



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

Basic Assessment Report And Environmental Management Programme for an environmental authorisation in support of a Prospecting Right Application for PalRho Exploration Proprietary Limited on the farm Moorddrift 289KR, Mokopane, Limpopo Province

DRAFT REPORT FOR PUBLIC REVIEW

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA) AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 (ACT NO. 59 OF 2008) (NEM:WA) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT NO. 28 OF 2002) (MPRDA) (AS AMENDED).

Name of Applicant:	PalRho Exploration Proprietary Limited
Tel no:	011 088 4300
Fax no:	086 206 5276
Physical Address:	82 Maude Street, Sandown, Sandton, 2031
File Reference Number SAMRAD:	LP30/5/1/1/2/14197PR

Digby Wells and Associates
(South Africa) (Pty) Ltd
Company Registration:
2010/008577/07

Turnberry Office Park,
Digby Wells House
48 Grosvenor Road,
Bryanston, 2191

Phone: +27 (0) 11 789 9495
Fax: +27 (0) 11 789 9495
E-mail: info@digbywells.com
Website: www.digbywells.com

Directors: J Leaver (Chairman)*,
NA Mehlomakulu*, DJ Otto, M
Rafundisani
*Non-Executive



DIGBY WELLS
ENVIRONMENTAL

This document has been prepared by Digby Wells Environmental.

Report Type:	Draft Basic Assessment Report
Project Name:	Basic Assessment Report and Environmental Management Programme in support of PalRho Exploration Proprietary Limited Prospecting Right Application on the farm Moorddrift 289KR, Mokopane, Limpopo Province
Project Code:	PAL6882

Name	Responsibility	Signature	Date
Anela Sotashe	Report Compiler		June 2021
Claire Wannenburg	Report Reviewer		June 2021
Lucy Stevens	Senior Report Reviewer		June 2021

This report is provided solely for the purposes set out in it and may not, in whole or in part, be used for any other purpose without Digby Wells Environmental prior written consent.

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 BASIC ASSESSMENT PROCESS

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

- determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- identify the alternatives considered, including the activity, location, and technology alternatives;
- describe the need and desirability of the proposed alternatives,
- through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
 - the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
 - the degree to which these impacts—
 - can be reversed;
 - may cause irreplaceable loss of resources; and
 - can be managed, avoided or mitigated;
- through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to:
 - identify and motivate a preferred site, activity and technology alternative;
 - identify suitable measures to manage, avoid or mitigate identified impacts; and
 - identify residual risks that need to be managed and monitored.

EXECUTIVE SUMMARY

Introduction

PalRho Exploration Proprietary Limited (hereafter PalRho), a subsidiary of Ivanhoe Mines Ltd. wishes to undertake prospecting activities on the farm Moorddrift 289KR which is situated near the town of Mokopane within the Mogalakwena Local Municipality and the jurisdiction of the Waterberg District Municipality within the Limpopo Province. The Prospecting Right Application (PRA) was submitted to the Department of Mineral Resources and Energy (DMRE) on 7 May 2021 together with the Environmental Authorisation (EA) Application. A reference number of **LP 30/5/1/1/2/14197 PR** was issued to the application. An amendment to the EA was then submitted to the DMRE on 13 May 2021. The DMRE acknowledged receipt of the PRA and EA on 20 May 2021.

Prospecting activities will include both invasive and non-invasive methods. Non-invasive methods include data capturing of all relevant geological data, a geophysical survey which utilises digital data to confirm proposed drill locations and structures as well as analytical work of the samples taken. Invasive methods will include the core drilling (approximately ten holes) to ascertain the stratigraphy sequence and reef horizons of the ore body.

No permanent infrastructure will be constructed as part of the prospecting activities. Activities associated with the prospecting operations include the establishment of temporary access roads/tracks where existing roads cannot be used, the clearing of vegetation for the drill rig and the establishment of three sumps to separate and store oil, sludge and water. The sumps, access roads/tracks and prospecting site will be rehabilitated following the completion of the prospecting activities. The area to be impacted by each of the prospecting sites will be approximately 25m X 25m or 625m².

The proposed project triggers Listed Activities in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (GN R982 of 4 December 2014, as amended) (the “*EIA Regulations, 2014*”) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The project specifically triggers activities in Listing Notice 1 (GN R327 of 7 April 2017 as amended), thus requiring a Basic Assessment (BA) process to be undertaken. This process requires a comprehensive public consultation process.

Project Applicant

The details of the applicant are presented in the table below:

Contact Details of the Applicant

Name of Applicant:	PalRho Exploration Proprietary Limited		
Registration number (if any):	2018/594378/07		
Trading name (if any):	PalRho Exploration		
Responsible person: (E.g. CEO, Director, etc.)	Sethe Patricia Makesha		
Contact person:	Sethe Patricia Makesha		
Physical address:	82 Maude Street, Sandown, Sandton, 2031		
Postal address:	P.O. Box 782078, Sandton, Gauteng		
Postal code:	2146	Cell phone:	079 138 5140
Telephone:	011 088 4300	Fax:	086 206 5276
Email:	patriciama@ivanplats.com		

Project Overview

PalRho have submitted a Prospecting Right Application to conduct prospecting activities on the farm Moorddrift 289KR. A list of minerals which PalRho proposes to prospect is presented in table below.

Minerals to prospect

Code	Mineral	Type
Au	Gold	Precious metals
Co	Cobalt	Ferrous & base metals
PGM	Platinum Group Metals	Platinum Group Minerals
Cu	Copper Ore	Ferrous & base metals
Ni	Nickel	Ferrous & base metals
Cr	Chrome Ore	Ferrous & base metals
F	Flurspar	Industrial minerals
Sn	Tin Ore	Ferrous & base metals
N/A	Rare Earth Metals	Industrial minerals

Purpose of this Report

The overarching objectives of this Basic Assessment Report are to:

- Identify and assess potential environmental impacts associated with the proposed Project; and

- Recommend mitigation and management measures to ensure that the development is undertaken in such a way as to minimise negative impacts.

This report also describes the status quo of the biophysical and socio-economic environment of the Project area through specialist studies undertaken. Furthermore, an Environmental Management Programme (EMPr) has been developed to mitigate and manage environmental impacts associated with the proposed prospecting activities. The details of the listed and specified activities for the Project are included below.

List and Specified Activities for the Project

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
Establishment of access road /tracks	Estimated dimensions (3m X 2.2km)	Not Listed	N/A
Clearance of vegetation	More than 1ha, but less than 10ha, for all prospecting boreholes in total	X- Activity 27	GN R 983 (as amended)
Establishment of prospecting infrastructure including sumps etc.	Depending on the prospecting site (maximum 9ha for all prospecting boreholes including associated infrastructure)	X – Activity 20 (Associated Prospecting Infrastructure)	GN R 983 (as amended)
Drilling of prospecting boreholes	Depending on the prospecting site (maximum 9ha for all prospecting boreholes including associated infrastructure)	X – Activity 20 (Prospecting Activities)	GN R 983 (as amended)
Decommission of the drill sites and associated infrastructure.	Depending on the prospecting site (maximum 9ha for all prospecting boreholes including associated infrastructure)	X – Activity 22	GN R 983 (as amended)
Relocation of protected species if encountered	Depending on the prospecting site (maximum 9ha for all prospecting boreholes	X – Activity 30	GN R 983 (as amended)

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
	including associated infrastructure)		

Environmental Consultants

PalRho has appointed Digby Wells Environmental (Digby Wells) as the Environmental Assessment Practitioner (EAP) to independently facilitate the environmental application process relevant to the proposed prospecting activities.

Contact details of the EAP.

Name of EAP:	Claire Wannenburg		
Professional affiliation/registration:	EAPASA Registration No. 2019/1013		
Contact person: (if different from EAP)	Claire Wannenburg		
Company:	Digby Wells and Associates (South Africa) (Pty) Ltd		
Physical address:	Digby Wells House, 48 Grosvenor Road, Bryanston, Johannesburg, 2191		
Postal address:	Private Bag X10046, Randburg, South Africa		
Postal code:	2125	Cell phone:	082 852 8482
Telephone:	011 789 9495	Fax:	011 789 9498
Email:	claire.wannenburg@digbywells.com		

Approach and Methodology for the Public Participation Process

A Public Participation Process (PPP) as per the EIA Regulations, 2014 (as amended), promulgated under the NEMA, has been initiated. The PPP is designed to provide Interested and Affected Parties (I&APs) with an opportunity to evaluate the proposed Project and to provide their comments, concerns or questions regarding the proposed Project.

The PPP for the proposed Project is founded on the following steps:

- **Background Information Document (BID):** BIDs with Comment and Registration Form (CRF) were emailed to stakeholders on **02 July 2021**. The BID entailed a project description, geographic location of the project, legislative processes and requirements, the stakeholder engagement and registration processes as well as contact details of the Digby Wells Stakeholder Engagement Office. A CRF was attached to the BID and provided for stakeholders to use for registration as I&APs or to submit comments. The BID was available in English and Sepedi. Information regarding the availability of the Draft BAR was also provided;

- **Newspaper advertisement:** Two newspaper advertisements in Sepedi and English were placed in the **Seipone Madireng** on **24 June 2021** (Sepedi Advert) and **Bosveld Review** on **02 July 2021** (English Advert). The advertisement included a brief project description, legal framework, the competent authorities, details of the appointed EAP, and the registration process for I&APs;
- **Announcement Letter:** A letter was sent via email in English which contained information about the proposed project, applicable legislation, details of the environmental process and information about the availability of the Draft BAR for public comment was emailed to stakeholders on the database on **2 July 2021**;
- **Site notices:** Site notices in both Sepedi and English were erected at various places on **02 July 2021** which contained a brief project description, legal framework, the competent authorities and details of the EAP as well as the registration process for I&APs;
- **SMS:** An SMS was sent to registered I&APs on 02 July 2021 to announce the availability of the Draft BAR for public comment; and
- **Virtual Meetings:** In compliance with the COVID-19 national regulations and associated restrictions, adjusted alert level 4, no gatherings are permitted. However, an online meeting will be held with representative community members, directly and indirectly affected landowners, tribal authorities and government departments. The purpose of these meetings will be to disseminate detailed information about the proposed Project, address comments already raised by the community representatives where possible, and to obtain further comments.

This Basic Assessment Report is available for a 30-day legislated comment period from **Friday, 02 July 2021 to Monday, 02 August 2021**. Comments or issues raised by the public will then be addressed and incorporated into the Final Basic Assessment Report to be submitted to the Department of Mineral Resources and Energy (DMRE) for consideration.

Project Alternatives

The options for alternatives are limited for this project due to the nature of the activity and the position of the geological resource. Alternative site locations for the activity have not been considered as the objective of the application is to prospect on a specific farm portion. Alternatives for the layout of the activity can be considered on a small scale as the drill hole locations can be relocated due to environmental sensitivities however this will be done during Exploration (Phase 1) of the prospecting process where the results of geological studies will confirm the exact locations. Alternative drilling technology was also investigated which included an investigation into the use of either hydraulic pressure core drilling or compressed core drilling. Both these alternatives will be considered and a final decision on the technology used will be determined should the right be approved.

Conclusions and Recommendations

The impacts identified are expected to be confined to site specific impacts and the significance of such impacts is greatly reduced with the implementation of mitigation and management measures. With the implementation of the mitigation and management measures, it is recommended that the proposed Project be granted Environmental Authorisation and a Prospecting Right. A quantitative impact rating methodology was applied to determine the significance of the expected impacts pre-mitigation and post-mitigation. Table A provides a summary of the key impacts expected during the various phases of the Project. As shown in the table all impacts after mitigation and found to have a negligible impact to the environment.

Table A: Summary of the Key Impacts Associated with the Proposed Activities

Activity	Potential Impact	Aspects Affected	Pre-Significance	Post-Significance
Establishment Phase				
Site Clearance	<ul style="list-style-type: none"> Soil compaction due to machinery and increased personnel activity; Soil erosion due to site clearance and the exposure of topsoil stockpiles to wind and water; and Loss of topsoil due to erosion. 	Soils	Minor Negative	Negligible Negative
	<ul style="list-style-type: none"> Site clearing will result in the direct loss of vegetation communities; and The loss of vegetation communities will result in the loss of biodiversity, with cleared areas resulting in potential habitat fragmentation 	Fauna and Flora	Minor Negative	Negligible Negative
	<ul style="list-style-type: none"> Soil erosion may result from wind and water on the exposed prospecting site and topsoil stockpiles. The soil erosion may result in increased turbidity and sedimentation of surrounding watercourses and wetlands. The likelihood of such an impact occurring has been reduced due to the implementation of a 1:100 year flood line buffer zone from the rivers and tributaries and a 500m buffer from the wetlands. However a water authorisation may be granted where new impacts to the water course will be assessed. Fragmentation of the wetland resources as a result of road crossings; Contamination of wetland resources; Impacts to water quality as a result of oil and lubricant spills; Compaction of soils; Loss of habitat and biodiversity; Increased potential for sheet runoff from paved/cleared surfaces; and Increased potential for erosion. 	Surface water	Minor Negligible	Negligible Negative
Operational Phase				
Drilling of Prospecting Boreholes	<ul style="list-style-type: none"> Impacts due to dust and noise generation are likely to be a nuisance to the nearest receptors. Increased dust levels may result due to site clearing, use of access roads and vehicular activity; Dust generation from vehicular activity; and Increased dust due to erosion of soil stockpiles. 	Social Nuisances	Minor Negative	Negligible Negative
	<ul style="list-style-type: none"> Compaction of soil due to machinery and personnel on-site; Stockpiles of topsoil could erode during windy and rainy days (December to March). Soil disturbance and/or compaction; Increased incidence of erosion; Sedimentation from erosion; and Potential water quality deterioration. 	Soils	Moderate Negative	Minor Negative
	<ul style="list-style-type: none"> Faunal species may disperse from the area due to loss of habitats, as well as due to the generation of noise from the drilling activities; Disturbance to avifauna and other fauna utilising the freshwater resources thus resulting in an overall loss of biodiversity. 	Fauna and Flora	Minor Negative	Negligible Negative

Activity	Potential Impact	Aspects Affected	Pre-Significance	Post-Significance
	<ul style="list-style-type: none"> Habitat fragmentation; and Risk of increase and encroachment of alien invasive species. 			
	<ul style="list-style-type: none"> Soil erosion may result from wind and water on the exposed prospecting site and topsoil stockpiles. The soil erosion may result in increased turbidity and sedimentation of surrounding watercourses and wetlands. The likelihood of such an impact occurring has been reduced due to the implementation of a 1:100 year flood line buffer zone from the rivers and tributaries and a 500m buffer from the wetlands. However a water authorisation may be granted where new impacts to the watercourse will be assessed; Fragmentation of the wetland resources; Contamination of wetland resources; Impacts to water quality as a result of spills; Compaction of soils; Loss of habitat and biodiversity; Increased potential for sheet runoff from paved/cleared surfaces; and Increased potential for erosion. 	Surface Water	Moderate Negligible	Minor Negative
Decommissioning Phase				
Rehabilitation	<ul style="list-style-type: none"> Encroachment of alien invasive vegetation Rehabilitation will attempt to restore the land to the pre-prospecting condition. Indigenous vegetation will be established and monitored for 1 year following the conclusion of the drilling. This is a positive outcome should it be implemented correctly; and Increase and encroachment of alien invasive species due to the presence of disturbed areas. 	Fauna and Flora	Minor Negligible	Negligible Negative
	<ul style="list-style-type: none"> Soil could wash away into a drainage and/or water systems should backfilling and levelling not take place; The site will be compacted due to heavy machinery and personnel movement on-site, affecting land capability. 	Soils	Minor Negative	Negligible Negative
	<ul style="list-style-type: none"> Increased dust and soil erosion during the removal of equipment could lead to sedimentation of the surface water resources and wetlands; and The decommissioning of sumps could contaminate soils and impact on water quality. 	Surface Water	Minor Negative	Negligible Negative

TABLE OF CONTENTS

Part A	1
1 Introduction	2
2 Project Applicant	2
2.1 <i>Details of EAP</i>	3
2.2 <i>Expertise of the EAP</i>	4
2.2.1 The Qualifications of the EAP	4
2.2.2 Summary of the EAP's Experience	4
3 Location of the overall Activity	4
4 Locality map	7
5 Description of the scope of the proposed overall activity	9
5.1 <i>Listed and specified activities</i>	9
5.2 <i>Description of the activities to be undertaken</i>	9
5.3 <i>Prospecting Operations</i>	10
5.4 <i>Prospecting Infrastructure</i>	11
5.5 <i>Prospecting Process</i>	11
5.5.1 Permission to Drill.....	11
5.5.2 Drilling Process.....	12
5.5.3 Rehabilitation Process	12
6 Policy and legislative context.....	14
7 Need and desirability of the proposed activities	18
8 Motivation for the overall preferred site, activities and technology alternative	18
9 Full description of the process followed to reach the proposed preferred alternatives within the site	18
9.1 <i>Details of the development footprint alternatives considered</i>	18
9.1.1 Site Alternates	19
9.1.2 Technology Alternatives.....	19
9.1.3 No-Go Option	20
10 Details of the public participation process followed.....	20

10.1	<i>Public Participation Process Objectives</i>	21
10.1.1	Approach and Methodology for Public Participation	21
10.2	<i>Basic Assessment Phase</i>	23
10.2.1	Summary of Public Participation Activities Undertaken to Date.....	24
10.3	<i>Decision Making Phase</i>	25
11	The environmental attributes associated with the alternatives	26
11.1	<i>Baseline environment</i>	26
11.1.1	Climate Rainfall	26
11.1.2	Topography	26
11.1.3	Geology	28
11.1.4	Water Resources	28
11.1.5	Wetlands	28
11.1.6	Aquatic Ecology	29
11.1.7	Terrestrial Biodiversity	32
11.1.8	Flora	33
11.1.9	Fauna	34
11.1.10	Heritage.....	35
11.1.11	Socio-economic	43
11.2	<i>Description of the Current Land Uses</i>	44
11.3	<i>Environmental and Current Land Use Map</i>	44
12	Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts 45	
12.1	<i>Establishment Phase</i>	46
12.1.1	Social Nuisance Impacts.....	46
12.1.2	Soil, Land Use and Land Capability	47
12.1.3	Fauna and Flora	47
12.1.4	Surface Water and Wetlands	48
12.1.5	Groundwater.....	49
12.1.6	Heritage Resources	49
12.2	<i>Operational Phase</i>	50

12.2.1	Social Nuisance Impacts.....	50
12.2.2	Soils, Land Use and Land Capability	50
12.2.3	Fauna and Flora	51
12.2.4	Surface Water and Wetlands	52
12.2.5	Groundwater	53
12.2.6	Heritage Resources	53
12.3	<i>Decommissioning Phase</i>	<i>54</i>
12.3.1	Soils, Land Use and Land Capability	54
12.3.2	Fauna and Flora	55
12.3.3	Surface Water and Wetlands	55
12.3.4	Heritage Resources	56
13	Methodology used in determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks.....	57
13.1	<i>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</i>	<i>61</i>
13.1.1	Establishment Phase	61
13.1.2	Operational Phase	61
13.1.3	Decommissioning Phase	62
13.2	<i>The possible mitigation measures that could be applied and the level of risk..</i>	<i>62</i>
13.3	<i>Motivation where no alternative sites were considered</i>	<i>62</i>
13.4	<i>Statement motivating the alternative development location within the overall site</i>	<i>63</i>
14	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.....	63
15	Assessment of each identified potentially significant impact and risk.....	64
16	Summary of specialist reports	68
17	Environmental impact statement	70
17.1	<i>Summary if the key findings of the environmental impact assessment.....</i>	<i>70</i>
17.2	<i>Final Site Map</i>	<i>74</i>



17.3	<i>Summary of the positive and negative implications and risks of the proposed activity and identified alternatives</i>	74
18	Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR	74
19	Aspects for inclusion as conditions of authorisation	74
20	Description of any Assumptions, Uncertainties and Gaps in Knowledge	75
21	Reasoned opinion as to whether the proposed activity should or should not be authorised	76
21.1	<i>Reasons why the activity should be authorised or not</i>	76
21.2	<i>Conditions that must be included in the authorisation</i>	76
22	Period for which the environmental authorisation is required	76
23	Undertaking	76
24	Financial provision	76
24.1	<i>Explain how the aforesaid amount was derived</i>	77
24.2	<i>Confirm that this amount can be provided for from operating expenditure</i>	78
25	Specific Information required by the competent Authority	78
25.1	<i>Impact on the socio-economic conditions of any directly affected person</i>	78
25.2	<i>Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act</i>	78
26	Other matters required in terms of sections 24(4)(a) and (b) of the Act	78
Part B		1
1	Details of the EAP	2
2	Description of the aspects of the activity	2
3	Composite Map	2
4	Description of Impact management objectives including management statements	2
4.1	<i>Determination of closure objectives</i>	2
4.2	<i>Volumes and rate of water use required for the operation</i>	2
4.3	<i>Has a water use licence has been applied for</i>	3
5	Impacts to be mitigated in their respective phases	4
6	Impact management outcomes	8
7	Financial provision	14

7.1	<i>Determination of the amount of Financial Provision</i>	14
7.1.1	Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.....	14
7.1.2	Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties	14
7.1.3	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	14
7.1.4	Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives	16
7.1.5	Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline	16
7.1.6	Confirm that the financial provision will be provided as determined	17
8	Monitoring compliance with and performance assessment.....	17
8.1	<i>Monitoring of impact management actions</i>	17
8.2	<i>Monitoring and reporting frequency</i>	18
8.3	<i>Responsible persons</i>	18
8.4	<i>Time period for implementing impact management actions</i>	18
8.5	<i>Mechanism for monitoring compliance</i>	18
9	Indicate the frequency of the submission of the performance assessment/ environmental audit report.....	21
10	Environmental Awareness Plan.....	21
10.1	<i>Manner in which the Applicant Intends to Inform his or her Employees of any Environmental Risk which may result from their Work</i>	21
10.1.1	Awareness Training	21
10.1.2	Specific Environmental Training.....	21
10.1.3	Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment	23
11	Specific information required by the Competent Authority	23
12	Undertaking.....	23
13	References.....	24

LIST OF FIGURES

Figure 4-1: Project Location Setting	8
Figure 5-1: Location of Prospecting Boreholes.....	13
Figure 11-1: Elevation of the Project Area.....	27
Figure 11-2: Heritage Resources Identified within the Regional Study Area.....	36
Figure 11-3: Historical Layering showing the Project area in 1965	42

LIST OF TABLES

Table 2-1: Contact Details of the Applicant	3
Table 2-2: Contact Details of the EAP.....	3
Table 3-1 Property Details	4
Table 5-1: Listed and Specified Activities	9
Table 5-2: Minerals to be prospected	10
Table 6-1: Policy and Legislative Context.....	14
Table 10-1: Draft BAR Availability	24
Table 10-2: Public Participation Activities.....	24
Table 11-1: Wetland HGM Units of the Project Area	29
Table 11-2: PESEIS Information for the Considered Nyl River	30
Table 11-3: Expected Macroinvertebrate Taxa in the Nyl River.....	30
Table 11-4: Expected Fish Species in the Nyl River	31
Table 11-5: Archaeological Periods in South Africa.....	36
Table 11-6: Employment Status of the Populations within the Regional Project Area.....	43
Table 11-7: Summary of the Plans indicating the Environmental Features of the Project Site	44
Table 12-1: Project Activities Summary.....	45
Table 12-2: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Social Nuisance Impacts during the Establishments Phase.....	46
Table 12-3: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Establishment Phase.....	47

Table 12-4: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Establishment Phase.....	48
Table 12-5: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Establishment Phase	48
Table 12-6: Pre- Interactions and Impacts of Construction Phase Activities	49
Table 12-7: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Social Nuisances during the Operations Phase	50
Table 12-8: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Operational Phase.....	50
Table 12-9: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Operational Phase.....	51
Table 12-10: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Operational Phase	52
Table 12-11: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Groundwater during the Operational Phase	53
Table 12-12: Interactions and Impacts of Operational Phase Activities	54
Table 12-13: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Decommissioning Phase	54
Table 12-14: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Decommissioning Phase	55
Table 12-15: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Decommissioning Phase.....	56
Table 12-16: Interactions and Impacts of Decommissioning Phase Activities.....	56
Table 13-1: Impact Assessment Parameter Ratings	58
Table 13-2: Probability/ Consequence Matrix.....	59
Table 13-3: Significance Rating Description.....	60
Table 15-1: Assessment of Each Identified Impact.....	64
Table 16-1: Specialist Studies undertaken for the Project	68
Table 17-1: Summary of the Potential Impacts.....	71
Table 20-1: Assumptions and Limitations.....	75
Table 24-1: Summary of the initial closure costs	77
Table 5-1: Impacts to be Mitigated	4
Table 6-1: Outcomes and Objectives of the EMP	8

Table 7-1: Summary of Rehabilitation and Closure Actions per area.....	15
Table 7-2: Summary of the initial closure costs	17
Table 8-1: Monitoring and Management of Environmental Impacts.....	19
Table 10-1: Training Guidelines	22

LIST OF APPENDICES

- Appendix A: EAP CV
- Appendix B: Plans
- Appendix C: Public Participation Process
- Appendix D: Biodiversity Screening Assessment
- Appendix E: Heritage Basic Assessment Report
- Appendix F: Closure Plan and Environmental Risk Assessment
- Appendix G: Prospecting Right Application Approval

LIST OF PLANS

- Plan 1: Regional Setting
- Plan 2 : Local Setting
- Plan 3: Land Tenure Map
- Plan 4: Prospecting Borehole Map
- Plan 5: Topographic Map of the Project Area
- Plan 6: Geology of the Project Area
- Plan 7: Quaternary Catchment Management Areas and Water Courses
- Plan 8: Wetland Delineation
- Plan 9: Regional Vegetation
- Plan 10: Land Cover
- Plan 11: Composite Map

Draft Basic Assessment Report

Basic Assessment Report and Environmental Management Programme in support of PalRho Exploration Proprietary Limited Prospecting Right Application on the farm Moorddrift 289KR, Mokopane, Limpopo Province

PAL6882



DIGBY WELLS
ENVIRONMENTAL

Part A: Scope of Assessment and Basic Assessment Report

1 Introduction

PalRho Exploration Proprietary Limited (hereafter PalRho), a subsidiary of Ivanhoe Mines Ltd. wishes to undertake prospecting activities on the farm Moorddrift 289KR which is situated near the town of Mokopane within the Mogalakwena Local Municipality and the jurisdiction of the Waterberg District Municipality within the Limpopo Province. The Prospecting Right Application (PRA) was submitted to the Department of Mineral Resources and Energy (DMRE) on 7 May 2021 together with the Environmental Authorisation (EA) Application. A reference number of LP 30/5/1/1/2/14197 PR was issued to the application. An amendment to the EA was then submitted to the DMRE on 13 May 2021. The DMRE acknowledged receipt of the PRA and EA on 20 May 2021.

Prospecting activities will include both invasive and non-invasive methods. Non-invasive methods include data capturing of all relevant geological data, a geophysical survey which utilises digital data to confirm proposed drill locations and structures as well as analytical work of the samples taken. Invasive methods will include the core drilling (approximately ten holes) to ascertain the stratigraphy sequence and reef horizons of the ore body.

No permanent infrastructure will be constructed as part of the prospecting activities. Activities associated with the prospecting operations include the establishment of temporary access roads/tracks where existing roads cannot be used, the clearing of vegetation for the drill rig and the establishment of three sumps to separate and store oil, sludge and water. The sumps, access roads/tracks and prospecting site will be rehabilitated following the completion of the prospecting activities. The area to be impacted by each of these prospecting sites will be approximately 25m X 25m or 625m².

The proposed project triggers Listed Activities in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (GN R982 of 4 December 2014, as amended) (the “*EIA Regulations, 2014*”) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The project specifically triggers activities in Listing Notice 1 (GN R327 of 7 April 2017 as amended), thus requiring a Basic Assessment (BA) process to be undertaken. This process requires a comprehensive public consultation process.

2 Project Applicant

PalRho is the applicant for this application. The details of the applicant are presented in Table 2-1.

Table 2-1: Contact Details of the Applicant

Name of Applicant:	PalRho Exploration Proprietary Limited		
Registration number (if any):	2018/594378/07		
Trading name (if any):	PalRho Exploration		
Responsible person: (E.g. CEO, Director, etc.)	Sethe Patricia Makesha		
Contact person:	Sethe Patricia Makesha		
Physical address:	82 Maude Street, Sandown, Sandton, 2031		
Postal address:	P.O. Box 782078, Sandton, Gauteng		
Postal code:	2146	Cell phone:	079 138 5140
Telephone:	011 088 4300	Fax:	086 206 5276
Email:	patriciama@ivanplats.com		

2.1 Details of EAP

PalRho appointed Digby Wells Environmental (Digby Wells) as the Environmental Assessment Practitioner (EAP) to independently facilitate the environmental application process relevant to the proposed prospecting activities. The EAP's Curriculum Vitae (CV) is attached in Appendix A.

Table 2-2: Contact Details of the EAP

Name of EAP:	Claire Wannenburg		
Professional affiliation/registration:	EAPASA Registration No. 2019/1013		
Contact person: (if different from EAP)	Claire Wannenburg		
Company:	Digby Wells and Associates (South Africa) (Pty) Ltd		
Physical address:	Digby Wells House, 48 Grosvenor Road, Bryanston, Johannesburg, 2191		
Postal address:	Private Bag X10046, Randburg, South Africa		
Postal code:	2125	Cell phone:	082 852 8482
Telephone:	011 789 9495	Fax:	011 789 9498
Email:	claire.wannenburg@digbywells.com		

2.2 Expertise of the EAP

This section provides details regarding the EAP's qualifications and experience.

2.2.1 The Qualifications of the EAP

Claire Wannenburg holds the following qualifications:

- BSc Environmental Science – University of Pretoria, 2012; and
- BSc Honours (Environmental Analysis and Management) – University of Pretoria, 2013.

2.2.2 Summary of the EAP's Experience

Claire holds a Bachelor of Science (BSc) in Environmental Science (2010-2012) and has completed her BSc (Honours) in Environmental Management and Analysis (2013) from the University of Pretoria where she majored in Environmental Impact Assessment, Auditing and Environmental Law. Claire is a hard-working individual, a good team player and always strives to perform to the best of her abilities. She has eight years' experience and has managed various Environmental Audits and Water Use License Audits and has worked as an Environmental Control Officer. She has also managed high-profile Environmental Impact Assessments; Basic Assessments; Water Use License and Permitting Applications; Environmental Management Programme Amendments; Green Star Environmental Management Programmes and Mine Closure Projects.

She was awarded Golden Key International Membership which recognises the top 15% of students per field of study in any undergraduate and post-graduate degree. Claire is also ISO14001 certified as an internal lead auditor and is registered as an Environmental Assessment Practitioner (EAPASA Ref No. 2019/1013).

3 Location of the overall Activity

Table 3-1 below provides the property details associated with the activities under the application.

Table 3-1 Property Details

Farm Name:	The PRA relates to the following properties:	
	Farm Name	Farm Portion
	Moorddrift, 289KR	Remaining Extent (RE)
	Moorddrift, 289KR	1
	Moorddrift, 289KR	3
	Moorddrift, 289KR	4
	Moorddrift, 289KR	5

	Moorddrift, 289KR	6
	Moorddrift, 289KR	7
	Moorddrift, 289KR	8
	Moorddrift, 289KR	RE of 9
	Moorddrift, 289KR	RE of 10
	Moorddrift, 289KR	RE of 11
	Moorddrift, 289KR	12
	Moorddrift, 289KR	13
	Moorddrift, 289KR	RE of 16
	Moorddrift, 289KR	17
	Moorddrift, 289KR	18
	Moorddrift, 289KR	19
	Moorddrift, 289KR	26
	Moorddrift, 289KR	27
	Moorddrift, 289KR	30
	Moorddrift, 289KR	31
	Moorddrift, 289KR	32
	Moorddrift, 289KR	33
	Moorddrift, 289KR	34
	Moorddrift, 289KR	35
	Moorddrift, 289KR	36
	Moorddrift, 289KR	37
	Moorddrift, 289KR	40
	Moorddrift, 289KR	45
	Moorddrift, 289KR	50
	Moorddrift, 289KR	51
	Moorddrift, 289KR	53
Application Area (Ha):	1782.8 ha	
Magisterial District:	The Moorddrift, 289KR farm is located in the Limpopo Province and falls under the Mokopane Magisterial District.	

Distance and direction from nearest town:	The Moorddrift, 289KR Prospecting Right area is located approximately 10 km southwest of the town of Mokopane in the Limpopo Province		
21 digit Surveyor General Code for each farm portion:	Farm	Portion	21 Digit Code
	Moorddrift, 289KR	RE	T0KR00000000028900000
	Moorddrift, 289KR	1	T0KR00000000028900001
	Moorddrift, 289KR	3	T0KR00000000028900003
	Moorddrift, 289KR	4	T0KR00000000028900004
	Moorddrift, 289KR	5	T0KR00000000028900005
	Moorddrift, 289KR	6	T0KR00000000028900006
	Moorddrift, 289KR	7	T0KR00000000028900007
	Moorddrift, 289KR	8	T0KR00000000028900008
	Moorddrift, 289KR	RE of 9	T0KR00000000028900009
	Moorddrift, 289KR	RE of 10	T0KR00000000028900010
	Moorddrift, 289KR	RE of 11	T0KR00000000028900011
	Moorddrift, 289KR	12	T0KR00000000028900012
	Moorddrift, 289KR	13	T0KR00000000028900013
	Moorddrift, 289KR	RE of 16	T0KR00000000028900016
	Moorddrift, 289KR	17	T0KR00000000028900017
	Moorddrift, 289KR	18	T0KR00000000028900018
	Moorddrift, 289KR	19	T0KR00000000028900019
	Moorddrift, 289KR	26	T0KR00000000028900026
	Moorddrift, 289KR	27	T0KR00000000028900027
	Moorddrift, 289KR	30	T0KR00000000028900030
Moorddrift, 289KR	31	T0KR00000000028900031	
Moorddrift, 289KR	32	T0KR00000000028900032	
Moorddrift, 289KR	33	T0KR00000000028900033	
Moorddrift, 289KR	34	T0KR00000000028900034	
Moorddrift, 289KR	35	T0KR00000000028900035	
Moorddrift, 289KR	36	T0KR00000000028900036	
Moorddrift, 289KR	37	T0KR00000000028900037	
Moorddrift, 289KR	40	T0KR00000000028900040	

	Moorddrift, 289KR	45	T0KR00000000028900045
	Moorddrift, 289KR	50	T0KR00000000028900050
	Moorddrift, 289KR	51	T0KR00000000028900051
	Moorddrift, 289KR	53	T0KR00000000028900053

4 Locality map

The proposed prospecting site is located 10 kilometres southwest of the town of Mokopane in the Limpopo Province. Plan 1 provides the regional setting for the project area included in Appendix B. Plan 2 in Appendix B and Figure 4-1 below presents the local setting and local and district municipalities for the project area.

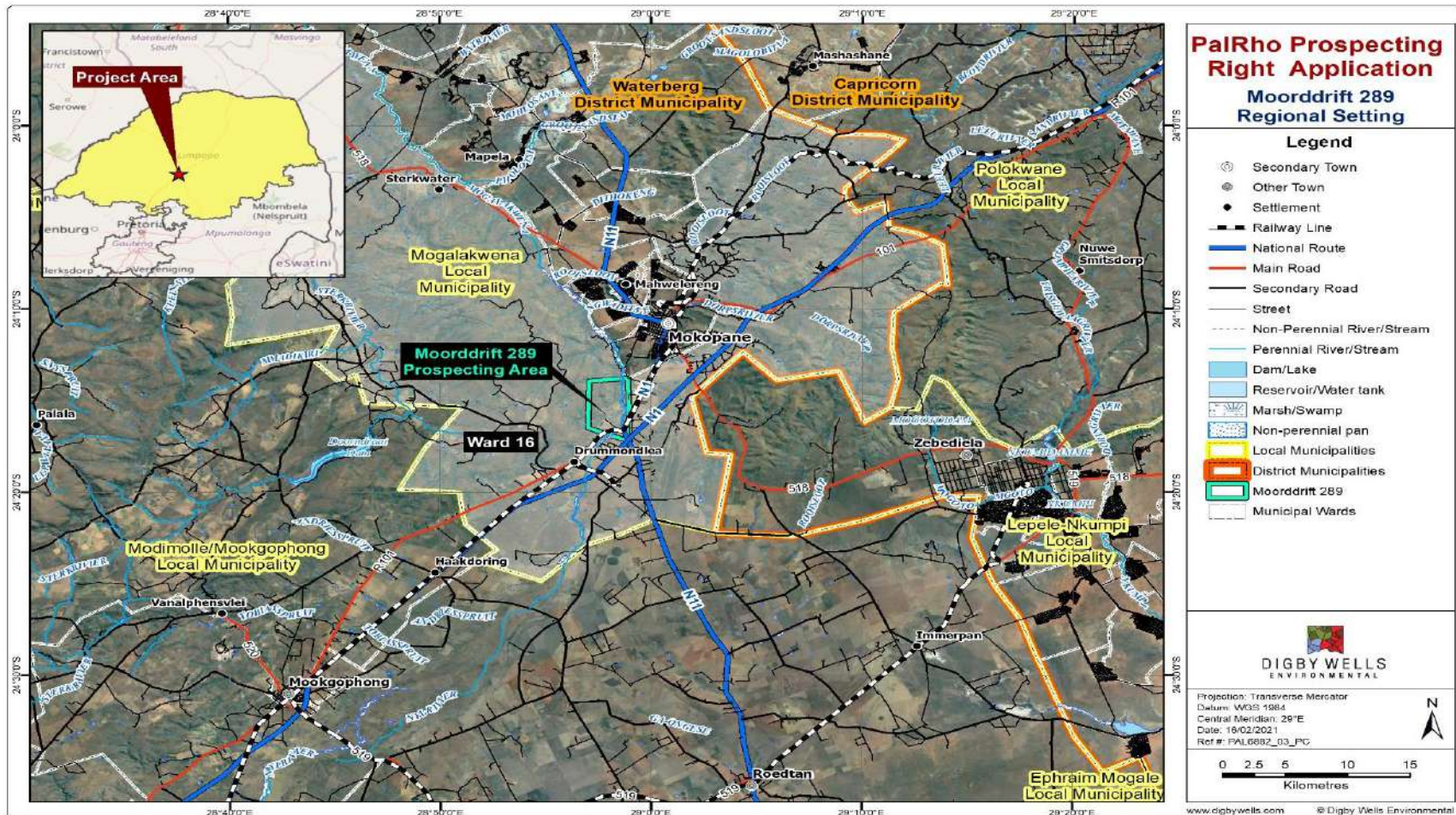


Figure 4-1: Project Location Setting

5 Description of the scope of the proposed overall activity

5.1 Listed and specified activities

Table 5-1 provides the identified Listed Activities as provided by the NEMA EIA Regulations 2014 (as amended). As indicated in the table below, only listed activities included in GN R.327 of April 2017 as amended will be triggered and therefore a BA process must be undertaken, and approval received prior to the activities being commenced with.

Table 5-1: Listed and Specified Activities

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
Establishment of access road /tracks	Estimated dimensions (3m X 2.2km)	Not Listed	N/A
Clearance of vegetation	More than 1ha, but less than 10ha, for all prospecting boreholes including associated infrastructure	X- Activity 27	GN R 983 (as amended)
Establishment of prospecting infrastructure including sumps etc.	Depending on the prospecting site (maximum 9ha for all prospecting boreholes including associated infrastructure)	X – Activity 20 (Associated Prospecting Infrastructure)	GN R 983 (as amended)
Drilling of prospecting boreholes	Depending on the prospecting site (maximum 9ha for all prospecting boreholes including associated infrastructure)	X – Activity 20 (Prospecting Activities)	GN R 983 (as amended)
Decommission of the drill sites and associated infrastructure.	Depending on the prospecting site (maximum 9ha for all prospecting boreholes including associated infrastructure)	X – Activity 22	GN R 983 (as amended)
Relocation of protected species if encountered	Depending on the prospecting site (maximum 9ha for all prospecting boreholes	X – Activity 30	GN R 983 (as amended)

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
	including associated infrastructure)		

5.2 Description of the activities to be undertaken

PalRho have submitted a Prospecting Right Application to conduct prospecting activities on the farm Moorddrift 289KR. A list of minerals which PalRho proposes to prospect is presented in Table 5-2.

Table 5-2: Minerals to prospect

Code	Mineral	Type
Au	Gold	Precious metals
Co	Cobalt	Ferrous & base metals
PGM	Platinum Group Metals	Platinum Group Minerals
Cu	Copper Ore	Ferrous & base metals
Ni	Nickel	Ferrous & base metals
Cr	Chrome Ore	Ferrous & base metals
F	Flurspar	Industrial minerals
Sn	Tin Ore	Ferrous & base metals
N/A	Rare Earth Metals	Industrial minerals

The project is located within an area dominated by sediments of the Transvaal Supergroup and intrusive rocks of the Bushveld Complex, namely the Northern Limb of the Bushveld Complex.

5.3 Prospecting Operations

Prospecting activities will include both invasive and non-invasive methods. Non-invasive methods include data capturing of all relevant geological data, a geophysical survey which utilises digital data to confirm proposed drill locations and structures as well as analytical work of the samples taken. Invasive methods will include the core drilling (approximately ten holes) to ascertain the stratigraphy sequence and reef horizons of the ore body. These proposed locations are shown in Figure 5-1 and Plan 4 in Appendix B. It should however be noted that these boreholes are estimated locations and changes to the actual locations of boreholes may change based on information available at the time of prospecting.

5.4 Prospecting Infrastructure

No permanent infrastructure will be constructed as part of the prospecting activities. Activities associated with the prospecting operations include:

- The establishment of temporary access route/tracks, which will make use of the shortest distance from an existing road;
- Ablution facilities;
- The clearing of vegetation for the drill rig;
- The establishment of three lined sumps / trenches to separate and store oil, sludge and water per drill site; and
- Rehabilitation following the prospecting activities.

5.5 Prospecting Process

Should the Prospecting Right be granted, the following steps will be undertaken in line with the Prospecting Work Programme, including drilling activities:

- Permission to Drill;
- Drilling Process; and
- Rehabilitation Process.

5.5.1 Permission to Drill

A borehole drilling plan is first compiled by the project appointed geologist. Once completed, a stakeholder engagement process is followed by which the landowners and/or lawful occupiers are informed of the project. A lead negotiator is then appointed to negotiate with the relevant landowners and/or lawful occupiers to obtain signed agreements to drill the boreholes in respect of their respective portions. Water utilised to drill the boreholes will be sourced locally from the landowners and/or lawful occupiers which will be agreed upon as part of the negotiations.

Once signed, the landowners and/or lawful occupiers will be permitted to accompany the drilling contractor to the site where drilling has been proposed. The locations of the drill sites are dependent on the environmental and heritage sensitivities of the prospecting area. Once the parties have agreed on the location of the borehole, the drill contractor will complete a risk assessment prior to undertaking any drilling activities and determine suitable mitigation measures to minimise environmental damage and to avoid areas of sensitivity. Additionally, where possible, large trees will be avoided and minimal vegetation removed. Buffer zones around wetlands and riparian areas will be maintained.

5.5.2 Drilling Process

Once all approvals have been obtained, a ground or airborne geophysics survey will be conducted to determine where the boreholes will be drilled. Following confirmation of the drill site vegetation will be cleared and the drill site constructed.

Existing farm roads are utilised where possible. Should new roads be required, these roads are firstly discussed with the landowners and incorporated within the signed agreement. Based on discussions with the landowners, these roads are usually left for communities to use once the prospecting boreholes have been drilled. Should the roads not be required, they will be left to naturally revegetate. If no vegetation is established within three months after rehabilitation then re-seeding needs to be completed.

During the drill process, waste is kept to a minimum and spillages are cleaned up should they occur. All waste is segregated and removed off site when waste bins are full. All hazardous waste will be removed by a hazardous waste collector, while general waste is disposed of at a municipal landfill site.

5.5.3 Rehabilitation Process

Once the boreholes have been drilled and the core samples are taken, the boreholes will be capped and marked in the event that PalRho wishes to access the boreholes again. All infrastructure is then removed. The prospecting areas are backfilled, taking care not to allow compaction of the soil. The vegetation is then allowed to naturally re-establish itself and blend into the original landscape. The rehabilitation of the site will be monitored by PalRho and the site will be vegetated with indigenous vegetation, if necessary.

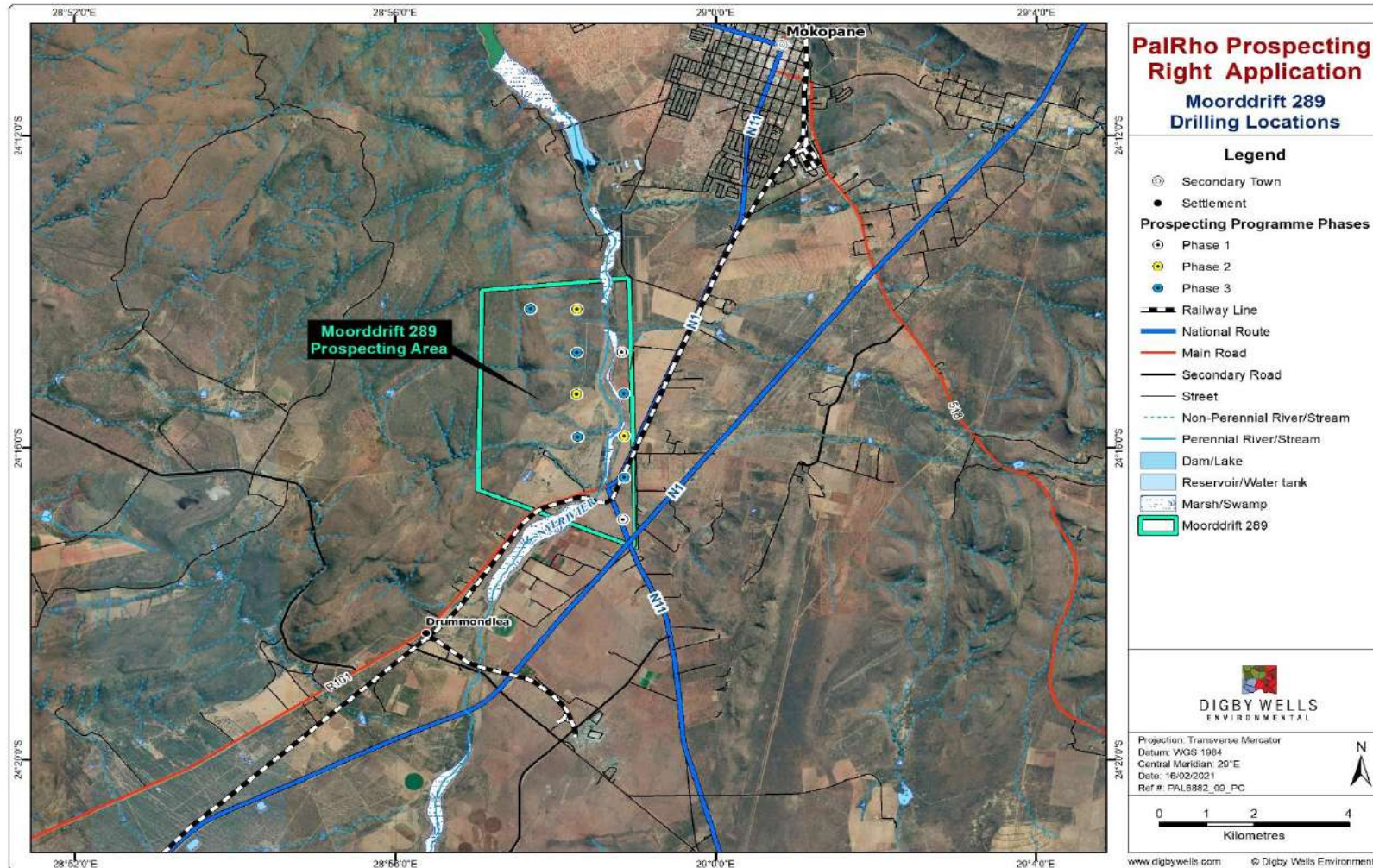


Figure 5-1: Location of Prospecting Boreholes

6 Policy and legislative context

This section describes the policy and legislative context which applies to the proposed prospecting activities. This section has been divided into national and provincial legislation and policies, plans, guidelines and development planning frameworks and tools. Table 6-1 describes of the national legislation, regulations and guidelines that are applicable to the proposed prospecting activities.

Table 6-1: Policy and Legislative Context

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the policy and legislative context?
<p><u>Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)</u></p> <p>Under Section 24 of the Constitution of the Republic of South Africa, 1996 (the Constitution) it is clearly stated that:</p> <p><i>Everyone has the right to</i></p> <p><i>(a) an environment that is not harmful to their health or well-being; and</i></p> <p><i>(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -</i></p> <p><i>(i) Prevent pollution and ecological degradation;</i></p> <p><i>(ii) Promote conservation; and</i></p> <p><i>(iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</i></p>	<p>Digby Wells is undertaking a BAR process to identify and determine the potential impacts associated with the proposed Project. Mitigation measures will aim to ensure that the potential impacts are managed to acceptable levels to support the rights as enshrined in the Constitution.</p>	<p>The environmental management objectives of the Project are to protect ecologically sensitive areas and to support sustainable development, whilst promoting justifiable socio-economic development.</p>
<p><u>Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)</u></p> <p>The MPRDA sets out the requirements relating to the development of the nation's mineral and petroleum resources. It also aims to ensure the promotion of economic and social development through exploration and mining related activities. The MPRDA requires that mining companies assess the socio-economic impacts of their activities from start to closure and beyond. Companies must develop and implement a comprehensive Social and Labour Plan (SLP) to promote socio-economic development in their host communities and to prevent or lessen negative social impacts.</p> <p>In terms of the provisions of Section 16 and 17 of the MPRDA, a Prospecting Right Application must be accepted provided the operation does not result in unacceptable pollution or damage to the environment. The applicant must submit an EMP to the DMRE and consult with I&APs for comment regarding the Project.</p>	<p>In terms of Section 16 (3)(b) of the EIA Regulation, 2014 (as amended), any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority. This Report has been compiled as per the requirements of the DMRE</p>	<p>PalRho wish to undertake prospecting activities and are thus applying for an EA to authorise new Listed Activities as per NEMA. The NEMA EA application and PRA were submitted to the DMRE on 13 May 2021.</p> <p>The Basic Assessment Report (BAR) is compiled to meet the requirements of the MPRDA read with the EIA Regulations, 2014 (as amended). Financial Provisioning and Closure Costs are included in the BAR Report</p>
<p><u>National Environmental Management Act, 1998 (Act No. 107 of 1998)</u></p> <p>The National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA), as amended was set in place in accordance with section 24 of the Constitution of the Republic of South Africa. Certain environmental principles under NEMA have to be adhered to, to inform decision making for issues affecting the environment. Section 24 (1)(a) and (b) of NEMA state that:</p> <p><i>The potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.</i></p> <p>The EIA Regulations, Government Notice (GN) Regulation (R) 982 were published on 04 December 2014 and promulgated on 08 December 2014 together with the Listing Notices. The regulations were subsequently amended by GNR 327 published on 7 April 2017. The following regulations were amended: GN R326, (EIA Regulations) GN R 327 (Listing Notice 1); GN R325 (Listing Notice 2) and GN R324 (Listing Notice 3) of 7 April 2017. These regulations have again been amended and thus referred to as GNR 327 (as amended)</p>	<p>The prospecting right project proposed by PalRho triggers listed activities in accordance with the EIA regulations, 2014 (as amended). The listed activities have been included in Table 5-1.</p>	<p>This BAR has been compiled in accordance with the requirements of the NEMA EIA Regulations, 2014 (as amended), with the environmental management objective to protect ecologically sensitive areas.</p>

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the policy and legislative context?
<p><u>National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)</u></p> <p>The NHRA is the overarching legislation that protects and regulates the management of heritage resources in South Africa, with specific reference to the following Sections:</p> <ul style="list-style-type: none"> • 5. General principles for HRM • 6. Principles for management of heritage resources • 7. Heritage assessment criteria and grading • 38. Heritage resources management <p>The Act requires that Heritage Resources Authorities (HRAs), be notified as early as possible of any developments that may exceed certain minimum thresholds in terms of Section 38(1), or when assessments of impacts on heritage resources are required by other legislation in terms of Section 38(8) of the Act.</p>	<p>The Heritage Basic Assessment Report (HBAR) have been compiled in accordance with Sections 38(3) and 38(8) of the NHRA and the South African Heritage Resources Agency (SAHRA) Minimum Standards for Heritage Impact Assessments (2012).</p>	<p>The HIA report has been compiled to comply with Section 5, 38(3), (4) and (8) of the NHRA. The report was submitted to the responsible HRAs, which in this instance is SAHRA and Limpopo Provincial Heritage Resources Authority (LIHRA).</p>
<p><u>National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA)</u></p> <p>According to the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA) the Department of Environmental Affairs (DEA), the provincial environmental departments and local authorities (district and local municipalities) are separately and jointly responsible for the implementation and enforcement of various aspects of NEM: AQA. A fundamental aspect of the new approach to the air quality regulation, as reflected in the NEM: AQA is the establishment of National Ambient Air Quality Standards (NAAQS). These standards provide the goals for air quality management plans and also provide the benchmark by which the effectiveness of these management plans is measured.</p> <p><u>National Dust Control Regulation 2013</u></p> <p>The Minister of Water and Environmental Affairs, released on the 01 November 2013 the National Dust Control Regulation, in terms of Section 53, read with Section 32 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA). In the published National Dust Control Regulations, terms like target, action and alert thresholds were omitted. Another notable observation was the reduction of the permissible frequency of exceedance from three to two incidences within a year. The standard actually adopted a more stringent approach than previously and would require dedicated mitigation plans now that it is in force.</p>	<p>Air Quality and dust generation has been considered for the proposed project. The activities proposed to take place do not trigger any air quality activities and consequently an Atmospheric Emissions Licence (AEL) is not required. The provisions of the act and associated regulations were considered as part of the project</p>	<p>The mitigation and management measures implemented as part of the proposed project aim to manage and prevent potential impacts to air quality. The mitigation measures comply with the NEM: AQA, as referred to in Part B Section 5.</p>
<p><u>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA)</u></p> <p>The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM: BA) regulates the management and conservation of the biodiversity of South Africa within the framework provided under NEMA. This Act also regulates the protection of species and ecosystems that require national protection and also takes into account the management of alien and invasive species. This Act works in accordance to the framework set under NEMA. The following regulations which have been promulgated in terms of the NEM:BA are also of relevance:</p> <ul style="list-style-type: none"> • Alien and Invasive Species Lists, 2014 published (GN R.599 in GG 37886 of 1 August 2014); • National Environmental Management: Biodiversity Act, 2004: Threatened and Protected Species Regulations; and • National list of Ecosystems Threatened and in need of Protection under Section 52(1) (a) of the Biodiversity Act (GG 34809, GN R.1002, 9 December 2011). 	<p>As part of this prospecting activities, flora, fauna, wetlands and aquatic have been investigated to determine the current status of the environment and to determine any potential ecological sensitivity to be avoided and/or mitigated. There are currently no applications submitted in terms of NEM:BA for the proposed project.</p>	<p>The mitigation and management measures implemented as part of the proposed project aim to manage and conserve biological diversity, as well as to minimise the spread of alien invasive species.</p>

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the policy and legislative context?
<p><u>Environmental Conservation Act, 1989 (Act No. 73 of 1989) (ECA)</u></p> <p>ECA makes provision for guidelines pertaining to noise control and measurements. The regulations make reference to the use of the South African National Standards 10103:2008 (SANS) guidelines for the Measurement and Rating of Environmental Noise with Respect to Land Use, Health, and Annoyance and to Speech Communication.</p>	<p>The prospecting activities may result in the generation of noise and thus PalRho must ensure compliance with this act.</p>	<p>Mitigation measures have been included for the potential impacts due to the generation of noise. The mitigation measures comply with the ECA.</p>
<p><u>National Noise Control Regulations, R.154 of 1992 (the Noise Regulations) promulgated in terms of Section 25 of the Environmental Conservation Act, 1989 (Act 73 of 1989)</u></p> <p>The National Noise-Control Regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) (NCRs) form part of the Environmental Conservation Act and these Regulations apply to external noise.</p> <p>The NCRs differentiates between Disturbing Noise levels (which is objective and scientifically measurable which are generally compared to existing ambient noise level) and Noise Nuisance (which is a subjective measure and is defined as noise that “<i>disturbs or impairs or may disturb or impair the convenience or peace of any person</i>”).</p> <p>Local Authorities use Controlled Areas to identify areas with high noise levels. Restrictions have been set out for development that occurs in these Controlled Areas. These regulations make provision for guidelines pertaining to noise control and measurements. The regulations make reference to the use of the South African National Standards 10103:2008 (SANS) guidelines for the Measurement and Rating of Environmental Noise with Respect to Land Use, Health, and Annoyance and to Speech Communication.</p> <p>As such, a Noise Impact Assessment in accordance with the NCRs must be undertaken for submission to determine the potential disturbing and nuisance noise levels associated with a particular development.</p>	<p>The prospecting activities may result in the generation of noise and thus PalRho must ensure compliance with this act.</p>	<p>Mitigation measures have been included for the potential impacts due to the generation of noise. The mitigation measures comply with the noise regulations.</p>
<p><u>National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)</u></p> <p>On 29 November 2013, the list of waste management activities published under GN R718 of 3 July 2009 (GN R718) was repealed and replaced with a new list of waste management activities under GN R921 of 29 November 2013. Included in the new list are activities listed under Category A, B and C. These activities include inter alia the following:</p> <p><u>Category A</u> describes waste management activities requiring a Basic Assessment process to be carried out in accordance with the EIA Regulations supporting an application for a waste management licence;</p> <p><u>Category B</u> describes waste management activities requiring an Environmental Impact Assessment process to be conducted in accordance with the EIA Regulations supporting a waste management licence application; and</p> <p><u>Category C</u> describes waste management activities that do not require a WML but these activities will have to comply with the prescribed requirements and standards as prescribed by the Minister, which includes the Norms and Standards for Storage of Waste, 2013. These activities include the storage of general waste at a facility with a capacity to store in excess of 100 m³ and storage of hazardous waste in excess of 80 m³.</p> <p>The Waste Classification and Management Regulations published under GN R 634 of November 2013 require that all wastes be classified according to SANS10234 and managed according to its classification.</p>	<p>The proposed project does not require a Waste Management Licence (WML), however, the norms and standards for waste management under the Act will be observed.</p>	<p>Mitigation measures for the effective management of waste to prevent the possibility of pollution or contamination to the area have been included. All domestic waste will be removed by the Municipality while any hazardous waste generated will be removed off site by a registered hazardous waste contractor for disposal at a hazardous waste landfill site.</p>
<p><u>Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)</u></p> <p>CARA aims to provide for the conservation of the natural agricultural resources of the country through the maintenance of the production potential of land, by combatting and preventing erosion and the weakening of water sources. In addition, this Act aims to protect vegetation, while combatting weeds and invader plants</p>	<p>As part of this prospecting project, flora, fauna, wetlands and aquatic have been investigated to determine the current status of the environment and to determine any potential ecological sensitivity to be avoided and/or mitigated.</p>	<p>Section 12 of the CARA details the maintenance of soil conservation in which every land user will be responsible for the maintenance and conservation of soil. The mitigation measures recommended as part of this BAR aim to prevent the compaction, erosion and degradation of the soil resources.</p>

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the policy and legislative context?
<p><u>GN R 1147 (Financial Provisioning Regulations), 2015</u></p> <p>The Financial Provisioning Regulations prescribe methods for determining the quantum of financial provision for rehabilitation and mechanisms for providing for it. Section 41 (1) of the MPRDA has been repealed and Section 24P of the NEMA, as amended, which provides that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision must guarantee the availability of sufficient funds.</p>	<p>Regulation 11 of the Financial Provisioning Regulations, 2015 requires a holder of a mining right to determine the quantum of the financial provision through detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for:</p> <ul style="list-style-type: none"> • Annual rehabilitation as reflected in the Annual Rehabilitation Plan (ARP) as per the minimum content prescribed by Appendix 3 of the Regulations (not compiled yet as no rehabilitation activities are planned for the next 12 months); • Final rehabilitation, decommissioning and closure as reflected in a Closure Plan as per the minimum content prescribed by Appendix 4 of the Regulations (Part A of this report); and • The remediation of latent or residual environmental impacts including but not limited to the pumping and treatment of polluted or extraneous water, as reflected in an ERR, as per the requirements of Appendix 5 of the Regulations 	<p>The Financial Provisioning Regulations apply to rehabilitation and closure plans as they prescribe the minimum content of an annual rehabilitation plan and the minimum content of a final rehabilitation, decommissioning and mine closure plan.</p> <p>The financial provision has been assessed and included in Part A Section 24.</p>
<p><u>National Water Act, 1998 (Act No. 36 of 1998) (NWA)</u></p> <p>The NWA provides for the sustainable and equitable use and protection of water resources. It is founded on the principle that the National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, and that a person can only be entitled to use water if the use is permissible under the NWA.</p>	<p>A water use licence has not been applied for as the site-specific borehole locations have not yet been determined. A water authorisation will need to be applied for if any water uses are triggered in terms of Section 21 of the NWA. Depending on the risk assessment, if a low risk is identified a General Authorisation application can be applied for.</p>	<p>Mitigation measures for the effective management of water are included to prevent any impact to water resources identified outside of the prospecting area.</p>

7 Need and desirability of the proposed activities

Mining is a significant contributor to the economic development of South Africa. Platinum Group Metals (PGMs) are needed for advancing durable growth and developing green technologies required for a low-carbon future. PGMs are seen globally as critical components to reduce harmful emissions from gasoline and diesel-powered engines and to develop green hydrogen-powered technology. The establishment of a mine would result in significant tax contributions towards the country, as well as potential royalties paid which will benefit receiving communities. In addition, employment opportunities are likely to be provided should a new mine be established which will improve the socio-economic profile of the region.

Before any mining activities can take place and in terms of designated legislation, prospecting activities are undertaken to inquire about the geology and grade of an area. Once the relative resource becomes known during this process, the feasibility of a prospective mine will be undertaken. Several auxiliary benefits such as employment, tax benefits and royalties may come about as a result of future mining activities. Sustainable development serves the interests of the public whilst maintaining the integrity of national policies and legislation.

Allowing PalRho the opportunity to prospect the area and to determine the geology would in turn allow progress with further potential mining activities. Additionally, for an environmental perspective minimal impact is anticipated to occur so long as the mitigation measures are implemented correctly and all sensitive environments are avoid where possible.

8 Motivation for the overall preferred site, activities and technology alternative

The extent of the proposed prospecting area is 5ha. The proposed prospecting site is expected to have minimal impacts on the environment due to the expected extent of the disturbed site. The location of the prospecting site will be determined through non-invasive prospecting methods. As a result of the above, there will be limited alternatives available for consideration. Sensitive environments have been identified as part of the baseline description and mitigation measures have been provided for potential nuisance impacts to surrounding receptors. The prospecting sites will avoid all wetlands and watercourses, as well as implementing the stipulated buffer zones.

9 Full description of the process followed to reach the proposed preferred alternatives within the site

9.1 Details of the development footprint alternatives considered

Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives aid in identifying the most appropriate method of developing the Project, taking into account location or site alternatives, activity alternatives, technology alternatives,

as well as the no-go project alternative. Alternatives also aid in determining the activity with the least environmental impact.

9.1.1 Site Alternates

The location of the prospecting activities is determined by the location of the resource. A mobile drill rig utilises rotary or diamond core drilling which will be used and requires water and biodegradable lubricants to drill the boreholes. Access routes and roads will be required to transport the mobile drill rig to the sites, resulting in additional potential impacts. The mobile drill rig can drill to great depths and requires a site of approximately 25m X 25m.

9.1.2 Technology Alternatives

The possible technology alternatives include drill rig types, as well as alternative methods for prospecting. The following technology alternatives have been considered.

9.1.2.1 Prospecting Method

9.1.2.1.1 Option 1: Borehole Drilling utilising Drill Rig

Drill rigs are utilised to drill boreholes to extract the core to determine the presence of materials that can be economically mined. The use of a drill rig is more effective as the drill is able to reach extensive depth which a trenching method would be unable to reach. Additionally, the impact to the area would be reduced as only a small area of vegetation would need to be cleared to utilise the drill rig. No topsoil or significance disturbance is anticipated. This option is most preferable.

9.1.2.1.2 Option 2: Excavation Exploration

The digging of trenches was investigated as an additional prospecting method. Trenches are excavations of 10 m by 15 m and approximately 1.5 m in depth. The trenches provide a greater quantity of material for analysis; however, they require much larger footprint areas to be disturbed and do not reach the required depths. Trenches will also result in a depression in the prospecting area following rehabilitation as the area will not be backfilled to its original, pre-prospecting state. This is the least preferred option.

9.1.2.2 Drill Rig Technology

The technology alternative that can be considered is the use of compressed air drill rigs vs hydraulic pressure drill rigs.

9.1.2.2.1 Compressed Air Core Drilling

A compressed air drill rig utilises compressed air to drill the borehole. The technology can be used when there is no need to support the walls of the borehole. The pressure and flow of the drilling fluid at, and immediately behind, the drilling bit effectively flushes the drilled material away from the bit and also prevents the borehole from collapsing, further back from this the

hydrostatic head of the drilling fluid ensures the stability of the hole and its viscosity must be such as to allow the transport to the surface of the drilled material. This alternative does not utilise water and therefore will reduce the potential for discharge of dirty water to the environment and assist in water conservation. It is however noted that biodegradable hydraulic fluid is still utilised and there is still a potential for contamination however it is reduced. The use of this method does result in an increase in dust generation as air rather than water is utilised to construct the borehole. The use of this method allows the depth for the borehole to range from 0 up to 600 m with an optimal borehole diameter from 152 mm up to 375 mm. The use of this technology is beneficial when soils are cohesive or soils with high compressive resistance. In loose soils casings may have to be used to accompany the tool advancement. This alternative can be considered and a decision on the final method used will be determined should the prospecting right be approved.

9.1.2.2 Hydraulic Pressure Core Drilling

Hydraulic pressure core drilling utilises water to drill the borehole as opposed to compressed air. This method helps reduce dust generation but will result in the need for water containment as dirty water is generated during the drilling process, it is however anticipated that biodegradable fluids will be utilised. The drilling process is still able to extract the drill core to be utilised for analysis of the geology composition. This alternative can be considered and a decision on the final method used will be determined should the prospecting right be approved.

9.1.3 No-Go Option

The No-go option would result in the resources remaining un-investigated and therefore unknown. Therefore, no anticipated environmental impact would occur as the prospecting activities would not take place.

10 Details of the public participation process followed

The Public Participation Process (PPP) was developed to ensure compliance with environmental regulatory requirements and to provide Interested and Affected Parties (I&APs) with an opportunity to evaluate the proposed Project. During this process stakeholders can provide inputs and to receive feedback from the environmental specialists and/or proponent.

During the PPP, the following core activities were undertaken:

- Identification of the stakeholders and creation of a stakeholder database;
- Development and distribution of PPP material;
- Stakeholder communication and consultation; and
- Recording and responding to suggestions and concerns raised during these meetings and the comment period.

A phased-consultative approach has been adopted to carry-out the PPP activities as a legislative requirement in terms of Chapter 6 of the EIA regulations, 2014 (as amended) in

accordance with Section 24(5) and 44 of the NEMA. The phased-consultative approach includes the following, namely:

- Phase 1-Application and Submission of Stakeholder Engagement Plan
- Phase 2-Announcement phase
- Phase 3-Consultation phase; and
- Phase 4- Decision making phase by the DMRE.

Phase 1 and 2 have been completed. The project is currently in Phase 3 of the PPP phase. The last phase of the process is the decision-making phase in which the DMRE will issue a decision on the outcome of the application which will be completed after the 30-day public review period.

10.1 Public Participation Process Objectives

The objectives of the Announcement phase and Consultation Phase is and will be to:

- Provide information and the environmental-legal process followed for the proposed project;
- Identify and register I&APs;
- Provide I&APs with an opportunity to comment on the proposed project;
- Utilise local knowledge to identify and record material environmental and social issues and concerns associated with the proposed project;
- Consult with registered I&APs who are impacted by the proposed project; and
- Record all issues and comments for inclusion into the Draft and Final BAR.

10.1.1 Approach and Methodology for Public Participation

The methodology undertaken and implemented for the PPP is briefly outlined below:

10.1.1.1 Compilation of Stakeholder Database

The following steps were followed before to placement of sites notices:

- Existing information was received from the Applicant with regards to the directly affected farm portions;
- Digby Wells conducted windeed searches to verify the ownership of the directly affected farm portions and a land tenure plan was compiled; and
- A Public Participation Plan was developed and submitted to DMRE detailing the approach and activities to be undertaken with stakeholders.

As part of the Public Participation Process, the following information material was compiled:

- Notification Letter;

- Background Information Document;
- Site Notice; and
- Newspaper Advertisement.

A site visit was conducted to place site notices in and around the project, the locations of these site notices was chosen based on the rate at which the place is frequented. The following activities were then carried out after placement of site notices:

- Information about outstanding property ownership was gathered;
- Additional stakeholders were identified when the site notices were placed in the surrounding areas;
- Government officials were identified through the internet and verified telephonically; and
- Additional stakeholders were identified after the Draft BAR was made public, the stakeholders requested to be added as I&APs and a consolidated database was then compiled with all the I&APs.

10.1.1.2 Public Participation Communication Channels

The legislative requirements indicate that specific materials and communication tools be utilised as part of the PPP to identify, inform and engage with I&APs as outlined below:

Digby Wells developed and submitted a Public Participation Plan in terms of the Covid-19 Regulations (GN R 650 of 5 June 2020) to the Limpopo DMRE. The Public Participation Plan outlined measures and actions to be adopted during the project stakeholder consultations especially in case of Focus Group Meetings. This was submitted to the relevant DMRE Case Officer on 26 May 2021.

- **Background Information Document (BID):** BIDs with Comment and Registration Form (CRF) were emailed to stakeholders on **2 July 2021**. The BID entailed a project description, geographic location of the project, legislative processes, and requirements the stakeholder engagement and registration processes as well as contact details of the Digby Wells Stakeholder Engagement Office. A CRF was attached to the BID and provided for stakeholders to use for registration as I&APs or to submit comments. The BID was available in English and Sepedi. Information regarding the availability of the Draft BAR was also provided;
- **Newspaper advertisement:** Two newspaper advertisements in Sepedi and English were placed in the **Seipone Madireng (Sepedi)** on **24 June 2021** and **Bosveld Local Newspaper (English)** on **2 July 2021**. The advertisements included a brief project description, legal framework, the competent authorities, details of the appointed EAP, and the registration process for I&APs;

- **Announcement Letter:** A letter was sent via email in English which contained information about the proposed project, applicable legislation, details of the environmental process and information about the availability of the Draft BAR for public comment was emailed to stakeholders on the database on **2 July 2021**;
- **Site notices:** Site notices in both Sepedi and English were erected at various places on **2 July 2021** which contained a brief project description, legal framework, the competent authorities and details of the EAP as well as the registration process for I&APs;
- **SMS:** An SMS was sent to registered I&APs on **2 July 2021** to announce the availability of the Draft BAR for public comment; and
- **Virtual Meetings:** In compliance with the COVID-19 national regulations and associated restrictions, adjusted alert level 4, no gatherings are permitted. However, an online meeting will be held with representative community members, directly and indirectly affected landowners, tribal authorities and government departments. The purpose of these meetings will be to disseminate detailed information about the proposed Project, address comments already raised by the community representatives where possible, and to obtain further comments.

10.2 Basic Assessment Phase

This draft BAR has been made available for a 30-day legislated comment period from **Friday, 02 July 2021 to Monday, 02 August 2021**. In compliance with the COVID-19 Alert Level 3 Regulations, a hard copy of the report will be placed at a public library for review by the public. I&APs can assess the DBAR from the public venue and digital platforms presented in Table 10-1.

Stakeholders are requested to submit written comments via email or contact Digby Wells telephonically using the Project reference number: PAL6882.

Furthermore, stakeholders identified and registered will be invited to Focus Group Meetings to be held on **7 and 8 July 2021**. Invitations to these FGMs will be distributed two weeks prior to the meetings.

Table 10-1: Draft BAR Availability

Person	Location	Contact
Refilwe Madisa	Mogalakwena Public Library, corner Van Riebeeck and Pretorius Streets	(015) 491 9729
Lerato Ratsoenyane & Bongane Nkuna	The report can be accessed at the links provided below: <ul style="list-style-type: none"> Website: http://www.digbywellsdocs.com/PublicDocuments/ Datafree: http://view.datafree.co/PublicDocuments/ 	(011) 789 9495 sh@digbywells.com

Comments, issues of concern and suggestions received from stakeholders during this public comment period will be captured in a Comments and Response Report (CRR) which will be included into the final BAR for DMRE's appraisal. Focus Group meetings to present the proposed prospecting activities will be held during the 30-day commenting period to present the project findings and provide identified categories of stakeholders with an additional opportunity to comment.

10.2.1 Summary of Public Participation Activities Undertaken to Date

Table 10-2 below provides a summary of the PPP activities undertaken to date, referencing material is also included in Appendix C.

Table 10-2: Public Participation Activities

Activity	Details	Reference in Report
Identification of stakeholders	Stakeholder database which represent various sectors of society, including directly affected and adjacent landowners, in and around the proposed Project area. As required by law personal information such as cell phone, telephone numbers, email addresses and home/work addresses will not be made available to the public.	Appendix C: Stakeholder database
Placing of newspaper advertisement	Two newspaper advertisements Sepedi and English were placed on the Seipone on 24 June 2021 and Bosveld Review on 02 July 2021 to announce the project and availability of the draft BAR.	Appendix C: Newspaper advertisements
Displaying site notices	English and Sepedi site notices were put up at and around the proposed project site and other public places around the proposed site on 02 July 2021 .	Appendix C: Site Notice

Activity	Details	Reference in Report
Distribution of BID and announcement letter	A BID and notification letters with Registration and Comment Forms were distributed via email on 02 July 2021 .	Appendix C: BID Appendix C: Registration and Comments Form, Appendix C: Notification Letters
Announcement of draft BAR	Announcement of availability of the draft BAR was emailed to stakeholders on 02 July 2021. In compliance with the COVID-19 Alert Level 3 Regulations, a hard copy of the report will be placed at a public library for review by the public. I&APs can assess the draft BAR from the public venue and digital platforms provided below: <ul style="list-style-type: none"> Website: http://www.digbywellsdocs.com/PublicDocuments/ Datafree: http://view.datafree.co/PublicDocuments/ 	Appendix C: Notification Letters
Consultation with Stakeholders	Focus Group meetings are planned to be held during the public review period. The meetings will be held at the Oasis hotel. The time and venue will be communicated to identified categories of stakeholders in due course.	To be completed

10.3 Decision Making Phase

The final BAR (including the CRR) will be submitted to DMRE for appraisal. The DMRE, as the competent authority, will issue a decision on the Environmental Authorisation for the proposed prospecting activities. This decision will be communicated to stakeholders as prescribed under the NEMA legislation. As such, notification to stakeholders will be done by means of a letter sent via email and SMS.

11 The environmental attributes associated with the alternatives

This section provides a description of the baseline environment associated with the Project area and region (where relevant). The purpose of understanding the environmental baseline conditions relates to the potential of the project to impact on the existing environment, and the potential for existing environmental aspects to influence a proposed development in terms of design, location, technology and layout.

11.1 Baseline environment

11.1.1 Climate Rainfall

The predominant wind direction is from northeast, with the secondary contributions from the east northeast and east respectively. Contributions from the northeast and southeast quadrant are dominant. Calm conditions (wind speeds < 0.5 m/s) occurred for 4.2 % of the time. Wind speed capable of causing erosion occurred 14.4% of the time. The latter is equivalent to 51 days of high wind speed capable of causing erosion in a year. This is twice the scenario observed in some areas.

11.1.2 Topography

The topographical model indicates that the elevation of the project area increases from 1 060 metres above mean sea level (mamsl.) in the Mogalakwena River floodplain in the south-eastern corner to 1 583 mamsl. on the ridges in the north-western corner of the project area. The majority of the project area has gentle slopes.

Moderate slopes occur at the foot of the ridges. The steepest slopes occur on the ridges and range. The slope aspect / direction of the project area are generally in a easterly and south-easterly direction towards the Mogalakwena River. Slopes of various other directions occur in isolated areas along the river valleys and on the ridges. Refer to Plan 5 in Appendix B and Figure 11-1 for the topographical map of the area.

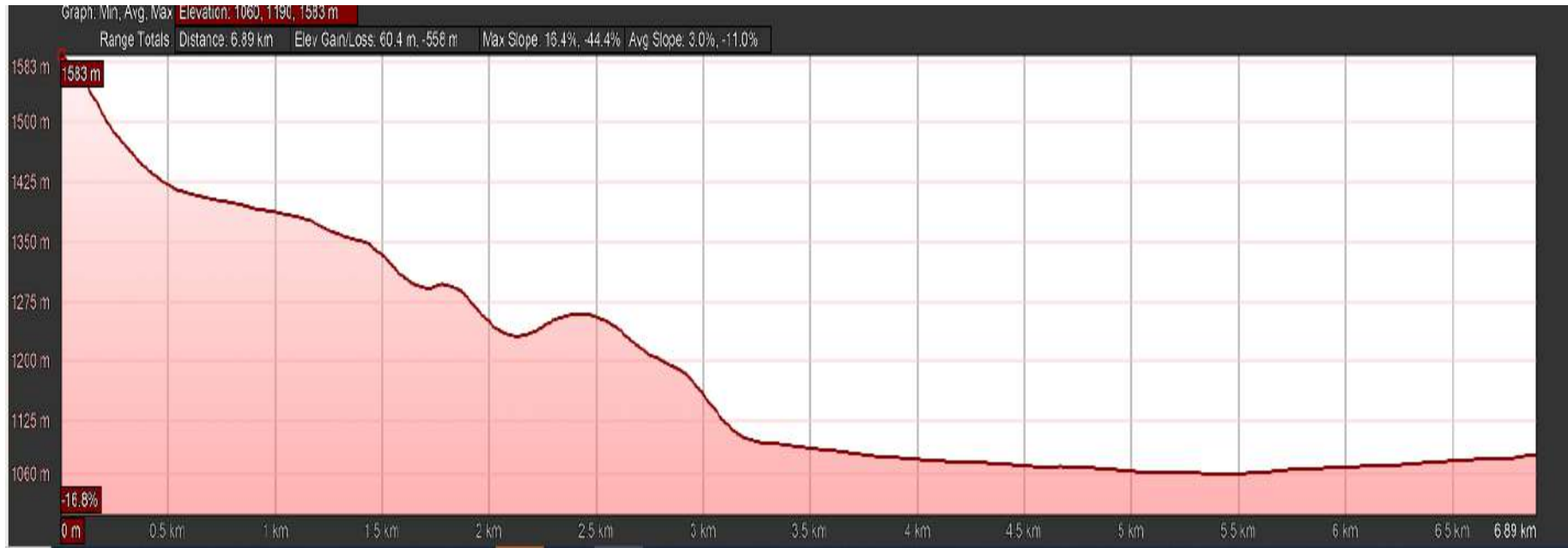


Figure 11-1: Elevation of the Project Area

11.1.3 Geology

The Transvaal sediments outcrops east of the prospecting area, refer to Plan 6 in Appendix B for the geology found within the area. This limb is characterised by the mafic and ultramafic rocks of the Rustenburg Layered Suite overlying Archaean basement granites, gneiss and schist. The Rustenburg Layered Suite dates between c. 2 050 Ma and 2 000 Ma and includes the Lower, Critical, Main and Upper Zones. The rocks of these layers are igneous in nature and are therefore generally devoid of fossils (Cawthorn, Eales, Walraven, Uken, & Watkeys, 2006).

The Rustenburg Layered Suite is intruded by Bushveld granite sills, namely the Lebowa Granite Suite. The Bushveld Group dates 2054Ma and is represented within the Project area by the Nebo Granite, which is the final stratigraphic layer of this unit (Cawthorn, Eales, Walraven, Uken, & Watkeys, 2006). Lithologies within the Bushveld Complex comprise intrusive igneous rocks and are of zero or insignificant palaeontological sensitivity (SAHRA, 2013). As such, these features are not considered further in this assessment.

11.1.4 Water Resources

The project area falls within the Limpopo River Catchment Area with the perennial Mogalakwena River flowing along the eastern boundary of the prospecting site. Floodplains occur along the Mogalakwena River with several non-perennial streams flowing through the area.

Farm Moorddrift 289KR lies within the quaternary catchments A61F and A61E refer to Plan 9 in Appendix B which is situated within the Mogalakwena River valley. The area is dominated by mountains which makes it difficult to be utilised for extensive agricultural practices.

11.1.5 Wetlands

A desktop Wetlands study was undertaken and is appended to this report as Appendix D.

The (Department of Water Affairs and Forestry, 2005) (DWS) accepted a methodology which identifies and delineate wetlands and riparian areas, however, " the (Department of Water Affairs and Forestry, 2008) states the four wetland indicators as Soil Wetness Indicators (SWI), Soil Form indicator (SFI), Vegetation and Terrain Unit Indicator (TUI). The wetland delineations were solely based on the TUI.

Terrain indicators help to identify areas in the landscape where wetlands are more likely to occur. The topography is typically the physical characteristics of an area with a variation of soils against the slope, each with its own characteristics because of its relative position in the landscape and terrain.

The topography of the Project Area is of the Highveld Lower Ecoregion with gentle, rolling grassland slopes and many valley systems. Detailed imagery and contours, allow the geomorphic setting of the wetland and catchments to be understood and the HGM to be

determined. Terrain indicators are important for understanding the specific functionality of the wetland and determining the potential risks from anthropological activities on the wetland.

The topography of the Project Area consist of steep slopes on the west of the Floodplain, with ridges associated with these systems.

Based solely on any available contour data and high-resolution aerial imagery, the freshwater resources within the vicinity of the proposed project were delineated into the following hydrogeomorphic (HGM) units:

- Hillslope seepage wetlands connected to a watercourse (HS);
- Valley bottom wetlands with a channel (CVB);
- Valley bottom wetlands without a channel (UVB); and
- Floodplain.

The wetlands cover approximately 944.61 ha which amounts to 53.0% of the total 1782.8 ha Project Area. The breakdown of the wetland types area is detailed in Table 11-1.

Table 11-1: Wetland HGM Units of the Project Area

HGM Unit	Area (ha)
Hillslope seepage wetlands connected to a watercourse (HS)	139.59
Valley bottom wetlands with a channel (CVB);	343.96
Valley bottom wetlands without a channel (UVB)	38.48
Floodplain	422.58
Total Wetlands (ha)	944.61

11.1.6 Aquatic Ecology

A desktop Aquatic Ecology study was undertaken and is appended to this report as Appendix D. Biodiversity within the aquatic ecosystems associated with the proposed prospecting area is outlined in the section below:

11.1.6.1 Associated Aquatic Ecosystems

The proposed prospecting area is solely associated with the Nyl River, specifically Sub-quaternary Reach (SQR) SQR A61E-00386), which drains into the Mogalakwena River. Due to the numerous agricultural practices, abstraction and damming occurring within the upper reaches of the river, the system has become dry, consisting mostly of segregated pools, as seen from available satellite imagery.

11.1.6.1.1 Desktop Information

According to the gathered Present Ecological State (PES), Ecological Importance (EI) and Ecological Sensitivity (ES) for the associated river ecosystems (DWS, 2014), the considered

Nyl reach is expected to be in a largely modified state (Ecological Category D) and of Moderate EI and ES (Table 11-2).

Table 11-2: PESEIS Information for the Considered Nyl River

Component	Nyl River (A61E-00386SQR)
Present Ecological Status	D
Ecological Importance	Moderate
Ecological Sensitivity	Moderate
SQR Length (km)	33.49

The gathered information further highlights existing impacts contributing to the modified conditions of the rivers in the form of water quality, agricultural encroachment, bed and channel disturbance, sedimentation, abstraction, dam construction, erosion, alien vegetation encroachment, overgrazing/trampling, urban runoff and vegetation removal.

Important taxa with relative sensitives are expected within the considered rivers (discussed in further detail below). However, due to the mostly dry nature of the project area, especially the lower Mogalakwena reach (i.e. SQR A61G-00297) (DWS, 2014), the probability of occurrence of said taxa is expected to be low, hence the Moderate EI and ES classifications.

11.1.6.2 Expected Aquatic Biodiversity

Focus was paid on the potential macroinvertebrate and ichthyofaunal compositions within the Mogalakwena River as part of the assessed/considered aquatic biodiversity.

A total of 40 macroinvertebrate taxa are expected to be present within the considered Nyl River reach (DWS, 2014) (Table 11-3).

Table 11-3: Expected Macroinvertebrate Taxa in the Nyl River

Family names		
Turbellaria	Belostomatidae	Haliplidae
Oligochaeta	Corixidae	Hydrophilidae
Hirudinea	Gerridae	Ceratopogonidae
Potamonautidae	Hydrometridae	Chironomidae
Atyidae	Naucoridae	Culicidae
Hydracarina	Nepidae	Dixidae
Baetidae	Notonectidae	Muscidae
Caenidae	Pleidae	Tabanidae
Chlorocyphidae	Veliidae	Tipulidae

Family names		
Chlorolestidae	Leptoceridae	Lymnaeidae
Ceonagrionidae	Dytiscidae	Physidae
Aeshnidae	Elmidae	Planorbinae
Gomphidae	Gyrinidae	Thiaridae
Libellulidae		

According to the expected macroinvertebrate list, only a single taxa (Elmidae) with a preference/dependence on high flow velocities ($> 0.6 \text{ m}^3$) is expected to occur within the aquatic ecosystems. No taxa that are highly sensitive to physio-chemical (i.e. water quality) modifications are expected within the river. However, some taxa such as Atyidae, Hydracarina, Chlorocyphidae, Chlorolestidae, Aeshnidae, Elmidae and Dixidae are classified as moderately intolerant to water quality deterioration/changes.

In addition, and according to the gathered desktop information (DWS, 2014), a total of 14 fish species are expected within the considered Nyl River reach (Table 11-4). Each species sensitivity ratings towards physio-chemical and no-flow conditions have been provided for together with their conservation status according to the IUCN List of Threatened Species.

Table 11-4: Expected Fish Species in the Nyl River

Fish Species	Common Name	Tolerance (1-2=tolerant; 2-3= moderately tolerant; >3-4 moderately intolerant; >4: intolerant)		Conservation Status
		Physio-chemical	No-flow	
<i>Chetia flaviventris</i>	Canary Kurper	2.0	1.3	LC
<i>Clarias gariepinus</i>	African Catfish	1.0	1.7	LC
<i>Engraulicypris brevianalis</i>	River Sardine	2.8	2.5	LC
<i>Barbus bifrenatus</i>	Hyphen Barb	3.0	1.1	LC
<i>Enteromius paludinosus</i>	Straightfin Barb	1.8	2.3	LC
<i>Enteromius trimaculatus</i>	Threespot Barb	1.8	2.7	LC
<i>Enteromius unitaeniatus</i>	Longbeard Barb	2.2	2.3	LC

Fish Species	Common Name	Tolerance (1-2=tolerant; 2-3= moderately tolerant; >3-4 moderately intolerant; >4: intolerant)		Conservation Status
		Physio-chemical	No-flow	
<i>Enteromius viviparus</i>	Bowstripe Barb	3.0	2.3	LC
<i>Labeobarbus marequensis</i>	Lowveld Largescale Yellowfish	2.9	3.3	LC
<i>Micropanchax johnstoni</i>	Johnston's Topminnow	3.8	1.5	LC
<i>Oreochromis mossambicus</i>	Mozambique Tilapia	1.3	0.9	VU
<i>Pseudocrenilabrus philander</i>	Southern Mouthbrooder	1.4	1.0	LC
<i>Tilapia rendalli</i>	Red-breasted Tilapia	2.1	1.8	LC
<i>Tilapia sparrmanii</i>	Banded Tilapia	1.4	0.9	LC

LC=Least Concern; VU=Vulnerable

Of the expected fish species, only a single species is moderately intolerant to physio-chemical modifications (i.e. *Micropanchax johnstoni*) and a single species moderately intolerant to no-flow conditions (i.e. *Labeobarbus marequensis*). Based on specialist experience within the project area, it is unlikely that all of these species are currently present within the Nyl River, especially in light of the non-perennial nature of the river compounded by the severe pollution sources observed from the associated urban areas within the lower reaches.

On the contrary, a single species of conservation concern classified as Vulnerable (i.e. *Oreochromis mossambicus*) is expected and is known to be present within the aquatic ecosystems associated with the proposed prospecting area. It is also known to be present within the lower Mogalakwena River which the Nyl drains into. This species and some of the other species of low probability of occurrence, such as the aforementioned *Micropanchax johnstoni* and *Labeobarbus marequensis*, have the potential to be utilising the pooled sections within the river as refuge areas from the dry conditions. However, ground-truthing will be needed to accurately determine this.

11.1.7 Terrestrial Biodiversity

A desktop Terrestrial Biodiversity study was undertaken and is appended to this report as Appendix D. The two-receiving terrestrial (fauna and flora) environments will be discussed in the subsections below including any sensitivities that may arise within the proposed

prospecting area and its surroundings. The proposed Project Areas lie within two Quarter Degree Square (QDS) 2428BB and 2428BD. Based on the following desktop findings below and due to the potential occurrence of Species of Conservation Concern (SCC), a pre-screening survey is recommended to locate such species and identify sensitive habitats that may support potentially threatened species.

11.1.8 Flora

11.1.8.1 Regional Vegetation

As described by Mucina & Rutherford (2012), the Moorddrift 289KR Project Area falls within the Makhado Sweet Bushveld (SVcb 20), Waterberg Mountain Bushveld (SVcb 17) and Waterberg Magaliesberg Summit Sourveld (Gm 29) vegetation types. The regional vegetation map has been included in Plan 9 in Appendix B. The vegetation types fall within two of the nine South African plant Biomes, namely the Savanna and Grassland. The Grassland Biome is situated primarily on the central plateau of South Africa, and the inland areas on Kwa-Zulu Natal and the Eastern Cape provinces. This biome is rich in fauna and flora but is under threat due to agricultural activities, expansion of mining and industrial activities. The Savanna Biome predominates in the northern regions of South Africa and almost encompasses the entire Grassland Biome.

Makhado Sweet Bushveld

It occurs on the plains south of the Soutpansberg, east of the Waterberg and on the apron surrounding the Blouberg and Lerataupje Mountains and extends into the Polokwane Plateau with an altitude of 850-1 200m. The landscape and vegetation are characterised by short and shrubby bushveld with a poorly developed grass layer. The conservation status is considered Vulnerable with only around 1 % statutorily conserved, mainly in the Bellevue Nature Reserve. Approximately 27% of the vegetation type has been transformed, primarily due to cultivation and urbanisation. The southwestern half of the unit has densely populated rural communities.

Waterberg Mountain Bushveld

This bushveld expands across the Waterberg Mountains and stretches to the north of Bela-Bela and west of Mokopane. The altitude sits at around 1 000-1 600m, which is slightly lower than the Waterberg-Magaliesberg Summit Sourveld (Gm 29). The rugged mountains are tasselled with vegetation such as *Faurea saligna* and *Protea caffra* on the higher slopes that grades into the Gm 29. The transition occurs through the broad-leaved deciduous bushveld (*Diplorhynchus condylocarpon*) on rocky footslopes to *Burkea africana-Terminalia sericea* in the lower-lying valleys. The grass layer is moderately well developed. The conservation status is Least Threatened.

Waterberg-Magaliesberg Summit Sourveld

This sourveld can be observed in isolated patches on the summits of the Waterberg with altitudes reaching up to 2,088m. the landscape features include summit positions such as crests with steep rocky scarps covered with wiry tussock grasslands. Patches of open *Protea caffra* savannoid vegetation and open shrubland *Englerophytum magalismontanum* are typical of this sourveld. Summits are characterised by high spatial heterogeneity influencing the soil profile, drainage and hydrological conditions. The varying aspects are generally associated as important predictors in biodiversity. The conservation status is listed as Least Threatened.

11.1.9 Fauna

This section will cover various groups of animals including mammals, birds, reptiles, amphibians and invertebrates.

11.1.9.1 Mammals

Mammals form a vital component of ecosystems. Not only are they important for nutrient cycling, habitat modification, consumers of plants and seed dispersal but they're also a considerable component of predators in healthy ecosystems. Mammals expected to occur are listed in Appendix B of the Biodiversity Screening Assessment appended as Appendix D in this report.

11.1.9.2 Birds

Birds have been viewed as good ecological indicators, since their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. Bird communities and ecological condition are linked to land cover. As the land cover of an area changes, so do the types of birds in that area. Land cover is directly linked to habitats within the project area. The diversity of these habitats should support many different species.

According to the South African Bird Atlas Project (SABAP2), almost 290 species of birds have been identified in the designated QDS (see Appendix B of the Biodiversity Screening Assessment appended as Appendix D in this report.).

11.1.9.3 Reptiles

Reptiles are ectothermic (cold-blooded) meaning their internal basal temperature is influenced by their surrounding external environment, as a result, reptiles are dependent on environmental heat sources. Thus, many reptiles regulate their body temperatures by basking in the sun, or warmer surfaces (or substrates). Substrates are an important determining factor for identifying which habitats are suitable for which species of reptile. Rocky outcrops and suitable woody vegetation would increase habitat and intern diversity of reptiles within the Project Area. Reptiles expected to occur on-site are listed in Appendix B of the Biodiversity Screening Assessment appended as Appendix D in this report..

11.1.9.4 Amphibians

Amphibians are viewed to be good indicators of changes to the whole ecosystem as they are sensitive to changes in the aquatic and terrestrial environments (Waddle, 2006). Most species of amphibians are dependent on the aquatic environment for reproduction. Additionally, amphibians are sensitive to water quality and ultraviolet radiation because of their permeable skin (Gerlanc, 2005).

18 species of amphibian have previously been recorded and are list in Appendix B of the Biodiversity Screening Assessment appended as Appendix D in this report..

11.1.9.5 Invertebrates

Butterflies are a good indication of the various habitats available in a specific area (Woodhall, 2005). Although many species are eurytrops (able to use a wide range of habitats) and are widespread and common, South Africa has many stenotrope (specific habitat requirements with populations concentrated in a small area) species which may be very specialised (Woodhall, 2005). Butterflies are useful indicators as they are relatively easy to locate and catch, and to identify. A list of expected and previously recorded Lepidoptera species within the Project Areas QDS is listed in Appendix B of the Biodiversity Screening Assessment appended as Appendix D in this report..

11.1.10 Heritage

Digby Wells did not undertake primary data collection of the heritage resources to inform this assessment. The current state of the heritage environment will be verified through an in-field inspection of the Project area and this section will be updated once complete.

The potential palaeontological sensitivities of the regional geological landscape notwithstanding, the cultural heritage baseline description considers the predominant landscape based on the identified heritage resource within the greater study area. Table 11-5 presents an overview of the broad timeframes for the major periods of the past in South Africa.

Table 11-5: Archaeological Periods in South Africa

The Stone Age	Earlier Stone Age (ESA)	2 mya to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 CE (Common Era ¹)
Farming Communities	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
Historical Period	-	1500 CE to 1850 (Behrens & Swanepoel, 2008)

Adapted from Esterhuysen & Smith (Stories in stone, 2007)

In total, 93 heritage resources were identified in the literature applicable to the regional, local and site-specific study areas. Figure 11-2 presents the breakdown of the identified heritage resources in terms of the archaeological periods.

The predominant tangible heritage resources recorded in the area under consideration are burial grounds and graves. This notwithstanding, archaeological resources affiliated with the MSA and the Farming Community, historical built environment resources and a Conservation Area² are present within the regional

The following section provides a brief description of these periods to provide context to the cultural heritage landscape.

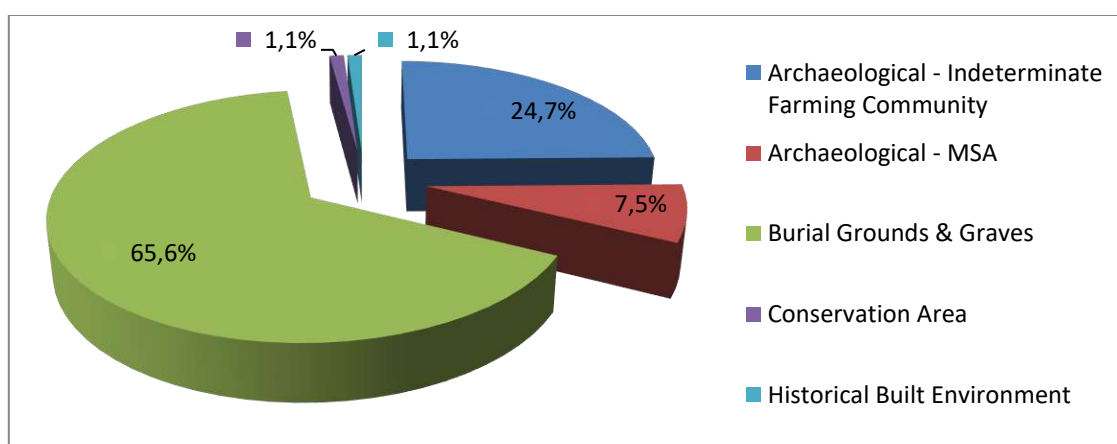


Figure 11-2: Heritage Resources Identified within the Regional Study Area

¹ Common Era (CE) refers to the same period as *Anno Domini* ("In the year of our Lord", referred to as AD): i.e., the time after the accepted year of the birth of Jesus Christ and which forms the basis of the Julian and Gregorian calendars. Years before this time are referred to as 'Before Christ' (BC) or, here, BCE (Before Common Era).

² The Makapan Valley. This is described in more detail below.

The southern African Stone Age comprises three broad phases which are determined according to the various hominid species and the lithic tools and associated materials created by these hominid species through time. These phases are the ESA, MSA and LSA.

The ESA is comprised predominantly of large handaxes and cleavers made of coarse-grained materials (Esterhuysen & Smith, *Stories in stone*, 2007). This period occurred between 2 mya and 250 kya and is associated with *Australopithecus* and early *Homo* hominid species. Archaeological evidence within the Limpopo Province suggests that hominids have inhabited the present-day province since the ESA.

The MSA dates between approximately 300 kya and 20 kya. High proportions of minimally-modified blades, created using the Levallois technique, the use of good quality raw material and the use of bone tools, ochre and pendants characterise the early MSA lithic industries (Clark, 1982; Deacon & Deacon, 1999). These tools were made and used by archaic *Homo sapiens*. MSA artefacts are usually associated with water sources, for example pans and the Limpopo River. These finds are often not found *in situ* and therefore offer limited contextual information. Within the regional study area, the MSA is represented by isolated surface artefacts.

The LSA dates from approximately 40 kya to the historical period. LSA lithics are specialised as specific tools each have specific uses (Mitchell, 2002). Assemblages from this period commonly include diagnostic tools such as scrapers and segments and may include bone points as well. As with the MSA artefacts, LSA artefacts are usually associated with water sources and are not usually found *in situ*.

The Fossil Sites of South Africa World Heritage Site (WHS), known colloquially as the Cradle of Humankind, is perhaps the most famous example of karst topography. The associated breccia within the caves has contributed significantly to the fossil heritage of South Africa (UNESCO, 2018). The fossils in these cave sites provide evidence for the occupation of the area for at least the last 2.3 mya. Hominid fossils recovered from these caves represent *Australopithecus africanus*, *Paranthropus* species and *Homo habilis*. New species recently identified in these caves include *A. prometheus*, *A. sediba* and *H. naledi*. The fossils of the Cradle of Humankind represent some of the earliest hominid species of southern Africa.

The Fossil Sites of South Africa occurs within the Gauteng, Limpopo and North-West Provinces (UNESCO, 2018). Within the Limpopo Province, the WHS includes the Makapan Valley. This site covers approximately 2 200 ha and is located approximately 25 km from the Project area. The Cave of Hearths is the most prolific site in the region and archaeological investigations undertaken since the early 20th Century have produced artefacts representing all three phases of the Stone Age.

In southern Africa, the LSA is closely associated with hunter-gatherers. This period is further defined by evidence of ritual practices and complex societies (Deacon & Deacon, 1999). This is commonly expressed through rock art. Three rock art painting traditions occur within South Africa and are widely dispersed, although they are most notably recorded in the northern and eastern regions.

Hunter-gatherers were later followed by the various peoples of the Farming Community period. This time is characterised by the movements of Bantu-speaking agro-pastoralists moving into southern Africa and is divided into an early and late phase (EFC and LFC).

EFC and LFC sites can be identified through secondary tangible surface indicators, such as ceramics and evidence for the domestication of animals (such as faunal remains or dung deposits). Farming Community sites can include potsherds (*fragments of pottery*). Ceramic classification is commonly used by archaeologists to establish relative cultural-historical temporal sequences within southern African Farming Communities. In this way, relative dates can be assigned to sites, as well as inferring tenuous cultural similarities or associations. The predominant ceramics reported in the regional study area include several facies dating from the 14th century to the 1800s (Huffman T. , 2007).

Besides ceramics, the LFC can be identified through evidence for temporary or permanent settlement. This includes cattle posts which have been identified along the escarpment and settlements that were briefly occupied and which have been identified close to the workable soils along the Limpopo River (Huffman & Van der Walt, 2011). Ethnographic evidence suggests that the cattle posts may be associated with users of the *Letsibogo* ceramics; these users may have been the baKaa (Schapera, 1953; Huffman T. , 2007; Huffman & Van der Walt, 2011; Biemond, 2014). The *Letsibogo* ceramics are characterised by lines of punctates separated by red and black zones (Huffman T. , 2007; Huffman & Van der Walt, 2011; Biemond, 2014). These ceramics date between 1500 CE and 1700 CE.

Within the regional study area, the Farming Community period is represented by isolated surface artefacts, stonewalling and one low-density surface scatter (Higgitt, Karodia, du Piesanie, & Nel, 2013; Du Piesanie, Higgitt, Hennessy, & Koeslag, 2016).

The historical period³ is commonly regarded as the period characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with this interaction. However, the division between the LFC and historical period is artificial, as there is a large amount of overlap between the two.

Within the regional cultural landscape, the LFC transition to the Historical Period is characterised by the emergence of large agricultural settlements associated with the baTswana. Archaeological excavations within the regional study area indicate that the baTswana occupation of the area may have been brief (Nel J. , 2012). As demonstrated in the history of the baKwena, periods of political turbulence caused disruptions during the 18th and 19th centuries (Schapera, 1953). It is these disruptions that are suggested to be the cause of the ephemeral remains of the archaeological sites (Nel J. , 2012).

³ In southern Africa, the last 500 years represents a formative period that is marked by enormous internal economic invention and political experimentation that shaped the cultural contours and categories of modern identities outside of European contact. This period is currently not well documented but is being explored through the 500 year initiative (Swanepoel, et al., 2008).

The LFC-Historical Period transition is further characterised by the movements of LFC Nguni-speaking groups entering the region in the 17th Century CE. These migrant groups became what today is termed the Ndebele, divided into the Southern and Northern Ndebele. Most of the Ndebele are believed to have left Kwa-Zulu Natal between 1630 – 1670 CE (Esterhuysen A. B., Ceramic alliances: pottery and the history of the Kekana Ndebele in the old Transvaal, 2007) and the migration routes are thought to be associated with two groups, namely the Musi (ancestral Southern Ndebele Ndzundza, Manala and Kekana) and the Hlubi (ancestral Northern Ndebele Langa).

Much of the history of these Ndebele groups is accessible through oral history (Huffman T. N., 2004). However, 17th and 18th century oral histories that have been collected do not necessarily provide coherent descriptions of events that led to the current populace and political environment (Delius, The land belongs to us, 1983). Missionary documents from the 19th century provide only a slightly more lucid record of the movements and fission of various chiefdoms (Esterhuysen A. , 2003).

Oral histories suggest that the Kekana trace their ancestry to the split of the chieftaincy after the death of Madidzi. A succession dispute between the two sons resulted in the chiefdom being divided into the Lidwaba and Gegana. The Gegana relocated their chiefdom to Muledlana near present day Zebediela (Esterhuysen A. , 2003). After a few generations, the lineage was disrupted again when Tjhumana passed away some time in the 18th century. Again, sons Mugombane I (Kxhaba) and Kxhumbha rivalled for the chieftaincy resulting in a split. Mugombane I was defeated by his brother and moved to the area just outside present day Mokopane in what has become known as the Makapan Valley.

The Langa first entered the regional study area toward the end of the 17th century, settling between the Matlotlo Mountains, the Sandsloot River in the south and Mogalakwena River to the west (Esterhuysen A. , 2003; Pistorius, 2002). They were led by Podile and settled at Bosega to the east of present-day Polokwane. From there they moved to Thaba Tsweu (Witkoppen Mountain). The numerous hills within the region are known to contain several historic Langa settlements, including Segopa, Magope, Fothane, Matlhogo and Ditlotswane.

Adding further to the instability in the region, European settlers, traders, missionaries and travellers moving into the interior further added to instability and resulting power struggles. Groups of Afrikaners initiated a move from the Cape to the interior to establish an independent state in approximately 1835, in reaction to increased British liberalism and the abolishment of slavery and pass laws. The migration of these *Voortrekkers* is commonly referred to as the Great Trek (or *Groot Trek*) and it started with the first group, the Robert Schoon Party, in 1836 (Delius & Cope, Hard-fought frontiers: 1845 - 1883, 2007).

The *Voortrekkers*, now Boers, arrived at Louis Trichardt in 1837, marking the first contact between the Boers and Ndebele (Naidoo, 1987). The influx of this new group into the region coupled with the constant threat of the Pedi to the east required the establishment of strong socio-economic alliances to ensure the survival of the Kekana, and expand economic interests (Esterhuysen A. B., 2006).

A significant historical event occurred, and was captured in written and oral records, at Historic Cave within the Makapan Valley in 1854. Tensions between the Boers and the Ndebele Groups developed Ndebele chiefdoms over land, labour and allegations of Boer slaving and were exacerbated in the 1850s after the establishment of Pietpotgietersrust⁴ (Tobias, 1945; Bonner, 1983; Hofmeyr, 1988; Hofmeyr, 1989; Esterhuysen, Sanders, & Smith, 2009; Esterhuysen A. B., 2010).

In September 1854, the Kekana and Langa undertook a series of events killing Boers (Naidoo, 1987; Hofmeyr, No Chief, No Exchange, No Story, 1989). This prompted Boer retaliation and reinforcements were sent from Rustenburg and the Soutpansberg (Esterhuysen A. B., Ceramic alliances: pottery and the history of the Kekana Ndebele in the old Transvaal, 2007). By the time the reinforcements had arrived, Mugombane I and his followers had retreated into Historic Cave, and the Langa had retreated to the hills in the north. The Boers discovered the Kekana seeking refuge in Historic Cave and laid siege to the cave. In the absence of water supplies, over 3 000 members of the Kekana died through dehydration or were captured or killed trying to escape the cave in search of water. The remaining Kekana surrendered and, on 21 November 1854, the Boers took control of the cave.

The first Potgietersrus Platinum Mine was established in the 1920s near the town of Potgietersrus (now known as Mokopane) (Environomics CC & NRM Consulting, 2010). The Platreef was mined until the 1930s, when the platinum industry collapsed. This industry only boomed again during the latter half of the 1900s.

The built environment sites within the regional study area include historical farmsteads (Higgit, Karodia, du Piesanie, & Nel, 2013). Other historical built environment resources include farmhouses and churches. The historical sites include surveyor posts and middens. Burial grounds and graves within the regional study area range in size from a single grave to burial grounds of fewer than 50 graves (Higgit, Karodia, du Piesanie, & Nel, 2013; Du Piesanie, Higgit, Hennessy, & Koeslag, 2016). The size of some of the burial grounds were not determined in the field.

11.1.10.1 Results from the Pre-disturbance Survey

Digby Wells did not undertake primary data collection to inform this assessment. At the time of compilation of this report, Palrho had engaged the affected landowner or landowners to inform them of the intended PR Application. During these engagements, it was not possible to confirm the requirements for access or to arrange for access during the regulatory timeframes.

11.1.10.2 Results of Historical Layering

Figure 11-3 presents the site-specific study area as of 1965. The historical imagery illustrates a landscape that is mostly undisturbed and is characterised by the flora expected of this region. There are some cultivated fields present and other visible anthropogenic disturbance

⁴ Later renamed Potgietersrust and now known as Mokopane

includes roads. No structures are visible in the historical imagery, however, there may potentially be a structure or multiple structures within the cluster of fields towards the northern extent of the site-specific study area. There is potential for structures over the age of 60 years to be present within the site-specific study area. Where such structures are located within the Project area, there is a strong possibility for graves to occur.



Figure 11-3: Historical Layering showing the Project area in 1965

11.1.11 Socio-economic

This section provides a brief overview of the socio-economic context within which the Project is located to enable an assessment of the potential social benefits arising from the Project and to compare identified benefits against the heritage impacts in compliance with the requirements of Section 38(3)(d) of the NHRA. This section is informed by data from Wazimap⁵ (Wazimap, 2017) and the Integrated Development Plan (IDP) for the WDM (2019/2020 Integrated Development Plan, 2019)⁶.

As of the 2011 Census, the Limpopo province included a population of 5 404 868 people, which accounts for approximately 10.4% of the South African population (Wazimap, 2017). The Limpopo Province is the fifth largest province in terms of population size and land size. The province includes five district municipalities, of which the WDM is the smallest in terms of population size. The WDM includes a population of 679 336 or approximately 12.6% of the provincial population. The district municipality includes five local municipalities. MLM is the largest of these in terms of population size, which includes 304 586 people or 44.8% of the population of WDM.

MLM includes 32 wards. The proposed Project is located in Ward 16, which has a population of 7 910 residents. This ward is rural in nature and it avoids the major urban settlements of Mokopane and surrounding settlements. The ward includes smaller settlements and a chrome mine, but is predominantly made of farming land, including cultivated fields and game farms or game lodges.

Table 11-6 presents an overview of the employment status within the regional project area.

Table 11-6: Employment Status of the Populations within the Regional Project Area

Statistics (Census 2011)	Ward 16		MLM		WDM	
	No.	%	No.	%	No.	%
Total Population	7 910	-	304 586	-	679 336	-
Working Age (18-64)	4 947	62.5	155 429	51	397 331	58.5
Employed	2 867	53.2	46 504	26.2	167 809	38.5
Discouraged Work Seeker	240	4.5	9 972	5.6	16 259	3.7
Unemployed	598	11.1	31 270	17.6	65 612	15
Other not economically active	1 688	31.2	89 874	50.6	187 181	42.8

Adapted from Wazimap (Wazimap, 2017)

⁵ These data were used because Wazimap realigns the 2011 data captured and presented by Statistics South Africa (2011) with new municipal boundaries used in the 2016 Municipal Elections (Open Up, 2017). This report uses the Census 2011 data as data from the 2016 Community Survey are not yet available at ward level.

⁶ Neither the final nor the draft IDP for 2020/2021 was available at the time of compilation of this report.

The key sectors contributing to the WDM economy include agriculture, manufacture, mining and tourism (WDM, 2019). Minerals mined within the WDM include chrome, coal, iron nickel, platinum, tin, and tungsten. The Waterberg field contains an estimated 76 billion tons of coal, which is more than 40% of the national coal reserve. Mining contributes 47.4% of the WDM GDP and the district produces the most platinum within the Limpopo Province. The WDM and contributes the most in terms of GDP to the national mining sector. Mining within the WDM centres around Mokopane, Lephalale and the Northam-Thabazimbi area.

11.2 Description of the Current Land Uses

The Project Area is predominantly made up of land classified as Open Woodland, Natural Grassland, Dense Forest and Woodland and Fallow Land and Old Fields. The remaining minor areas are classified as Herbaceous Wetlands, Commercial Annual Crops Rain-fed/Dryland, Open and Sparse Plantation Forest, Contiguous and Dense Plantation Forest and Subsistence/Small-Scale Annual Crops. Refer to Plan 10 in Appendix B.

11.3 Environmental and Current Land Use Map

The Plans indicating the environmental features of the Project site are summarised in Table 11-7.

Table 11-7: Summary of the Plans indicating the Environmental Features of the Project Site

Environmental Feature	Plan Number (Appendix A)
Topography	Plan 5
Geology	Plan 6
Wetlands	Plan 8
Vegetation	Plan 9
Land Cover	Plan 10

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

The potential impacts are discussed according to each Phase of the proposed Project: the Construction, Operational and Decommissioning Phases. The Project activities are summarised in Table 12-1.

This section also rates the significance of the potential impacts pre-mitigation and post-mitigation. The impacts below are a result of both the environment in which the activity takes place, as well as the activity itself. The impacts associated with the Project includes the EIA Regulations, 204 (as amended) Listed Activities, as well as the prospecting activities to take place at the Property. The methodology utilised to assess the significance of the potential impacts is described in Section 13.

Table 12-1: Project Activities Summary

Activity No.	Activity
Establishment Phase	
1	<ul style="list-style-type: none"> ● Establishment of site ● Site clearance and topsoil removal prior to the commencement of physical construction activities. Topsoil will be stored in stockpiles not greater than 1m in height; and ● Construction of access roads.
Operational Phase	
2	<ul style="list-style-type: none"> ● Drilling of prospecting boreholes; ● Utilisation of potable toilets; ● Handling of general and hazardous waste; ● Use of heavy vehicles; and ● Maintain newly established roads.
Decommissioning Phase	
3	<ul style="list-style-type: none"> ● Decommissioning of camps and drilling equipment (Dismantling and removal of prospecting infrastructure); ● Removal of waste; and ● Rehabilitation of each prospecting site (topsoil cover, ripping and natural vegetation establishment)

12.1 Establishment Phase

No physical construction will take place as no permanent infrastructure will be established. Activities will relate to the possible establishment of a temporary access road, as well as the clearing of vegetation for the establishment of the prospecting drill site.

Potential access roads will be constructed from existing road infrastructure with the shortest possible route to the prospecting drill site being utilised, ensuring that there are minimal environmental impacts related to this activity. The temporary access roads will only be utilised by personnel vehicles for site inspections and the pick-up of drill core during the Operational Phase.

Water utilised by the drill contractor will be sourced locally and agreed upon during the negotiation process. Three sumps will be constructed within the boundary of each prospecting drill site footprint to separate oil, sludge and water. Topsoil will be stockpiled and stored for future rehabilitation of the prospecting drill site once drilling has concluded. Topsoil stockpiles will be covered during windy and rainy months to prevent soil erosion. The wet season occurs between December and March.

12.1.1 Social Nuisance Impacts

The impacts associated with social nuisance to the neighbouring communities during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-2.

Table 12-2: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Social Nuisance Impacts during the Establishments Phase

Activity No 1: Site Clearance	
Criteria	Details / Discussion
Description of impact	<ul style="list-style-type: none"> Impacts due to dust and noise generation are likely to be a nuisance to the nearest receptors. Increased dust levels may result due to site clearing, use of access roads and vehicular activity; and Ambient noise levels will increase due to vehicles and site clearing machinery.
Mitigation required	<ul style="list-style-type: none"> Keep soils moist to suppress possibility of dust; Ensure that dust suppressants are applied to gravel or unpaved roads that are in use; Vehicles and machinery will be properly maintained to minimise operating noise; Ensure agreements with the land owners have been established prior to the drilling of boreholes; Vehicles will obey speed limits; and Bulk Delivery of materials should be maximised to reduce the frequency of deliveries.

<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	1	3	5	Negligible (-30)
Post-Mitigation	1	1	1	4	Negligible (-12)

12.1.2 Soil, Land Use and Land Capability

The impacts associated with soil and land capability during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-3.

Table 12-3: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Establishment Phase

Activity No. 1: Site Clearance					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> Soil compaction due to machinery and increased personnel activity; Soil erosion due to site clearance and stockpile of topsoil exposure to wind and water; and Loss of topsoil due to erosion. 				
Mitigation required	<ul style="list-style-type: none"> Only clear vegetation when and where necessary; Only remove topsoil when and where necessary; Ensure topsoil is stored in one dedicated stockpile, less than 1 m high, and within the demarcated prospecting site; and Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions so as to prevent erosion (December to March). 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	2	3	6	Minor (-42)
Post-Mitigation	1	2	2	5	Negligible (-25)

12.1.3 Fauna and Flora

The impacts associated with fauna and flora during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-4.

Table 12-4: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Establishment Phase

Activity No. 1: Site Clearance					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> Site clearing will result in the direct loss of vegetation communities; The loss of vegetation communities will result in the loss of biodiversity, with cleared areas resulting in potential habitat fragmentation. 				
Mitigation required	<ul style="list-style-type: none"> Only remove vegetation when and where necessary; Minimise the size of the prospecting drill sites as far as possible; Indigenous trees and protected species will not be removed; Undertake a screening of the area prior to prospecting to ensure no important species occur within the drill site; Drainage lines, and indigenous vegetation will be avoided; and Use existing access roads where possible. 				
Parameters	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	1	3	4	6	Minor (- 48)
Post-Mitigation	1	3	2	4	Negligible (- 24)

12.1.4 Surface Water and Wetlands

The impacts associated with surface water during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-5.

Table 12-5: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Establishment Phase

Activity No. 1: Site Clearing.	
Criteria	Details / Discussion
Description of impact	<ul style="list-style-type: none"> Soil erosion may result from wind and water on the exposed prospecting site and topsoil stockpiles. The soil erosion may result in increased turbidity and sedimentation of surrounding watercourses and wetlands. The likelihood of such an impact occurring has been reduced due to the implementation of a 1:100 year flood line buffer zone from the rivers and tributaries and a 500m buffer from the wetlands. However a water authorisation may be granted where new impacts to the watercourse will be assessed; Fragmentation of the wetland resources as a result of road crossings; Contamination of wetland resources; Impacts to water quality as a result of spills; Compaction of soils;

	<ul style="list-style-type: none"> Loss of habitat and biodiversity; Increased potential for sheet runoff from paved/cleared surfaces; and Increased potential for erosion. 				
Mitigation required	<ul style="list-style-type: none"> Ensure site clearing is limited to the designated areas; Berms must be constructed around the periphery of the prospecting site to separate clean and dirty water. Water within the prospecting site must be diverted to the water sump; All prospecting activities may not occur within the 500m buffer of a wetland and the 1:100 year flood line of a river or tributary unless a water authorisation is granted; and Remediate using commercially available emergency clean up kits. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	3	4	6	Minor (-54)
Post-Mitigation	1	3	3	4	Negligible (-28)

12.1.5 Groundwater

There are no anticipated impacts associated with groundwater resources for the site establishment phase.

12.1.6 Heritage Resources

Table 12-6 presents the activities expected to occur during the Construction Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 12-6: Pre- Interactions and Impacts of Construction Phase Activities

Interaction	Impact
Establishment of temporary access routes or tracks between existing roads and drill locations	Digby Wells does not foresee any impact to the cultural heritage landscape, given the nature of the proposed activities and their flexibility in terms of their location.
Establishment of site and contractors camp and three sumps or trenches to separate and store oil, sludge and water	
Clearing of vegetation for the drill rig	
Stockpiling of topsoil	

Digby Wells does not foresee any impact to the identified heritage resources from the above-mentioned activities at this time, but this must be confirmed through in-field assessment. Digby Wells has therefore not assessed these impacts further in this report.

12.2 Operational Phase

12.2.1 Social Nuisance Impacts

The impacts associated with social nuisance to the neighbouring communities during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-7.

Table 12-7: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Social Nuisances during the Operations Phase

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> Impacts due to dust and noise generation are likely to be a nuisance to the nearest receptors. Increased dust levels may result due to site clearing, use of access roads and vehicular activity; Dust generation from vehicular activity; and Increased dust due to erosion of soil stockpiles. 				
Mitigation required	<ul style="list-style-type: none"> Maintain drilling equipment and, if possible, fit silencing equipment; Use a dust suppressant and keep access roads moist; and Cover stockpiles with a plastic liner in windy and rain conditions so as to prevent topsoil from eroding. 				
Parameters	Spatial	Duration	Intensity	Probability	Significant rating
Pre-Mitigation	2	2	4	6	Minor (- 48)
Post-Mitigation	1	2	3	4	Negligible (- 24)

12.2.2 Soils, Land Use and Land Capability

The impacts associated with soil and land capability during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-8.

Table 12-8: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Operational Phase

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> Compaction of soil due to machinery and personnel on-site; and Stockpiles of topsoil could erode during windy and rainy days (December to March). Soil disturbance and/or compaction; Increased incidence of erosion; 				

	<ul style="list-style-type: none"> Sedimentation from erosion; Potential water quality deterioration 				
Mitigation required	<ul style="list-style-type: none"> Stockpiles must be covered with a plastic liner in windy and rain conditions (October to March) to prevent potential soil erosion. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	3	4	7	Moderate (-70)
Post-Mitigation	2	3	3	5	Minor (- 40)

12.2.3 Fauna and Flora

The impacts associated with fauna and flora during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-9.

Table 12-9: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Operational Phase

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> Faunal species may disperse from the area due to loss of habitats, as well as due to the generation of noise from the drilling activities; Disturbance to avifauna and other fauna utilising the freshwater resources thus resulting in an overall loss of biodiversity. Habitat fragmentation; and Risk of increase and encroachment of alien invasive species. 				
Mitigation required	<ul style="list-style-type: none"> Remove alien invasive species as and when they occur; Maintain drilling equipment and, if possible, fit silencing equipment; Remediate any spillages using commercially available emergency clean up kits; and All personnel are to remain on the prospecting drill site only, to prevent the footprint of the site expanding and further vegetation loss. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	3	4	5	Minor (- 45)
Post-Mitigation	1	2	3	4	Negligible (- 24)

12.2.4 Surface Water and Wetlands

The impacts associated with surface water during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-10.

Table 12-10: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Operational Phase

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> Soil erosion may result from wind and water on the exposed prospecting site and topsoil stockpiles. The soil erosion may result in increased turbidity and sedimentation of surrounding watercourses and wetlands. The likelihood of such an impact occurring has been reduced due to the implementation of a 1:100 year flood line buffer zone from the rivers and tributaries and a 500m buffer from the wetlands. However a water authorisation may be granted where new impacts to the water course will be assessed. Fragmentation of the wetland resources; Contamination of wetland resources; Impacts to water quality as a result of spills; Compaction of soils; Loss of habitat and biodiversity; Increased potential for sheet runoff from paved/cleared surfaces; and Increased potential for erosion. 				
Mitigation required	<ul style="list-style-type: none"> Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions (October to March) so as to prevent erosion; Drilling fluid must be biodegradable; All prospecting activities may not occur within the 500m buffer of a wetland and the 1:100 year flood line of a river or tributary unless a water authorisation is granted; and Berms on the periphery of the prospecting site will be inspected daily and maintained to ensure runoff from within the prospecting site does not report to the catchment. 				
Parameters	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	3	5	6	Moderate (- 60)
Post-Mitigation	2	3	4	4	Minor (-36)

12.2.5 Groundwater

The impacts associated with groundwater during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-11.

Table 12-11: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Groundwater during the Operational Phase

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> The circulation of drill fluid through the drill rig is likely to come into contact with the aquifers. The drill fluid may impact on groundwater quality as it is dispersed. The quantities of drill fluid to disperse and impact on the aquifers is expected to be negligible, provided the drill rig does not break down; and Use of water from boreholes for the prospecting operations may impact on groundwater quantity. 				
Mitigation required	<ul style="list-style-type: none"> Emergency spill response plan required to handle any unplanned spillages this includes the establishment of a catchment berm or collection pan around the drill rig for unforeseen hydro-carbon spillage and lining of water collection/reticulation sumps; Daily inspection of the drill rig must be undertaken prior to the commencement of drilling and routine maintenance must be undertaken to prevent the likelihood of fluid dispersing and breakdowns; Biodegradable drill fluid must be utilised where possible; An agreement with the landowner must be established for the use of water from the boreholes; and Source water from external resources should the groundwater supply not be sufficient for prospecting activities. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	3	3	3	Negligible (- 27)
Post-Mitigation	2	3	3	2	Negligible (-16)

12.2.6 Heritage Resources

Table 12-12 presents the activities expected to occur during the Operational Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 12-12: Interactions and Impacts of Operational Phase Activities

Interaction	Impact
Drilling of approximately ten prospecting boreholes	Digby Wells does not foresee any impact to the cultural heritage landscape, given the nature of the proposed activities and the consideration of the heritage landscape in the placement of the drilling sites and associated infrastructure.
Utilisation of portable toilet facilities	
Handling of general and hazardous waste	
Use of heavy vehicles	
Maintenance of newly established roads	

Digby Wells does not foresee any impact to the identified heritage resources from the above-mentioned activities at this time, but this must be confirmed through in-field assessment. Digby Wells has therefore not assessed these impacts further in this report

12.3 Decommissioning Phase

Each Prospecting site will be rehabilitated immediately following the cessation of the drilling activities for that individual site. All Prospecting sites will be rehabilitated fully prior to the cessation of the Prospecting Right.

12.3.1 Soils, Land Use and Land Capability

The impacts associated with soil and land capability during the Decommissioning Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-13.

Table 12-13: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Decommissioning Phase

Activity 3: Rehabilitation of topsoil cover, ripping and vegetation establishment.	
Criteria	Details / Discussion
Description of impact	<ul style="list-style-type: none"> Soil could wash away into drainage and water systems should backfilling and levelling not take place; The site will be compacted due to heavy machinery and personnel movement on-site, affecting land capability.
Mitigation required	<ul style="list-style-type: none"> Sumps will be backfilled and the site levelled immediately after drilling has concluded. The topography must be restored to the pre-prospecting state; All compacted areas will be ripped to loosen the soils during rehabilitation; Rehabilitation of all prospecting site must be undertaken immediately after prospecting has been completed; Any erosion that may occur must be remediated; and

	<ul style="list-style-type: none"> Rehabilitation monitoring must be conducted until the site has been successfully rehabilitated. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	3	2	6	Minor (- 48)
Post-Mitigation	1	1	2	2	Negligible (- 8)

12.3.2 Fauna and Flora

The impacts associated with fauna and flora during the Decommissioning Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-14.

Table 12-14: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Decommissioning Phase

Activity 3: Rehabilitation of topsoil cover, ripping and vegetation establishment.					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> Rehabilitation will attempt to restore the land to the pre-prospecting condition. Indigenous vegetation will be established and monitored for 1 year following the conclusion of the drilling. This is a positive outcome should it be implemented correctly; Increase and encroachment of alien invasive species due to the presence of disturbed areas. 				
Mitigation required	<ul style="list-style-type: none"> Remove alien invasive species as and when they occur; An alien invasive management plan must be established; All compacted areas will be ripped to loosen the soils during rehabilitation and seeded with an appropriate seed mixture; and The site should be allowed to naturally vegetated and must be monitored until vegetation has been well established. Should vegetation establishment not occur within 3 months, seeding of the area will need to occur utilising an indigenous seed mix. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	3	4	6	Minor (-54)
Post-Mitigation	1	3	2	5	Negligible (-30)

12.3.3 Surface Water and Wetlands

The impacts associated with surface water during the Decommissioning Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-15.

Table 12-15: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Decommissioning Phase

Activity 3: Rehabilitation of topsoil cover, ripping and vegetation establishment.					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> Increased dust and soil erosion during the removal of equipment could lead to sedimentation of the surface water resources and wetlands; and The decommissioning of sumps. 				
Mitigation required	<ul style="list-style-type: none"> The site and access roads will be kept moist to avoid the creation and disturbance of dust and soil erosion which may lead to the sedimentation of watercourses; Cut-off drains or sediment traps should be constructed around rehabilitated areas to prevent erosion from reporting to the catchment; and The sumps must be pumped empty and the oil and sludge must be disposed of at a registered waste facility, with the water treated at a water treatment plant. The liner used in the sumps must be removed from site for reuse elsewhere, or disposal at a registered waste facility, and any potential spillages from the liner on-site must be cleaned up immediately. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	3	4	6	Minor (-54)
Post-Mitigation	1	3	2	5	Negligible (-30)

12.3.4 Heritage Resources

Table 12-16 presents the activities expected to occur during the Decommissioning Phase and the expected impacts to the cultural heritage landscape that may arise from these activities.

Table 12-16: Interactions and Impacts of Decommissioning Phase Activities

Interaction	Impact
Concurrent rehabilitation: mined-out areas will be backfilled with stockpiled topsoil and waste material from the screening plant.	Digby Wells envisages no impact to the cultural heritage landscape, given the nature of the proposed activities and the temporary nature of the proposed infrastructure.
Backfilled material will be levelled and contoured to avoid ponding of water.	
Revegetation: either naturally or through use of an indigenous seed mix where vegetation is not suitably established.	

Digby Wells does not envisage any impact to the identified heritage resources from the above-mentioned activities and has therefore not assessed these impacts further in this report. However, where any structures within the PR area are older than 60 years old, or where structures age beyond 60 years during the Project lifecycle, such structures cannot be destroyed or altered without permits issued in terms of Section 34 of the NHRA.

13 Methodology used in determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks

Details of the impact assessment methodology used to determine the significance of physical, bio-physical and socio-economic impacts are provided below.

The significance rating process follows the established impact/risk assessment formula:

$$\text{Significance} = \text{CONSEQUENCE} \times \text{PROBABILITY} \times \text{NATURE}$$

Where

$$\text{Consequence} = \text{intensity} + \text{extent} + \text{duration}$$

And

$$\text{Probability} = \text{likelihood of an impact occurring}$$

And

$$\text{Nature} = \text{positive (+1) or negative (-1) impact}$$

The matrix calculates the rating out of 147, whereby intensity, extent, duration and probability are each rated out of seven as indicated in Table 13-3. The weight assigned to the various parameters is then multiplied by +1 for positive and -1 for negative impacts.

Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in this BAR. The significance of an impact is then determined and categorised into one of eight categories, as indicated in Table 13-2, extracted from Table 13-1. The descriptions of the significance ratings are presented in Table 13-3.

It is important to note that the pre-mitigation rating takes into consideration the activity as proposed, (i.e., there may already be some mitigation included in the engineering design). If the specialist determines the potential impact is still too high, additional mitigation measures are proposed.

Table 13-1: Impact Assessment Parameter Ratings

Rating	Intensity		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	Positive Impacts (Nature = +1)			
7	Irreplaceable loss or damage to biological or physical resources or highly sensitive environments. Irreplaceable damage to highly sensitive cultural/social resources.	Noticeable, on-going natural and / or social benefits which have improved the overall conditions of the baseline.	<u>International</u> The effect will occur across international borders.	Permanent: The impact is irreversible, even with management, and will remain after the life of the Project.	Definite: There are sound scientific reasons to expect that the impact will occur. >80% probability.
6	Irreplaceable loss or damage to biological or physical resources or moderate to highly sensitive environments. Irreplaceable damage to cultural/social resources of moderate to highly sensitivity.	Great improvement to the overall conditions of a large percentage of the baseline.	<u>National</u> Will affect the entire country.	Beyond Project life: The impact will remain for some time after the life of the Project and is potentially irreversible even with management.	Almost certain / Highly probable: It is most likely that the impact will occur. <80% probability.
5	Serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function. Very serious widespread social impacts. Irreparable damage to highly valued items.	On-going and widespread benefits to local communities and natural features of the landscape.	<u>Province/ Region</u> Will affect the entire province or region.	Project Life (>15 years): The impact will cease after the operational life span of the Project and can be reversed with sufficient management.	Likely: The impact may occur. <65% probability.
4	Serious loss and/or damage to physical or biological resources or moderately sensitive environments, limiting ecosystem function. On-going serious social issues. Significant damage to structures / items of cultural significance.	Average to intense natural and / or social benefits to some elements of the baseline.	<u>Municipal Area</u> Will affect the whole municipal area.	Long term: 6-15 years and impact can be reversed with management.	Probable: Has occurred here or elsewhere and could therefore occur. <50% probability.
3	Moderate loss and/or damage to biological or physical resources of low to moderately sensitive environments and, limiting ecosystem function. On-going social issues. Damage to items of cultural significance.	Average, on-going positive benefits, not widespread but felt by some elements of the baseline.	<u>Local</u> Local extending only as far as the development site area.	Medium term: 1-5 years and impact can be reversed with minimal management.	Unlikely: Has not happened yet but could happen once in the lifetime of the Project, therefore there is a possibility that the impact will occur. <25% probability.

Rating	Intensity		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	Positive Impacts (Nature = +1)			
2	<p>Minor loss and/or effects to biological or physical resources or low sensitive environments, not affecting ecosystem functioning. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.</p>	<p>Low positive impacts experience by a small percentage of the baseline.</p>	<p><u>Limited</u> Limited to the site and its immediate surroundings.</p>	<p>Short term: Less than 1 year and is reversible.</p>	<p>Rare / improbable: Conceivable, but only in extreme circumstances. The possibility of the impact materialising is very low because of design, historic experience or implementation of adequate mitigation measures. <10% probability.</p>
1	<p>Minimal to no loss and/or effect to biological or physical resources, not affecting ecosystem functioning. Minimal social impacts, low-level repairable damage to commonplace structures.</p>	<p>Some low-level natural and / or social benefits felt by a very small percentage of the baseline.</p>	<p><u>Very limited/Isolated</u> Limited to specific isolated parts of the site.</p>	<p>Immediate: Less than 1 month and is completely reversible without management.</p>	<p>Highly unlikely / None: Expected never to happen. <1% probability.</p>

Table 13-2: Probability/ Consequence Matrix

		Significance																																					
Probability	7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
	6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
	5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
	4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
	3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
	2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
	1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			Consequence																																				
		-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Table 13-3: Significance Rating Description

Score	Description	Rating
109 to 147	A very beneficial impact that may be sufficient by itself to justify implementation of the Project. The impact may result in permanent positive change	Major (positive) (+)
73 to 108	A beneficial impact which may help to justify the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and / or social) environment	Moderate (positive) (+)
36 to 72	A positive impact. These impacts will usually result in positive medium to long-term effect on the natural and / or social environment	Minor (positive) (+)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the natural and / or social environment	Negligible (positive) (+)
-3 to -35	An acceptable negative impact for which mitigation is desirable. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural and / or social environment	Negligible (negative) (-)
-36 to -72	A minor negative impact requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the natural and / or social environment	Minor (negative) (-)
-73 to -108	A moderate negative impact may prevent the implementation of the Project. These impacts would be considered as constituting a major and usually a long-term change to the (natural and / or social) environment and result in severe changes.	Moderate (negative) (-)

Score	Description	Rating
-109 to -147	A major negative impact may be sufficient by itself to prevent implementation of the Project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts are likely to be irreversible and/or irreplaceable.	Major (negative) (-)

13.1 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

There will be no infrastructure, temporary or permanent, associated with the proposed Project. The potential negative impacts associated with the Project are deemed to have a negligible significance after mitigation measures due to the limited extent of the drill site.

The extent of the proposed prospecting right area is 1782.8 ha however of that area only 5 ha is expected to be disturbed in total. The location of the prospecting site will be determined through non-invasive prospecting methods where the sensitive environments will be identified and avoided specifically to ensure prospecting does not occur within water courses or its associated buffer zones. These impacts are further discussed in the subsections below.

13.1.1 Establishment Phase

The predominant impacts associated with the Establishment Phase are as a result of site clearing. Site clearing activities will remove vegetation and expose soil surfaces. The exposed soils may become eroded, compacted and contaminated during the Establishment Phase. The erosion of soils may result in additional impacts on the wetlands and surface water resources as sediment finds its way into the watercourses, inhibiting wetland function and deteriorating water quality. It is expected that the prospecting activities will have a slight negative impact on air quality. Site clearing and drilling activities may result in fugitive dust emissions. The establishment activities are limited in footprint and, hence, the potential impacts are expected to be of a minor significance. Machinery and vehicles will be used in the establishment which is anticipated to increase noise generation slightly.

13.1.2 Operational Phase

The predominant impact during the Operational Phase is due to the presence of drill fluid circulating throughout the drilling process and is utilised to cool the drill. Negligible quantities of drill fluid may spill into the environment and cause soil, surface water, wetland and groundwater pollution, if not managed correctly. Negative impacts with regards to the biophysical environment include potential contamination of the area due to spillage of hydrocarbon products. Heritage resource that may be encountered during the Operational Phase may be disturbed or destroyed. The increased dust levels due to the use of access

roads and vehicular activity as well as the increase in ambient noise levels from the drill rig and the movement of vehicles will result in social nuisance. The proposed project is expected to also contribute potentially (directly or indirectly) to the employment of people in an area where unemployment is a challenge.

Should the prospecting right be converted to a mining right the mine has the potential to contribute to the upgrading/ maintenance of infrastructure in and around the local area and indirectly contribute to the economy of the area.

13.1.3 Decommissioning Phase

The impacts associated with decommissioning are similar to the impacts during the Establishment Phase, with soil erosion and the resultant sedimentation of surface water resources the predominant impacts.

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

The most significant potential impacts identified for the proposed Project includes loss of vegetation and soil erosion during the Establishment Phase, possible spillage of drill fluid during the Operational Phase and soil erosion as a result of sedimentation of surface water during Decommissioning of the Project. The erosion of soils may result in additional impacts on the wetlands and surface water resources as sediment finds its way into the watercourses, inhibiting wetland function and deteriorating water quality. The mitigation measures provided aim to prevent or reduce the impacts from occurring. Dust suppression must be used on exposed surfaces and the establishment of vegetation is crucial to managing and prevent soil erosion, leading to a loss of soil resources and containing the source for dust generation. The clearance of natural vegetation will be limited to the prospecting site footprint.

The potential mitigations for the Project have been recommended and entail responsible practices by the prospecting personnel to ensure that the footprint of disturbance is minimised as far as possible.

13.3 Motivation where no alternatives sites were considered

The location of the prospecting activities is determined by the location of the resource. A mobile drill rig utilises rotary or diamond core drilling which will be used and requires water and lubricants to drill the boreholes. Access routes and roads will be required to transport the mobile drill rig to the sites, resulting in additional potential impacts. The mobile drill rig can drill to great depths and requires a site of approximately 25m X 25m. The prospecting activities will avoid sensitive environments, such as watercourse, wetlands, fauna and flora where possible.

13.4 Statement motivating the alternative development location within the overall site

As noted above, the prospecting site is small and exact locations will be determined based on non-invasive prospecting methods. All watercourses and wetlands will be avoided with their associated buffers. The project site will also not require any permanent infrastructure to be constructed, with only temporary access routes being utilised. A more detailed description is provided in Section 9.

14 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

Refer to Section 12 for a description of the process undertaken to identify, assess and rank the impacts, the proposed project will impose on the preferred site.

The prospecting activities are deemed to have negligible impact on the receiving environment after mitigation measures are implemented due to the limited extent of each disturbed area. Some vegetation may be cleared in preparation of the site, as well as potentially impacted upon during site access, however the vegetation will be limited with a negligible impact expected on the surrounding habitats.

As the determination for the location of the prospecting boreholes will be based on non-invasive methods, very few impacts are anticipated. All impacts identified will be mitigated against to reduce the significance of such impacts.

Refer to Section 15 below for a description of all environmental issues and risks that were identified during the environmental impact assessment process.

15 Assessment of each identified potentially significant impact and risk

The potential impacts per activity are detailed in Table 15-1 below. The impacts per phase of the Project are outlined in Section 12 Item 3 (g)(v) above and indicate the mitigation measures proposed, as well as the impact significance pre-mitigation and post mitigation.

Table 15-1: Assessment of Each Identified Impact

Activity	Potential Impact	Aspects Affected	Phase	Pre-Significance	Mitigation Measure	Significance
Establishment Phase						
Site Clearance	<ul style="list-style-type: none"> Impacts due to dust and noise generation are likely to be a nuisance to the nearest receptors. Increased dust levels may result due to site clearing, use of access roads and vehicular activity; and Ambient noise levels will increase due to vehicles and site clearing machinery 	Social Nuisance Impacts	Project life	Negligible Negative	<ul style="list-style-type: none"> Keep soils moist to suppress possibility of dust; Ensure that dust suppressants are applied to gravel or unpaved roads that are in use; Vehicles and machinery will be properly maintained to minimise operating noise; Ensure agreements with the land owners have been established prior to the drilling of boreholes; Vehicles will obey speed limits; and Bulk Delivery of materials should be maximised to reduce the frequency of deliveries. 	Negligible Negative
	<ul style="list-style-type: none"> Soil compaction due to machinery and increased personnel activity; Soil erosion due to site clearance and stockpile of topsoil exposure to wind and water; and Loss of topsoil due to erosion. 	Soils	Establishment Phase	Minor Negative	<ul style="list-style-type: none"> Only clear vegetation when and where necessary; Only remove topsoil when and where necessary; Ensure topsoil is stored in one dedicated stockpile, less than 1 m high, and within the demarcated prospecting site; and Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions so as to prevent erosion (December to March). 	Negligible Negative
	<ul style="list-style-type: none"> Site clearing will result in the direct loss of vegetation communities; The loss of vegetation communities will result in the loss of biodiversity, with cleared areas resulting in potential habitat fragmentation 	Fauna and Flora	Establishment Phase	Minor Negative	<ul style="list-style-type: none"> Only remove vegetation when and where necessary; Minimise the size of the prospecting drill sites as far as possible; Indigenous trees and protected species will not be removed; Undertake a screening of the area prior to prospecting to ensure no important species occur within the drill site; Drainage lines, and indigenous vegetation will be avoided; and Use existing access roads where possible. 	Negligible Negative
	<ul style="list-style-type: none"> Soil erosion may result from wind and water on the exposed prospecting site and topsoil stockpiles. The soil erosion may result in increased turbidity and sedimentation of surrounding watercourses and wetlands. The likelihood of such an impact occurring has been reduced due to the implementation of a 	Surface water	Establishment Phase Operational Phase	Minor Negligible	<ul style="list-style-type: none"> Ensure site clearing is limited to the designated areas; Berms must be constructed around the periphery of the prospecting site to separate clean and dirty water. Water 	Negligible Negative

Activity	Potential Impact	Aspects Affected	Phase	Pre-Significance	Mitigation Measure	Significance
	<p>1:100 year flood line buffer zone from the rivers and tributaries and a 500m buffer from the wetlands. However a water authorisation may be granted where new impacts to the water course will be assessed.</p> <ul style="list-style-type: none"> Fragmentation of the wetland resources as a result of road crossings; Contamination of wetland resources; Impacts to water quality as a result of spills; Compaction of soils; Loss of habitat and biodiversity; Increased potential for sheet runoff from paved/cleared surfaces; and Increased potential for erosion. 				<p>within the prospecting site must be diverted to the water sump;</p> <ul style="list-style-type: none"> All prospecting activities may not occur within the 500m buffer of a wetland and the 1:100 year flood line of a river or tributary unless a water authorisation is granted; Remedy through concurrent rehabilitation and monitoring; and Remediate using commercially available emergency clean up kits. 	
Operational Phase						
Drilling of Prospecting Boreholes	<ul style="list-style-type: none"> Impacts due to dust and noise generation are likely to be a nuisance to the nearest receptors. Increased dust levels may result due to site clearing, use of access roads and vehicular activity; Dust generation from vehicular activity; and Increased dust due to erosion of soil stockpiles. 	Social Nuisances	Project life	Minor Negative	<ul style="list-style-type: none"> Maintain drilling equipment and, if possible, fit silencing equipment; Use a dust suppressant and keep access roads moist; and Cover stockpiles with a plastic liner in windy and rain conditions so as to prevent topsoil from eroding 	Negligible Negative
	<ul style="list-style-type: none"> Compaction of soil due to machinery and personnel on-site; and Stockpiles of topsoil could erode during windy and rainy days (December to March). Soil disturbance and/or compaction; Increased incidence of erosion; Sedimentation from erosion; Potential water quality deterioration 	Soils	Operational Phase Decommissioning Phase	Moderate Negative	<ul style="list-style-type: none"> Stockpiles must be covered with a plastic liner in windy and rain conditions (October to March) to prevent potential soil erosion; and Remedy through concurrent rehabilitation and monitoring. 	Minor Negative
	<ul style="list-style-type: none"> Faunal species may disperse from the area due to loss of habitats, as well as due to the generation of noise from the drilling activities; Disturbance to avifauna and other fauna utilising the freshwater resources thus resulting in an overall loss of biodiversity. Habitat fragmentation; and Risk of increase and encroachment of alien invasive species. 	Fauna and Flora	Operational Phase Decommissioning Phase	Minor Negative	<ul style="list-style-type: none"> Remove alien invasive species as and when they occur; Maintain drilling equipment and, if possible, fit silencing equipment; Remediate any spillages using commercially available emergency clean up kits; and All personnel are to remain on the prospecting drill site only, to prevent the footprint of the site expanding and further vegetation loss. 	Negligible Negative

Activity	Potential Impact	Aspects Affected	Phase	Pre-Significance	Mitigation Measure	Significance
	<ul style="list-style-type: none"> Soil erosion may result from wind and water on the exposed prospecting site and topsoil stockpiles. The soil erosion may result in increased turbidity and sedimentation of surrounding watercourses and wetlands. The likelihood of such an impact occurring has been reduced due to the implementation of a 1:100 year flood line buffer zone from the rivers and tributaries and a 500m buffer from the wetlands. However a water authorisation may be granted where new impacts to the water course will be assessed. Fragmentation of the wetland resources; Contamination of wetland resources; Impacts to water quality as a result of spills; Compaction of soils; Loss of habitat and biodiversity; Increased potential for sheet runoff from paved/cleared surfaces; and Increased potential for erosion. 	Surface Water	Operation Phase	Moderate Negligible	<ul style="list-style-type: none"> Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions (October to March) so as to prevent erosion; Drilling fluid must be biodegradable; All prospecting activities may not occur within the 500m buffer of a wetland and the 1:100 year flood line of a river or tributary unless a water authorisation is granted; and Berms on the periphery of the prospecting site will be inspected daily and maintained to ensure runoff from within the prospecting site does not report to the catchment. 	Minor Negative
	<ul style="list-style-type: none"> The circulation of drill fluid through the drill rig is likely to come into contact with the aquifers. The drill fluid may impact on groundwater quality as it is dispersed. The quantities of drill fluid to disperse and impact on the aquifers is expected to be negligible, provided the drill rig does not break down; and Use of water from boreholes for the prospecting operations may impact on groundwater quantity. 	Groundwater	Operation Phase	Negligible Negative	<ul style="list-style-type: none"> Emergency spill response plan required to handle any unplanned spillages; Daily inspection of the drill rig must be undertaken prior to the commencement of drilling and routine maintenance must be undertaken to prevent the likelihood of fluid dispersing and breakdowns; An agreement with the landowner must be established for the use of water from the boreholes; and Source water from external resources should the groundwater supply not be sufficient for prospecting activities. 	Negligible Negative
<ul style="list-style-type: none"> Decommissioning Phase 						
Rehabilitation	<ul style="list-style-type: none"> Encroachment of alien invasive vegetation. Rehabilitation will attempt to restore the land to the pre-prospecting condition. Indigenous vegetation will be established and monitored for 1 year following the conclusion of the drilling. This is a positive outcome should it be implemented correctly; and Increase and encroachment of alien invasive species due to the presence of disturbed areas. 	Fauna and Flora	Decommissioning Phase	Minor Negligible	<ul style="list-style-type: none"> Remove alien invasive species as and when they occur; An alien invasive management plan must be established; All compacted areas will be ripped to loosen the soils during rehabilitation and seeded with an appropriate seed mixture; and The site should be allowed to naturally vegetated and must be monitored until vegetation has been well established. Should vegetation establishment not occur within 3 months, seeding of the area will need to occur utilising an indigenous seed mix.. 	Negligible Negative

Activity	Potential Impact	Aspects Affected	Phase	Pre-Significance	Mitigation Measure	Significance
	<ul style="list-style-type: none"> Soil could wash away into drainage and water systems should backfilling and levelling not take place; The site will be compacted due to heavy machinery and personnel movement on-site, affecting land capability. 	Soils	Operational Phase Decommissioning Phase	Minor Negative	<ul style="list-style-type: none"> Sumps will be backfilled and the site levelled immediately after drilling has concluded. The topography must be restored to the pre-prospecting state; All compacted areas will be ripped to loosen the soils during rehabilitation; Rehabilitation of all prospecting site must be undertaken immediately after prospecting has been completed; Any erosion that may occur must be remediated; and Rehabilitation monitoring must be conducted until the site has been successfully rehabilitated. 	Negligible Negative
	<ul style="list-style-type: none"> Increased dust and soil erosion during the removal of equipment could lead to sedimentation of the surface water resources and wetlands; and The decommissioning of sumps 	Surface Water	Decommissioning Phase	Minor Negative	<ul style="list-style-type: none"> The site and access roads will be kept moist to avoid the creation and disturbance of dust and soil erosion which may lead to the sedimentation of watercourses; Cut-off drains or sediment traps should be constructed around rehabilitated areas to prevent erosion from reporting to the catchment; and The sumps must be pumped empty and the oil and sludge must be disposed of at a registered waste facility, with the water treated at a water treatment plant. The liner used in the sumps must be removed from site for reuse elsewhere, or disposal at a registered waste facility, and any potential spillages from the liner on-site must be cleaned up immediately. 	Negligible Negative

16 Summary of specialist reports

Baseline assessments were undertaken in support of this BAR which have been described below.

Table 16-1: Specialist Studies undertaken for the Project

List of Studies undertaken	Recommendations of Specialist Reports (Inputs of the Specialist Studies)	Specialist Recommendations that have been included in the BAR	Reference to Applicable Section of Report where Specialist Recommendations have been Included
Biodiversity Screening Report - Wetlands	<p>Based solely on any available contour data and high-resolution aerial imagery, the freshwater resources within the vicinity of the proposed project were delineated into hillslope seepage wetlands connected to a watercourse, valley bottom wetlands with a channel, valley bottom wetlands without a channel and a floodplain.</p> <p>All 10 of the proposed drilling locations are located within desktop delineated wetlands, and or within the 100 m and 500 m zone of regulations. A Floodplain NFEPA Wetland (Rank 6) is located along the eastern section of the Project Area with a small Un-channelled Valley Bottom NFEPA Wetland (Rank 6) located in the south-west. Therefore, as per Section 21 (c) and (i) of the NWA, the activities will require a full WUL application or a GN application, depending on the outcome of the DWS risk assessment unless the boreholes are relocated.</p> <p>It is therefore recommended to conduct a risk assessment (including a site visit confirming the wetland delineations and impacts) to identify the possible risks to these wetlands and to confirm whether a WULA or a GA is applicable to the Moorndrift Project.</p>	X – The specialist inputs have been included into this BAR	Refer to Appendix D and Part A Section and Part B Section 5 and 6.
Biodiversity Screening Report - Aquatics	<p>Based on the gathered desktop information, the considered aquatic ecosystems appear to be in a largely modified state (Ecological Category D) (DWS, 2014). The EI and ES of all systems are further classified as Moderate due to the presence of mostly common aquatic biota that are largely tolerant.</p> <p>Some species of varying sensitivities and habitat preferences are expected within the systems, including aquatic macroinvertebrate taxa moderately intolerant to water quality modifications and no-flow conditions, and a single fish species moderately intolerant to water quality modifications (i.e. <i>Micropanchax johnstoni</i>) and a single fish species moderately intolerant to no-flow conditions (i.e. <i>Labeobarbus marequensis</i>).</p> <p>In addition, the Vulnerable fish species <i>Oreochromis mossambicus</i> is expected to occur within the considered aquatic ecosystems. Its presence is extant within the lower Mogalakwena River based on specialist experience within the project area. However, ground truthing is recommended to confirm its presence, as well as the presence of the aforementioned moderately intolerant taxa, within the direct proposed prospecting area.</p>	X – The specialist inputs have been included into this BAR	Refer to Appendix D and Part A Section 11 and Part B Section 5 and 6.
Biodiversity Screening Report – Fauna and Flora	<p>Due to the location of the CBA 1, proximity of the Protected Areas, potential occurrence of certain SCC and numerous wetlands within the Project Area, an assessment will need to be conducted to assess potential impacts such as habitat loss, habitat fragmentation, AIP proliferation and loss of faunal and floral SCC.</p> <p>Field verification will focus on the proposed drilling locations, where impacts are expected to be greatest. It is therefore recommended to conduct an impact assessment to assess the expected losses of vegetation and flora along with associated faunal habitats. In combination with, and as part of, the BAR the Mining and Biodiversity Guidelines 2013 and LCP v2 will be considered.</p> <p>A strategic environmental management plan for the area should be developed and adhered to. This should include the conservation of CBAs and sensitive areas (identified during upcoming fieldwork) as well as provision of corridors for faunal migration.</p>	X – The specialist inputs have been included into this BAR	Refer to Appendix D and Part A Section 11 and Part B Section 5 and 6.

List of Studies undertaken	Recommendations of Specialist Reports (Inputs of the Specialist Studies)	Specialist Recommendations that have been included in the BAR	Reference to Applicable Section of Report where Specialist Recommendations have been Included
Heritage Specialist Study	<p>Considering the nature and the scope of the Project, Digby Wells recommends the following recommendations be implemented prior to the commencement of the Project:</p> <ul style="list-style-type: none"> ● PalRho must appoint a suitably-qualified heritage specialist to undertake a pre-disturbance survey of the Project area to verify the presence or absence of heritage resources that may be impacted by the proposed Project and to inform the placement of the proposed boreholes; ● The results of the pre-disturbance survey and an updated assessment of the potential impacts to identified heritage resources must be submitted to the HRAs for adjudication. PalRho must receive Final Comment from the HRAs before the Project may commence and PalRho must comply with all HRA conditions during Project activities; and ● PalRho must develop and implement a CFP prior to the commencement of Project activities to mitigate against potential impacts to unidentified heritage resources. This CFP must be approved by the HRAs prior to implementation. 	X – The specialist inputs have been included into this BAR	Refer to Appendix E and Part A Section 11 and Part B Section 5 and 6.
Closure and Rehabilitation Assessment	<p>Potential unwanted events for and during closure were identified and discussed.</p> <p>Nine (9) unwanted events were identified. These unwanted events were ranked for risk based on the maximum reasonable severity should they occur and the likelihood of that specific severity/consequence occurring. This analysis was firstly done assuming that no controls are in place (i.e. the raw risk) and secondly considering current controls were in place and effective (i.e. residual risk). Five events were ranked (2) as highly intolerable, six (6) as ALARP and one (1) ranked maintain. All of the above are the raw risks without mitigation.</p> <p>Only the scheduled closure scenario is described for the Moorddrift Prospecting Project, once activities are implemented on-site the Closure Plan should be updated to include an unscheduled closure scenario. Actions should be implemented during the operational phase to reduce the financial burden at closure (concurrent rehabilitation).</p>	X – The specialist inputs have been included into this BAR	Refer to Appendix F and Part A Section 11 and Part B Section 5 and 6

17 Environmental impact statement

17.1 Summary if the key findings of the environmental impact assessment

The Environmental Impact Statement is utilised to summarise all of the potential environmental impacts identified during each phase of the proposed Project. The significance of the impacts associated with the biophysical environment, pre-mitigation and post-mitigation, is summarised in Table 17-1.

Table 17-1: Summary of the Potential Impacts

Phase	Activity	Potential Impact	Aspects Affected	Pre-Significance	Significance
Establishment Phase	Site Clearance	<ul style="list-style-type: none"> Impacts due to dust and noise generation are likely to be a nuisance to the nearest receptors. Increased dust levels may result due to site clearing, use of access roads and vehicular activity; and Ambient noise levels will increase due to vehicles and site clearing machinery 	Social Nuisance Impacts	Negligible Negative	Negligible Negative
		<ul style="list-style-type: none"> Soil compaction due to machinery and increased personnel activity; Soil erosion due to site clearance and stockpile of topsoil exposure to wind and water; and Loss of topsoil due to erosion. 	Soils	Minor Negative	Negligible Negative
		<ul style="list-style-type: none"> Site clearing will result in the direct loss of vegetation communities; The loss of vegetation communities will result in the loss of biodiversity, with cleared areas resulting in potential habitat fragmentation 	Fauna and Flora	Minor Negative	Negligible Negative
		<ul style="list-style-type: none"> Soil erosion may result from wind and water on the exposed prospecting site and topsoil stockpiles. The soil erosion may result in increased turbidity and sedimentation of surrounding watercourses and wetlands. The likelihood of such an impact occurring has been reduced due to the implementation of a 1:100 year flood line buffer zone from the rivers and tributaries and a 500m buffer from the wetlands. However a water authorisation may be granted where new impacts to the water course will be assessed. Fragmentation of the wetland resources as a result of road crossings; Contamination of wetland resources; Impacts to water quality as a result of spills; Compaction of soils; Loss of habitat and biodiversity; Increased potential for sheet runoff from paved/cleared surfaces; and Increased potential for erosion. 	Surface water	Minor Negligible	Negligible Negative
Operational Phase	Drilling of Prospecting Boreholes	<ul style="list-style-type: none"> Impacts due to dust and noise generation are likely to be a nuisance to the nearest receptors. Increased dust levels may result due to site clearing, use of access roads and vehicular activity; Dust generation from vehicular activity; and Increased dust due to erosion of soil stockpiles. 	Social Nuisances	Minor Negative	Negligible Negative
		<ul style="list-style-type: none"> Compaction of soil due to machinery and personnel on-site; and Stockpiles of topsoil could erode during windy and rainy days (December to March). Soil disturbance and/or compaction; Increased incidence of erosion; 	Soils	Moderate Negative	Minor Negative

Phase	Activity	Potential Impact	Aspects Affected	Pre-Significance	Significance
		<ul style="list-style-type: none"> Sedimentation from erosion; Potential water quality deterioration 			
		<ul style="list-style-type: none"> Faunal species may disperse from the area due to loss of habitats, as well as due to the generation of noise from the drilling activities; Disturbance to avifauna and other fauna utilising the freshwater resources thus resulting in an overall loss of biodiversity. Habitat fragmentation; and Risk of increase and encroachment of alien invasive species. 	Fauna and Flora	Minor Negative	Negligible Negative
		<ul style="list-style-type: none"> Soil erosion may result from wind and water on the exposed prospecting site and topsoil stockpiles. The soil erosion may result in increased turbidity and sedimentation of surrounding watercourses and wetlands. The likelihood of such an impact occurring has been reduced due to the implementation of a 100 m or 500m buffer from all watercourses or wetlands. However a water authorisation may be granted where new impacts to the water course will be assessed. Fragmentation of the wetland resources; Contamination of wetland resources; Impacts to water quality as a result of spills; Compaction of soils; Loss of habitat and biodiversity; Increased potential for sheet runoff from paved/cleared surfaces; and Increased potential for erosion. 	Surface Water	Moderate Negative	Minor Negative
		<ul style="list-style-type: none"> The circulation of drill fluid through the drill rig is likely to come into contact with the aquifers. The drill fluid may impact on groundwater quality as it is dispersed. The quantities of drill fluid to disperse and impact on the aquifers is expected to be negligible, provided the drill rig does not break down; and Use of water from boreholes for the prospecting operations may impact on groundwater quantity. 	Groundwater	Negligible Negative	Negligible Negative
Decommissioning Phase	Rehabilitation	<ul style="list-style-type: none"> Encroachment of alien invasive vegetation. Rehabilitation will attempt to restore the land to the pre-prospecting condition. Indigenous vegetation will be established and monitored for 1 year following the conclusion of the drilling. This is a positive outcome should it be implemented correctly; and Increase and encroachment of alien invasive species due to the presence of disturbed areas. 	Fauna and Flora	Minor Negligible	Negligible Negative
		<ul style="list-style-type: none"> Soil could wash away into drainage and water systems should backfilling and levelling not take place; The site will be compacted due to heavy machinery and personnel movement on-site, affecting land capability. 	Soils	Minor Negative	Negligible Negative

Phase	Activity	Potential Impact	Aspects Affected	Pre-Significance	Significance
		<ul style="list-style-type: none"> Increased dust and soil erosion during the removal of equipment could lead to sedimentation of the surface water resources and wetlands; and The decommissioning of sumps 	Surface Water	Minor Negative	Negligible Negative

17.2 Final Site Map

The prospecting sites will be 100m² in extent. A total of 10 prospecting borehole sites is expected to be drilled. The Project area with the proposed borehole locations is displayed in Plan 4, Appendix B. It should be noted that the location of these boreholes may change deepening on the non-invasive method investigation and thus these are just an indication of where the boreholes may be drilled.

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

This section has been discussed in Section 13.1, Part A of this report.

18 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR

The EMPr seeks to achieve a required end state and describes how activities that have, or could have, an adverse impact on the environment will be mitigated, controlled and monitored.

This EMPr addresses the environmental impacts during the Construction, Operational, Decommissioning and Post-Closure Phases of the Project. Due regard must be given to environmental protection during the entire Project; a number of environmental recommendations are made to achieve environmental protection. These recommendations are aimed at ensuring that the contractor maintains adequate control over the Project to:

- Minimise the extent of an impact during the life of the Project;
- Ensure appropriate restoration of areas affected by the Project; and
- Prevent long term environmental degradation.

19 Aspects for inclusion as conditions of authorisation

The EAP recommends that the following conditions be considered for inclusion into the Authorisation, should it be granted:

- The mitigation measures contained in the attached specialist reports and EMPr for the proposed prospecting project must be adhered to;
- Annual environmental audits against the conditions of the EMPr and licence must be undertaken to ensure mitigation measures are being implemented; and
- Monitoring must be undertaken as described in the monitoring programme provided in Part B Section 8.

20 Description of any Assumptions, Uncertainties and Gaps in Knowledge

The following assumptions were identified as part of the Biodiversity Screening Assessment, Heritage and Closure -Plan and Risk Assessment as presented in Table 20-1.

Table 20-1: Assumptions and Limitations

Biodiversity Screening Assessment
<p>The following assumptions were identified as part of the Biodiversity Screening Assessment:</p> <ul style="list-style-type: none"> ● The Biodiversity Screening Assessment is based on documents provided by PalRho Exploration and supplemented by relevant further research. It is assumed that these are accurate; ● Due to increasing climate change events and the general non-perennial nature of the considered river systems associated with the project, the perceived aquatic biodiversity is assumed to be of low abundance and in poor ecological state. Ground truthing is recommended to confirm the presence of desktop-defined conditions, specifically the expected aquatic biota; ● The report was consolidated using desktop information only, no site visits, ground truthing or field assessments were undertaken; ● Wetland delineations were done using aerial imagery, together with contour data and as a result some discrepancies in terms of the extent of the delineated area might occur until verification can be undertaken through a field survey; ● No wetland health, services and functionality assessments were conducted, all data provided in this report is purely based on the specialist opinion based on desktop information available; ● No impact assessments were conducted; ● This report must be considered as a dynamic document and will be updated as information becomes available; and ● The described aquatic biodiversity and sensitivity within the considered ecosystems was done solely from a desktop level. Data was supplemented with specialist experience, where possible. However, it is worth noting that inaccuracies in aquatic species diversity is to be expected to a marginal extent, especially considering the dynamic nature of aquatic ecosystems.
Closure -Plan and Risk Assessment
<p>The compilation of this Report is based on the following assumptions and limitations:</p> <ul style="list-style-type: none"> ● The information contained within this Closure Plan is based on the current layout plans and information provided by PalRho; ● If there is a significant change or addition of other infrastructure areas, the Closure Plan will need updating to cater for the change; ● The recommendations contained within this report currently exclude any comments or issues raised by stakeholders and/or I&APs. This report will be updated should any comments from stakeholders or I&APs be received; and

- This report must be considered as a living document and should be updated as additional information become available and as monitoring and rehabilitation progresses.

Heritage Assessment

- Digby Wells did not undertake a pre-disturbance survey to inform this assessment. At the time of the compilation of this report, PalRho was engaging with the landowners to inform them of the proposed Project and could not establish requirements for access to the properties within the regulated timeframes;
- Whilst every attempt was made to obtain the latest available information, the reviewed literature does not represent an exhaustive list of information sources for the various project area; and
- Archaeological and palaeontological resources commonly occur at subsurface levels. These types of resources cannot be adequately recorded or documented by assessors without destructive and intrusive methodologies and without the correct permits issued in terms of Section 35 of the NHRA.

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

21.1 Reasons why the activity should be authorised or not

The limited extent of the prospecting activities will have insignificant impact on the environment. Digby Wells recommends that the proposed prospecting activities be granted authorisation, provided that the stipulated mitigation and management measures are implemented for the proposed project.

21.2 Conditions that must be included in the authorisation

The implementation of the mitigation measures provided in this report must be a condition for authorisation.

22 Period for which the environmental authorisation is required

The Prospecting Right is required for a period of 5 years.

23 Undertaking

Please refer to Part B of Section 12 for the complete undertaking application to both the BAR and EMP sections of this report.


24 Financial provision

The closure cost assessment for the Moorddrift Prospecting Project is aligned with The Financial Provisioning Regulations, 2015 (GN R. 1147 of 20 November 2015) (as amended)

published under the NEMA. The closure costs are also determined in accordance with the broader legislative requirements presented in the Closure Report appended to this report.

A summary of the initial scheduled closure costs for the Moorddrift Project is provided in Table 24-1 and amounts to **R 466,931** (excl. VAT).

Table 24-1: Summary of the initial closure costs

 DIGBY WELLS ENVIRONMENTAL	Digby Wells Environmental
	PalRho Exploration Proprietary Limited, Moorddrift, PAL6882 Revision: 1
Area and Description	End of Operation
<u>Infrastructure and Rehabilitation</u>	
Area 1: Prospecting Sites and Boreholes	R110,745
Area 2: Access Roads	R207,600
Sub-total	R318,345
<u>Monitoring and Maintenance</u>	
Monitoring Costs (Vegetation)	R16,810
Maintenance Costs (Vegetation)	R61,741
Sub-total	R78,550
Preliminary and General (12%)	R38,201
Contingency (10%)	R31,835
GRAND TOTAL	R466,931

24.1 Explain how the aforesaid amount was derived

The costing methodology employed is summarised as follows:

- Conduct a document review of available information) and compile a ERR to distil an initial set of rehabilitation actions to provide a basis for the costing;
- Compile an itemised layout plan indicating the battery limits for the closure costing based on the above;
- Populate a site-specific closure costing spreadsheet using the Digby Wells GN R.1147 aligned template to develop a costing model;
- Determine the site-specific closure and rehabilitation unit rates based on the Digby Wells rates database, interaction with rehabilitation contractors and from experience in the implementation of similar projects; and

- Documenting the methodology, outcomes and forward working plan to address the identified knowledge gaps.

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

PalRho confirms that it has the available resources to provide the amount determined in Section 24.

25 Specific Information required by the competent Authority

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

No impacts on the socio-economic conditions of any directly affected person have been identified. The following general socio-economic impacts are anticipated:

- Positive impacts of proposed project can be summarised as follows:
 - **Employment-** Limited jobs may be generated from the drilling of the prospecting boreholes however should the prospecting right be converted to a mining right a positive socio-economic impact will be anticipated.
- Negative impacts of the proposed project can be summarised as follows:
 - **Social Nuisance-** increased dust levels are anticipated due to the site clearing and vehicular activity as well as the increase in ambient noise levels from machinery and the movement of vehicles will result in social nuisance immediate surroundings. These impacts are expected to be negligible.

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

Based on a review of the applicable planning documents and available socio-economic data. The potential socio-economic benefits that will arise from the Project outweigh the identified risks and impacts to the known heritage resources within the site-specific project area. This statement is supported by the potential for the identified impacts to heritage resources to be mitigated through the recommendations included in Section 12.

26 Other matters required in terms of sections 24(4)(a) and (b) of the Act

Section 24(4)(b)(i) of the NEMA (as amended), provides that an investigation must be undertaken of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts,

including the option of not implementing the activity. The outcome of the investigation has been provided in Section 7 to Section 18 of this BAR.

Draft Basic Assessment Report

Basic Assessment Report and Environmental Management Programme in support of
PalRho Exploration Proprietary Limited Prospecting Right Application on the farm Moorddrift
289KR, Mokopane, Limpopo Province

PAL6882



DIGBY WELLS
ENVIRONMENTAL

Part B: Environmental Management Programme Report

1 Details of the EAP

The details of the EAP have been provided in Section 2, Part A of this report.

2 Description of the aspects of the activity

The aspects of the activity as described in Section 5 of Part A are covered by the EMP.

3 Composite Map

The composite plan for the Project area, indicating sensitive areas, heritage resources watercourse buffers, is included as Plan 11, Appendix B.

4 Description of Impact management objectives including management statements

4.1 Determination of closure objectives

Aligned with the closure approach and principles, the following initial closure objectives are proposed for the Moorddrift Prospecting Application:

- Implement responsible closure practices and leave a closed exploration-site that does not represent a risk to the health and safety of people or animals ;
- Minimize potential adverse effects to environmental quality, such as surface or ground water impacts;
- Rehabilitate or remove any waste or potentially hazardous substances from site;
- Rehabilitate disturbed areas to a suitable land capability to ensure the constructive integration and alignment of the rehabilitated site with the surrounding land use mix;
- Ensure proactive and constructive stakeholder engagement with individuals, communities and relevant authorities regarding the proposed end land use;
- Reduce the requirement for long-term monitoring and maintenance by establishing stable landforms;
- Comply with national regulatory requirements; and
- Obtain a closure certificate.

4.2 Volumes and rate of water use required for the operation

Water will be required during the drilling activities to be passed over the drill bits to ensure that the drill does not overheat. Water will also be utilised for dust suppression, when required. The water will be sourced either through an agreement with the landowner or transported in through a water truck. The volumes will be determined once a contractor has been appointed.

4.3 Has a water use licence has been applied for

A water use licence has not been applied for as the site-specific borehole locations have not yet been determined. A water authorisation will need to be applied for if any water uses are triggered in terms of Section 21 of the NWA. Depending on the risk assessment, if a low risk is identified a General Authorisation application can be applied for.

5 Impacts to be mitigated in their respective phases

The proposed mitigation measures and its compliance with the relevant standards are presented in Table 5-1.

Table 5-1: Impacts to be Mitigated

Activity	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standards	Time Period for Implementation
Establishment Phase						
Site Clearance	Social Nuisance	Establishment Phase	Limited to the prospecting site	<ul style="list-style-type: none"> Keep soils moist to suppress possibility of dust; Ensure that dust suppressants are applied to gravel or unpaved roads that are in use; Vehicles and machinery will be properly maintained to minimise operating noise; Ensure agreements with the land owners have been established prior to the drilling of boreholes; Vehicles will obey speed limits; and Bulk Delivery of materials should be maximised to reduce the frequency of deliveries. 	<ul style="list-style-type: none"> Dust Management Plan Regular Vehicle Inspections in accordance with: NEM:AQA; and ECA. 	<ul style="list-style-type: none"> Ongoing and Daily during: Establishment Phase
	Soils	Establishment Phase	100 m ²	<ul style="list-style-type: none"> Only clear vegetation when and where necessary; Only remove topsoil when and where necessary; Ensure topsoil is stored in one dedicated stockpile, less than 1 m high, and within the demarcated prospecting site; and Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions so as to prevent erosion (December to March). 	<ul style="list-style-type: none"> Soil Rehabilitation Plan; and Storm Water Management Plan in accordance with: MPRDA Regulation 56 (1) to (8); soil pollution and erosion control; and CARA. 	<ul style="list-style-type: none"> Ongoing and Weekly during: Establishment Phase
	Fauna and Flora	Establishment Phase	100 m ²	<ul style="list-style-type: none"> Only remove vegetation when and where necessary; Minimise the size of the prospecting drill sites as far as possible; Indigenous trees and protected species will not be removed; Undertake a screening of the area prior to prospecting to ensure no important species occur within the drill site; Drainage lines, and indigenous vegetation will be avoided; and Use existing access roads where possible.. 	<ul style="list-style-type: none"> NEM:BA; and ECA. 	<ul style="list-style-type: none"> Ongoing during: Establishment Phase
	Biodiversity	Establishment Phase	100 m ²	<ul style="list-style-type: none"> Remedy through concurrent rehabilitation and monitoring; and Remediate using commercially available emergency clean up kits. 	<ul style="list-style-type: none"> NEM:BA; and ECA. 	<ul style="list-style-type: none"> Ongoing during: Establishment Phase
	Biodiversity	Establishment Phase	100 m ²	<ul style="list-style-type: none"> Remedy through concurrent rehabilitation and monitoring. 	<ul style="list-style-type: none"> NEM:BA; and ECA. 	<ul style="list-style-type: none"> Ongoing during: Establishment Phase

Activity	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standards	Time Period for Implementation
	Biodiversity	Establishment Phase	100 m ²	<ul style="list-style-type: none"> Remedy through concurrent rehabilitation and monitoring; and Remediate using commercially available emergency clean up kits. 	<ul style="list-style-type: none"> NEM:BA; and ECA. 	<ul style="list-style-type: none"> Ongoing during: Establishment Phase
	Surface water and Wetlands	Establishment Phase	Local	<ul style="list-style-type: none"> Ensure site clearing is limited to the designated areas; Berms must be constructed around the periphery of the prospecting site to separate clean and dirty water. Water within the prospecting site must be diverted to the water sump; All prospecting activities may not occur within the 500m buffer of a wetland and the 1:100 year flood line of a river or tributary unless a water authorisation is granted; Remedy through concurrent rehabilitation and monitoring; and Remediate using commercially 	<ul style="list-style-type: none"> Buffer zones; and Spill Response Plan in accordance with: NWA; Best Practice Guidelines; MPRDA. 	<ul style="list-style-type: none"> As required and throughout: Establishment Phase
	Groundwater	Establishment Phase	Local	<ul style="list-style-type: none"> All potential hydrocarbon spillages and leaks must be cleaned up immediately and the soils remediated; Spillage control kits will be readily available on-site to contain the mobilisation of contaminants and clean up spills; All vehicles and machinery to be serviced in a hard park area or at an off-site location; and Vehicles with leaks must have drip trays in place. 	<ul style="list-style-type: none"> Spill Response Plan; and Vehicle Maintenance Plan in accordance with: NWA; Best Practice Guidelines 	<ul style="list-style-type: none"> As required
	Cultural Heritage	Establishment Phase	Site specific	<ul style="list-style-type: none"> PalRho must appoint a suitably qualified heritage specialist to undertake an in-field assessment the Project area to inform the placement of the proposed boreholes; and Where any heritage resources are identified through the in-field assessment, impacts to these resources must be assessed and the results of this assessment must be submitted to the HRAs for Statutory Comment 	<ul style="list-style-type: none"> Section 35 of the NHRA. 	<ul style="list-style-type: none"> Prior to the compilation of the borehole drilling plan daily during: Establishment Phase
Operational Phase						
Drilling of Prospecting Boreholes	Social Nuisance	Operational Phase	Limited	<ul style="list-style-type: none"> Maintain drilling equipment and, if possible, fit silencing equipment; Use a dust suppressant and keep access roads moist; and Cover stockpiles with a plastic liner in windy and rain conditions so as to prevent topsoil from eroding. 	<ul style="list-style-type: none"> Dust Management Plan 	<ul style="list-style-type: none"> Ongoing and Daily during: Establishment Phase
	Fauna and Flora	Operational Phase	100 m ²	<ul style="list-style-type: none"> Remove alien invasive species as and when they occur; Maintain drilling equipment and, if possible, fit silencing equipment; and All personnel are to remain on the prospecting drill site only, to prevent the footprint of the site expanding and further vegetation loss. 	<ul style="list-style-type: none"> NEM:BA; and ECA. 	<ul style="list-style-type: none"> Ongoing during: Operational Phase
	Soil	Operational Phase	Site Specific	<ul style="list-style-type: none"> Stockpiles must be covered with a plastic liner in windy and rain conditions (October to March) to prevent potential soil erosion; and 	<ul style="list-style-type: none"> MPRDA Regulation 56 (1) to (8); soil pollution 	<ul style="list-style-type: none"> As required and throughout: Operational Phase

Activity	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standards	Time Period for Implementation
		Decommissioning Phase		<ul style="list-style-type: none"> Remedy through concurrent rehabilitation and monitoring 	<ul style="list-style-type: none"> and erosion control; and CARA. 	
	Surface Water and wetlands	Operational Phase	Local	<ul style="list-style-type: none"> Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions (October to March) so as to prevent erosion; Drilling fluid must be biodegradable; All prospecting activities may not occur within the 500m buffer of a wetland and the 1:100 year flood line of a river or tributary unless a water authorisation is granted; and Berms on the periphery of the prospecting site will be inspected daily and maintained to ensure runoff from within the prospecting site does not report to the catchment. 	<ul style="list-style-type: none"> Spill Response Plan in accordance with: MPRDA Regulation 56 (1) to (8); soil pollution and erosion control. 	<ul style="list-style-type: none"> As required and throughout: Operational Phase
	Groundwater	Operational Phase	Local	<ul style="list-style-type: none"> Emergency spill response plan required to handle any unplanned spillages; Daily inspection of the drill rig must be undertaken prior to the commencement of drilling and routine maintenance must be undertaken to prevent the likelihood of fluid dispersing and breakdowns; An agreement with the landowner must be established for the use of water from the boreholes; and Source water from external resources should the groundwater supply not be sufficient for prospecting activities. 	<ul style="list-style-type: none"> Spill Response Plan; and Vehicle Maintenance Plan in accordance with: NWA; Best Practice Guidelines 	As required
Decommissioning Phase						
Rehabilitation	Surface Water	Project life	Local	<ul style="list-style-type: none"> The site and access roads will be kept moist to avoid the creation and disturbance of dust and soil erosion which may lead to the sedimentation of watercourses; Cut-off drains or sediment traps should be constructed around rehabilitated areas to prevent erosion from reporting to the catchment; and The sumps must be pumped empty and the oil and sludge must be disposed of at a registered waste facility, with the water treated at a water treatment plant. The liner used in the sumps must be removed from site for reuse elsewhere, or disposal at a registered waste facility, and any potential spillages from the liner on-site must be cleaned up immediately. 	<ul style="list-style-type: none"> MPRDA Regulation 56 (1) to (8); soil pollution and erosion control; CARA 	<ul style="list-style-type: none"> As required during: Operational Phase and Decommissioning Phase.
	Soil	Operational Phase Decommissioning Phase	100 m ²	<ul style="list-style-type: none"> Sumps will be backfilled and the site levelled immediately after drilling has concluded. The topography must be restored to the pre-prospecting state; All compacted areas will be ripped to loosen the soils during rehabilitation; Rehabilitation of all prospecting site must be undertaken immediately after prospecting has been completed; Any erosion that may occur must be remediated; and 	<ul style="list-style-type: none"> Spill Response Plan; and Vehicle Maintenance Plan in accordance with: 	<ul style="list-style-type: none"> As required

Activity	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standards	Time Period for Implementation
				<ul style="list-style-type: none"> Rehabilitation monitoring must be conducted until the site has been successfully rehabilitated 	<ul style="list-style-type: none"> MPRDA Regulation 56 (1) to (8); soil pollution and erosion control; CARA. 	
	Fauna and Flora	Decommissioning Phase	100 m ²	<ul style="list-style-type: none"> Remove alien invasive species as and when they occur; An alien invasive management plan must be established; All compacted areas will be ripped to loosen the soils during rehabilitation and seeded with an appropriate seed mixture; and The site should be allowed to naturally vegetated and must be monitored until vegetation has been well established. Should vegetation establishment not occur within 3 months, seeding of the area will need to occur utilising an indigenous seed mix. 	<ul style="list-style-type: none"> NEM:BA; and ECA. 	<ul style="list-style-type: none"> Ongoing during: Decommission Phase
	Biodiversity	Decommissioning Phase	100 m ²	<ul style="list-style-type: none"> Remedy through concurrent rehabilitation and monitoring; and Remediate using commercially available emergency clean up kits. 	<ul style="list-style-type: none"> NEM:BA; and ECA. 	<ul style="list-style-type: none"> Ongoing during: Decommission Phase

6 Impact management outcomes

A description of the impact management actions, objectives and outcomes of the EMP is outlined in Table 6-1, taking into account the impact and mitigation type.

Table 6-1: Outcomes and Objectives of the EMP

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standards to be Achieved	Time Period for Implementation	Compliance with Standards
Establishment Phase							
	<ul style="list-style-type: none"> Impacts due to dust and noise generation are likely to be a nuisance to nearest receptors. Increased dust levels may result due to site clearing, use of access roads and vehicular activity; and Ambient noise levels will increase due to vehicles and site clearing machinery 	Social Nuisance	Establishment Phase	<ul style="list-style-type: none"> Keep soils moist to suppress possibility of dust; Ensure that dust suppressants are applied to gravel or unpaved roads that are in use; Vehicles and machinery will be properly maintained to minimise operating noise; Ensure agreements with the land owners have been established prior to the drilling of boreholes; Vehicles will obey speed limits; and Bulk Delivery of materials should be maximised to reduce the frequency of deliveries.. 	<ul style="list-style-type: none"> To minimise fugitive dust generation emanating from the Project. 	Control through: <ul style="list-style-type: none"> Dust Management Plan. Vegetation Establishment. Operating hours. Use of silencers. Routine maintenance and services. 	<ul style="list-style-type: none"> Dust Management Plan
Site Clearance	<ul style="list-style-type: none"> Soil compaction due to machinery and increased personnel activity; Soil erosion due to site clearance and stockpile of topsoil exposure to wind and water; and Loss of topsoil due to erosion.. 	Soils	Establishment Phase	<ul style="list-style-type: none"> Only clear vegetation when and where necessary; Only remove topsoil when and where necessary; Ensure topsoil is stored in one dedicated stockpile, less than 1 m high, and within the demarcated prospecting site; and Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions so as to prevent erosion (December to March). 	<ul style="list-style-type: none"> To prevent soil contamination and degradation. 	<ul style="list-style-type: none"> Ongoing and Weekly during: Establishment Phase 	<ul style="list-style-type: none"> Soil Rehabilitation Plan; and Storm Water Management Plan in accordance with: MPRDA Regulation 56 (1) to (8); soil pollution and erosion control; and CARA.
	<ul style="list-style-type: none"> Site clearing will result in the direct loss of vegetation communities; 	Fauna and Flora	Establishment Phase	<ul style="list-style-type: none"> Only remove vegetation when and where necessary; 	<ul style="list-style-type: none"> To prevent and minimise the loss of vegetation 	<ul style="list-style-type: none"> Ongoing during: 	<ul style="list-style-type: none"> NEM:BA; and ECA.

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standards to be Achieved	Time Period for Implementation	Compliance with Standards
	<ul style="list-style-type: none"> The loss of vegetation communities will result in the loss of biodiversity, with cleared areas resulting in potential habitat fragmentation 			<ul style="list-style-type: none"> Minimise the size of the prospecting drill sites as far as possible; Indigenous trees and protected species will not be removed; Undertake a screening of the area prior to prospecting to ensure no important species occur within the drill site; Drainage lines, and indigenous vegetation will be avoided; and Use existing access roads where possible.. 	<ul style="list-style-type: none"> communities; and To minimise habitat destruction. 	<ul style="list-style-type: none"> Establishment Phase 	
	<ul style="list-style-type: none"> Soil erosion may result from wind and water on the exposed prospecting site and topsoil stockpiles. The soil erosion may result in increased turbidity and sedimentation of surrounding watercourses and wetlands. The likelihood of such an impact occurring has been reduced due to the implementation of a 1:100 year flood line buffer zone from the rivers and tributaries and a 500m buffer from the wetlands. However a water authorisation may be granted where new impacts to the water course will be assessed.; Fragmentation of the wetland resources as a result of road crossings; Contamination of wetland resources; Impacts to water quality as a result of spills; 	Surface water	Establishment Phase Operational Phase	<ul style="list-style-type: none"> Ensure site clearing is limited to the designated areas; Berms must be constructed around the periphery of the prospecting site to separate clean and dirty water. Water within the prospecting site must be diverted to the water sump; All prospecting activities may not occur within the 500m buffer of a wetland and the 1:100 year flood line of a river or tributary unless a water authorisation is granted; Remedy through concurrent rehabilitation and monitoring; and Remediate using commercially available emergency clean up kits. 	<ul style="list-style-type: none"> To prevent sedimentation of surface water resources and wetlands. 	<ul style="list-style-type: none"> As required and throughout: Establishment Phase 	<ul style="list-style-type: none"> Buffer zones; and Spill Response Plan in accordance with: NWA; Best Practice Guidelines; MPRDA.

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standards to be Achieved	Time Period for Implementation	Compliance with Standards
	<ul style="list-style-type: none"> • Compaction of soils; • Loss of habitat and biodiversity; • Increased potential for sheet runoff from paved/cleared surfaces; and • Increased potential for erosion. 						
Operational Phase							
Drilling of Prospecting Boreholes	<ul style="list-style-type: none"> • Impacts due to dust and noise generation are likely to be a nuisance to the nearest receptors. Increased dust levels may result due to site clearing, use of access roads and vehicular activity; • Dust generation from vehicular activity; and • Increased dust due to erosion of soil stockpiles. 	Social Nuisance	Establishment Phase	<ul style="list-style-type: none"> • Maintain drilling equipment and, if possible, fit silencing equipment; • Use a dust suppressant and keep access roads moist; and • Cover stockpiles with a plastic liner in windy and rain conditions so as to prevent topsoil from eroding 	<ul style="list-style-type: none"> • To minimise fugitive dust generation emanating from the Project. 	Control through: <ul style="list-style-type: none"> • Dust Management Plan. • Vegetation Establishment. • Operating hours. • Use of silencers. • Routine maintenance and services. 	<ul style="list-style-type: none"> • Dust Management Plan
	<ul style="list-style-type: none"> • Compaction of soil due to machinery and personnel on-site; and • Stockpiles of topsoil could erode during windy and rainy days (December to March). • Soil disturbance and/or compaction; • Increased incidence of erosion; • Sedimentation from erosion; • Potential water quality deterioration 	Soil	Operational Phase	<ul style="list-style-type: none"> • Stockpiles must be covered with a plastic liner in windy and rain conditions (October to March) to prevent potential soil erosion; and • Remedy through concurrent rehabilitation and monitoring. 	<ul style="list-style-type: none"> • To prevent soil contamination and degradation. 	<ul style="list-style-type: none"> • Ongoing and Daily during: • Establishment Phase 	<ul style="list-style-type: none"> • Dust Management Plan

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standards to be Achieved	Time Period for Implementation	Compliance with Standards
	<ul style="list-style-type: none"> Faunal species may disperse from the area due to loss of habitats, as well as due to the generation of noise from the drilling activities; Disturbance to avifauna and other fauna utilising the freshwater resources thus resulting in an overall loss of biodiversity. Habitat fragmentation; and Risk of increase and encroachment of alien invasive species. 	Fauna and Flora	Operational Phase	<ul style="list-style-type: none"> Remove alien invasive species as and when they occur; Maintain drilling equipment and, if possible, fit silencing equipment; Remediate any spillages using commercially available emergency clean up kits; and All personnel are to remain on the prospecting drill site only, to prevent the footprint of the site expanding and further vegetation loss. 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> As required and throughout: Operational Phase 	<ul style="list-style-type: none"> Buffer zones; and Spill Response Plan in accordance with: NWA; Best Practice Guidelines; MPRDA.
	<ul style="list-style-type: none"> Soil erosion may result from wind and water on the exposed prospecting site and topsoil stockpiles. The soil erosion may result in increased turbidity and sedimentation of surrounding watercourses and wetlands. The likelihood of such an impact occurring has been reduced due to the implementation of a 100 m or 500m buffer from all watercourses or wetlands. However a water authorisation may be granted where new impacts to the water course will be assessed; Fragmentation of the wetland resources; Contamination of wetland resources; Impacts to water quality as a result of spills; 	Surface Water	Operational Phase	<ul style="list-style-type: none"> Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions (October to March) so as to prevent erosion; Drilling fluid must be biodegradable; All prospecting activities may not occur within the 500m buffer of a wetland and the 1:100 year flood line of a river or tributary unless a water authorisation is granted; and Berms on the periphery of the prospecting site will be inspected daily and maintained to ensure runoff from within the prospecting site does not report to the catchment. 	<ul style="list-style-type: none"> To prevent the sedimentation of surface water resources and wetlands. 	<ul style="list-style-type: none"> As required 	<ul style="list-style-type: none"> Spill Response Plan; and Vehicle Maintenance Plan in accordance with: NWA; Best Practice Guidelines

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standards to be Achieved	Time Period for Implementation	Compliance with Standards
	<ul style="list-style-type: none"> • Compaction of soils; • Loss of habitat and biodiversity; • Increased potential for sheet runoff from paved/cleared surfaces; and • Increased potential for erosion. 						
	<ul style="list-style-type: none"> • The circulation of drill fluid through the drill rig is likely to come into contact with the aquifers. The drill fluid may impact on groundwater quality as it is dispersed. The quantities of drill fluid to disperse and impact on the aquifers is expected to be negligible, provided the drill rig does not break down; and • Use of water from boreholes for the prospecting operations may impact on groundwater quantity 	Groundwater	Operational Phase	<ul style="list-style-type: none"> • Emergency spill response plan required to handle any unplanned spillages; • Daily inspection of the drill rig must be undertaken prior to the commencement of drilling and routine maintenance must be undertaken to prevent the likelihood of fluid dispersing and breakdowns; • An agreement with the landowner must be established for the use of water from the boreholes; and • Source water from external resources should the groundwater supply not be sufficient for prospecting activities. 	<ul style="list-style-type: none"> • To prevent contamination of groundwater and reduction in groundwater quality. 	<ul style="list-style-type: none"> • As required during: • Operational Phase 	<ul style="list-style-type: none"> • NEM:BA; and • ECA.
Decommissioning Phase							
Rehabilitation	<ul style="list-style-type: none"> • Encroachment of alien invasive vegetation. Rehabilitation will attempt to restore the land to the pre-prospecting condition. Indigenous vegetation will be established and monitored for 1 year following the conclusion of the drilling. This is a positive outcome should it be implemented correctly; and 	Fauna and Flora	Decommissioning Phase	<ul style="list-style-type: none"> • Remove alien invasive species as and when they occur; • An alien invasive management plan must be established; • All compacted areas will be ripped to loosen the soils during rehabilitation and seeded with an appropriate seed mixture; and • The site should be allowed to naturally vegetated and must be monitored until vegetation has been well established. Should vegetation establishment not occur within 3 months, seeding of the 	<ul style="list-style-type: none"> • To rehabilitate and establish vegetation to align with the closure objectives 	<ul style="list-style-type: none"> • As required during: • Operational Phase and Decommissioning Phase. 	<ul style="list-style-type: none"> • NEM:BA; and • ECA.

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standards to be Achieved	Time Period for Implementation	Compliance with Standards
	<ul style="list-style-type: none"> Increase and encroachment of alien invasive species due to the presence of disturbed areas. 			<p>area will need to occur utilising an indigenous seed mix..</p>			
	<ul style="list-style-type: none"> Soil could wash away into drainage and water systems should backfilling and levelling not take place; The site will be compacted due to heavy machinery and personnel movement on-site, affecting land capability. 	Soil	Operational Phase Decommissioning Phase	<ul style="list-style-type: none"> Sumps will be backfilled and the site levelled immediately after drilling has concluded. The topography must be restored to the pre-prospecting state; All compacted areas will be ripped to loosen the soils during rehabilitation; Rehabilitation of all prospecting site must be undertaken immediately after prospecting has been completed; Any erosion that may occur must be remediated; and Rehabilitation monitoring must be conducted until the site has been successfully rehabilitated. 	<ul style="list-style-type: none"> To prevent soil contamination and degradation in accordance with the CARA. 	<ul style="list-style-type: none"> Ongoing during: Decommissioning Phase 	<ul style="list-style-type: none"> Buffer zones; and Spill Response Plan in accordance with: NWA; Best Practice Guidelines; MPRDA.
	<ul style="list-style-type: none"> Increased dust and soil erosion during the removal of equipment could lead to sedimentation of the surface water resources and wetlands; and The decommissioning of sumps 	Surface Water	Decommissioning Phase	<ul style="list-style-type: none"> The site and access roads will be kept moist to avoid the creation and disturbance of dust and soil erosion which may lead to the sedimentation of watercourses; Cut-off drains or sediment traps should be constructed around rehabilitated areas to prevent erosion from reporting to the catchment; and The sumps must be pumped empty and the oil and sludge must be disposed of at a registered 	<ul style="list-style-type: none"> To prevent sedimentation and contamination of surface water resources and wetlands 	<ul style="list-style-type: none"> Ongoing during: Decommissioning Phase 	<ul style="list-style-type: none"> NWA; Best Practice Guidelines

7 Financial provision

7.1 Determination of the amount of Financial Provision

7.1.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation

Aligned with the closure approach and principles, the following initial closure objectives are proposed for the Moorddrift Prospecting Application:

- Implement responsible closure practices and leave a closed exploration-site that does not represent a risk to the health and safety of people or animals ;
- Minimize potential adverse effects to environmental quality, such as surface or ground water impacts;
- Rehabilitate or remove any waste or potentially hazardous substances from site;
- Rehabilitate disturbed areas to a suitable land capability to ensure the constructive integration and alignment of the rehabilitated site with the surrounding land use mix;
- Ensure proactive and constructive stakeholder engagement with individuals, communities and relevant authorities regarding the proposed end land use;
- Reduce the requirement for long-term monitoring and maintenance by establishing stable landforms;
- Comply with national regulatory requirements; and
- Obtain a closure certificate.

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

As part of the PPP, this BAR, along with the closure objectives, will be provided to I&APs for review and stakeholders will be able to provide comment.

7.1.3 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 rehabilitation and closure actions required to address the identified risks are summarised in Table 7-1. Only the scheduled closure scenario is described for the Moorddrift Prospecting Project, once activities are implemented on-site the Closure Plan should be updated to include an unscheduled closure scenario. Actions should be implemented during the operational phase to reduce the financial burden at closure (concurrent rehabilitation).

Table 7-1: Summary of Rehabilitation and Closure Actions per area

Areas	Concurrent rehabilitation	Closure Measures
Drill sites	<p>The following measures should be implemented for all drilling sites:</p> <ul style="list-style-type: none"> • Shape and level areas to ensure a free draining landform aligned with the surrounding surface water drainage framework • Rip all disturbed areas to alleviate compaction • Ameliorate soil chemistry based on dedicated fertility sampling and analysis • Seed areas with a suitable species mix sourced from reputable suppliers to ensure quality • Conduct rehabilitation sampling and performance assessments to highlight deficiencies and determine when closure objectives (abandonment criteria) have been met • Conduct post rehabilitation care and maintenance to address deficiencies highlighted through the monitoring period 	<p>The following measures should be implemented at closure for the drill sites developed:</p> <ul style="list-style-type: none"> • Shape and level areas to ensure a free draining landform aligned with the surrounding surface water drainage framework • Rip all disturbed areas to alleviate compaction • Ameliorate soil chemistry based on dedicated fertility sampling and analysis • Seed areas with a suitable species mix sourced from reputable suppliers to ensure quality • Conduct rehabilitation sampling and performance assessments to highlight deficiencies and determine when closure objectives (abandonment criteria) have been met • Conduct post rehabilitation care and maintenance to address deficiencies highlighted through the monitoring period
Tracks developed for access to drill sites	<p>None, tracks to remain to access wells and rehabilitated drill sites as required.</p>	<p>The following measures should be implemented at closure:</p> <ul style="list-style-type: none"> • Shape and level areas to ensure a free draining landform aligned with the surrounding surface water drainage framework. • Rip all disturbed areas to alleviate compaction. • Ameliorate soil chemistry based on dedicated fertility sampling and analysis. • Seed areas with a suitable species mix sourced from

Areas	Concurrent rehabilitation	Closure Measures
		reputable suppliers to ensure quality. <ul style="list-style-type: none"> ● Conduct rehabilitation sampling and performance assessments to highlight deficiencies and determine when closure objectives (abandonment criteria) have been met. ● Conduct post rehabilitation care and maintenance to address deficiencies highlighted through the monitoring period.
Boreholes	<ul style="list-style-type: none"> ● Remove and dispose drill sludge and drill chips or residue ● Loosen topsoil, apply mulch, fertiliser and seed. ● Place drill socks down boreholes to remove hydrocarbons that might exist in the borehole water. ● Test boreholes for contamination with hydrocarbons. ● Capping and casing of boreholes. 	<ul style="list-style-type: none"> ● Remove and dispose drill sludge and drill chips or residue ● Loosen topsoil, apply mulch, fertiliser and seed. ● Test and analyse boreholes for contamination with hydrocarbons. ● Capping and casing of boreholes.

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


The rehabilitation plan has been compiled in support of the primary closure objective which is to rehabilitate the prospecting sites to their natural or predetermined state, or to a land use that conforms to the generally accepted principles of sustainable development through restoration, remediation, rehabilitation and stabilisation remediation of the impact land to a post-mining land use capable of supporting grazing activities.

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

The closure cost assessment for the Moorddrift Prospecting Project is aligned with The Financial Provisioning Regulations, 2015 (GN R. 1147 of 20 November 2015) (as amended) published under the NEMA. The closure costs are also determined in accordance with the broader legislative requirements presented in the Closure Report appended to this report.

A summary of the initial scheduled closure costs for the Moorddrift Project is provided in Table 7-2 and amounts to **R 466,931** (excl. VAT).

Table 7-2: Summary of the initial closure costs

 DIGBY WELLS ENVIRONMENTAL	Digby Wells Environmental
	PalRho Exploration Proprietary Limited, Moorddrift, PAL6882 Revision: 1
Area and Description	End of Operation
<u>Infrastructure and Rehabilitation</u>	
Area 1: Prospecting Sites and Boreholes	R110,745
Area 2: Access Roads	R207,600
Sub-total	R318,345
<u>Monitoring and Maintenance</u>	
Monitoring Costs (Vegetation)	R16,810
Maintenance Costs (Vegetation)	R61,741
Sub-total	R78,550
Preliminary and General (12%)	R38,201
Contingency (10%)	R31,835
GRAND TOTAL	R466,931

7.1.6 Confirm that the financial provision will be provided as determined

PalRho confirms that it has the available resources to provide the amount determined in Section 24.

8 Monitoring compliance with and performance assessment

PalRho will be responsible for the implementation of all of the monitoring of mitigation and management measures, as well as compliance with the EMP. The recommended monitoring for the identified impacts is detailed in Table 8-1. PalRho will keep a record of all environmental monitoring carried out on-site.

8.1 Monitoring of impact management actions

The identified impacts that require monitoring programmes include the following:

- Site clearing and establishment:
 - Removal of vegetation;
 - Impact on watercourses and wetlands; and

- Soil erosion.
- Prospecting:
 - Soil erosion;
 - Dust and noise; and
 - Water generated.
- Hydrocarbon spillages;
- Domestic waste; and
- Rehabilitation.

Supervisors must be appointed to monitor the potential impacts of the above-mentioned activities and Project Managers will foresee that all of the management plans are implemented. Once the prospecting activities have been completed, PaIRho will appoint an independent environmental officer to conduct a site visit to audit the rehabilitation following which a report will be compiled and submitted to the DMRE.

8.2 Monitoring and reporting frequency

Table 8-1 discussed the monitoring and reporting frequency for the management of impacts.

8.3 Responsible persons

Table 8-1 sets out roles and responsibilities concerning the monitoring programme.

8.4 Time period for implementing impact management actions

Table 8-1 captures the time period for implementing impact management actions.

8.5 Mechanism for monitoring compliance

Table 8-1 sets out the method of monitoring the implementation of the impact management actions, the frequency of monitoring the implementation of the impact management actions, an indication of the persons who will be responsible for the implementation of the impact management actions, the time periods within which the impact management actions must be implemented and the mechanism for monitoring compliance with the identified impact management actions.

Table 8-1: Monitoring and Management of Environmental Impacts

Activities	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
All activities throughout the Project life	Removal of vegetation	<ul style="list-style-type: none"> Vegetation cleared from the prospecting drill site will be stored adjacent to the prospecting drill site and removed from the area should it not be adequate to use for rehabilitation. Only the necessary vegetation required for the establishment of the prospecting drill site will be cleared and indigenous trees and prospected species will be avoided 	<ul style="list-style-type: none"> Environmental Manager 	Daily
	Soil erosion	<ul style="list-style-type: none"> All topsoil removed will be stored in a stockpile and protected from erosion for use during rehabilitation. Daily site inspection will be undertaken by the site manager to ensure that all soil erosion mitigation measures are in place and implemented 	<ul style="list-style-type: none"> Environmental Manager Soil Specialist 	Daily
	Dust and Noise	<ul style="list-style-type: none"> Soil stockpiles must be covered with a plastic liner during windy conditions. The drill must be maintained and serviced regularly and, if possible, a silencing system should be fitted. Drilling must be communicated to directly affected persons 	<ul style="list-style-type: none"> Environmental Manager 	Daily
	Water generated	<ul style="list-style-type: none"> Water generated from the drilling must be captured and treated as waste water, since drill fluids will be present in the water 	<ul style="list-style-type: none"> Environmental Manager 	Daily
	Access roads	<ul style="list-style-type: none"> Machinery operators and drivers must be made aware of the possible safety hazards that they could pose 	<ul style="list-style-type: none"> Environmental Manager 	Daily
	Heritage landscape	<ul style="list-style-type: none"> A Watching Brief must be implemented during site establishment in the event that heritage resources are discovered. Identified heritage resources (historical structures, graves and Iron Age sites) must be avoided and a 50 m buffer implemented 	<ul style="list-style-type: none"> Environmental Manager 	Daily during site establishment
	Use of hydrocarbons	<ul style="list-style-type: none"> During drilling, a spill tray will be placed under the machinery to collect any hydrocarbon leaks and spillages. Should spillages occur, the soil must be cleared and treated utilising bioremediation techniques. Should the soil not be adequately treated on-site, the soil must be removed from the prospecting drill site and disposed of at a waste handling facility 	<ul style="list-style-type: none"> Environmental Manager 	Daily
	Ablution facilities	<ul style="list-style-type: none"> The contents of the chemical toilets must be emptied on a regular basis, at least weekly, to prevent spillages 	<ul style="list-style-type: none"> Environmental Manager 	Weekly

Activities	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
	Domestic waste	<ul style="list-style-type: none"> Bins will be placed at each prospecting drill site to collect the domestic waste and will be disposed of at a registered waste handling facility. The waste in the rubbish bins will be removed as required by the contractor 	<ul style="list-style-type: none"> Environmental Manager 	Weekly
	Rehabilitation	<ul style="list-style-type: none"> Review of rehabilitation after each prospecting activity 	<ul style="list-style-type: none"> Environmental Manager 	After the completion of each prospecting activity
	Environmental Impacts	<ul style="list-style-type: none"> Annual environmental audits to ensure compliance to the EMPr and authorisation conditions 	<ul style="list-style-type: none"> Independent EAP 	Annually

9 Indicate the frequency of the submission of the performance assessment/ environmental audit report

An environmental audit report for the proposed project will be submitted on an annual basis to the DMRE from commencement of the activity until a closure application has been submitted.

10 Environmental Awareness Plan

10.1 Manner in which the Applicant Intends to Inform his or her Employees of any Environmental Risk which may result from their Work

The purpose of the Environmental Awareness Plan is to outline the methodology that will be used to inform PalRho staff of environmental risks that may result from the working environment, and the manner in which these risks will be dealt with to reduce the potential degradation of the environment.

10.1.1 Awareness Training

10.1.2 Specific Environmental Training

Environmental Awareness Training will be undertaken to make employees and contractors aware of the following:

- The importance of conforming with the environmental policy and procedures and with the requirements of the EMP;
- The significant social and environmental impacts of their work activities and the environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the environmental management system;
- The potential consequences of departure from specified operating procedures; and
- Possible archaeological finds action steps for mitigation measures, surface collections, excavations and communication routes to follow in the case of a discovery.

The guidelines for training are summarized below, which are in line with the ISO 14001:2004 guidelines with regards to training and awareness creation.

Table 10-1: Training Guidelines

Types of Training	Audience	Purpose
Raising awareness of the strategic importance of environmental management.	Senior management	To gain commitment and alignment to the organisation's environmental policy.
Raising general environmental awareness.	All employees	To gain commitment to the environmental policy and objectives and to instil a sense of individual responsibility.
Skill enhancement.	Employees with environmental responsibilities	To improve performance in specific tasks.
Compliance.	Employees whose actions can affect compliance	To ensure that regulatory and internal requirements for training are met.

The training programme will consist of the following elements:

- Identification of employee training needs;
- Development of a training plan to address defined needs;
- Verification of conformance of the training programme to regulatory or organisation requirements and standards;
- Training of target employee groups;
- Documentation of training received; and
- Evaluation of training received.

This training is undertaken on an annual basis for all personnel, together with the annual required induction programmes. The training material provided will be subject to annual review, based on issues such as incidents, accidents, new legislative requirements, modified processes and environmental and social aspects identified from time to time. This training is to be carried out and coordinated internally by PalRho.

PalRho will, therefore, develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets.

In addition, an Emergency Preparedness Plan will be communicated and trained to all site personnel during the induction process.

10.1.3 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment

An Emergency Response Plan has been developed and is the approach used by PalRho to respond to risks that may pollute or degrade the environment during the during the establishment, operational and closure and rehabilitation phases.

11 Specific information required by the Competent Authority

(The financial provision for the environmental rehabilitation and closure requirements of mining operations is governed by National Environmental Management Act, 1998, Act 107 of 1998), as amended, (NEMA) which provides in Section 24P that the holder of a prospecting right must make financial provision for rehabilitation of negative environmental impacts. The financial provision will be reviewed annually.

12 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.

Signature of the Environmental Assessment Practitioner:	
Name of Company:	Digby Wells
Date:	June 2021

13 References

- Behrens, J. & Swanepoel, N., 2008. Historical archaeologies of southern Africa: precedents and prospects. In: N. Swanepoel, A. Esterhuysen & P. Bonner, eds. *Five Hundred Years Rediscovered: South African precedents and prospects*. Johannesburg: Wits University Press, pp. 23-39.
- Biemond, W. M., 2014. *The Iron Age Sequence around a Limpopo River floodplain on Basinghall Farm, Tuli Block, Botswana, during the second Millenium AD*, Unpublished MA dissertation: University of South Africa.
- Bonner, P., 1983. *Kings, commoners and concessionaires. The evolution and dissolution of the nineteenth century Swazi State. African Study Series, Volume 31*. Cambridge: Cambridge University Press.
- Cawthorn, R. G. et al., 2006. The Bushveld Complex. In: *The Geology of South Africa*. Johannesburg / Pretoria: Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria, pp. 261-282.
- Clark, J., 1982. The cultures of the Middle Palaeolithic/Middle Stone Age. In: J. Clark, ed. *The Cambridge History of Africa, Volume 1: From the Earliest Times to c. 500 BC*. Cambridge: Cambridge University Press, pp. 248-341.
- Behrens, J., & Swanepoel, N. (2008). Historical archaeologies of southern Africa: precedents and prospects. In N. Swanepoel, A. Esterhuysen, & P. Bonner (Eds.), *Five Hundred Years Rediscovered: South African precedents and prospects* (pp. 23-39). Johannesburg: Wits University Press.
- Biemond, W. M. (2014). *The Iron Age Sequence around a Limpopo River floodplain on Basinghall Farm, Tuli Block, Botswana, during the second Millenium AD*. Unpublished MA dissertation: University of South Africa.
- Bonner, P. (1983). *Kings, commoners and concessionaires. The evolution and dissolution of the nineteenth century Swazi State. African Study Series, Volume 31*. Cambridge: Cambridge University Press.
- Clark, J. (1982). The cultures of the Middle Palaeolithic/Middle Stone Age. In J. Clark (Ed.), *The Cambridge History of Africa, Volume 1: From the Earliest Times to c. 500 BC* (pp. 248-341). Cambridge: Cambridge University Press.
- Climate-data.org. (n.d.). *Climate-data.org*. Retrieved from Climate-data.org: <https://en.climate-data.org/>
- Darwell, W., Smith, K., Tweddle, D., & Skelton, P. (2009). *The status and distribution of freshwater biodiversity in southern Africa*. Grahamstown, South Africa: SAIAB: Gland, Switzerland: IUCN.
- DEA. (2007). *Threatened or Protected Species (TOPS) Regulations*.

- Deacon, H., & Deacon, J. (1999). *Human Beginnings in South Africa*. Cape Town: David Phillip.
- Delius, P. (1983). *The land belongs to us*. Berkley: University of California Press.
- Delius, P., & Cope, R. (2007). Hard-fought frontiers: 1845 - 1883. In P. Delius, *Mpumalanga: History and Heritage*. (pp. 137-199). Pietermaritzburg: University of KwaZulu-Natal Press.
- Department of Environmental Affairs. (2016). *National Protected Area Expansion Strategy for South Africa*. Pretoria, South Africa.
- Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, & South African National Biodiversity Institute. (2013). *Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector*. Pretoria.
- Department of Water Affairs and Forestry. (2005). *A practical field procedure for the identification and delineation of wetlands and riparian areas*. Pretoria: DWAF.
- Department of Water Affairs and Forestry. (2008). *Updated manual for identification and delineation of wetlands and riparian areas*. Pretoria: DWAF.
- Desmet, P., Holness, S., Skowno, A., & Egan, V. (2013). *Limpopo Conservation Plan v.2: Technical Report. Contract Number EDET/2216/2012. Report for Limpopo Department of Economic Development, Environment & Tourism (LEDET) by ECOSOL GIS*.
- Driver, A., Nel, J., Snaddon, K., Murray, K., Roux, D., & Hill, L. (2011). *Implementation Manual for Freshwater Ecosystem Priority Areas. Draft Report for the Water Research Commission*. Retrieved from <http://www.wrc.org.za/Knowledge Hub D>
- Du Piesanie, J., Higgitt, N., Hennessy, M., & Koeslag, L. (2016). *Heritage Impact Assessment Addendum Report: Addendum to the Environmental Impact Assessment Report for the Proposed Platreef Underground Mine near Mokopane, Limpopo Province*. Digby Wells Environmental: Unpublished report prepared for Ivanplats (Pty) Ltd. SAHRIS Case ID: 566.
- Environomics CC & NRM Consulting. (2010). *Environmental Management Framework for the Waterberg District: Status Quo Report*. Department of Environmental Affairs: Unpublished report.
- Esterhuysen, A. (2003). *Phase 1 & Phase 2 Report Makapan Valley Project: Heritage and Archaeological Resources Development Project*. University of the Witwatersrand: Unpublished report.
- Esterhuysen, A. B. (2006). *Let the Ancestors Speak: an archaeological excavation and re-evaluation of events prior and pertaining to the 1854 siege of Mugombane, Limpopo Province, South Africa*. University of the Witwatersrand: Unpublished PhD dissertation.

- Esterhuysen, A. B. (2007). Ceramic alliances: pottery and the history of the Kekana Ndebele in the old Transvaal. In N. Swanepoel, A. B. Esterhuysen, & P. Bonner (Eds.), *Five Hundred Years Rediscovered: Southern African Precedents and Prospects* (pp. 197-215). Johannesburg: Wits University Press.
- Esterhuysen, A. B. (2010). Excavations at Historic Cave, Makapan's Valley, Limpopo: 2001-2005. *South African Archaeological Bulletin*, 65(191), 67-83.
- Esterhuysen, A. B., Sanders, V. M., & Smith, J. M. (2009). Human skeletal and mummified remains from the AD1854 siege of Mugombane, Limpopo South Africa. *Journal of Archaeological Science*, 36, 1038 - 1049.
- Esterhuysen, A., & Smith, J. (2007). Stories in stone. In P. Delius (Ed.), *Mpumalanga: History and Heritage: reclaiming the past, defining the future* (pp. 41-67). Pietermaritzburg: University of KwaZulu-Natal Press.
- Friedman, Y., & Daly, B. (2004). *Red Data Book of the Mammals of South Africa: A Conservation Assessment*. South Africa: CBSG Southern Africa, Conservation Breeding Specialist Group (SSC/IUCN), Endangered Wildlife Trust.
- GEOTERRAIMAGE (GTI). (2018). *South African National Land Cover*.
- Gerlanc, N. M. (2005). Habitat origin and changes in water chemistry influence development of Western Chorus Frogs. *Journal of Herpetology* 39(2), 254-265.
- Higgit, N., Karodia, S., du Piesanie, J., & Nel, J. (2013). *Heritage Impact Assessment for the proposed Platreef Mining Project on the farms Bultongfontein 866 LR, Turfspruit 241 KR, Macalacaskop 243 KR and Rietfontein 2 KS in Mokopane, Limpopo Province*. Digby Wells Environmental: Unpublished report prepared for Platreef Resources (Pty) Ltd. SAHRIS Case ID: 566.
- Hofmeyr, I. (1988). Oral and written versions of the Makapansgat Siege. In R. Mason (Ed.), *Cave of Hearths, Makapansgat, Transvaal* (pp. 417 - 426). Johannesburg: University of the Witwatersrand, Archaeological Research Unit.
- Hofmeyr, I. (1989). *No Chief, No Exchange, No Story*. Johannesburg: African Studies Institute, University of the Witwatersrand.
- Huffman, T. (2007). *The Handbook to the Iron Age: The Archaeology of Pre-Colonial Farming Societies in Southern Africa*. Pietermaritzburg: University of KwaZulu-Natal Press.
- Huffman, T. N. (2004). The archaeology of the Nguni past. *Southern African Humanities*, 16, 79-111.
- Huffman, T., & Van der Walt, J. (2011). *A Field Study prepared for Environmental Resources Management, Sasol Technology*. Archaeological Resources Management: Unpublished report prepared for SRK Consulting and Sustainable Environmental Solutions.

- Kleynhans, C., Thirion, C., & Moolman, J. (2005). *A Level 1 River Ecoregion classification System for South Africa, Lesotho and Swaziland*. Water.
- Köppen, W., & Geiger, R. (1936). *Handbuch der klimatologie*. Berlin.
- Kotze, D., & Marneweck, G. (1999). *Guidelines for delineating the wetland boundary and zones within a wetland under the South African Water Act*.
- Land Type Survey Staff. (1972 - 2006). *Land Types of South Africa: Digital Map (1:250 000) and Soil Inventory Databases*. . Pretoria: Agricultural Research Council - Institute for Soil, Climate and Water.
- Lötter, M. C. (2015). *Technical Report for the Mpumalanga Biodiversity Sector Plan - MBSP*. Nelspruit: Mpumalanga Tourism & Parks Agency.
- Macfarlane, D., Bredin, I., Adams, J., Zungu, M., Bate, G., & Dickens, C. (2014). *Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries: Consolidated Report (WRC Report No. TT 610/14, September 2014)*.
- Mitchell, P. (2002). *The Archaeology of Southern Africa*. Cambridge: Cambridge University Press.
- Mucina, L., & Rutherford, M. C. (2012). *The Vegetation of South Africa, Lesotho and Swaziland*. Pretoria: South African National Biodiversity Institute.
- Naidoo, J. (1987). The siege of Makapansgat: a massacre? and a Trekker victory? *History in Africa*, 14, 173 - 187.
- Nel, J. (2012). *Phase 2 Archaeological Assessment: Mitigation for Boikarabelo Coal Mine*. Digby Wells Environmental: Unpublished report.
- Nel, J., Murray, K., Maherry, A., Petersen, C., Roux, D., Driver, A., . . . Nienaber, S. (2011). *Technical Report for the National Freshwater Priority Areas project*. WRC: 1801/2/11.
- Pistorius, J. C. (2002). *A Cultural Heritage Impact Assessment for the Proposed Overysel Zwartfontein (PPRust North) Project. Amendment to Potgietersrust Platinums Ltd's (PPRust) Environmental Management Programme Report (EMPR)*. SRK Consulting: Unpublished report (2002-SAHRA-0085).
- SANBI. (2010). *Threatened Species: A guide to Red Lists and their use in conservation. Threatened Species Programme*, 28.
- SANBI. (2018). *National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report*. Pretoria: South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries.
- SAPAD. (2020). *South African Protected Areas Database*.
- Schapera, I. (1953). *The Tswana*. London: International African Institute Press.

- Skinner, J., & Chimimba, T. (2005). *The mammals of the Southern African Subregion. 3rd Edition*. South Africa: Cambridge University Press.
- Taylor MR, P. F. (2015). *The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland*. Johannesburg: BirdLife South Africa.
- Tobias, P. V. (1945). Student scientific expedition to the Makapan. *WU's Views*, 9(5), 1.
- Tolley, M. B. (2017, June). *Northern Crag Lizard (Pseudocororylus transvaalensis)*. Retrieved from South African biodiversity Institute: <http://speciesstatus.sanbi.org/assessment/last-assessment/275/>
- UNESCO. (2018). *World Heritage List: Fossil Hominid Sites of South Africa*. Retrieved March 1, 2021, from <http://whc.unesco.org/en/list/915>
- Waddle, J. H. (2006). *Use of amphibians as ecosystem indicator species. Dissertation*. University of Florida.
- Wazimap. (2017). *Wazimap*. Retrieved March 01, 2021, from Profiles: Province North West: <https://wazimap.co.za/>
- WDM. (2019). *2019/2020 Integrated Development Plan*. Modimolle: Government planning document drafted by the WDM.
- Woodhall, S. (2005). *Field Guide to Butterflies of South Africa*. Cape Town: Struik Publisher.
- WRC. (2007). *WET-RoadMap: A Guide to the Wetland Management Series*. Water Research Commission.
- Wazimap, 2017. *Wazimap*. [Online] Available at: <https://wazimap.co.za/> [Accessed 01 March 2021].
- WDM, 2019. *2019/2020 Integrated Development Plan*, Modimolle: Government planning document drafted by the WDM.
- Winter, S. & Baumann, N., 2005. Guidelines for involving heritage specialists in EIA processes: first edition. CSIR Report No ENV-S-C 2005 053 E, Cape Town: Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning.



DIGBY WELLS
ENVIRONMENTAL

Appendix A: EAP CV



Appendix B: Plans

Plan 1: Regional Setting

Plan 2 : Local Setting

Plan 3: Land Tenure Map

Plan 4: Prospecting Borehole Map

Plan 5: Topographic Map of the Project Area

Plan 6: Geology of the Project Area

Plan 7: Quaternary Catchment Management Areas and Water Courses

Plan 8: Wetland Delineation

Plan 9: Regional Vegetation

Plan 10: Land Cover

Plan 11: Composite Map



DIGBY WELLS
ENVIRONMENTAL

Appendix C: Public Participation Process



DIGBY WELLS
ENVIRONMENTAL

Appendix D: Biodiversity Screening Assessment



DIGBY WELLS
ENVIRONMENTAL

Appendix E: Heritage Basic Assessment Report



DIGBY WELLS
ENVIRONMENTAL

Appendix F: Closure Plan and Environmental Risk Assessment



DIGBY WELLS
ENVIRONMENTAL

Appendix G: Prospecting Right Application Approval