level drawdown in the fractured rock aquifer; 		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	<ul style="list-style-type: none"> ○ It is not expected that there will be a notable impact on the groundwater qualities within the proposed No 3 shaft development area. 		
Heritage Impact Assessment	<p>The high significant areas should be avoided, and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan.</p> <ul style="list-style-type: none"> • Chance Find Procedures <p>The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.</p> <p>This procedure applies to the developer’s permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures</p>	X	Table 7-1

<p>LIST OF STUDIES UNDERTAKEN</p>	<p>RECOMMENDATIONS OF SPECIALIST REPORTS</p>	<p>SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)</p>	<p>REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.</p>
	<p>to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.</p> <ul style="list-style-type: none"> • If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. • It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area. • The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA. 		

(Attach copies of Specialist Reports as appendices)

9 ENVIRONMENTAL IMPACT STATEMENT

9.1 Summary of the positive and negative implications and risks of the proposed activity and identified alternatives

Table 9-1: Summary of the positive and negative implications and risks of the proposed activity and alternatives

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WM)
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	
CONSTRUCTION PHASE							
All activities during the pre-construction and construction phases.	WETLAND AND DRAINAGE LINE	Direct	Water quality	Layout 1	Yes	Negative	Low-Medium
				Layout 2			Low-Medium
		Indirect	Silt	Layout 1	Yes	Negative	Low
				Layout 2			Low
		Direct	Surface water run-off	Layout 1	Yes	Negative	Low
				Layout 2			Low
		Indirect	Contamination of water from hazardous substances	Layout 1	Yes	Negative	Low
				Layout 2			Low
		Direct	Disturbance of natural system	Layout 1	Yes	Negative	Low-Medium
				Layout 2			Low-Medium
		Direct	Disturbance/pollution of sub-surface flow	Layout 1	Yes	Negative	Low-Medium
				Layout 2			Low-Medium
		Direct	Disturbance of aquatic ecological systems	Layout 1	Yes	Negative	Low-Medium
				Layout 2			Low-Medium
Establishment of Construction Camp and installation and operation of construction support services including chemical toilets and water tanks and generation of power.	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Low
				Layout 2			Low
		Direct	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.)	Layout 1	Yes	Negative	Low-Medium
				Layout 2			Low-Medium
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	Low
				Layout 2			Low

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WM)	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE		
	SOIL	Direct	Soil alteration including compaction, contamination and pollution and erosion.	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	HERITAGE	Direct	Destruction or partial destruction of non-renewable heritage resources.	Layout 1	Yes	Negative	Low	
				Layout 2			Medium-High	
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	Site clearing, removal of vegetation and topsoil (and stockpiling of topsoil) of the site footprint and for service infrastructure including access and haul roads, raw water and wastewater pipelines and stormwater management infrastructure.	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Low
					Layout 2			Low
			Direct	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.).	Layout 1	Yes	Negative	Low-Medium
					Layout 2			Low-Medium
		NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	Low
					Layout 2			Low
SOIL		Direct	Loss of topsoil and erosion	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
		Direct	Soil alteration including contamination and compaction	Layout 1	No	Negative	Low	
				Layout 2			Low	
LAND CAPABILITY		Direct	Loss of land capability	Layout 1	Yes	Negative	Low-Medium	
				Layout 2			Low-Medium	
BIODIVERSITY	Direct	Destruction, further loss and	Layout 1	Yes	Negative	Low		

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WM)	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE		
			fragmentation of the vegetation community	Layout 2			Medium-High	
		Direct	Destruction of protected tree species	Layout 1	Yes	Negative	Absent	
				Layout 2			Medium	
		Direct	Displacement of faunal community (including threatened and protected species) due to habitat loss, direct mortalities and disturbance (noise, dust and vibration).	Layout 1	Yes	Negative	Low	
				Layout 2			Medium	
		Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
		VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	Low
					Layout 2			Low
		HERITAGE	Direct	Destruction or partial destruction of non-renewable heritage resources.	Layout 1	Yes	Negative	Low
					Layout 2			Medium-High
		Generation and disposal domestic waste, construction and hazardous waste	SERVICES	Direct	Additional burden on existing landfill.	Layout 1	Yes	Negative
	Layout 2					Low		
	SOIL, WATER		Direct	Potential pollution of soil, surface and groundwater due to indiscriminate disposal of waste.	Layout 1	No	Negative	Low
					Layout 2			Low
VISUAL	Direct		Visual impact	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
BIODIVERSITY	Direct		Mortalities of fauna caused by ingestion of plastic and potentially toxic materials, or they may suffocate on	Layout 1	No	Negative	Low	

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WM)	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE		
			plastic, if waste is not disposed of correctly. They can also become stuck in waste and may die of hunger and or dehydration as a result.	Layout 2			Low	
Loading/off-loading and transportation of construction materials, machinery, equipment and construction workers.	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	NOISE	Indirect	Noise generation by increased traffic on the roads and construction vehicles.	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	SOIL	Direct	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained construction vehicles; and spillages of construction materials etc.	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	HEALTH AND SAFETY	Direct	Potential for accidents due to increased traffic and construction vehicles not keeping to traffic rules and speed limits and reckless driving.	Layout 1	No	Negative	Low	
				Layout 2			Low	
	NATURAL RESOURCES	Direct	Increased fuel consumption	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	Earthworks – excavations for establishment of site infrastructure, buildings, headgear, shaft box cut, installation of services and construction of access and haul roads. Stockpiling of construction and excavated materials	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Low
					Layout 2			Low
		AIR QUALITY	Direct	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.).	Layout 1	Yes	Negative	Low
					Layout 2			Low

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WM)	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE		
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	TOPOGRAPHY	Direct	Temporary alteration of topography	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	SOIL	Direct	Stockpiling of materials may cause soil compaction.	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	HEALTH AND SAFETY	Direct	Health and safety impacts e.g. accidents causing injury to workers or visitors to the site when falling into excavation.	Layout 1	No	Negative	Low	
				Layout 2			Low	
	HERITAGE	Direct	Destruction or partial destruction of non-renewable heritage resources.	Layout 1	Yes	Negative	Low	
				Layout 2			Medium-High	
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
		TOPOGRAPHY	Direct	Temporary alteration of topography caused by drill rig.	Layout 1	Yes	Negative	Low-Medium
					Layout 2			Low-Medium
NOISE		Direct	Noise impact	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
HEALTH AND SAFETY		Direct	Health and safety impacts	Layout 1	No	Negative	Low	
				Layout 2			Low	
GROUNDWATER		Direct	Impacts on groundwater volumes due to dewatering of the lined No 3 and No 4 shafts	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
		Direct	Impacts on groundwater volumes due to	Layout 1	Yes	Negative	Low	

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WM)	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE		
Civil works including establishment of infrastructure on site including the stormwater dam, shaft headgear, conveyor belts and services infrastructure including permanent stormwater management infrastructure, raw water pipeline, potable water pipeline, mud pipeline, sewage pipeline, backfill pipeline, electrical substation and powerlines. Construction of buildings and structures including offices, ablution/change house, waste storage area and stores, including cement mixing.			dewatering of the unlined No 3A, 3B, and 3C Shafts	Layout 2			Low	
		Direct	Impacts on groundwater qualities due to construction of the lined No 3 and No4 shafts	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
		Direct	Impacts on groundwater qualities due to construction of the unlined No 3A, 3B and 3C Shafts	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
		Direct	Impacts on groundwater qualities due to seepage from the SWD	Layout 1	Yes	Negative	Low	
	Layout 2			Low				
	AIR QUALITY	Direct	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.).	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
		NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	Low
					Layout 2			Low
	SOIL AND WATER	Direct	Contamination of soil and surface and ground water through cement mixing and spillages of hydrocarbons.	Layout 1	No	Negative	Low	
Layout 2				Low				
VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	Low		
			Layout 2			Low		

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WM)	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE		
Energy, water, raw materials and fuel consumption	NATURAL RESOURCES	Direct	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, raw materials and fuel.	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
Demolition and /or removal of temporary construction infrastructure including stormwater drainage structures (e.g. diversion berms), chemical toilets and construction camp. Rehabilitation of construction camp and other construction areas, including along the raw water, potable water, sewage, mud and backfill pipelines and access and haul roads.	SOILS	Direct	Soil erosion, compaction and contamination, as well as loss of topsoil.	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	BIODIVERSITY	Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	HEALTH AND SAFETY	Direct	Health and safety impacts e.g. accidents causing injury to workers or visitors to the site when falling into excavations to be backfilled.	Layout 1	No	Negative	Low	
				Layout 2			Low	
	SOILS AND WATER	Direct	Contamination of surface and ground water through spillages of hydrocarbons and wastewater.	Layout 1	No	Negative	Low	
				Layout 2			Low	
	BIODIVERSITY	Direct	Failure of re-vegetation efforts due to insufficient seeding and monitoring of vegetation establishment.	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	Creation of employment opportunities throughout the construction phase.	SOCIO-ECONOMIC	Direct	Decreased unemployment in the area and economic multiplier effects may improve the socio-economic circumstances of the local community.	Layout 1	Yes	Positive	High
					Layout 2			High
OPERATIONAL PHASE								
Operation of shaft complex and removal of ore.	NOISE	Direct	Noise impact	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	TOPOGRAPHY / VISUAL	Direct	Temporary alteration of topography caused by drill rig causing visual impact.	Layout 1	Yes	Negative	Low-Medium	
				Layout 2			Low-Medium	
	SOILS	Direct	Soil alteration through soil erosion and compaction on	Layout 1	No	Negative	Low	
				Layout 2			Low	

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WM)	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE		
			the surface, as well as contamination through spillages of hydrocarbons.	Layout 2			Low	
	HEALTH AND SAFETY	Direct	Health and safety impacts	Layout 1	No	Negative	Low	
				Layout 2			Low	
	BIODIVERSITY	Direct	Continued disturbance and degradation of the vegetation community and encroachment by alien invasive plant species.	Layout 1	No	Negative	Low	
				Layout 2			Low-Medium	
		Direct	Continued displacement and fragmentation of the faunal community due to ongoing anthropogenic disturbances (noise, traffic and dust).	Layout 1	No	Negative	Absent	
				Layout 2			Low-Medium	
		Direct	Loss of faunal species (road mortalities and/or poaching)	Layout 1	No	Negative	Low	
				Layout 2			Low	
		Direct	Infringement by humans into the few remaining natural grassland and wetlands areas, with associated impacts such as poaching, litter as well as introduction of pests, diseases and feral species such as cats.	Layout 1	No	Negative	Absent	
				Layout 2			Absent	
		WETLAND AND DRAINAGE LINE	Direct	Water quality	Layout 1	Yes	Positive	Medium
					Layout 2			Medium
	Indirect		Silt	Layout 1	Yes	Positive	Medium	
				Layout 2			Medium	
	Direct		Surface water run-off	Layout 1	Yes	Positive	Medium	
				Layout 2			Medium	
	Indirect	Contamination of water from	Layout 1	Yes	Negative	Low		

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WM)	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE		
Loading / off-loading and transportation / hauling of overburden and ore and transportation of construction workers and other traffic.			hazardous substances	Layout 2			Low	
		Direct	Disturbance of natural system	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
		Direct	Disturbance/pollution of sub-surface flow	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
		Direct	Disturbance of aquatic ecological systems	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
		AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	Low
					Layout 2			Low
			Direct	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.)	Layout 1	Yes	Negative	Low-Medium
					Layout 2			Low-Medium
			Indirect	Noise generation by increased traffic on the surrounding roads.	Layout 1	Yes	Negative	Low-Medium
Layout 2	Low-Medium							
Direct	Generation of noise through heavy vehicles and equipment, causing a nuisance to fauna and surrounding land uses.		Layout 1	Yes	Negative	Low		
			Layout 2			Low		
Direct	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained heavy vehicles; and spillages of construction materials etc.	Layout 1	No	Negative	Low			
		Layout 2			Low			
Direct	Increase in fauna mortalities on the roads.	Layout 1	No	Negative	Low			
		Layout 2			Low			

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WM)	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE		
	HEALTH AND SAFETY	Direct	Potential for accidents due to increased traffic and heavy vehicles not keeping to traffic rules and speed limits and reckless driving.	Layout 1	No	Negative	Low	
				Layout 2			Low	
	TRAFFIC	Direct	Increased traffic on adjacent roads and access issues.	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
	NATURAL RESOURCES	Direct	Increased fuel consumption.	Layout 1	Yes	Negative	Low-Medium	
				Layout 2			Low-Medium	
	GROUNDWATER	Direct	Impacts on groundwater volumes due to dewatering of the lined No 3 and No 4 shafts	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
Direct		Impacts on groundwater volumes due to dewatering of the unlined No 3A, 3B, and 3C Shafts	Layout 1	Yes	Negative	Low		
			Layout 2			Low		
Direct		Impacts on groundwater qualities due to operation of the lined No 3 and No4 shafts	Layout 1	Yes	Negative	Low		
			Layout 2			Low		
Direct		Impacts on groundwater qualities due to seepage from the SWD	Layout 1	Yes	Negative	Low		
			Layout 2			Low		
Direct		Impacts on groundwater qualities due to seepage from the Reef and Waste Storage Silos	Layout 1	Yes	Negative	Low		
			Layout 2			Low		
SERVICES		Direct	Decrease in water availability to persons dependent on ground water such as farmers and local communities.	Layout 1	Yes	Negative	Low	
				Layout 2			Low	
Operation of conveyor belts		NOISE	Direct	Noise impact	Layout 1	Yes	Negative	Low
					Layout 2			Low
Operation and maintenance of the support services infrastructure on the shaft complex including substation, pollution control dam and stormwater management	SOILS	Direct	Soil erosion, compaction and contamination.	Layout 1	No	Negative	Low	
				Layout 2			Low	
	BIODIVERSITY	Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	Low	

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WM)
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	
infrastructure, powerlines, raw water pipelines, sewage, backfill and mud pipelines, access and haul roads.				Layout 2			Low
Energy, fuel, water consumption and depletion of minerals	NATURAL RESOURCES	Direct	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, minerals and fuel.	Layout 1	Yes	Negative	Low
				Layout 2			Low
Creation of new employment opportunities and sustaining existing employment at the mine.	SOCIO-ECONOMIC	Direct	Decreased unemployment in the area and economic multiplier effects will improve the socio-economic circumstances of the local community and wider region.	Layout 1	Yes	Positive	High
				Layout 2			High
Operation of the shaft complex	SOCIO-ECONOMIC	Indirect	Decline/increase in property value	Layout 1	Yes	Negative	Low
				Layout 2			Low
		Indirect	Loss of Sense of Place	Layout 1	Yes	Negative	Low-Medium
				Layout 2			Low-Medium

9.2 Key findings of the Environmental Impact Assessment

9.2.1 Activity description

The proposed 3 Shaft project triggered a listed activity from Listing Notice 1 and 2 of the EIA Regulations, 2014 [as amended]. As such a Scoping and EIA process was undertaken to assess the impacts of the proposed development and to ensure that the development was in line with the concept of sustainable development captured in NEMA.

The new shaft complex to be known as 3 Shaft, will allow improved access to the western block of Northam Platinum’s Zondereinde Mine securing economic viability of the Zondereinde Mine and also further extend the Life of Mine (LoM), which will sustain mining related work opportunities associated with maintained production.

The proposed development involves shafts to be positioned on two constructed terraces one for the up-cast ventilation shafts (Terrace 2) and one for the two access shafts and downcast ventilation shaft (Terrace 1). The two terraces will require a servitude between them for services. The servitude will carry buried power cables from the main consumer substation to the ventilation shafts. A servitude will be required between the current Zondereinde operations and Terrace 1. This servitude will carry service water, sewerage, backfill slurry, power cables, mud return pipeline and overhead power lines. Overhead power lines will be installed to connect Terrace 1 to the adjacent Eskom high voltage overhead lines. The existing two potable water pipelines will be diverted

within the terrace area (1) and an off take to the new facility will be done from one of the newly installed diversion pipelines. The current paved road from the R510 to the current shaft and concentrator facility will be diverted around Terrace 1 and an additional unpaved road will be required from the existing paved road to Terrace 2. Two layout alternatives were assessed.

9.2.2 Public Participation

Public Participation was undertaken throughout the process and some comments were received by registered I&APs. No specific concerns have been raised to date. Although, comments were addressed and taken into consideration in this report.

Based on the comments from I&APs, listed activities and potential impacts associated with the development, a number of specialist studies were undertaken to assess the impacts associated with the development. Several technical studies were also undertaken and informed the EIA process. Specialist and technical studies included:

- Biodiversity Impact Assessment;
- Heritage Impact Assessment;
- Geohydrological Impact Assessment;
- Surface Water Impact Assessment;
- Geotechnical Assessment; and
- Engineering report.

9.2.3 Specialist findings

The Biodiversity Impact Assessment found that from an ecological overview, as well as the baseline data collected to date that the project area is an assembly of different habitats that have been altered both historically and presently. Current impacts include secondary roads and associated human activity, including dumping of rubble, livestock, litter and infringement by people and livestock into natural areas. The study area is disturbed primarily due to clearing of vegetation, and associated activities of human activity such as litter and roads and was given a lower sensitivity rating. The study area surrounding the shaft area is in a semi-natural state and was giving a low-moderate sensitivity due the area not being threatened either according to the NBA and/or LCPv2. According to the Mining and Biodiversity Guidelines, the project area is situated within an area that is considered to be 'highest risk for mining' and of 'highest biodiversity importance'. The koppie habitat exhibits a healthy ecological functionality, integrity and may provide habitat for some threatened species. This diversity is indicative of the importance of these systems to collectively provide refugia, food and corridors for dispersal in and through the surrounding area. No development of construction may be allowed within the 50-meter buffer or the koppie habitat. Access to these surrounding areas should be prevented. Human encroachment into this area is severely altering the state of this important area. The feasibility of fencing this area off, around the 50 m buffer to prevent access should be highly considered. Based on the findings of the study, the specialists are of the opinion that the proposed development can be considered for authorisation. Field surveys confirmed the ecological integrity of this some areas present, as well as the presence and likelihood of some threatened species in the area. Therefore, it is imperative that the recommendations and mitigations of the specialists are included in the EMPR and implemented.

In terms of heritage, the Heritage Impact Assessment (HIA) for the proposed development was conducted and specialist found that there is a section of an archaeological site relating to the development layout, which is divided into high and medium significance areas. Areas of high significance contain features (middens and stone walled enclosures) and is located outside of the development footprint and will not be directly impacted on. The areas marked as of medium significance contain few if any visible surface features but could very well contain subsurface cultural deposit and a small section of this area will be directly impacted by the proposed layout and will have to be mitigated. According to the SAHRA palaeontological sensitivity map the study area is indicated as of insignificant significance and no further studies are required. In terms of the built environment of the area (Section 34 of the NHRA) no standing structures older than 60 years occur, and no burial sites were recorded (Section 36 of the NHRA). If any graves are located in future they should ideally be preserved in-situ or alternatively relocated according to existing legislation. The study area is surrounded by existing mining activities and the proposed development will not impact negatively on significant views as it will be in line with current land use of the area. During the public participation process conducted for the project no heritage concerns was raised. The impact of the proposed project on heritage resources can be mitigated to an acceptable level and it is recommended that the proposed project can commence on the condition that the recommendations are implemented as part of the EMPr and based on approval from SAHRA.

The geohydrologist concluded that the impact assessment shows that it not expected that there will be any measurable impact on the groundwater levels in the area. No privately-owned boreholes around the proposed No 3 shaft development area will be impacted by the groundwater level drawdown in the fractured rock aquifer. It is also not expected that there will be notable impact on groundwater qualities within the study area. The specialist recommended that the project may be authorised provided that the Applicant commits to optimal management and monitoring of the expected impacts as described in the report.

In terms of natural surface water resources, the aquatic specialist found two aquatic resources will be impacted by the services and upgrades of services and road network. These will be minor impacts on the systems as the existing servitudes will be utilised in most instances. The wetland and drainage line have low ecological value and is degraded due to historical activities and ongoing anthropogenic activities. The impact areas are limited and with the necessary mitigation and rehabilitation most of the current function will remain intact. This to ensure sustainability of the system. For this reason, it can be supported that the proposed development activities may go-ahead if the required buffers are maintained and the resource drivers preserved. The rehabilitation of the wetland is vital to recover the required ecological function. The wetland drivers must be enhanced as part of the rehabilitation of the affected areas. In respect of the construction phase, it is important to ensure that the required erosion protection measures linked to the crossing sections be carefully designed and installed. Silt transportation to the downstream system must also be carefully managed. The project can be supported, should all the mitigation measures be implemented and monitored against to ensure compliance.

9.2.4 Alternatives assessed

Various options to access the Zondereinde Western Block have been identified and analysed at a desktop study level. A combination of raisebored vertical shafts with hoisting facilities and a decline system to the working levels was the preferred option as this option provides access to the ore body on time and in the most economical way.

Ten positions for the placement of new vertical main and raisebore shafts were investigated. Underground access, surface features and other land considerations indicated the current position as the only feasible raiseboring site.

Various sinking methods were investigated. Shafts up to a diameter of 4.6m can be raisebored which allows access to upper levels of the mine. The depths in the region of 1350m are yet untested. Blind sinking of shafts of diameters and depths proposed in the options are commonplace.

In line with the Regulations, the following alternatives have been assessed for the proposed development: One layout alternative to the Proposed layout (Figure 3-2) was developed and both options were assessed in detail in the impact assessment (Table 7-1). Based on the findings of the specialist studies and impact assessment and considering the successful implementation of the EMPr, a recommendation as to the preferred alternative was made. The Proposed layout is the preferred alternative since the proposed layout does not encroach onto any high sensitive areas (high sensitive heritage area and Koppie and buffer). All effort was made by the project team to develop the proposed alternative which only encroach onto the medium sensitivity heritage areas and low sensitive ecological areas (Refer to Figure 6-30 and Figure 6-31).

The option of not establishing the Shaft Complex, also known as the “No-go option” will result in the Western Block of the Mining Right Area not being as accessible as it could be and may potentially decrease the LoM of the Zondereinde Mine. The Zondereinde Western Block will also require additional ventilation, which can be provided by the proposed activity. Should the LoM decrease, the benefit of not securing the economic viability of the Zondereinde Mine (300kozpa PGM and 9200 current staff) through the Zondereinde Western Block may not be realised, including the socio-economic benefits arising from the Zondereinde Mine and its SLP.

9.2.5 Impact Assessment

In terms of the impact assessment undertaken as part of the EIA Report, a qualitative and quantitative approach was followed. From a qualitative perspective, impacts related to listed activities and raised by I&APs were assessed. This was then followed by a more detailed quantitative assessment which incorporated the findings of the specialists where possible. Overall all impacts could be mitigated satisfactorily. Alternatives were then compared and assessed based on their impact to environmental attributes as well as how well they incorporated the requirements of the various specialists. Based on this assessment, the recommended alternative is the proposed layout.

Thus, with the implementation of the EMPr which includes all necessary mitigation measures, it is felt that impacts can be satisfactorily mitigated, and the benefits will be maximised and thus it is recommended that the development be authorised.

9.3 Final Site Map

(Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers. Attach as Appendix)

The Final Site Map is attached in Appendix 11.

9.4 Final proposed alternatives

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment.)

The following was considered during the alternative assessment:

- The findings of the specialist studies undertaken;
- The results of the impact assessment; and
- The need for the project.

Based on the findings of the specialist studies and impact assessment and considering the successful implementation of the EMPr, a recommendation as to the preferred alternative was made. The Proposed layout is the preferred alternative since the proposed layout does not encroach onto any high sensitive areas (high sensitive heritage area and Koppie and buffer). All effort was made by the project team to develop the proposed alternative which only encroach onto the medium sensitivity heritage areas and low sensitive ecological areas (Refer to Figure 6-30 and Figure 6-31).

9.5 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

(Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.)

Impact management objectives and outcomes are provided in the EMPr to ensure that the proposed development is sustainable and has no significantly negative impacts. A summary of these management objectives is provided below:

- Planning and layout of construction site is undertaken responsibly to ensure protection of potential sensitive environmental features;
- Environmental awareness creation and training is undertaken throughout the construction phase to minimise environmental impacts and ensure compliance to relevant legislation and authorisations;
- Minimise environmental impacts associated with emergency procedures;
- A safe working environment for contractors/construction workers and the public is provided;
- Proper management of site clearing is undertaken to ensure minimal environmental disturbance;
- Minimise environmental impacts associated with site establishment;
- Minimal disturbances to traffic due to delivery of construction material;
- Proper management of labour force is undertaken to ensure that:
 - There are no security-related issues or disturbance to tenants or landowners outside the construction footprint;
 - There is optimal use of local labourer.

- Minimise environmental impacts associated with ablution facilities;
- Reduce the generation of waste by changing behaviours of contractors throughout the development
- Re-use waste generated by the construction where possible thereby resulting in decreased waste disposal volumes;
- Waste separation and recycling must be undertaken as part of construction;
- Waste generated during the construction of the proposed development, to be disposed of at licenced landfill sites;
- Minimal environmental impacts associated with waste;
- Effective and safe management of hazardous and non-hazardous materials on site, in order to minimise the impact of materials on the environment;
- Minimal environmental impacts associated with the management of workshops and equipment;
- Ensure that all possible causes of pollution are mitigated as far as possible to minimise impacts to the surrounding environment;
- Prevent polluted water from entering the clean stormwater drainage paths;
- Minimise noise disturbance to surrounding areas;
- Protect flora species outside of construction areas;
- Control alien plants and noxious weeds;
- Minimal impact to fauna species;
- To have no adverse impact on the historical inheritance of the area;
- The preservation and appropriate management of new findings should these be discovered during construction;
- Adequate reinstatement and rehabilitation of construction areas;
- Water conservation mechanisms to be implemented;
- Electricity reduction mechanisms to be implemented; and
- Carbon footprint of the proposed development is minimised by the implementation of sustainable construction and operational practices.

9.6 Aspects for inclusion as conditions of Authorisation

(Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation.)

A number of critical mitigation measures accompany this recommendation and should be included as conditions of the environmental authorisation (should it be granted). These include:

- The proposed layout should be implemented;
- An Environmental Control Officer (ECO) should be appointed to ensure compliance to the authorisation and EMPr. Monthly monitoring together with six-monthly full environmental audits is recommended;
- Construction contractors, sub-contractors and operators must ensure that no fauna taxa are unduly disturbed, trapped, hunted or killed;
- An archaeological specialist should be appointed for the heritage (medium sensitivity area) to be impacted on and permits from SAHRA to be in place;

- Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels;
- Preparation of the footprint, civil construction activities and the construction of the roads should be limited to daytime only.
- The stormwater management system included in the Stormwater Management Plan must be implemented and maintained;
- It is recommended that a comprehensive baseline study is conducted of the koppie habitat in order to be able to create an ecological baseline for this habitat. This will assist in future monitoring the koppie throughout the life of the project.

9.7 Description of any assumptions, uncertainties and gaps in knowledge

(Which relate to the assessment and mitigation measures proposed.)

The Environmental Impact Assessment (EIA) was based on the conceptual designs of the bulk services infrastructure. Furthermore, EIAs are intended to suggest mitigation which may alter the design and layout of the project. Detail designs would be required post EIA and Environmental Authorisation (EA) to complete the project for construction.

Prism EMS used the information provided and made available by Northam Platinum Limited and their professional team as well as the input from the relevant specialists as described in the document. The accuracy of the document would be limited to the available documents presented at this phase of the development process.

9.8 Reasoned opinion as to whether the proposed activity should or should not be authorised

9.8.1 Reasons why the activity should be authorised or not

Based on the findings of the specialist studies and impact assessment and taking into account the successful implementation of the EMP, it is felt that the 3 shaft project should proceed. In summary, the following reasons form the basis of this opinion.

- The proposed development and location are in line with the Environmental Management Framework applicable to the area, as well as other guidelines and frameworks for the area as demonstrated within this report;
- Part of the site is currently impacted upon by existing land uses. Using this site therefore reduces the need for greenfields development elsewhere;
- Services required for the development are available or will be developed during the construction phase;
- No environmental or technical specialist study identified any fatal flaws related to the site selection for the proposed development;
- In addition, all potential negative impacts identified for the Proposed Layout, as part of specialist studies and the impact assessment could be satisfactorily mitigated to 'low' or 'low-medium'. As such no significantly negative impacts are expected;

- Rehabilitation of the identified surface water features will have a medium significant positive impact on the aquatic ecological systems;
- The proposed 3 shaft project will secure the economic viability of the Zondereinde Mine (300kozpa PGM and 9200 current staff) through providing improved access to underground mineral resources in the Zondereinde Western Block. This in turn will result in continuing the socio-economic benefits currently provided by the mine through the approved Social and Labour Plan;
- The assumptions, uncertainties and gaps are such that the impact assessment is expected to be accurate;
- The mitigation measures included in the EMPr are thought to adequately mitigate impacts so that the impact management objectives can be met; and
- The comparison of alternatives resulted in the selection of the BPEO for the site: the proposed layout.

9.8.2 Conditions that must be included in the authorisation

9.8.2.1 Specific conditions to be included into the compilation and approval of EMPr

A number of critical mitigation measures accompany this recommendation and should be included in the approved EMPR. These include:

- The proposed layout should be implemented;
- An Environmental Control Officer (ECO) should be appointed to ensure compliance to the authorisation and EMPr. Monthly monitoring together with six-monthly full environmental audits is recommended;
- Construction contractors, sub-contractors and operators must ensure that no fauna taxa are unduly disturbed, trapped, hunted or killed;
- If the heritage features (structures older than 60 years) to be impacted on, then a Conservation architect should be appointed. Permits from PHRA-G to be in place should this be the case;
- Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels;
- Preparation of the footprint, civil construction activities and the construction of the roads should be limited to daytime only.
- The stormwater management system included in the Stormwater Management Plan must be implemented and maintained;
- The high significant heritage areas should be avoided, and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be included in the EMPR and implemented for the project as well as a site development management plan;
- Monitoring of Alien Invasive Plant species and their presence, in conjunction with the alien invasive plant management plan for the life of the project;
- Fire management plan must be in place for the areas surrounding the project area and the road to restrict the impact from fire on the natural flora and fauna communities;
- Awareness of the sensitivity of this community (in particular a threatened vegetation type, rocky ridge habitats, CBA areas, IBAs and possibility of occurrence of certain threatened species);

- A commitment to safely and properly relocate all fauna encountered during the operational phase, including invertebrate species such as scorpions, all reptiles, amphibian, bird and/or mammal species;
- All access roads should make use of existing access roads where possible. Signs should also be erected that warn motorists of wildlife which may stray onto access roads and all relevant speed limits should be put in place to prevent road-mortalities;
- Where possible, new infrastructure must be placed in areas that area already disturbed and should not cross CBAs, wetland areas, rivers or rocky ridge zones;
- Strict measures must be put in place to prevent the presence of any feral cats, dogs or livestock on site;
- Limiting the construction area to the current/final project layout and only impacting those areas; and
- Water recycling and rainwater harvesting mechanisms included in the EMPr must be implemented.

9.8.2.2 Rehabilitation requirements

Decommissioning of the proposed 3 Shaft project and associated services is not envisioned. However, should decommissioning be required the activity will need to comply with the appropriate environmental legislation and best practices at that time.

Remediation and rehabilitation of the construction footprint will be undertaken prior to operation. Mitigation measures to ensure proper rehabilitation are included in the EMPr.

10 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The proposed development includes operational activities and thus once construction has commenced, the authorisation will be viewed to be permanently valid. The proposed period for which the environmental authorisation should be valid prior to operation is 10 years with an option to extend if necessary. Should construction not commence within this period, the authorisation will lapse, and new authorisation process would be required. The period for which the authorisation for the operational aspects of the activity is required is approximately 35 -40 years, which is the expected remaining life of mine.

11 UNDERTAKING

(Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Environmental Impact Assessment report and the Environmental Management Programme report.)

The EAP confirms that the information contained in Part A is correct. The undertaking applicable to the EIA and EMPr is contained in Part B of this report.

12 FINANCIAL PROVISION

(State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.)

Financial provision was determined for remediation of latent and residual environmental impacts and risks which may become known in the future. The calculation of the financial provision was based on the Financial Provision

Regulations, 2015 and considered the Guideline document for the evaluation of the quantum of closure related financial provision provided by a mine by the DMR.

The amount and the closure cost assessment will be included in the final EIA/EMPR report to be submitted to the DMR, as this is privileged information.

12.1 Explain how the aforesaid amount was derived

The aforesaid amount was calculated using the DMR Guideline for calculation of the quantum as well as adding a long-term inflation rate over the remaining LoM. The decommissioning and restoration costs are reviewed on an annual basis.

12.2 Confirm that this amount can be provided for from operating expenditure

(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

Northam has procured the issue of insurance guarantees and has a trust fund, the Northam Platinum Restoration Fund, in place for the Rehabilitation Liability. It presently has financial provision for the Rehabilitation Liability ("Zondereinde Financial Provision").

The future value of the Rehabilitation Liability can either be paid over to the Northam Platinum Restoration Fund over the remaining LoM, or through other financial products as approved by the DMR.

13 DEVIATIONS FROM THE APPROVED SCOPING REPORT AND PLAN OF STUDY

13.1 Deviations from the methodology used in determining the significance of potential environmental impacts and risks.

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation).

The project description and the preferred layout differs from the scoping report.

13.2 Motivation for the deviation

Due to the results of the specialist studies and alternative assessments as described in Section of this report, the layout and project description needed to be amended. However, the scope of the activity or the nature of the impacts have not been increased or altered.

14 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

14.1 Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the:-

14.1.1 Impact on the socio-economic conditions of any directly affected person

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix 2.19.1 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12. herein).

The socio-economic impacts of the proposed 3 shaft project relate to ensuring the continuation of present employees' employment, as the LoM will be maintained.

This will also ensure the continued socio-economic benefits of Zondereinde Mine to the employee's dependants and the existing procurement benefits to the local and surrounding Communities.

14.1.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

In terms of heritage, the Heritage Impact Assessment (HIA) (Appendix 10.4) for the proposed development was conducted and specialist found that there is a section of an archaeological site relating to the development layout, which is divided into high and medium significance areas.

Areas of high significance contain features (middens and stone walled enclosures) and is located outside of the development footprint and will not be directly impacted on. The areas marked as of medium significance contain few if any visible surface features but could very well contain subsurface cultural deposit and a small section of this area will be directly impacted by the proposed layout and will have to be mitigated

According to the SAHRA palaeontological sensitivity map the study area is indicated as of insignificant significance and no further studies are required.

In terms of the built environment of the area (Section 34 of the NHRA) no standing structures older than 60 years occur, and no burial sites were recorded (Section 36 of the NHRA). If any graves are located in future they should ideally be preserved in-situ or alternatively relocated according to existing legislation.

The study area is surrounded by existing mining activities and the proposed development will not impact negatively on significant views as it will be in line with current land use of the area.

During the public participation process conducted for the project no heritage concerns was raised.

The impact of the proposed project on heritage resources can be mitigated to an acceptable level and it is recommended that the proposed project can commence on the condition that the recommendations are implemented as part of the EMPr and based on approval from SAHRA.

15 OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT

(The EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as Appendix 4.)

Information regarding the baseline and potential impacts for the Project are based on the information available, discussions with stakeholders, specialists, Northam and the authorities. The EAP has included all identified impacts based on the scope in this report and has assigned appropriate management measures to reduce the impacts associated with the identified impacts and have been included in the EMPr.

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1 DETAILS OF THE EAP

(Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required.)

Please refer to Part A: EIA Report Section 1.3.

2 DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

(Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required).

Please refer to Part A: EIA Report Section 2 and 3.

3 COMPOSITE MAP

(Provide a map (**Attached as an Appendix**) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers)

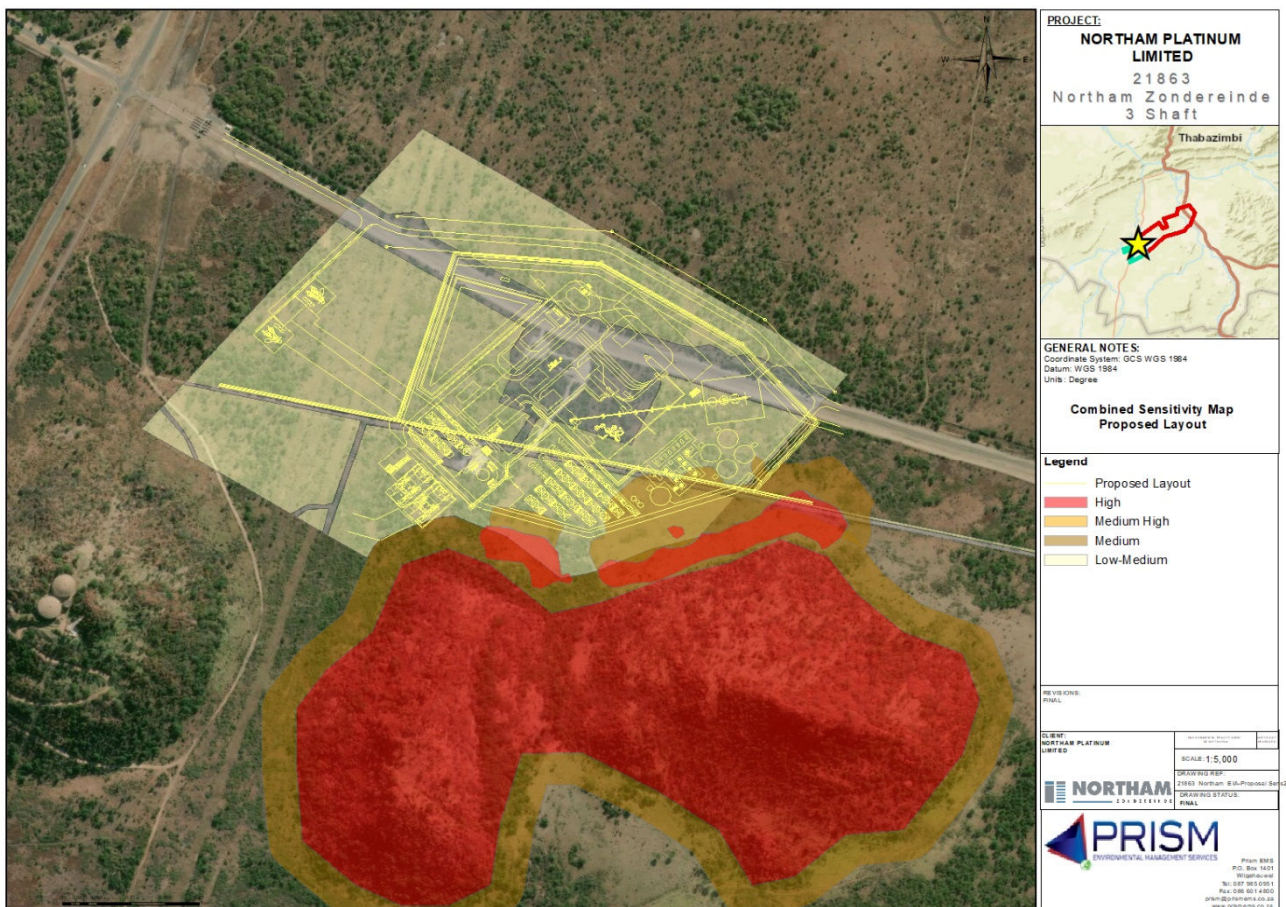


Figure 3-1: Composite map of the layout and environmental sensitivities

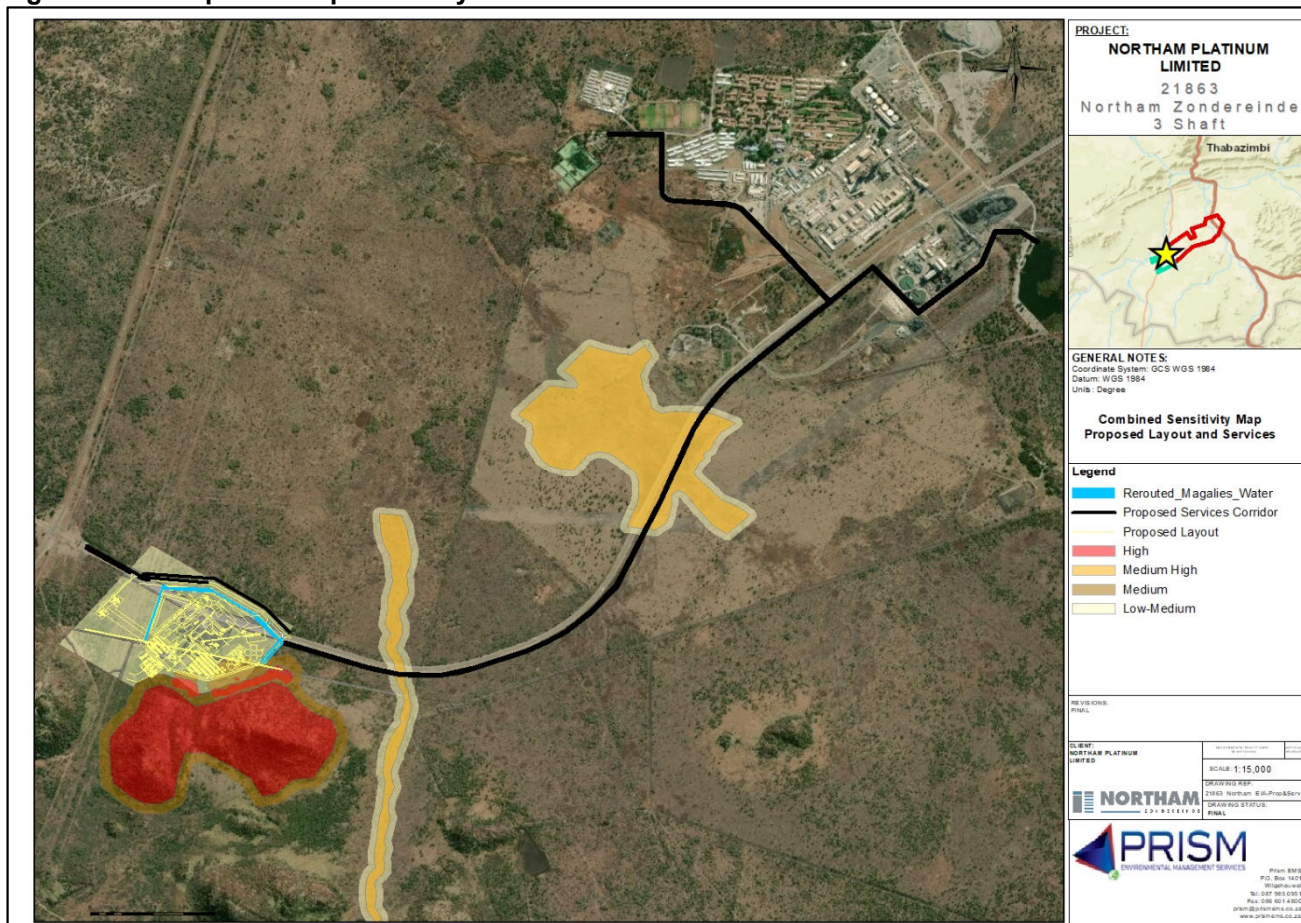


Figure 3-2: Composite map of the layout, services corridor and environmental sensitivities

Also refer to Appendix 11.

The high sensitive area (Koppie and heritage area), and the medium-high (wetland and drainage line) and medium (buffer of Koppie) must be avoided, with the exception of the services that crosses the wetland and drainage line (medium-high sensitivity). Where the layout overlaps with the medium sensitive heritage area, mitigation measures must strictly be adhered to as indicated in this EMPR.

4 DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

4.1 Determination of closure objectives

(ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

The closure objectives and closure criteria developed in the 2013 EMP (NPL, Zondereinde Division, Final EMP Amendment and Consolidation, GCS, 2013) for the existing Zondereinde operation can be adopted for the closure of the #3 Shaft project. The objectives are:

- Ensure that all areas to be rehabilitated are returned, as far as possible to the end land use (agriculture);
- Visual impacts of rehabilitated areas should be minimised by recreating natural landforms and ensuring that reshaped areas are visually suited to surrounding landscapes;

- Natural landforms such as drainage lines, undulating areas and ridges, which have been damaged during activities, must be restored;
- Soil integrity is important as soils form the base from which rehabilitation proceeds. If soils are not correctly prepared, suitable conditions for re-vegetation will not be achieved;
- Alien floral invasion poses a threat both during and post-rehabilitation activities. Adequate alien and invasive species control measures will contribute towards an effective rehabilitation effort;
- Infrastructure will be removed, and the area restored to as much of the natural state it was before the construction phase;
- The minimum objectives for the closure and rehabilitation of the mining areas must be to prevent air and water pollution in accordance with the requirements of the relevant regulations and with good international practice. The intended end-use should take into consideration the prior land-use and the location with respect to current and potential future socio-economic development; and
- Northam intends to plan for alternative land uses for all mining infrastructure as early as possible before closure. If alternative land uses are not found and agreed to with I&APs and the authorities within five (5) years of closure, then rehabilitation should be made over the final five (5) year period of the rehabilitation fund duration.

The closure actions contained in the 2013 EMP that are relevant to the #3 Shaft project and will be used to mitigate environmental risks at closure are documented below:

- **Buildings, plants and associated infrastructure**
 - Foundations will be removed to a depth of at least 1m below surface;
 - Electrical sub stations will be made safe;
 - Saleable plant infrastructure including substation equipment will be dismantled and removed;
 - Redundant steelwork will be demolished;
 - The extent of surface contamination (concrete and soil) will be identified, quantified and demarcated;
 - An alternative use for the brick structures will first be sought, i.e. they can either be sold or donated to the post-mining landowner on sale of the land. If an alternative use cannot be found, the buildings will be demolished; and
 - All material recovered from the demolition of buildings and/or structures will either be transported to a permitted disposal site, sold as scrap or made available to the local community as building materials (provided they are in a satisfactory condition following demolition).
- **Linear Infrastructure**
 - Linear infrastructure constructed by the mine (i.e. roads, conveyors and power lines) will be removed if it proves to inhibit land use at decommissioning. Linear infrastructure servicing the hostels and villages, as well as the tarred road linking the R510 and R511 will remain. Northam intends to hand over the responsibility for managing this infrastructure to the TLM;
 - The soils and land capability will be rehabilitated to near pre-mining conditions;

- All roads within the mining/operational areas will be rehabilitated by ripping these structures to a depth of 500mm; and
 - All fences erected around the mine and linear infrastructure will be dismantled and either disposed of at a permitted disposal site or sold as scrap (provided these structures will no longer be required by the post-mining landowner). Fences erected to cordon-off dangerous excavations will remain in place and will be maintained as and when required.
- **Pollution Control Dams**
 - The pollution control dams will only be demolished should the area prove to be free draining with no pollution potential after rehabilitation.

4.2 The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity

The impact assessment assessed all impacts in detail and mitigation measures recommended by the specialists are included in this EMPR (Table 4-1). In terms of potential pollution of the drainage line and wetland by the sewerage, backfill and mud pipelines, the mitigation is to install high-pressure pipes at the crossings, so that, should the pipes burst, it will not burst close to the crossings. Further, a water use licence will be applied for from the DHSWS and all standards will be complied with.

In terms of groundwater, the specialist concluded the following:

4.2.1 Construction Phase

- ***Impacts on groundwater volumes***

- Construction of the No 4 shaft will be completed by December 2021. The shaft will be excavated to 1 546 m depth. The shaft will be lined with shotcrete, thereby reducing, or eliminating, groundwater inflows into the shaft. It is expected that due to the lining the shaft will have minimal impact on the groundwater levels in the surrounding aquifers;
- Construction of the No 3C Shaft will lead to a maximum vertical drawdown in groundwater level of around 150 m. The maximum zone of influence for the groundwater level drawdown is calculated to be 175 m. The dewatering cone does not impact any private owned groundwater boreholes or surface streams;
- The No 3 shaft will be lined using shotcrete, similar to the No 4 shaft. The shotcrete will reduce or eliminate groundwater inflows into the shaft. Similar to the No 4 shaft it is expected that the No 3 shaft will have minimal impact on the groundwater levels in the surrounding aquifers;
- Similar to the No 3C Shaft the No 3A Shaft will be unlined, allowing groundwater to seep into the shaft. The zone of influence of the groundwater level drawdown cone is calculated to be approximately 175 m. The dewatering cone does not impact any private owned groundwater boreholes or surface streams;
- Similar to the No 3c and 3A Shafts the No 3B Shaft will be unlined. As with the No 3c and 3A Shafts it is assumed that there is a 150 m extinction depth to the underlying aquifers. The zone

of influence of the groundwater level drawdown cone is calculated to be approximately 175 m. The dewatering cone does not impact any private owned groundwater boreholes or surface streams.

- ***Impact on groundwater qualities***

- The material excavated during construction of the different shaft areas will be stored in the waste storage silo before being moved to the existing waste rock dump. This material in the waste storage silo will not be in direct contact with the soil or the underlying aquifers and is not expected to impact the groundwater qualities;
- The groundwater flow directions around the No 3A, 3B, and 3C Shafts will be directed towards the individual shafts due to drawdown of the groundwater levels in the shafts. This will prevent contaminant migration away from these 3 shafts. Lining, or sealing off, of individual seepage zones will further mitigate contaminant migration;
- Lining of the No 3 and No 4 shafts will also prevent contaminant migration away from those 2 shafts. Based on this, it can be said that it is expected that there will be little to no impact on the groundwater qualities from the excavation of the various shafts as long as the lining is maintained properly;
- The storm water dam will be lined. Therefore, no impacts on the underlying aquifers from the SWD on the underlying groundwater qualities are expected assuming the dam will be constructed correctly and maintained properly.

4.2.2 Operational Phase

- ***Impacts on groundwater volumes***

- It is expected that there will be minimal impact on the groundwater levels in the aquifers around the No 3 and No 4 shafts due to the fact that the shafts will be lined;
- Drawdown in groundwater level around the unlined shafts (No 3A, No 3B, and No 3c) is expected to be around 150 m to the limit of the active aquifer, while the zone on influence of the groundwater level drawdown cone is expected to be in the order of 175 m. Sealing off of individual seepage zones will further reduce the impact.

- ***Impact on groundwater qualities***

- The material excavated from the underground mine via the proposed No 3 and No 4 shaft development area will be stored in the Reef and Waste storage silos before being moved to the existing concentrator and waste rock dump areas. The material stored in these silos is not in direct contact with the soil or underlying aquifers and is not expected to have an impact on the groundwater qualities, assuming that all the mined material is stored, and the silos are properly maintained;
- The groundwater flow directions around the unlined No 3A, 3B, and 3C Shafts will be directed towards the individual shafts due to drawdown of the groundwater levels in the shafts. This will

prevent contaminant migration away from these 3 shafts. Lining of the No 3 and No 4 shafts will also prevent contaminant migration away from those 2 shafts. Based on this, it can be said that it is expected that there will be little to no impact on the groundwater qualities from the various shafts;

- The storm water dam will be lined. Therefore, no impacts on the underlying aquifers from the SWD on the underlying groundwater qualities are expected.

4.3 Potential risk of Acid Mine Drainage

(Indicate whether or not the mining can result in acid mine drainage)

The proposed activities will not result in acid mine drainage.

4.4 Steps taken to investigate, assess, and evaluate the impact of acid mine drainage.

The proposed activities will not result in acid mine drainage.

4.5 Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage

The proposed activities will not result in acid mine drainage.

4.6 Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage

The proposed activities will not result in acid mine drainage.

4.7 Volumes and rate of water use required for the mining, trenching or bulk sampling operation

The exact volumes and water use required for the construction phase of the proposed activities will be determined during the application for a water use licence. However, it should be noted that the Northam Zondereinde Mine has an existing water use licence and that no increase in production is planned, therefore the water use will also not increase significantly during operation.

4.8 Has a water use licence has been applied for?

A water use licence will be applied for, for the following Section 21 of the National Water Act, 1998 (Act No. 36 of 1998) [as amended] listed water uses:

Section 21 c) and i) water uses for the crossings of the identified drainage line and wetland by the services infrastructure.

4.9 Impacts to be mitigated in their respective phases

ACTIVITIES <i>(as listed in 2.11.1)</i>	PHASE <i>(of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure.</i>	SIZE AND SCALE OF DISTURBANCE <i>(volumes, tonnages and hectares or m²)</i>	MITIGATION MEASURES <i>(describe how each of the recommendations herein will remedy the cause of pollution or degradation and migration of pollutants)</i>	COMPLIANCE WITH STANDARDS <i>(A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)</i>	TIME PERIOD FOR IMPLEMENTATION <i>Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.</i>

Refer to Table 4-1 for the above requested information.

Table 4-1: Measures to rehabilitate the environment affected by the undertaking of any listed activity

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
CONSTRUCTION PHASE				
<i>Wetland and drainage</i>				
All activities during the pre-construction and construction phases.	Water quality	<ul style="list-style-type: none"> • Stockpiling outside the wetland area, stormwater management, dry season construction, coffer damming, filtration, sub-surface drains, velocity dissipation structures (such as reno mattresses); • Limited use of machinery in the wetland area. No servicing of vehicles and equipment on site; • a WULA must be submitted to the Department of Human Settlements, Water and Sanitation (DHSWS), as the proposed activities will trigger sections of Section 21 of the National Water Act [NWA], 1998 (Act No. 36 of 1998) that will require such an application; • Together with the WULA, a rehabilitation and monitoring plan will have to be compiled and approved; • Approved stormwater management plan (SWMP) must be implemented; • Wetland monitoring occurring on a quarterly basis should be conducted by a skilled professional qualified in assessing and understanding the complex nature of wetlands and their associated drivers; • Wetland drivers should be protected as far as possible; 	<ul style="list-style-type: none"> ➤ NWA ➤ Approved WUL and WUL monitoring and auditing ➤ Approved SWMP ➤ Monitoring Plan ➤ Rehabilitation Plan ➤ Spill procedure ➤ Incident procedure 	<ul style="list-style-type: none"> ➤ Internal EO ➤ Wetland aquatic specialist ➤ Stormwater engineer ➤ Project Manager
	Silt			
	Surface water run-off			
	Contamination of water from hazardous substances			
	Disturbance of natural system			
	Disturbance/pollution of sub-surface flow			
	Disturbance of aquatic ecological systems			

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> • Wetland release into downstream aquatic sources should be rehabilitated, enhanced and monitored; • Water quality preservation is key. Monitoring should take place during the construction phase as per the Water Use License (WUL) requirements; • Enhance wetland integrity; • Subsurface drains to be installed to assist in the aquatic driver sustainability across the full width of the wetland; • Velocity dissipation structures (such as reno mattresses) must also be installed to prevent water flowing through culverts to gain velocity; • Spill and incident procedures to be developed and implemented. 		
Establishment of Construction Camp and installation and operation of construction support services including chemical toilets and	Dust emissions altering air quality and visibility on nearby roads.	<ul style="list-style-type: none"> ➤ A speed limit of 20km/h must be maintained on all dirt roads; Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	EMPR Dust control regulations (NEMAQA)	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
water tanks and generation of power.	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.)	<ul style="list-style-type: none"> ➤ All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; ➤ In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; ➤ All vehicles used during the project should be properly maintained and in good working order; ➤ All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions. 	<ul style="list-style-type: none"> ➤ EMPR 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor
	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	<ul style="list-style-type: none"> • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Construction activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; 	<ul style="list-style-type: none"> ➤ SANS 10103:2008 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised. 		
	Soil alteration including compaction, contamination and pollution and erosion.	<ul style="list-style-type: none"> Instability and erosion of steep slopes must be stabilised immediately; Re-vegetation in consultation with landscape architect and ECO should be done if required; To reduce the loss of material by erosion, disturbance must be kept to a minimum; If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area. Where possible, natural vegetation should be retained to reduce the risk of erosion; Should erosion occur due to negligence on the part of the Contractor, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor; 	<ul style="list-style-type: none"> EMPR requirements Rehabilitation Plan 	<ul style="list-style-type: none"> Contractor to implement actions ECO to monitor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil. 		
	Destruction or partial destruction of non-renewable heritage resources.	<ul style="list-style-type: none"> The high significant areas should be avoided, and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan. 	<ul style="list-style-type: none"> SAHRA requirements National Heritage Resources Act, 2004 (Act No. 10 of 2004) and associated regulations. 	<ul style="list-style-type: none"> Qualified Archaeological Specialist Project Manager
	Visual impact	<ul style="list-style-type: none"> Suitable screening to be put in place during construction to minimise visual impacts; No littering to be allowed; Good housekeeping practices to be followed. 	<ul style="list-style-type: none"> EMPR 	<ul style="list-style-type: none"> Contractor to implement actions ECO to monitor
Site clearing, removal of vegetation and topsoil (and stockpiling of topsoil)	Dust emissions altering air quality and visibility on nearby roads.	<ul style="list-style-type: none"> A speed limit of 20km/h must be maintained on all dirt roads; Dust suppression measures by means of either water or biodegradable chemical agent will be implemented 	<ul style="list-style-type: none"> EMPR Dust control regulations (NEMAQA) 	<ul style="list-style-type: none"> Project Manager Contractor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
of the site footprint and for service infrastructure including access and haul roads, raw water and wastewater pipelines and stormwater management infrastructure.	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.).	<p>during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.</p> <ul style="list-style-type: none"> ➤ All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; ➤ In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; ➤ All vehicles used during the project should be properly maintained and in good working order; ➤ All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions. 	<ul style="list-style-type: none"> ➤ EMPR 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor
	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	<ul style="list-style-type: none"> ➤ The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; ➤ Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; ➤ Construction activities should be limited to daytime only; 	<ul style="list-style-type: none"> ➤ SANS 10103:2008 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> ➤ Noise monitoring should be undertaken as spot checks; ➤ When required noise mufflers should be utilised to reduced noise; ➤ It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised. 		
	Loss of topsoil and erosion	<ul style="list-style-type: none"> ➤ During clearing of vegetation, topsoil and subsoil must be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase; ➤ Topsoil should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater. Topsoil stockpiles should be checked on a monthly basis to ensure that this is the case; ➤ Topsoil should be used in landscaping and rehabilitation where possible. 	<ul style="list-style-type: none"> ➤ EMPR requirements ➤ Rehabilitation Plan 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor
	Soil alteration including contamination and compaction	<ul style="list-style-type: none"> ➤ Instability and erosion of steep slopes must be stabilised immediately; ➤ Re-vegetation in consultation with landscape architect and ECO should be done if required; ➤ To reduce the loss of material by erosion, disturbance must be kept to a minimum; 	<ul style="list-style-type: none"> ➤ EMPR requirements ➤ Rehabilitation Plan 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> ➤ If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area. Where possible, natural vegetation should be retained to reduce the risk of erosion; ➤ Should erosion occur due to negligence on the part of the Contractor, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor; ➤ Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil; ➤ Hazardous materials (Hydrocarbon) storage areas to be installed and managed appropriately and spill procedures in place and implemented. 		
Loss of land capability		None during construction.		
Destruction, further loss and fragmentation of the vegetation community		<ul style="list-style-type: none"> • Prevent the unnecessary destruction of, and fragmentation of, the vegetation community as well as the surrounding environment; 	<ul style="list-style-type: none"> ➤ Biodiversity Impact Assessment ➤ EMPR 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> • Prevent the loss of the faunal community (including occurring species of conservation concern) associated with these vegetation communities; • High sensitive areas (koppie and buffer) to be demarcated by fencing and avoided completely; • As far as possible, the proposed developments should be placed in areas that have already been disturbed (low-moderate sensitivity areas). No further loss of the koppie areas or the buffer should be permitted as construction of the infrastructure and roads should only take place in the transformed areas. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon (including fencing off the defined project area); • The primary mitigation measure recommended for the project area is for there to be no new development in remaining koppie areas including the buffer; • All dumping and storage during the construction phase must be within the existing infrastructure footprint and the low sensitivity areas; • All laydown, storage areas etc should be restricted to transformed areas during construction, close to the 	<ul style="list-style-type: none"> ➤ SWMP ➤ Dust Control Regulations in terms of NEMAQA ➤ National Environmental Management Biodiversity Act and associated regulations. ➤ Spill procedure; ➤ Incident procedure ➤ Fire Management Plan ➤ Environmental Awareness training manual and 	<ul style="list-style-type: none"> ➤ Biodiversity specialist (for demarcation and rehabilitation monitoring) ➤ ECO for monitoring

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<p>preferred option and existing roads should be used as far as possible;</p> <ul style="list-style-type: none"> • The number (and size) of laydown, storage and staff facilities must be kept to a minimum for the duration of the project. These areas must be designated in already disturbed areas, adhering to the avoidance of moderately and highly sensitive areas; • Building material must be stored in areas that has previously been disturbed and is classified as a low risk according to the sensitivity map in this report; • Building materials may not be stored for extended periods of time and must be removed from the site once the project has been concluded; • Dumping in moderate and highly sensitive areas must be prevented; • Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces; • A spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas and particularly the savanna and koppie; 	<p>signed attendance registers</p>	

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> • The contractors used for the construction should have spill kits available prior to construction to ensure that any fuel, oil or hazardous substance spills are cleaned-up and discarded correctly; • No vehicles or activities, dumping or clearing is permitted within the moderate to high sensitive areas as defined in this report; • All rubble generated must be removed from the site; • Keep storm water away from the working/mining areas; • Prevent rainwater and the process water that has fallen on site from leaving the site in an uncontrolled and unregulated fashion. • Implementation of a fire management plan; • Environmental awareness training; • Rehabilitation and re-vegetation. 		
	Destruction of protected tree species	<ul style="list-style-type: none"> • No person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate, or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a license or exemption; • Environmental awareness training; 	<ul style="list-style-type: none"> ➤ Biodiversity Impact Assessment ➤ EMPR ➤ National Environmental Management 	<ul style="list-style-type: none"> ➤ Authorisation holder and internal EO; ➤ Project Manager ➤ Contractor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> • Fire management plan. 	<ul style="list-style-type: none"> ➤ Biodiversity Act and associated regulations. ➤ Fire Management Plan; ➤ Environmental Awareness Training Manual and signed attendance registers 	<ul style="list-style-type: none"> ➤ Biodiversity specialist (for demarcation and rehabilitation monitoring) ➤ ECO for monitoring
	<p>Displacement of faunal community (including threatened and protected species) due to habitat loss, direct mortalities and disturbance (noise, dust and vibration).</p>	<ul style="list-style-type: none"> • High sensitive areas (koppie and buffer) to be demarcated and avoided completely; • Construction activities should be limited during summer when the risk of disturbing sensitive life history stages (e.g. nesting) is lowest; • Where possible, work should be restricted to one area at a time; • If any faunal are recorded during construction, activities should temporarily cease, and time permitted 	<ul style="list-style-type: none"> ➤ Biodiversity Impact Assessment ➤ EMPR ➤ SWMP ➤ Dust Control Regulations in terms of NEMAQA 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Biodiversity specialist (for demarcation and rehabilitation monitoring)

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<p>for the species to move away. In the event the species does not move away (voluntarily), the species must be removed safely from the area and relocated to a suitable area that will not be directly disturbed by the project;</p> <ul style="list-style-type: none"> • Fauna species that have not moved away should be carefully and safely removed to a suitable location beyond the extent of the development footprint by a suitably qualified ECO trained in the handling and relocation of animals; • Waste management • No killing of animals • Speedbumps; • Inspection of pipelines for leaks • Transmission lines should be fitted with bird diverters. • Lighting should be kept to a minimum; • Implementation of a fire management plan; • Environmental awareness training; • Rehabilitation and re-vegetation. 	<ul style="list-style-type: none"> ➤ National Environmental Management Biodiversity Act and associated regulations. ➤ Spill procedure; ➤ Incident procedure ➤ Fire Management Plan ➤ Environmental Awareness training manual and signed attendance registers 	<ul style="list-style-type: none"> ➤ ECO for monitoring

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
	Spreading of alien vegetation	<ul style="list-style-type: none"> • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species; • Include in environmental awareness training manual; • Alien invasive management plan to be implemented. 	<ul style="list-style-type: none"> ➤ Biodiversity Impact Assessment ➤ EMPR ➤ Alien invasive management plan ➤ National Environmental Management Biodiversity Act and associated regulations. 	<ul style="list-style-type: none"> ➤ Authorisation holder and internal EO; ➤ Project Manager ➤ Contractor ➤ Biodiversity specialist (for rehabilitation monitoring) ➤ ECO for monitoring
	Visual impact	<ul style="list-style-type: none"> • Suitable screening to be put in place during construction to minimise visual impacts. 	<ul style="list-style-type: none"> ➤ EMPR 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor
	Destruction or partial destruction of non-renewable heritage resources.	<ul style="list-style-type: none"> • The high significant areas should be avoided, and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find 	<ul style="list-style-type: none"> ➤ SAHRA requirements ➤ National Heritage 	<ul style="list-style-type: none"> ➤ Qualified Archaeological Specialist

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<p>procedure should be implemented (as outlined below) for the project as well as a site development management plan.</p>	<p>Resources Act, 2004 (Act No. 10 of 2004) and associated regulations.</p>	<p>➤ Project Manager</p>
<p>Generation and disposal domestic waste, construction and hazardous waste</p>	<p>Additional burden on existing landfill</p>	<ul style="list-style-type: none"> Waste minimisation strategies in EMPR (Section 7.2.1 implemented). 	<p>➤ EMPR – Waste Management Plan Section 7.2.1</p>	<p>➤ Project Manager ➤ Contractor ➤ Authorisation holder (internal EO)</p>
	<p>Potential pollution of soil, surface and groundwater due to indiscriminate disposal of waste.</p>	<ul style="list-style-type: none"> Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil; Spill and incident procedure. 	<p>➤ EMPR – Waste Management Plan Section 7.2.1 ➤ EMPR – Emergency Preparedness Plan ➤ Section 7.2.2</p>	<p>➤ Project Manager ➤ Contractor ➤ Authorisation holder (internal EO)</p>

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
			<ul style="list-style-type: none"> ➤ Approved Spill and incident procedure. 	
	Visual impact	<ul style="list-style-type: none"> • Suitable screening to be put in place during construction to minimise visual impacts; • No littering to be allowed; • Good housekeeping practices to be followed 	<ul style="list-style-type: none"> ➤ EMPR 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor
	Mortalities of fauna caused by ingestion of plastic and potentially toxic materials, or they may suffocate on plastic, if waste is not disposed of correctly. They can also become stuck in waste and may die of hunger and or dehydration as a result.	<ul style="list-style-type: none"> • No littering to be allowed; • Waste management strategies included in Section 7.2.1 of EMPR implemented; • Good housekeeping practices to be followed; • Implement spill and incident procedure. 	<ul style="list-style-type: none"> ➤ EMPR – Waste Management Plan Section 7.2.1 ➤ EMPR – Emergency Preparedness Plan ➤ Section 7.2.2 ➤ Approved Spill and incident procedure. 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation holder (internal EO)

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
Loading/off-loading and transportation of construction materials, machinery, equipment and construction workers.	Dust emissions altering air quality and visibility on nearby roads.	<ul style="list-style-type: none"> • A speed limit of 20km/h must be maintained on all dirt roads; • Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water. 	<ul style="list-style-type: none"> ➤ EMPR ➤ Dust control regulations (NEMAQA) 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor
	Noise generation by increased traffic on the roads and construction vehicles.	<ul style="list-style-type: none"> • Construction activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • Road users should adhere to speed limits; • Construction vehicles to be serviced at appropriate intervals to reduce unnecessary noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised. 	<ul style="list-style-type: none"> ➤ SANS 10103:2008 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor
	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel	<ul style="list-style-type: none"> • Construction vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; • Construction vehicles to keep to the designated roads; 	<ul style="list-style-type: none"> ➤ EMPR requirements ➤ Rehabilitation Plan 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
	etc. on gravel roads from poorly maintained construction vehicles; and spillages of construction materials etc.	<ul style="list-style-type: none"> Construction vehicles carrying materials to be appropriately covered as to reduce loss of materials. 		
	Potential for accidents due to increased traffic and construction vehicles not keeping to traffic rules and speed limits and reckless driving.	<ul style="list-style-type: none"> Enforce speed limits; Penalties or fines for reckless driving. 	➤ EMPR	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor
	Increased fuel consumption	Reduce unnecessary trips through efficient planning.	➤ EMPR	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor
Earthworks – excavations for establishment of site infrastructure, buildings, headgear, shaft box cut, installation of services	Dust emissions altering air quality and visibility on nearby roads.	<ul style="list-style-type: none"> A speed limit of 20km/h must be maintained on all dirt roads; Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water. 	<ul style="list-style-type: none"> ➤ EMPR ➤ Dust control regulations (NEMAQA) 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
and construction of access and haul roads. Stockpiling of construction and excavated materials	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.).	<ul style="list-style-type: none"> • All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; • In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; • All vehicles used during the project should be properly maintained and in good working order; • All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions. 	➤ EMPR	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor
	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	<ul style="list-style-type: none"> • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Construction activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; 	➤ SANS 10103:2008	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> When required noise mufflers should be utilised to reduced noise; It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised. 		
	Temporary alteration of topography	None during construction phase.		
	Stockpiling of materials may cause soil compaction.	<ul style="list-style-type: none"> Stockpiling only to be done on designated approved areas. 	➤ EMPR	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor
	Health and safety impacts e.g. accidents causing injury to workers or visitors to the site when falling into excavation.	<ul style="list-style-type: none"> Complying with legislation and best practice health and safety standards. 	➤ Mine Health and Safety Act and associated Regulations.	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor
	Destruction or partial destruction of non-renewable heritage resources.	<ul style="list-style-type: none"> The high significant areas should be avoided, and areas of medium sensitivity must be test excavated to test for subsurface deposits. These areas should be monitored during construction and a chance find procedure should be implemented (as outlined below) for the project as well as a site development management plan. 	<ul style="list-style-type: none"> ➤ SAHRA requirements ➤ National Heritage Resources Act, 2004 (Act No. 10 of 	<ul style="list-style-type: none"> ➤ Qualified Archaeological Specialist ➤ Project Manager

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
	Visual impact	<ul style="list-style-type: none"> • Suitable screening to be put in place during construction to minimise visual impacts; • No littering to be allowed; • Good housekeeping practices to be followed. 	<p>2004) and associated regulations.</p> <p>➤ EMPR</p>	<p>➤ Contractor to implement actions</p> <p>➤ ECO to monitor</p>
Sinking of shafts and vent raises and construction of SWD	Temporary alteration of topography caused by drill rig.	None during construction phase.		
	Noise impact	<ul style="list-style-type: none"> • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer’s specifications on acceptable noise levels; • Where possible, drilling and mining activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; 	<p>➤ SANS 10103:2008</p>	<p>➤ Contractor to implement actions</p> <p>➤ ECO to monitor</p>

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised. 		
	Health and safety impacts	<ul style="list-style-type: none"> • Complying with legislation and best practice health and safety standards. 	<ul style="list-style-type: none"> ➤ Mine Health and Safety Act and associated Regulations. 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor
	Impacts on groundwater volumes due to dewatering of the lined No 3 and No 4 shafts	<ul style="list-style-type: none"> • Lining of shaft; • Maintenance of lining; • Installation of monitoring boreholes and monitoring. 	<ul style="list-style-type: none"> ➤ EMPR ➤ Groundwater monitoring plan 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder
	Impacts on groundwater volumes due to dewatering of the unlined No 3A, 3B, and 3C Shafts	<ul style="list-style-type: none"> • Lining / sealing off individual inflow areas; • Maintenance of lining; • Installation of monitoring boreholes and monitoring. 	<ul style="list-style-type: none"> ➤ EMPR ➤ Groundwater monitoring plan 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder
	Impacts on groundwater qualities due to construction of	<ul style="list-style-type: none"> • Lining of shaft; • Maintenance of lining; 	<ul style="list-style-type: none"> ➤ EMPR 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
	the lined No 3 and No4 shafts	<ul style="list-style-type: none"> • Installation of monitoring boreholes and monitoring. 	<ul style="list-style-type: none"> ➤ Groundwater monitoring plan 	<ul style="list-style-type: none"> ➤ Authorisation Holder
	Impacts on groundwater qualities due to construction of the unlined No 3A, 3B and 3C Shafts	<ul style="list-style-type: none"> • Lining / sealing off individual inflow areas; • Maintenance of lining; • Installation of monitoring boreholes and monitoring. 	<ul style="list-style-type: none"> ➤ EMPR ➤ Groundwater monitoring plan 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder
	Impacts on groundwater qualities due to seepage from the SWD	<ul style="list-style-type: none"> • Proper construction and maintenance; • Regular inspection of the lining system; • Installation of monitoring boreholes and monitoring. 	<ul style="list-style-type: none"> ➤ EMPR ➤ Groundwater monitoring plan 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder
Civil works including establishment of infrastructure on site including the stormwater dam, shaft headgear, conveyor belts and services infrastructure	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.).	<ul style="list-style-type: none"> • All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; • In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; • All vehicles used during the project should be properly maintained and in good working order; 	<ul style="list-style-type: none"> ➤ EMPR 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
including permanent stormwater management infrastructure, raw water pipeline, potable water pipeline, mud pipeline, sewage pipeline, backfill pipeline, electrical substation and powerlines. Construction of buildings and structures including offices, ablution/change house, waste storage area and stores, including cement mixing.	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	<ul style="list-style-type: none"> • All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions. • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer’s specifications on acceptable noise levels; • Construction activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised. 	<ul style="list-style-type: none"> ➤ SANS 10103:2008 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor
	Contamination of soil and surface and ground water through cement mixing and	<ul style="list-style-type: none"> • Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil; 	<ul style="list-style-type: none"> ➤ EMPR requirements ➤ Rehabilitation Plan 	<ul style="list-style-type: none"> ➤ Contractor to implement actions

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
	spillages of hydrocarbons.	<ul style="list-style-type: none"> • Appropriate installation and maintenance of temporary and permanent ablution facilities sanitation infrastructure; • No cement mixing may occur on open ground; • Drip trays to be used under stationary vehicles. 		<ul style="list-style-type: none"> ➤ ECO to monitor
	Visual impact	<ul style="list-style-type: none"> • Suitable screening to be put in place during construction to minimise visual impacts; • No littering to be allowed; • Good housekeeping practices to be followed. 	<ul style="list-style-type: none"> ➤ EMPR 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor
Energy, water, raw materials and fuel consumption	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, raw materials and fuel.	<ul style="list-style-type: none"> • Reduce consumption of water by reusing water where possible; • Buildings will comply with NHBRC standards (SANS 10400) for energy efficiency; As part of this, the following measures will be put in place: <ul style="list-style-type: none"> ○ Energy saving measures for water heating (for example heat pumps or solar); ○ LED lamps; ○ General control switching (to minimise use of lights when not needed); and • Energy saving appliances to be used at all times; 	<ul style="list-style-type: none"> ➤ EMPR 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> • Energy and water saving strategies to be included in environmental awareness training material; • Enforce electricity reduction strategies through issuing of fines when personnel do not comply with strategies; • Enforce water saving strategies including design of recycling and reuse, rainwater harvesting etc.; • Record and monitor fuel consumption regularly; • Reduce theft of fuel (increase security); • Promote effective use of raw materials. 		
Demolition and /or removal of temporary construction infrastructure including stormwater drainage structures	Soil erosion, compaction and contamination, as well as loss of topsoil.	<ul style="list-style-type: none"> • Appropriate rehabilitation techniques recommended by biodiversity and aquatic specialists to be implemented. 	<ul style="list-style-type: none"> ➤ EMPR requirements ➤ Rehabilitation Plan 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor
Rehabilitation of construction camp	Spreading of alien vegetation	<ul style="list-style-type: none"> • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species 	<ul style="list-style-type: none"> ➤ Biodiversity Impact Assessment ➤ EMPR ➤ Alien invasive management plan 	<ul style="list-style-type: none"> ➤ Authorisation holder and internal EO; ➤ Project Manager ➤ Contractor ➤ Biodiversity specialist (for

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
and other construction areas, including along the raw water, potable water, sewage, mud and backfill pipelines and access and haul roads.			<ul style="list-style-type: none"> ➤ Rehabilitation Plan ➤ National Environmental Management Biodiversity Act and associated regulations. 	<ul style="list-style-type: none"> rehabilitation monitoring) ➤ ECO for monitoring
	Health and safety impacts e.g. accidents causing injury to workers or visitors to the site when falling into excavations to be backfilled.	<ul style="list-style-type: none"> • Complying with legislation and best practice health and safety standards. 	<ul style="list-style-type: none"> ➤ Mine Health and Safety Act and associated Regulations. 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor
	Contamination of surface and ground water through spillages of hydrocarbons and wastewater.	<ul style="list-style-type: none"> • Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil; • Drip-trays to be used underneath stationary vehicles and machinery; • Implementation of Spill and incident procedure. 	<ul style="list-style-type: none"> ➤ EMPR – Waste Management Plan Section 7.2.1 ➤ EMPR – Emergency 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation holder (internal EO)

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
			Preparedness Plan ➤ Section 7.2.2 ➤ Approved Spill and incident procedure.	
	Failure of re-vegetation efforts due to insufficient seeding and monitoring of vegetation establishment	<ul style="list-style-type: none"> • Appropriate rehabilitation techniques recommended by biodiversity and aquatic specialists to be implemented. 	<ul style="list-style-type: none"> ➤ Rehabilitation plan ➤ Biodiversity specialist report ➤ Surface water assessment specialist report ➤ WUL requirements ➤ Rehabilitation Plan ➤ Monitoring Plan 	<ul style="list-style-type: none"> ➤ Biodiversity Specialist ➤ Project Manager ➤ ECO ➤ Contractor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
Creation of employment opportunities throughout the construction phase.	Decreased unemployment in the area and economic multiplier effects may improve the socio-economic circumstances of the local community.	<ul style="list-style-type: none"> • Use of local labour force; • Implement approved Social and Labour Plan. 	SLP	Authorisation Holder

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
OPERATIONAL PHASE				
Wetland and drainage				
Operation of shaft complex and removal of ore.	Water quality	<ul style="list-style-type: none"> • Rehabilitation of construction impacted area, continuous monitoring, stormwater management, and silt management; • Spill and incident procedures to be implemented; • The wetland integrity should be improved during the rehabilitation phase. This may entail the following: <ul style="list-style-type: none"> ○ Removal of alien and invasive plant species during the construction and operational phases. ○ Re-vegetation and landscaping the wetland and buffer areas with indigenous wetland plant species. ○ Stabilisation of gullies and drainage lines to prevent erosion. ○ Planting of indigenous herbaceous plants on shallow banks and indigenous woody vegetation on steep banks to increase stability of banks, thereby preventing erosion. • Implementation of topsoil management (stockpiling, topography shaping) and erosion control (berms, geotextiling, silt fences, hay bales and gabion structures); 	<ul style="list-style-type: none"> ➤ NWA ➤ Approved WUL and WUL monitoring and auditing ➤ Approved SWMP ➤ Monitoring Plan ➤ Rehabilitation Plan ➤ Spill procedure ➤ Incident procedure 	<ul style="list-style-type: none"> ➤ NWA ➤ Approved WUL and WUL monitoring and auditing ➤ Approved SWMP ➤ Monitoring Plan ➤ Rehabilitation Plan ➤ Spill procedure ➤ Incident procedure
	Silt			
	Surface water run-off			
	Contamination of water from hazardous substances			
	Disturbance of natural system			
	Disturbance/pollution of sub-surface flow			
	Disturbance of aquatic ecological systems			

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> • Approved rehabilitation and monitoring plan must be implemented; • Wetland monitoring occurring on a quarterly basis should be conducted by a skilled professional qualified in assessing and understanding the complex nature of wetlands and their associated drivers; • Wetland drivers should be protected as far as possible; • Wetland release into downstream aquatic resources should be rehabilitated, enhanced and monitored; • Water quality preservation is key. Monitoring should take place during the construction phase as per the Water Use License (WUL) requirements; • Enhance wetland integrity. 		
	Noise impact	<ul style="list-style-type: none"> • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Where possible, drilling and mining activities should be limited to daytime only; 	<ul style="list-style-type: none"> ➤ SANS 10103:2008 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
		<ul style="list-style-type: none"> • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised. 		
	Temporary alteration of topography caused by drill rig causing visual impact.	None during drilling.		
	Soil alteration through soil erosion and compaction on the surface, as well as contamination through spillages of hydrocarbons.	<ul style="list-style-type: none"> • To reduce the loss of material by erosion, disturbance must be kept to a minimum; • Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil; • Spillages of hydrocarbons to be prevented. 	<ul style="list-style-type: none"> ➤ EMPR requirements ➤ Rehabilitation Plan 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor
	Health and safety impacts	<ul style="list-style-type: none"> • Complying with legislation and best practice health and safety standards. 	<ul style="list-style-type: none"> ➤ Mine Health and Safety Act and associated Regulations. 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
	Continued disturbance and degradation of the vegetation community and encroachment by alien invasive plant species.	<ul style="list-style-type: none"> • Environmental protection activities during the reclamation process are; <ul style="list-style-type: none"> ○ Keep storm water away from the working/mining areas; ○ Prevent rainwater and the process water that has fallen on site from leaving the site in an uncontrolled and unregulated fashion; and ○ Prevent dust pollution during dry, windy conditions; • High sensitive areas (koppie and buffer) to be demarcated and avoided completely; • Dust-reducing mitigation measures; • A spill management plan must be put in place; • All rubble generated must be removed from the site; • Keep storm water away from the working/mining areas; • Prevent rainwater and the process water that has fallen on site from leaving the site in an uncontrolled and unregulated fashion; • Implementation of a fire management plan; • Environmental awareness training. 	<ul style="list-style-type: none"> ➤ Biodiversity Impact Assessment ➤ EMPR ➤ SWMP ➤ Dust Control Regulations in terms of NEMAQA ➤ National Environmental Management Biodiversity Act and associated regulations. ➤ Spill procedure; ➤ Incident procedure ➤ Fire Management Plan 	<ul style="list-style-type: none"> ➤ Authorisation holder and internal EO; ➤ Project Manager ➤ Contractor ➤ Biodiversity specialist (for Rehabilitation monitoring) ➤ ECO for monitoring

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
	Continued displacement and fragmentation of the faunal community due to ongoing anthropogenic disturbances (noise, traffic and dust).	<ul style="list-style-type: none"> • High sensitive areas (koppie and buffer) to be demarcated and avoided completely; • If any faunal are recorded during operation, activities should temporarily cease, and time permitted for the species to move away. In the event the species does not move away (voluntarily), the species must be removed safely from the area and relocated to a suitable area that will not be directly disturbed by the project; • Waste management; • Inspection of pipelines for leaks; • Transmission lines should be fitted with bird diverters; • Lighting should be kept to a minimum; • Implementation of a fire management plan; • Environmental awareness training. 	<ul style="list-style-type: none"> ➤ Environmental Awareness training manual ➤ Biodiversity Impact Assessment ➤ EMPR ➤ SWMP ➤ Dust Control Regulations in terms of NEMAQA ➤ National Environmental Management Biodiversity Act and associated regulations. ➤ Spill procedure; 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Biodiversity specialist (for demarcation and rehabilitation monitoring) ➤ ECO for monitoring

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
			<ul style="list-style-type: none"> ➤ Incident procedure ➤ Fire Management Plan ➤ Environmental Awareness training manual and signed attendance registers 	
	Loss of faunal species (road mortalities and/or poaching)	<ul style="list-style-type: none"> • Implementation of a fire management plan; • Environmental awareness training. • No killing of animals; • Speedbumps. 	<ul style="list-style-type: none"> ➤ Biodiversity Impact Assessment ➤ EMPR ➤ SWMP ➤ Dust Control Regulations in terms of NEMAQA ➤ National Environmental 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Biodiversity specialist (for demarcation and rehabilitation monitoring) ➤ ECO for monitoring

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
			Management Biodiversity Act and associated regulations. ➤ Spill procedure; ➤ Incident procedure ➤ Fire Management Plan ➤ Environmental Awareness training manual and signed attendance registers	
	Infringement by humans into the few remaining natural grassland and	<ul style="list-style-type: none"> • High sensitive areas (koppie and buffer) to be demarcated and avoided completely; • Waste management; • Inspection of pipelines for leaks; 	<ul style="list-style-type: none"> ➤ Biodiversity Impact Assessment ➤ EMPR 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
	<p>wetlands areas, with associated impacts such as poaching, litter as well as introduction of pests, diseases and feral species such as cats.</p>	<ul style="list-style-type: none"> • Transmission lines should be fitted with bird diverters; • Lighting should be kept to a minimum; • Implementation of a fire management plan; • Environmental awareness training; • No domesticated animals or feral species allowed at the site. 	<ul style="list-style-type: none"> ➤ SWMP ➤ Dust Control Regulations in terms of NEMAQA ➤ National Environmental Management Biodiversity Act and associated regulations. ➤ Spill procedure; ➤ Incident procedure ➤ Fire Management Plan ➤ Environmental Awareness training manual and 	<ul style="list-style-type: none"> ➤ Biodiversity specialist (for demarcation and rehabilitation monitoring) ➤ ECO for monitoring

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
			signed attendance registers	
Loading / off-loading and transportation / hauling of overburden and ore and transportation of construction workers and other traffic.	Dust emissions altering air quality and visibility on nearby roads.	<ul style="list-style-type: none"> • A speed limit of 20km/h must be maintained on all dirt roads; • Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water. 	<ul style="list-style-type: none"> ➤ EMPR ➤ Dust control regulations (NEMAQA) 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor
	Emissions from vehicles and machinery (CO ₂ , NO _x , SO _x , VOC's etc.)	<ul style="list-style-type: none"> • All vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; • In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; • All vehicles used during the project should be properly maintained and in good working order; • All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions. 	<ul style="list-style-type: none"> ➤ EMPR 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
	<p>Noise generation by increased traffic on the surrounding roads.</p> <p>Generation of noise through heavy vehicles and equipment, causing a nuisance to fauna and surrounding land uses.</p>	<ul style="list-style-type: none"> • Where possible, mining activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • Road users should adhere to speed limits; • Mining vehicles to be serviced at appropriate intervals to reduce unnecessary noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised. 	<ul style="list-style-type: none"> • SANS 10103:2008 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor
	<p>Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained heavy vehicles; and spillages of construction materials etc.</p>	<ul style="list-style-type: none"> • Mining vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; • Mining vehicles to keep to the designated roads; • Mining vehicles carrying materials to be appropriately covered as to reduce loss of materials. 	<ul style="list-style-type: none"> ➤ EMPR requirements ➤ Rehabilitation Plan 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
	Increase in fauna mortalities on the roads.	<ul style="list-style-type: none"> • Enforce speed limits; • Penalties or fines for reckless driving. 	➤ EMPR	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder
	Potential for accidents due to increased traffic and heavy vehicles not keeping to traffic rules and speed limits and reckless driving.	<ul style="list-style-type: none"> • Enforce speed limits; • Penalise or fines for reckless driving. 	➤ EMPR	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder
	Increased traffic on adjacent roads and access issues.	<ul style="list-style-type: none"> • Reduce unnecessary trips through efficient planning. 	➤ EMPR	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder
	Increased fuel consumption.	<ul style="list-style-type: none"> • Reduce unnecessary trips through efficient planning' • Record and monitor fuel consumption regularly; • Reduce theft of fuel (increase security). 	➤ EMPR	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder
Sinking and operation of shafts and vent	Impacts on groundwater volumes	<ul style="list-style-type: none"> • Lining of shaft • Maintenance of lining 	➤ EMPR	➤ Project Manager

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
raises, operation of SWD, reef and waste silos.	due to dewatering of the lined No 3 and No 4 shafts	<ul style="list-style-type: none"> • Installation of monitoring boreholes and monitoring 	<ul style="list-style-type: none"> ➤ Groundwater monitoring plan 	<ul style="list-style-type: none"> ➤ Contractor ➤ Authorisation Holder
	Impacts on groundwater volumes due to dewatering of the unlined No 3A, 3B, and 3C Shafts	<ul style="list-style-type: none"> • Lining / sealing off of individual inflow areas • Maintenance of lining • Installation of monitoring boreholes and monitoring 	<ul style="list-style-type: none"> ➤ EMPR ➤ Groundwater monitoring plan 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder
	Impacts on groundwater qualities due to operation of the lined No 3 and No 4 shafts	<ul style="list-style-type: none"> • Lining of shaft • Maintenance of lining • Installation of monitoring boreholes and monitoring 	<ul style="list-style-type: none"> ➤ EMPR ➤ Groundwater monitoring plan 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder
	Impacts on groundwater qualities due to seepage from the SWD	<ul style="list-style-type: none"> • Lining / sealing off of individual inflow areas • Maintenance of lining • Installation of monitoring boreholes and monitoring 	<ul style="list-style-type: none"> ➤ EMPR ➤ Groundwater monitoring plan 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder
	Impacts on groundwater qualities due to seepage from the Reef and Waste Storage Silos	<ul style="list-style-type: none"> • Proper construction and maintenance • Regular inspection of the lining system • Installation of monitoring boreholes and monitoring 	<ul style="list-style-type: none"> ➤ EMPR ➤ Groundwater monitoring plan 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
	Decrease in water availability to persons dependent on ground water such as farmers and local communities.	<ul style="list-style-type: none"> • Lining of shafts 3 and 4 • Lining / sealing off of individual inflow areas of ventilation shafts • Maintenance of lining 	<ul style="list-style-type: none"> ➤ EMPR ➤ Groundwater monitoring plan 	<ul style="list-style-type: none"> ➤ Project Manager ➤ Contractor ➤ Authorisation Holder
Operation of conveyor belts	Noise impact	<ul style="list-style-type: none"> • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Conveyor belts, if any, which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Where possible, operation activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised. 	<ul style="list-style-type: none"> ➤ SANS 10103:2008 	<ul style="list-style-type: none"> ➤ Contractor to implement actions ➤ ECO to monitor

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
Operation and maintenance of the support services infrastructure on the shaft complex including substation, pollution control dam and stormwater management infrastructure, powerlines, raw water pipelines, sewage, backfill and mud pipelines, access and haul roads.	Soil erosion, compaction and contamination.	<ul style="list-style-type: none"> • Mining vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; • Mining vehicles to keep to the designated roads; • Mining vehicles carrying materials to be appropriately covered as to reduce loss of materials; • Spill procedures to be approved and implemented. 		
	Spreading of alien vegetation	<ul style="list-style-type: none"> • Alien invasive species control methods to be included in the EIA/EMPR and implemented; • Recommendations by Biodiversity specialist to be implemented; • Include in environmental awareness training manual; • Alien invasive management plan to be implemented. 	<ul style="list-style-type: none"> ➤ Biodiversity Impact Assessment ➤ EMPR ➤ Alien invasive management plan ➤ National Environmental Management Biodiversity Act and associated regulations. 	<ul style="list-style-type: none"> ➤ Authorisation holder and internal EO; ➤ Project Manager ➤ Contractor ➤ Biodiversity specialist (for rehabilitation monitoring) ➤ ECO for monitoring
Energy, fuel, water consumption and depletion of minerals	Unsustainable use of natural resources may deplete and / or	<ul style="list-style-type: none"> • Reduce consumption of water by reusing water where possible; 	<ul style="list-style-type: none"> ➤ EMPR 	<ul style="list-style-type: none"> ➤ Contractor to implement actions

Activity including size/ scale of disturbance (volumes, tonnages and hectares or m ²)	Aspects and potential impacts	Mitigation type and measures	Standards to be achieved and compliance with standards	Responsible Party
	decrease the availability of water, power, minerals and fuel.	<ul style="list-style-type: none"> Water and energy minimisation strategies to be included in the EIA/EMPR and implemented. 		➤ ECO to monitor
Creation of new employment opportunities and sustaining existing employment at the mine.	Decreased unemployment in the area and economic multiplier effects will improve the socio-economic circumstances of the local community and wider region.	<ul style="list-style-type: none"> Use of local labour; Implementation of Social and Labour Plan 	➤ Social and Labour Plan	➤ Authorisation Holder
Operation of the shaft complex	Decline/increase in property value	Implementation of all the mitigation measures in the EMPR.	➤ Social and Labour Plan	➤ Authorisation Holder
	Loss of Sense of Place	Implementation of all the mitigation measures in the EMPR.	➤ Social and Labour Plan	➤ Authorisation Holder

4.10 Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ());

ACTIVITY whether listed or not listed <i>(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).</i>	POTENTIAL IMPACT <i>(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc...)</i>	ASPECTS AFFECTED	PHASE In which impact is anticipated <i>(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)</i>	MITIGATION TYPE <i>(modify, remedy, control, or stop) through</i> <i>(e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)</i> E.g. <ul style="list-style-type: none"> • <i>Modify through alternative method.</i> • <i>Control through noise control</i> • <i>Control through management and monitoring</i> • <i>Remedy through rehabilitation)</i> 	STANDARD TO BE ACHIEVED <i>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.</i>

Refer to Table 4-1 for the above requested information.

4.11 Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

<p>ACTIVITY whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.).</p>	<p>POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc...)</p>	<p>MITIGATION TYPE (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. • Modify through alternative method. • Control through noise control • Control through management and monitoring Remedy through rehabilitation.</p>	<p>TIME PERIOD FOR IMPLEMENTATION (Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either: Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.)</p>	<p>COMPLIANCE WITH STANDARDS (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)</p>

4.12 Financial Provision

4.12.1 Determination of the amount of Financial Provision

4.12.1.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein

Closure objectives are provided in Section of this report. These closure objectives are aligned to the baseline environment as it includes all aspects of the environment. It is recommended however that the following objectives be included in an updated rehabilitation plan to accommodate the specific site sensitivities as indicated on the Final Site Map:

➤ **Biodiversity:**

- Alien invasive management plan and rehabilitation of project construction and project footprint to near pre-activity conditions, to ensure the continued preservation of the high sensitivity Koppie habitat and buffer.

➤ **Wetland and Drainage Line:**

- The wetland drivers must be enhanced as part of the rehabilitation of the affected areas.

➤ **Heritage**

- Rehabilitation of project construction and project footprint to near pre-activity conditions, to ensure continued preservation of the existing heritage features on the study area.

4.12.1.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

As part of the public participation process, the EIA/EMPR Report are made available to registered I&APs and the MRA landowners and they will accordingly be invited to the public meeting for consultation. It should be noted that Northam Platinum Limited is in the process of purchasing the land from the landowner (Rustenburg Platinum Mines) and a sale agreement is in place. The transfer of properties is currently taking place.

4.12.1.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure

The current approved rehabilitation plan of Northam Platinum Limited will be implemented. The updated rehabilitation plan will only be developed once sufficient information is achieved from the

monitoring of areas where rehabilitation concurrent with construction and operational activities. The data from the areas already rehabilitated will be utilised to inform scientifically sound, safe and technically feasible solutions to achieving the rehabilitation objectives. The rehabilitation plan must be updated to include site specific sensitivities.

4.12.1.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives

The rehabilitation plan will be updated and adjusted where necessary, to be in line with the closure objectives and outcomes. The rehabilitation plan was not developed and will not be updated in isolation and considered and will consider the nature of the sites, the agreed end land use, and other specialist requirements.

4.12.1.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline

Financial provision was determined for remediation of latent and residual environmental impacts and risks which may become known in the future. The calculation of the financial provision was based on the Financial Provision Regulations, 2015 and considered the Guideline document for the evaluation of the quantum of closure related financial provision provided by a mine by the DMR.

The amount and the closure cost assessment will be included in the final EIA/EMPR report to be submitted to the DMR, as this is privileged information.

4.12.2 Confirm that the financial provision will be provided as determined

Northam has procured the issue of insurance guarantees and has a trust fund, the Northam Platinum Restoration Fund, in place for the Rehabilitation Liability. It presently has financial provision for the Rehabilitation Liability ("Zondereinde Financial Provision").

5 MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON, INCLUDING

- a) *Monitoring of Impact Management Actions*
- b) *Monitoring and reporting frequency*
- c) *Responsible persons*
- d) *Time period for implementing impact management actions*
- e) *Mechanism for monitoring compliance)*

Monitoring is required to ensure that the receiving environment at the proposed Development is suitably safeguarded against the identified potential impacts, and to ensure that the environmental management requirements are adequately implemented and adhered to during the execution of the project.

The method of monitoring the implementation of the management and mitigation measures stipulated within the EMPr are indicated in Table 5-1.

Table 5-1: Method of monitoring implementation of EMPr

Method	Frequency	Responsibility	Main Topics	Outcome
Internal Inspections	Daily – Weekly	Project Manager	<ul style="list-style-type: none"> • Observe housekeeping practices • Check for spillages, leaks or any other sources of pollution • Observe waste management • Observe stormwater control 	<ul style="list-style-type: none"> • Based on observations identify need for protocols / procedures and compile where needed in order to comply with EMPr • Verbally inform employees on any identified issues
External Inspections	Weekly for first 3 months, Thereafter bi-weekly for second quarter; From the seventh month of construction, monthly site inspections and reporting.	ECO	<ul style="list-style-type: none"> • Check compliance with management measures in EMPr 	<ul style="list-style-type: none"> • Based on observations identify need for protocols / procedures and compile where needed in order to comply with EMPr • Verbally inform employees on any identified issues. • Information from inspections will be used to compile monthly report. • Photos from inspections to be utilised in monthly reporting.

Method	Frequency	Responsibility	Main Topics	Outcome
External audits	Biyearly or as per EA.	ECO	<ul style="list-style-type: none"> Check compliance with management measures in EMPr 	<ul style="list-style-type: none"> Compile audit report with recommendations / actions where non-compliance was identified
Management Meetings	Quarterly – Bi-annually	Management	<ul style="list-style-type: none"> Discuss (problem solve) recurring issues or actions that require management intervention 	<ul style="list-style-type: none"> Record minutes of main points of discussion Implement outcome actions of meeting

5.1 Compliance Monitoring and Auditing

5.1.1 Environmental Audits

The mechanism for monitoring compliance with the management and mitigation measures stipulated within the EMPr must include an audit undertaken by an independent Environmental Control Officer (ECO).

The objective of the environmental audit is to:

- Report on the level of compliance with the conditions of the environmental authorisation and the management and mitigation measures stipulated within the EMPr;
- The extent to which the avoidance, management and mitigation measures provided in Table 4-1 achieve the objectives and outcomes in Section 4;
- Identify and assess new impacts and risks as a result of undertaking the activities;
- Evaluate the effectiveness of the management and mitigation measures generated in the EMPr;
- Identify shortcomings in the EMPr;
- Identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMPr.

5.1.2 Procedure

The following methodology or procedure is to be used for assessment of the management and mitigation measures of the EMPr:

- **Pre-site preparation:** prior to the site inspection a review of the management measures contained in the EMPr, and a checklist must be drawn up.

- **Site inspection:** The Development must be traversed on foot and must include an assessment of each major component of the facility.
- **Documentation review:** after the site inspection a documentation review must be undertaken by requesting specific key documentation relating to the proposed development.

5.1.3 Evaluation Criteria

During evaluation of the EMPr, the following criteria must be used:

- Management measures stipulated in the plan;
- Environmental monitoring required;
- Legal requirements; and
- Best practice observations.

Where any indication of non-compliance is determined, recommended actions will be provided.

5.1.4 Reporting

All inspections undertaken as part of internal / external auditing must be provided in the form of a report. External audits will be submitted to the competent authority as required by the EIA Regulations, 2014 [as amended].

5.1.5 Penalties

In order to ensure that there is adequate motivation for the contractor to comply with the conditions set out in the EMPr, the following applies with regards to penalties:

- The Contractor will comply with the environmental requirements on an ongoing basis, and any failure on their part to do so will entitle the Project Manager, in consultation with the Environmental Manager and ECO, to certify the imposition of a fine subject to the details set out in the EMPr.
- The Project Manager, Environmental Manager and any other specific personnel as designated by the Project Manager may alter the Schedule of Fines for this specific project.
- Fines may be issued per incident at the discretion of the Project Manager. Such fines will be issued in addition to any remedial costs incurred as a result of noncompliance with the requirements of the EMPr and documents supporting thereof. Fines may be omitted from construction guarantees as supplied by the contractor.
- The Project Manager and ECO will be the judge as to what constitutes a transgression in terms of the above clause. Further, note that in the event that transgressions continue to an unacceptable level the client may cancel the contract.
- Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental requirements, he will be liable to pay a penalty fine over and

above any other contractual consequence. This may also lead into a Rectification Application in terms of Section 24G of the NEMA, which could lead to certain fines and / or prosecution.

- The Contractor is deemed NOT to have complied with this specification if: -
 - Within the boundaries of the site, site extensions and access roads there is evidence of contravention of the requirements of the EMPr.
 - Environmental damage ensues due to negligence.
 - The Contractor fails to respond adequately to complaints from the public.
 - Legal action is instituted against the developer in terms of Environmental laws due to any action / activities undertaken by the Contractor.
- Payment of any fines in terms of the contract will not absolve the offender from being liable from prosecution in terms of any law.
- A record of penalties will be maintained within the procurement department and may influence later commissions awarded to the contractor.

5.2 General Roles and Responsibilities

There are various role players that are involved in responsible environmental management. Information on each role player is then provided in the subsections below.

5.2.1 Competent Authorities

Due to the fact that that activities are triggered in terms of the EIA Regulations, 2014 (National Environmental Management Act, 1998 (NEMA), the Department of Mineral Resources is the relevant competent authority.

5.2.2 Department of Mineral Resources (DMR)

DMR is the mandated authority in terms of NEMA that determined whether an Environmental Authorisation (EA) will be issued for the project, following a decision-making process conducted as part of the EIA. Conditions will be included in the EA, which need to be complied with by the project applicant. The EMPr will need to be updated to take into account these conditions.

DMR also fulfils a compliance and enforcement role with regards to the EA. The Department may perform random inspections to check compliance. DMR will also review the monitoring and auditing reports compiled by the ECO.

Amendments may be required to the EMPr, based on adaptive management to the site conditions and the technical requirements of the project. These amendments will need to be approved by DMR.

5.2.3 Authorisation Holder

Northam Platinum Limited (Pty) Ltd is the applicant in terms of NEMA and is ultimately responsible for the development and implementation of the EMPr and ensuring that the conditions in the EA are satisfied. The liability for non-compliance also rests with the Authorisation Holder. Details of the Authorisation holder are contained in Table 5-2.

Table 5-2: Details of the Applicant

Applicant:	Northam Platinum Limited
Contact Person:	Ms Sonwabiso Ndaki

5.2.4 Consultants

➤ Project Manager

In order to ensure that the proposed development is constructed as per the relevant designs and requirements, a project manager will be responsible for managing the planning, design and construction phases of the project. The Project Manager will furthermore also be required to tend to any environmental matters at the request of the Environmental Control Officer (ECO). The Project Manager shall assist the ECO where necessary and shall have the following responsibilities in terms of the implementation of the EMPr:

- Regular site inspections;
- Reviewing and approving the Contractor’s Method Statements;
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO where necessary; and
- Communicating all environmental issues to the ECO.

➤ Contractors

Contractors will be responsible for constructing the proposed Development and associated infrastructure. All contractor/s employed by the developer in respect of any aspect of the construction of the subject site, will be bound by all and any agreement between the developer and the contractor, to ensure compliance with the Environmental Authorisation, mitigating measures included in the Specialist Studies, as well as this EMPr. The responsibilities include:

- Taking full responsibility for each of his/her employees.
- Be familiar with the contents of the EMPr and the specifications contained herein.
- Comply with the Environmental Specifications contained in the EMPr and subsequent revisions.
- Confirm legislative requirements for the construction works and ensure that appropriate permissions and permits have been obtained before commencing activities.

- Prepare Method Statements, programme of activities and drawings/plans for submission to the ECO when requested.
- Undertake daily site inspections to monitor environmental performance and compliance with the Environmental Specifications.
- Notify the ECO immediately in the event of any accident or infringements of the Environmental Specifications and ensure appropriate remedial action is taken.
- Notify the ECO at least 10 working days in advance of any activity he has reason to believe may have significant adverse environmental impacts, with specific reference to blasting, so that mitigatory measures may be implemented timeously.

➤ **Independent ECO**

A competent and independent ECO must be appointed and will undertake bimonthly inspections with monthly reporting on site as well as biyearly auditing against the EMPr and EA. The report must be submitted to Northam Platinum Limited (Pty) Ltd. and DMR for their records.

The ECO will also check the following:

- The record of environmental incidents (spills, impacts, legal transgressions, etc.) as well as corrective and preventive actions taken;
- The public complaints register in which all complaints are recorded, as well as actions taken; and
- Results from the environmental monitoring programme (water quality etc.).

In terms of Audits, the ECO will be required to ensure the following:

- All documentation (e.g. audit/monitoring/compliance reports and notifications) required to be submitted to the Department in terms of the EA.
- The holder of the EA must submit an environmental audit report to the Department within 30 days of the completion of the construction phase (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities.
- The Environmental Audit Report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the EA conditions as well as the requirements of an approved EMPr.
- Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.
- Further specific monitoring requirements for aspects of the environment are indicated in Table 5-3.

Table 5-3: Mechanisms for Monitoring Compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
CONSTRUCTION PHASE				
GROUNDWATER				
Dewatering of the lined No 3 and No 4 shafts	Impacts on groundwater volumes	Monitoring boreholes be installed: <ul style="list-style-type: none"> • Down gradient of the storm water dam; • Down gradient of the Reef and waste storage silos. Existing groundwater monitoring plan to be implemented.	Internal Environmental Officer ECO	According to WUL Requirements Existing groundwater quality monitoring plan
Dewatering of the unlined No 3A, 3B, and 3C Shafts	Impacts on groundwater volumes			
Construction of the lined No 3 and No4 shafts	Impacts on groundwater qualities			
Construction of the unlined No 3A, 3B and 3C Shafts	Impacts on groundwater qualities			
Seepage from the SWD	Impacts on groundwater qualities due to			

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
WETLAND AND DRAINAGE LINE				
Installation of services crossing drainage line and wetland	Water quality	Up-stream and downstream water sampling as per WUL requirements	<ul style="list-style-type: none"> ➤ Internal Environmental Officer ➤ Aquatic wetland specialist must be appointed for external monitoring ➤ ECO 	<ul style="list-style-type: none"> ➤ During Construction and Operational Phase ➤ Quarterly and or according to WUL Requirements ➤ Approved monitoring plan
	Silt	Visual observation		
	Surface water run-off	Visual observation		
	Contamination of water from hazardous substances	Visual and water sampling as per WUL requirements.		
	Disturbance of natural system	Visual and water sampling as per WUL requirements.		
	Disturbance/pollution of sub-surface flow			
	Disturbance of aquatic ecological systems			

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPRATIONAL PHASE				
GROUNDWATER				
Dewatering of the lined No 3 and No 4 shafts	Impacts on groundwater volumes			
Dewatering of the unlined No 3A, 3B, and 3C Shafts	Impacts on groundwater volumes	Monitoring boreholes be installed: <ul style="list-style-type: none"> • Down gradient of the storm water dam; • Down gradient of the Reef and waste storage silos. Existing groundwater monitoring plan to be implemented.	Internal Environmental Officer ECO	According to WUL Requirements Existing groundwater quality monitoring plan
Construction of the lined No 3 and No4 shafts	Impacts on groundwater qualities			
Construction of the unlined No 3A, 3B and 3C Shafts	Impacts on groundwater qualities			
Seepage from the SWD	Impacts on groundwater qualities due to			

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Dewatering of the lined No 3 and No 4 shafts	Impacts on groundwater volumes			
WETLAND AND DRAINAGE LINE				
Installation of services crossing drainage line and wetland	Water quality	Up-stream and downstream water sampling as per WUL requirements	<ul style="list-style-type: none"> ➤ Internal Environmental Officer ➤ Aquatic wetland specialist must be appointed for external monitoring ➤ ECO 	<ul style="list-style-type: none"> ➤ During Construction and Operational Phase ➤ Quarterly and or according to WUL Requirements ➤ Approved monitoring plan
	Silt	Visual observation		
	Surface water run-off	Visual observation		
	Contamination of water from hazardous substances	Visual and water sampling as per WUL requirements.		
	Disturbance of natural system	Visual and water sampling as per WUL requirements.		
	Disturbance/pollution of sub-surface flow			
	Disturbance of aquatic ecological systems			

6 INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT REPORT

An EMPr performance assessment audit must be undertaken at the frequency included in the EIA Regulations or the conditions of the environmental authorisation, for the duration of the Zondereinde Mining Right. Internal operational inspections must be undertaken at least Bi-annually. All findings, recommendations and actions must be recorded and retained on site for inspection.

7 ENVIRONMENTAL AWARENESS PLAN

7.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work

Training aims to create an understanding of environmental management obligations and prescriptive measures governing the execution of the project. It is generally geared towards project team members that require a higher-level of appreciation of the environmental management context and implementation framework for the project. In contrast, Environmental Awareness Creation strives to foster a general attentiveness amongst the construction workforce to sensitive environmental features and an understanding of implementing environmental best practices. The Environmental Awareness Plan for the Development incorporates both training and environmental awareness to ensure that the proposed development is implemented in line with the requirements of the EMPr and that environmental sensitivities on site are managed correctly.

Northam Platinum Limited is committed to remaining responsible and accountable for environmental practices on site. Being accountable for environmental practices undertaken during working tasks and activities remain the responsibility of both employer and employee awareness of the potential environmental impacts that could result from these activities.

All potential incidents to the environment may be effectively minimised through effective training and awareness of the employees using any of the following methods:

- Supervisory meetings (weekly);
 - EMPR Training (annually);
 - Induction training (annually); and
 - External environmental and/or health and safety courses (when applicable).
- These methods are discussed below in more detail.

7.1.1 Meetings

Weekly supervisory meetings are ideal to facilitate awareness of specific environmental dangers pertaining to each week. Various topics may be discussed during these meetings and must be recorded or logged. All attendees at each meeting must sign an attendance register, these records must be kept on file at the administration office. Topics for discussion may include:

- Topics applicable to the entire operation;

- Area specific topics (e.g. heritage); and
- General environmental awareness:
 - Waste management
 - Spillages
 - Saving water
 - Electricity consumption
 - Dust control
 - Noise generation
 - Housekeeping
 - Indigenous Vegetation
 - Alien vegetation
 - Fire-making.

Should issues be identified by the ECO, these can also be addressed during these weekly meetings.

7.1.2 EMPr Training

Aspects of the EMPr must be selected and discussed at training workshops at least annually. Such training topics may be focused around the incidents that are frequently reported during the previous year and may be focused around the following:

- Hydrocarbon spillages;
- Stormwater Control;
- Waste Management;
- Monitoring Protocols; and
- Safety topics.

Workers should be informed that they may refuse work that is harmful to human health and/or the environment.

7.1.3 Induction Training

All new employees are required to undergo induction training prior to commencement of work. Returning and existing employees must undergo repeat induction training at least annually. Environmental awareness training must form part of the induction and must include the basic topics relating to the environment:

- Main environmental legislation (e.g. NEM:WA1 or NWA2);
- Constitutional right pertaining to the environment;
- Waste Management hierarchy;
- Environmental, social and economic concerns;
- Sensitive environmental features; and
- Prevention of poaching.

¹ National Environmental Management Waste Act (NEM:WA), 2008 (Act No. 59 of 2008)

² National Water Act (NWA), 1998, (Act No. 36 of 1998)

7.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment

The identified risks must be managed through the implementation of the management and mitigation measures contained in the EMPr. Compliance with the EMPr during the construction phase, will be monitored internally daily and externally by an independent Environmental Control Officer on a weekly basis for the first three months and on a bi-weekly for the 2nd quarter. Thereafter, monthly monitoring until the closure of construction.

Compliance with the EMPr during the operational phase will be monitored through internal auditing to be undertaken at least bi-annually and external auditing at a frequency in accordance with the EIA Regulations or the conditions of the environmental authorisation, for the duration of the Zondereinde Mining Right.

7.2.1 Waste Management plan

In order to ensure waste is properly dealt with, waste management is included in the EMPr. In addition, a Waste Management Plan is discussed below.

- **Legal Requirements**

Section 16 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), as amended states that –

“A holder of waste must, within the holder’s power, take all reasonable measures to –

- *Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;*
- **Reduce, reuse, recycle and recover waste;**
- *Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;*
- *Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;*
- *Prevent any employee or any person under his or her supervision from contravening this Act;*
- *Prevent the waste from being used for any unauthorised purpose.*

Only temporary storage of waste is allowed (once of storage of waste for a period less than 90 days). The volume of material should be limited to less than 100m³ of general waste and less than 80m³ of hazardous waste. Should this be exceeded the Norms and Standards for the Storage of Waste will need to be complied with.

- **Waste Hierarchy**

Management objectives provided in this EMPr are aligned to the waste management hierarchy indicated in Figure 7-1.

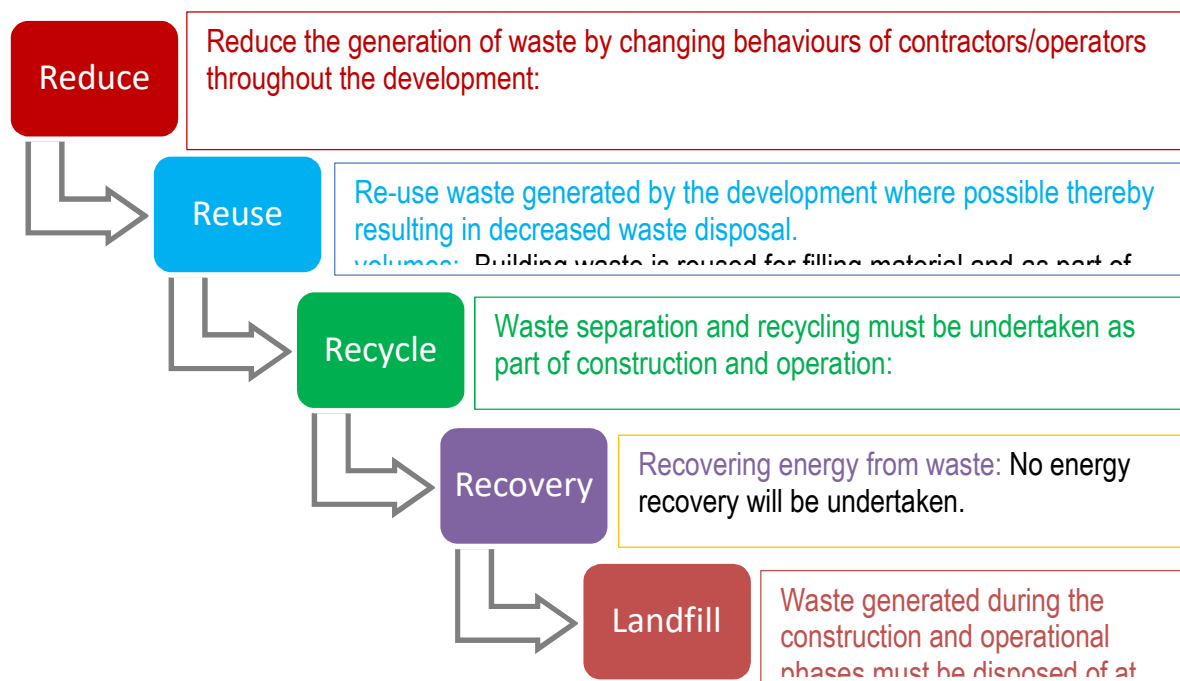


Figure 7-1: Waste Hierarchy

- **Waste Management Actions**

The following waste management actions must be implemented in order to ensure the objectives included in the waste hierarchy above are met.

- **Waste Avoidance and Reduction**

Avoidance and reduction should be practiced wherever possible. Recommended actions include: but are not limited to:

- Bulk buying of materials to reduce the volume of packaging required.
- Avoidance of materials/items/brands that are heavily packaged, have a short lifespan or are low quality.
- Buying items that last longer and can be repaired.
- Buying items in refillable containers.
- Environmental awareness training should focus on management of waste and all construction workers should be aware of the importance of waste minimisation and avoidance.

- **Recycling**

Recycling should be practiced whenever waste prevention or reuse is not possible, provided that any such recycling is cost effective, taking into consideration environmental benefits, financial costs and community interests.

Potential priority recyclable waste streams include:

- Used Oil;
- Paper;
- Glass;
- Tyres;
- Plastics;
- Building rubble; and
- Electronic waste.

The following actions must be implemented:

- To reduce or avoid the need for sorting after collection, the categories of distinctively marked waste receptacles must be provided in order to receive waste as it is generated.
- These receptacles shall be fitted with a tight cover.
- All types of waste collection receptacles shall be clearly marked with the type of waste they are receiving.
- Obtain and label recycling containers for office waste, aluminium, steel, glass, ferrous metals, nonferrous metals, waste timber.
- Locate these containers within office buildings and trailers.
- Establish a recycled material collection schedule.
- Arrange full bins to be hauled away.
- **Waste Disposal**

The contractor is responsible for removal of all waste from the site, generated through the contractor's activities. The contractor shall ensure that all waste is removed to an appropriately licensed waste management facilities (the following source may be utilised – www.sawic.org.za). During operation, waste that is not collected for recycling must be collected by the municipality or by a municipality approved 3rd party collector.

In addition, it should be noted that the classification of waste determines the handling methods and the ultimate disposal of the material. All **hazardous waste** that may be generated by construction and operation must be managed as follows:

- Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required).
- Obtain and provide an acceptable container with a label.
- Place hazardous waste material in the container.
- Inspect the container on a regular basis.
- Haul the full container to the licenced and correct disposal site.
- Provide documentary evidence of proper disposal of the waste.
- A Waste Manifest must be put in place for all hazardous waste.

In addition, the following actions must also be undertaken:

- Provide waste skips on site. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs.
- Skips should be covered to prevent waste blowing away.
- Vermin / weatherproof bins will be provided in sufficient numbers and capacity to store domestic waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.
- Ensure that solid waste is transported so as to avoid waste spills en-route.
- No waste shall be buried or burned anywhere on the site.
- Permits to transport/dispose of waste must be in place.

7.2.2 Emergency Preparedness Plan

- **Potential Emergencies**

The following potential emergencies that may occur on site include:

- Environmental Incidents:
 - Fuel and hydrocarbon spillages;
 - Sewage spillages from the chemical toilets; and
 - Fire Hazards.
- Safety Incidents:
 - Injuries related to operation of heavy machinery such as Front-End Loaders, Excavators, Mobile Crushers etc. during construction;
 - Driving related accidents and incidents from Trucks on site during construction;
 - Accidents during earth moving, levelling and rehabilitation activities; and
 - Criminal incidents such as theft or potential violent crime during construction and operation.
- **Emergency Plan**
 - Emergency Assemblage Area

A central area on site must be demarcated with appropriate signage for the gathering of all employees and visitors on site in the event of an emergency.

- Emergency Procedures

The following procedures must be compiled in order for the identified potential emergencies to be managed effectively:

- Drill and evacuation procedure for any emergency related incidents containing information on the following:
 - Reporting structure for all incidents
 - Emergency contact information (e.g. telephone numbers)

- Procedure to be followed for the specific emergency
- First Aid information

- Spillages of fuel and hydrocarbons:
 - Immediate action plan (e.g. use of spill kits) to prevent spill for spreading
 - Reporting of incident to manager and supervisor to advise on next steps

- Procedure for Theft and Crime:
 - Details on security system on site
 - Emergency response units
 - Panic alarms
 - Details of community response units
 - Emergency Contact Information

A list of potential emergency contact centres specific to the area must be drawn up and displayed on common notice boards for all employees to access. The following emergency centres must be sourced:

- Nationwide emergency response;
- Cellphone Emergency;
- Ambulance;
- Hospitals;
- Fire Response; and
- Police.

This list must be checked and updated at least quarterly to ensure that the information remains up to date.

8 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

(Among others, confirm that the financial provision will be reviewed annually).

The financial provision will be reviewed annually.

Refer to Table containing required information by the competent authority for the EIA/EMPR report and an indication of where in the report the information is included.

9 UNDERTAKING

The EAP herewith confirms:

the correctness of the information provided in the reports;	✓
the inclusion of comments and inputs from stakeholders and I&APs;	✓
the inclusion of inputs and recommendations from the specialist reports where relevant; and	✓
the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.	✓

-END-