BASIC ASSESSMENT REPORT FOR THE PROPOSED PROSPECTING ACTIVITIES ON PORTION 2 OF THE FARM SCHAFFHAUSEN 689 LR, IN THE MAGISTERIAL DISTRICT OF BLOUBERG, LIMPOPO PROVINCE

For

Sylvania Northern Mining (Pty) Ltd

For the following Minerals:
Chrome Ore, Cobalt, Copper Ore, Gold Ore, Nickel Ore, Platinum Group Metals

Located on:
Portion 2 of the Farm Schaffhausen 689 LR, in the Magisterial District of Blouberg, Limpopo Province

DMRE Reference Number: LP30/5/1/1/2/14728PR

This report will be made available for comment from

11 November 2022
To
11 December 2022

Compiled by:

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Title:
Basic Assessment Report for the Proposed Prospecting Activities on Portion 2 of the Farm Schaffhausen 689 LR in the District of Blouberg, Limpopo Province for Sylvania Northern Mining (Pty) Ltd

Client:

Project Applicant:	Sylvania Northern Mining (Pty) Ltd		
Registration Number (if any):	2021/940751/07		
Trading Name (if any):	Sylvania Northern Mining (Pty) Ltd		
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Report no.:
SylvaniaNM/LP/PR/Schaff/BAR/v1

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Document Control

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This report has been reviewed and approved for submission for Sylvania Northern Mining (Pty) Ltd by ……..,:

Date: ……

Signature: …….

Revision And Amendments

Description of Revision / Amendment	No	Date
Draft Sylvania Basic Assessment Report (PPP)	0	02/11/2022
Sylvania Basic Assessment Report	1	

mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

BASIC ASSESSMENT REPORT
AND
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

Basic Assessment Report for the proposed prospecting activities for Sylvania Northern Mining (Pty) Ltd for the following Minerals: Chrome Ore, Cobalt, Copper Ore, Gold Ore, Nickel Ore, Platinum Group Metals. The proposed activities will be located on Portion 2 of the Farm Schaffhausen 689 LR, in the Magisterial District of Blouberg, Limpopo Province.

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT:	Sylvania Northern Mining (Pty) Ltd
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DMRE REFERENCE NUMBER:	LP30/5/1/1/2/14728PR

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—

(a) 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;
(b) identify the alternatives considered, including the activity, location, and technology alternatives;
(c) describe the need and desirability of the proposed alternatives,
(d) 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:
    (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
    (ii) the degree to which these impacts—
        (aa) can be reversed;
        (bb) may cause irreplaceable loss of resources; and
        (cc) can be managed, avoided or mitigated;
(e) 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—
    (i) identify and motivate a preferred site, activity and technology alternative;
    (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and
    (iii) identify residual risks that need to be managed and monitored.

EXECUTIVE SUMMARY

Sylvania Northern Mining (Pty) Ltd is proposing to conduct prospecting activities for Chrome Ore, Cobalt, Copper Ore, Gold Ore, Nickel Ore, and Platinum Group Metals. The proposed activities will be located on Portion 2 of the Farm Schaffhausen 689 LR, in the Magisterial District of Blouberg, Limpopo Province. The proposed prospecting activities will include the following activities as described below.

- **Non-Invasive Activities:** Non-invasive activities include investigation of academic data, liaise with communities, conducting inventories and a preliminary site visit and assessment, logging and evaluation of data obtained from the invasive activities.
- **Invasive Activities:** The invasive activities will consist of ground geophysics and soil chemistry, exploration borehole drilling and trenching. A contractor camp is also proposed.

Listed Activities:

The proposed activities will trigger the following NEMA Listed Activities:

NAME OF ACTIVITY *(E.g. For prospecting – drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route*	**AERIAL EXTENT OF THE ACTIVITY** Ha or m^2	**LISTED ACTIVITY** *(Mark with an **X** where applicable or affected).*	**APPLICABLE LISTING NOTICE**	**WASTE MANAGEMENT AUTHORIZATION** *(Indicate whether an authorization is required in terms of the Waste Management Act). (Mark with an X)*
Drill Site	10 m x 10 m Drill Sites 1 Drill site= 100 m^2 Total Drill Site Areas (4) = 400 m^2	X	GNR 983 (as amended 07 April 2017) Listed Activity 20	
Trenching	25 m x 2 m Trench Sites 1 Trench = 50 m^2 Total Trench Areas (25) = 400 m^2	X	GNR 983 (as amended 07 April 2017) Listed Activity 20	
Total potential Vegetation clearance as a result of Drilling and trenching in CBA2 area – an area of 400 m2 was added for a potential contractor's camp	1 200 m^2	X	GNR 324 (as amended) 7April 2017	Total potential Vegetation clearance as a result of Drilling and trenching in CBA2 area – an area of 400 m2 was added for a potential contractor's camp
Rehabilitation and Closure	1200 m^2	X	GNR 983 (as amended 07 April 2017) Listed Activity 31	

Impacts identified

The findings are that the proposed prospecting activities will result in Low to Medium-High impact for the various physical and socio-economic aspects of the environment before the implementation of the identified mitigation / management measures and a Low to Medium (Agriculture) impact following mitigation / management measures implementation. A summary of the positive and negative impacts of the proposed activity are provided in Table below.

Table A: Positive and Negative impacts and the phases

(C=Construction/Site Establishment; O=Operational; R=Rehabilitation; Cl= Closure; D=Decommissioning)

Aspect	Activity	Activity	Impact	Phase
Topography	All prospecting activities	All prospecting activities	Impact on topography that result in water ponding - area not free-draining	C, O, R, Cl
Geology	All prospecting activities	All prospecting activities	Sterilisation of mineral resource as a result of prospecting activities.	C, O, R, Cl
Groundwater	All prospecting activities	All prospecting activities	Impact on groundwater quality as a result of hydrocarbon spills from machinery.	C, O, R, Cl
Groundwater	All prospecting activities	All prospecting activities	Impact on groundwater levels	C, O, R, Cl
Air quality	All prospecting activities	All prospecting activities	Dust generated as a result of the prospecting activities including travelling on road could impact on local PM10 levels.	C, O, R, Cl
Noise	All prospecting activities	All prospecting activities	The operation of machinery could result in increased noise levels in an area that is rural in nature. This noise could become a nuisance to the residents.	C, O, R, Cl
Socio-Economic	All prospecting activities	All prospecting activities	(+) Very few employment opportunities will be created during prospecting. However, it is anticipated that a few (<10) could be created that will result in a positive economic impact.	C, O, R, Cl
Socio-Economic	All prospecting activities	All prospecting activities	The proposed prospecting activities could create awareness of the area by people seeking employment and result in people moving to the area in case of future employment opportunities should the mineral be viable for full scale mining. This could negatively affect the existing social aspects of the area and impact on the sustainability of services such as schools, clinics, police etc.	C, O, R, Cl
Surface water quality	Ground geophysics and soil geochemical sampling	Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C
Surface water quality	Ground geophysics and soil geochemical sampling	Topsoil stockpiling	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and	C, O

Aspect	Activity	Activity	Impact	Phase
			the physico & chemical quality of the water in the watercourse.	
Surface water quality	Ground geophysics and soil geochemical sampling	Topsoil stockpiling/ Vegetation removal & General activities	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O
Surface water quality	Ground geophysics and soil geochemical sampling	Replace topsoil	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	R
Surface water quality	Ground geophysics and soil geochemical sampling	Replace topsoil	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	R
Surface water quality	Trenching	Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C
Surface water quality	Trenching	Topsoil stockpiling	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C, O
Surface water quality	Trenching	Topsoil stockpiling/ Vegetation removal & General activities	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O
Surface water quality	Trenching	Overburden stockpiling	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C, O
Surface water quantity	Trenching	Containment of rainwater in trench	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	O

Aspect	Activity	Activity	Impact	Phase
Surface water quality	Trenching	Heavy machinery equipment on site	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	C, O
Surface water quality	Trenching	Chemical toilets and sewage waste management	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	C, O
Surface water quality	Trenching	General waste generation	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	C, O
Surface water quality	Resource drilling: drill pad and sump	Heavy machinery equipment on site	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	C, O
Surface water quality	Resource drilling: drill pad and sump	Drilling sludge	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	O
Surface water quality	Resource drilling: drill pad and sump	Vegetation removal & General activities	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O
Surface water quality	Resource drilling: drill pad and sump	Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C
Surface water quantity	Resource drilling: drill pad and sump	Operation of drill pad sump	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	O
Surface water quality	Resource drilling: drill pad and sump	Chemical toilets and sewage waste management	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any	C, O

Aspect	Activity	Activity	Impact	Phase
			watercourse and this could impact on the biota.	
Surface water quality	Resource drilling: drill pad and sump	Capping of Borehole	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	R
Surface water quality	Resource drilling: drill pad and sump	Rip impacted area	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	R
Surface water quality	Resource drilling: drill pad and sump	Rip impacted area	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	R
Surface water quality	Resource drilling: drill pad and sump	General waste generation	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	C, O
Surface water quality	Access road	Vegetation removal (all access roads combined)	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	C
Surface water quality	Access road	Daily travelling to prospecting site	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O
Surface water quality	Access road	Daily travelling to prospecting site	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	C, O
Surface water quality	Access road	Rip road area	Silt generation during rainfall events could reach surface water resources result in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	R

Aspect	Activity	Activity	Impact	Phase
Surface water quality	Contractor camp	Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C
Surface water quality	Contractor camp	Diesel storage	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	O
Surface water quality	Contractor camp	Chemical toilets and sewage waste management	Contamination from spills from chemical toilets / emptying of septic tank (if applicable) could impact on water quality which in turn could impact on the biota and habitat as well.	O
Surface water quality	Contractor camp	Storage of material	Contaminated water from material storage area could detrimentally impact on watercourses quality, biota and habitat.	O
Surface water quality	Contractor camp	Storage of general and hazardous waste	Contaminated water from waste storage area could detrimentally impact on watercourses quality, biota and habitat.	O
Surface water quality	Contractor camp	Topsoil stockpiling/Vegetation removal & General activities	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O
Surface water quality	Contractor camp	Vehicle maintenance	Hydrocarbon spills from vehicles and other equipment could negatively impact water quality, habitat and biota.	C, O
Surface water quality	Contractor camp	Removal of all infrastructures	Potential for spills from e.g. hydrocarbon tanks, septic tank, chemical toilets could impact on the surface water resource quality, habitat and biota if not managed.	R
Surface water quality	Contractor camp	Rip impacted area	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	R
Surface water quantity	Contractor camp	Camp area (whole off)	Removal of run-off from the surface water resource could reduce surface flow in	C, O

Aspect	Activity	Activity	Impact	Phase
			watercourses which in turn could impact on the habitat and biota within this area.	
Surface water quality	Prospecting activities (all)	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	C, O
Surface water quantity	Prospecting activities (all)	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	O
Surface water quality	Prospecting activities (all)	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	During the rehabilitation phase water quality could be impacted as a result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.	R
Heritage and Archaeological	Prospecting activities (all)	Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on open-air Stone Age sites that could be found in the area, most likely in the form of individual stone tools or small scatters. The possibility of Iron Age sites (especially stone-walled Late Iron Age sites) in the areas can also not be excluded, although this is less likely	C, O
Heritage and Archeologically	Prospecting activities (all)	Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on Iron Age sites (especially stone-walled Late Iron Age sites) although this is less likely than Stone Age sites.	C,O
Heritage and Archeologically	Prospecting activities (all)	Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on recent historical sites and features as the possibility of their presence the area is High, and will most be represented by the remnants of individual homesteads and rural settlements.	C,O
Heritage and Archeologically	Prospecting activities (all)	Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on both formal & informal cemeteries, individual graves and even previously unknown & unmarked graves.	C,O
Terrestrial biodiversity	Development activities	Drilling, Roads, Trenching and geochemical sampling	Invasive prospecting and associated activities will lead to destruction and damage of habitats and vegetation	O

Aspect	Activity	Activity	Impact	Phase
			communities and overall loss of biodiversity and ecosystem function within the clearance and operational area. Destruction of habitat may lead to faunal species migrating to other more favourable areas.	
Terrestrial biodiversity	Development activities	Drilling, Roads, Trenching and geochemical sampling	The continuous human activity over a longer-term period may further impact on the faunal communities within the area. Associated noise, waste, the smell of humans and physical infiltration into remaining natural areas are problematic and may lead to declining populations (where the disturbance of habitat has caused habitat remaining to become unfavourable).	O
Terrestrial biodiversity	Development activities	Vegetation clearance	Vegetation clearance will destroy indigenous vegetation and lead to possible invasive and/or exotic species establishing in the area and edge-effects occurring surrounding the prospecting activities. Bare areas may become vulnerable to Alien and Invasive Plant species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat.	C, O
Terrestrial biodiversity	Development activities	Drilling, Roads, Trenching and geochemical sampling	Invasive prospecting and associated activities may impact on areas designated as high sensitivity, including critical biodiversity areas and watercourses situated in and around the Prospecting Right area. The majority of the proposed target areas are located in area categorised as ONA and NNR. The layout of the prospecting target areas appears to have been designed to avoid most of the non-perennial tributaries. The activity may lead to the loss of species of conservation concern. Based on the desktop study findings, no flora SCC are considered to be likely to occur on the project area. However, fifteen (15) faunal species previously	O

Aspect	Activity	Activity	Impact	Phase
			recorded in the area queried are categorised as SCC.	
Terrestrial biodiversity	Development activities	Rehabilitation	Rehabilitation could be ineffective if rehabilitation actions are not effectively implemented. Without the necessary mitigation measures, rehabilitation will be less successful and the ecology of the impacted areas may not recover to a pre-prospecting state. Without mitigation the alien invasive species may increase and result in a degraded veld condition making the property less viable for post-closure land use activities such as wilderness, grazing and agriculture.	Cl, Post Cl
Soil, Land Use and Land Capability	All	Soil stripping	Soil Erosion	C
Soil, Land Use and Land Capability	All	Vehicles driving on the soil surface	Compaction and loss of soil structure	C
Soil, Land Use and Land Capability	All	Spillages of hydrocarbons	Soil pollution and contamination	C
Soil, Land Use and Land Capability	All	Soil stripping	Soil Erosion	O
Soil, Land Use and Land Capability	All	Soil Stripping / Trenching and Drilling	Dilution of topsoil through mixing with subsoil; Loss of topsoil as a resource	O
Soil, Land Use and Land Capability	All	Soil Stripping / Trenching and Drilling	Decline in organic matter & biological activity	O
Soil, Land Use and Land Capability	All	Soil Stripping /Trenching and Drilling	Loss of water holding capacity	O
Soil, Land Use and Land Capability	All	Vehicles driving on the soil surface	Compaction and loss of soil structure	O
Soil, Land Use and Land Capability	All	Soil Stripping / Trenching and Drilling	Loss of land capability and land use	O
Soil, Land Use and Land Capability	All	Spills from vehicles, accidental spills of hazardous chemicals	Soil pollution and contamination	O
Soil, Land Use and Land Capability	All	Stockpiling of Soil	Loss of Topsoil as a Resource: Compaction and Erosion	Cl, R
Soil, Land Use and Land Capability	All	Backfilling of soil material layers	Loss of land capability	Cl, R

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Sylvania Northern Mining is also in the process of applying for prospecting rights on Altona 696 LR, Gillemberg 861 LR, Non Plus Ultra 683 LR, Teneriffe 682 LR, Aurora 397 LR and Nonnenwerth 421 LR in terms of DMRE Reference Number: LP30/5/1/1/2/14710PR. The desktop specialist studies conducted covered both the applications' areas therefore the maps generated by the specialists indicates the whole of the two application areas.

LIST OF TABLES

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ABBREVIATIONS

%	Percentage
ADI	Area of direct influence
ADU	Animal Demographic Unit
AII	Area of indirect influence
AIP	Alien Invasive Plant
Au	Gold
BAR	Basic Assessment Report
BMS	Base-metal Sulphide
CA	Competent Authority
CBA	Critical Biodiversity Area
CITES	Convention on International Trade in Endangered Species
Co	Cobalt
Cr	Chrome
Cu	Copper
DAFF	Department of Agriculture, Forestry and Fisheries
DFFE	Department of Forestry, Fisheries and the Environment
DMRE	Department Of Mineral Resources and Energy
DWAF	Department of Water Affairs and Forestry
E.g.	Example
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association South Africa
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
ESA	Ecological Support Area
FEPA	Freshwater Ecosystem Priority Area
GNR	Government Notice Regulation
Ha	Hectare
I&AP	Interested and Affected Party
IBA	Important Birding and Biodiversity Area
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IUCN	International Union for Conservation of Nature and Natural Resources
Km	Kilometres
km^2	Square kilometres
LC	Least Concern
LCP	Limpopo Conservation Plan
LEMA	Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003)
LM	Local Municipality
m	Meters
m^2	Square metres
MAR	Mean annual runoff
mm	Millimetres
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMAQA	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
NEMWA	National Environmental Management Waste Act, 2008 (Act No. 59 of 2008)
NFA	National Forests Act, 1998 (Act No. 84 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
Ni	Nickel
NNR	No Natural Remaining
No.	Number

NPAES	National Protected Area Expansion Strategy
NWA	National Water Act, 1998 (Act No. 36 of 1998)
ºC	Degrees Celsius
ONA	Other Natural Area
PES	Present Ecological Status
PFS	Pre-Feasibility study
PGM	Platinum Group Metals
POSA	Plants of Southern Africa
PPP	Public Participation Process
Pri.Sci.Nat	Principal Natural Scientist
PWP	Prospecting Works Programme
QA/QC	Quality Assurance/Quality Control
QDS	Quarter Degree Squares
RLS	Rustenburg Layered Suite
SABAP2	South African Bird Atlas Project 2
SABCA	South African Butterfly Conservation Assessment
SACAD	South African Conservation Areas Database
SACNASP`	South African Council for Natural Applied Science Professionals
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity institute
SAPAD	South African Protected Areas Database
SARCA	South African Reptile Conservation Assessment
SCC	Species of conservation concern
SDF	Spatial Development Framework
TDS	Total dissolved solids
ToPS	Threatened and Protected Species List (2007) as part of the NEMBA
VU	Vegetation Unit
WISA	Water Institute of South Africa
WMA	Water Management Area
XRF	X-ray fluorescence

PART A
SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1 CONTACT PERSON AND CORRESPONDENCE ADDRESS

1.1 DETAILS OF:

1.1.1 The EAP who prepared the report

Name of the Practitioner: Prescali Environmental Consultants.
The report was compiled by Dr Petro Erasmus *(EAPASA)(Pri.Sci.Nat)*.
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1.2 EXPERTISE OF THE EAP

1.2.1 The qualifications of the EAP

(With evidence attached as Appendix)

Dr. P. Erasmus has qualifications in Zoology and Biochemistry and further studied in Zoology and Marine pollution. She is registered as a Pri Sci Nat. (SACNASP), Natural Professional Scientist, for Ecological and Environmental Sciences. She is also a registered Environmental Assessment Practitioner with EAPASA. Her qualifications are provided in Appendix 1.

Reviewers:

- Ms Simrin Reddy has qualifications in Environmental Sciences. Her qualifications are provided in Appendix 1. She is also a registered Candidate Environmental Assessment Practitioner with EAPASA.
- Ms. E. van der Linde has qualifications in Geology, Engineering Geology and Environmental Management and experience in Water and Environmental Management. She is registered as a Pri Sci Nat. (SACNASP), Natural Professional Scientist. Her qualifications are provided in Appendix 1. She is also a registered Environmental Assessment Practitioner with EAPASA

1.2.2 Summary of the EAP's past experience.

(Attach the EAP's curriculum vitae as Apendix

Dr. P. Erasmus has 15 years of applicable experience (a short resume with a list of projects is attached in Appendix 2 and has been employed by:

- Department: Water Affairs and Forestry (DWAF);
- M2 Environmental Connections (Pty) Ltd; and
- Prescali Environmental Consultants (Pty) Ltd.

Reviewers:

- Miss S. Reddy has 1 year 5 months applicable experience (a short resume with a list of projects is attached in Appendix 2 and has been employed by:
  - Prescali Environmental Consultants (Pty) Ltd.
- Ms. E. van der Linde has 20 years of applicable experience (a short resume with a list of projects is attached in Appendix 2 and has been employed by:
  - Department: Water Affairs and Forestry (DWAF);
  - Groundwater Consulting Services cc;
  - M2 Environmental Connections cc; and
  - Prescali Environmental Consultants (Pty) Ltd.

2 LOCATION OF THE OVERALL ACTIVITY

The proposed prospecting activities will take place on the following farm(s) and portion(s) as outlined below. Please refer to Figure 3-1.

1.	Farm Name:	Schaffhausen	
	Farm Number:	689	
	Registration Division:	LR	
	Portions:	2	
	Administrative District:	Blouberg Local Municipality	
	SG Codes	Farm Portion	SG Code
		2	T0LR00000000068900002

Application Area (Ha):	601.72 Ha
Distance and Direction from Nearest Town:	Approximately 67 km North-west of Mokopane and 61 km North West of Polokwane
Magisterial District:	Capricorn District Municipality
Locality Map:	Attach a locality map at a scale not smaller than 1:250000. (See Locality map append as Appendix 3)

3 LOCALITY MAP

(Show nearest town, scale not smaller than 1:250000).

The locality map is provided in Appendix 3 and in Figure 3-1 and Figure 3-2.

Sylvania Northern Mining is also in the process of applying for prospecting rights on Altona 696 LR, Gillemberg 861 LR, Non Plus Ultra 683 LR, Teneriffe 682 LR, Aurora 397 LR and Nonnenwerth 421 LR in terms of DMRE Reference Number: LP30/5/1/1/2/14710PR. The desktop specialist studies conducted covered both the applications' areas therefore the maps generated by the specialists indicates the whole of the two application areas.

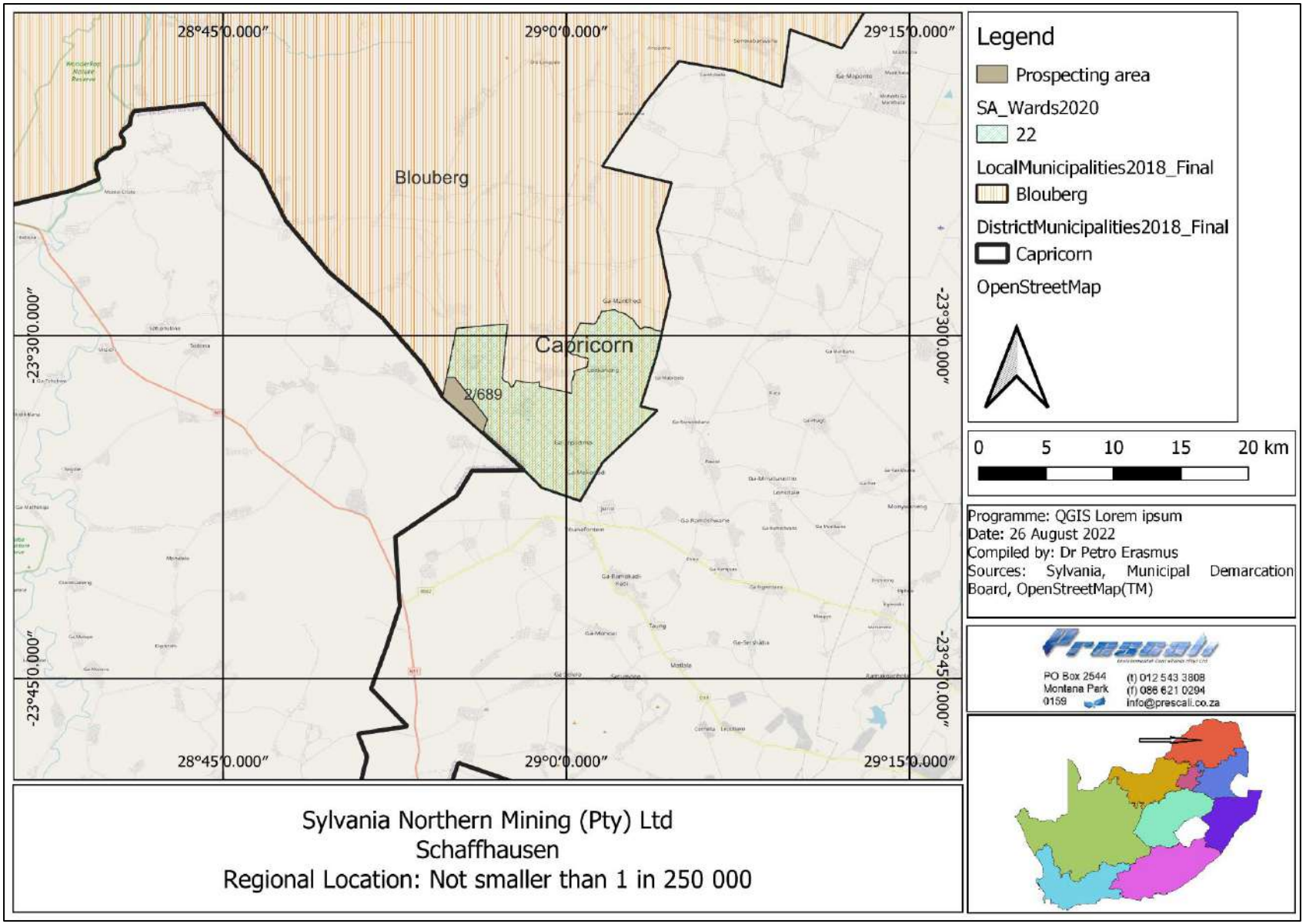


Figure 3-1: Regional Location of the Prospecting Right Area (Not less than 250 000)

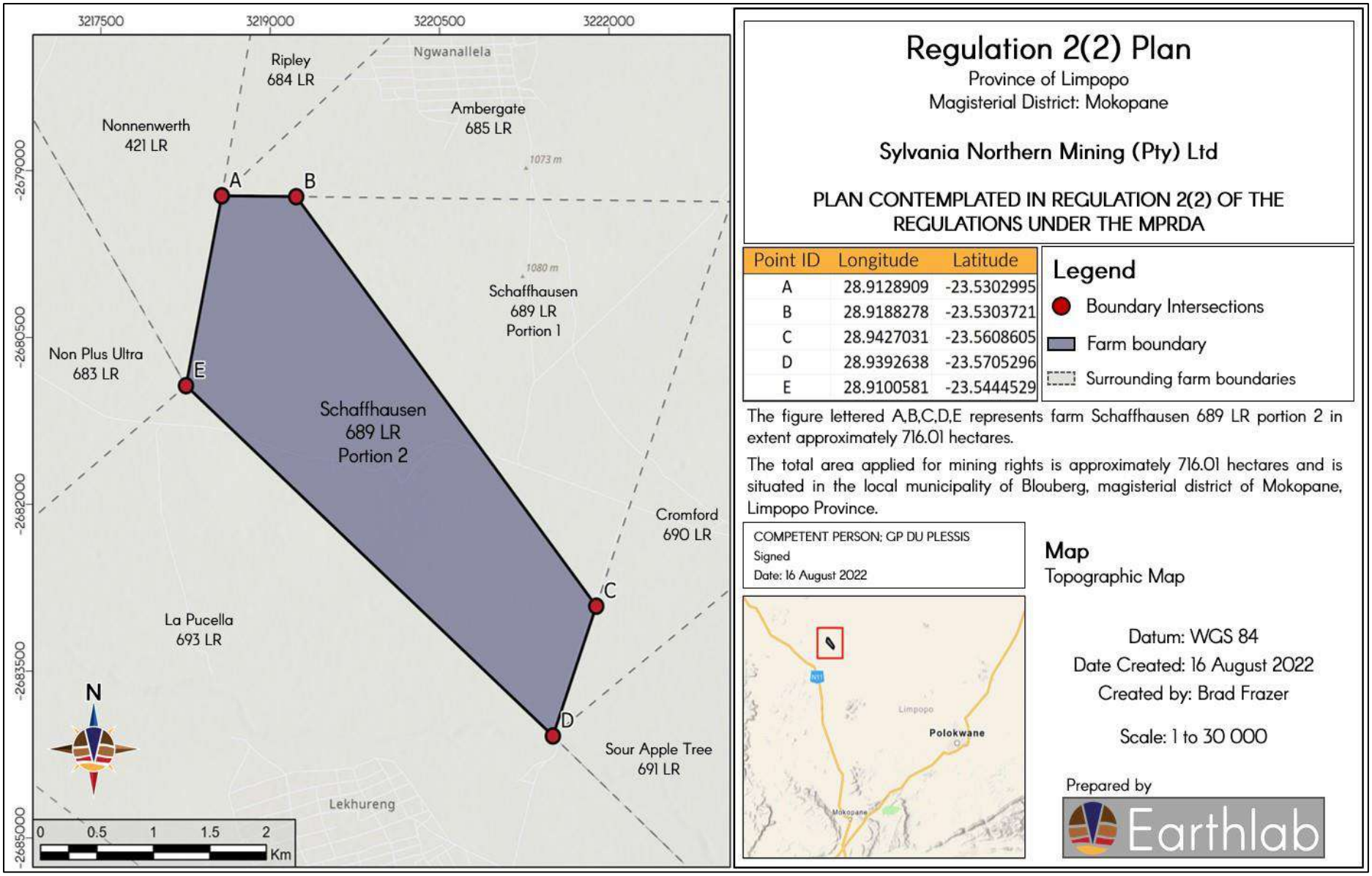


Figure 3-2: Regulation 2(2) map

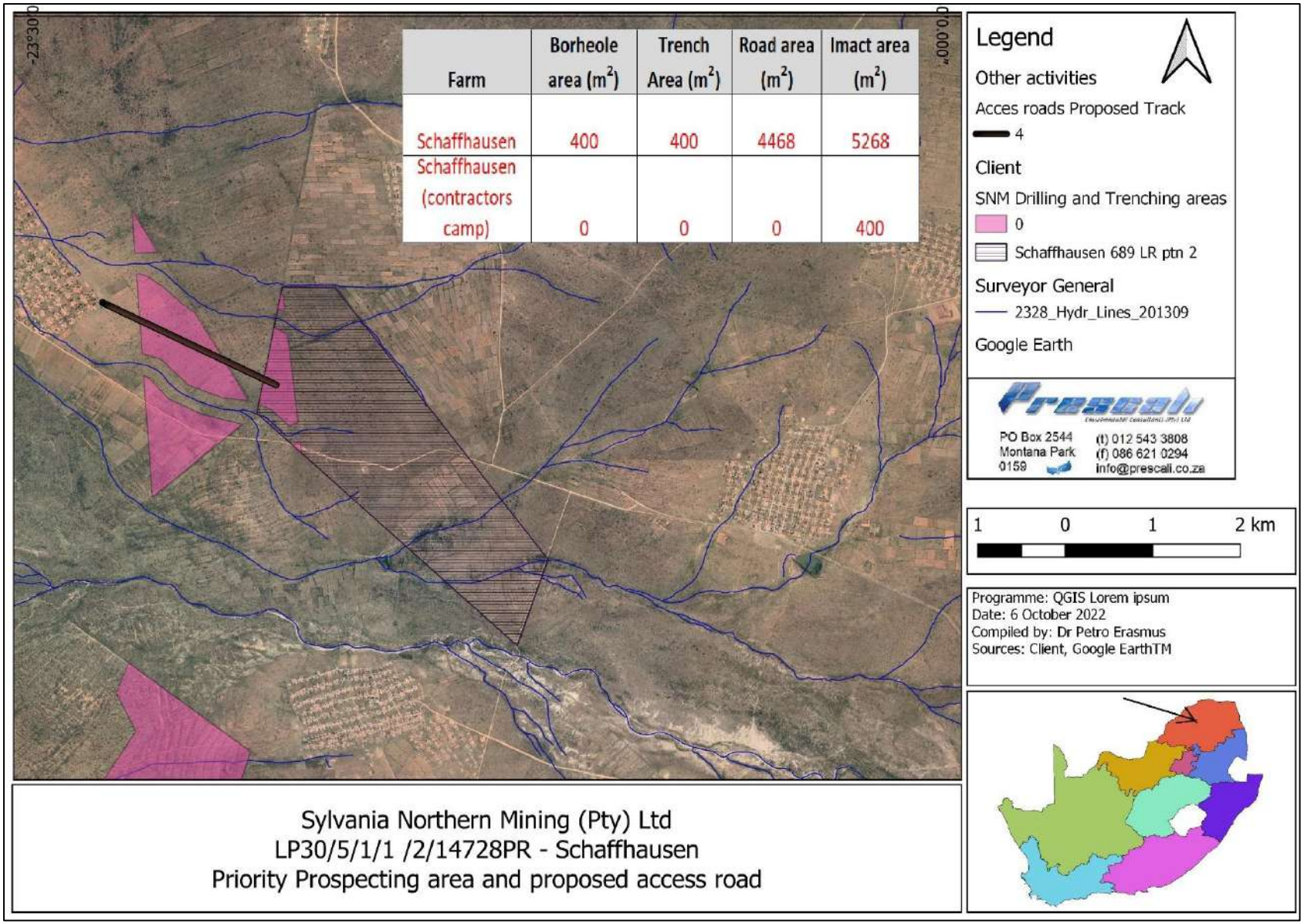


Figure 3-3: Location and area extend of main and listed activities

4 DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

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

The following sections outline the proposed prospecting activities and the phases and timelines in which they will occur.

4.1.1 Non-Invasive Activities:

4.1.1.1 Phase 1

- **1.1 – 1.3 Investigate academic data and liaise with communities: [Year 1; Duration: 6 Months]:** Historical mining data and academic literature references will be acquired and reviewed. The data includes historical borehole information and any available geological maps. Additional relevant information will also be acquired. This newly acquired information will be scrutinised, inventoried and verified (QA/QC procedure). Relevant academic studies about the area will also be examined for details on controls of mineralisation. Remote sensing data including satellite imagery, regional airborne geophysical data will also be acquired.
- **1.4 Desktop study: [Year 1; Duration: 1 month]:** A desktop study will be undertaken with a focus on the controls of mineralisation in the project area. The study aims to better understand the mineralisation features to define detailed exploration target areas more accurately.
- **1.5 Inventories, capture and QA/QC and database creation: [Year 1; Duration: 5 months]:** The above data will be compiled into a geological database in GIS digital map format to perform target generation exercises as well as geological modelling during later stages of the project.
- **1.6 Preliminary site visit: [Year 1; Duration: 1 week]:** A field visit will be undertaken to familiarise the applicant with surface features (such as cultural features, infrastructure, water bodies and wetlands) in the project area and to meet the surface landowners. During this visit farm boundaries within the project area and farming activities will be verified. An effort will be made to identify any factors that may impact the exploration program. The information collected during the site visit will be used to derive and prioritise preliminary exploration targets.
- **1.7 – 1.8 Regional geochemistry and geophysical interpretation: [Year 1; Duration: 4 months]:** Existing regional soil geochemical data and geophysical data will be interpreted to derive exploration targets in the prospecting area.
- **1.9 Integrate information and define exploration targets: [Year 1; Duration: 1 month]:** Information collected will be analysed and interpreted. Preliminary exploration targets will be delineated and ranked according to appropriate prospect activity parameters including geological stratigraphy and structures, historic exploration results, etc. This will permit an exploration strategy to be devised for the project area.

4.1.1.2 Phase 2

- **2.1 – 2.2 Ground geophysics and soil geochemical sampling: [Year 2; Duration: 10 months]:** Please refer to the invasive exploration section.
- **2.3 Trenching:** [Year 2; Duration: 5 months]: Please refer to the invasive exploration section.

4.1.1.3 Phase 3

- **3.1 Drilling**: **[Year 3; Duration: 8 months]:** Please refer to the invasive exploration section.
- **3.2 Logging, sampling and analysis: [Year 3; Duration: 12 Months]:** Logging of the lithology, mineralization, structure and alteration will be undertaken on all the drill holes, followed by a sampling of the mineralized sections of the drill holes. Included in the number of samples produced per drill hole will be the QA/QC samples (approximately about 30%). Samples will be sent to a commercial laboratory for elemental analysis.
- **3.3 Geological modelling: [Year 3; Duration: 6 Months**]: Utilising all the detailed geological and grade information, a geological model for the deposit will be generated.

4.1.1.4 Phase 4

- **4.1 Resource drilling: [Year 4; Duration: 4 Months**]: Please refer to the invasive exploration section.
- **4.2 Estimation of resource:** [**Year 4; Duration: 3 Months**]: Utilising all the detailed geological and grade information, an estimation of the resource will be undertaken for the deposit.
- **4.3 Pre-feasibility study: [Year 4; Duration: 12 Months**]: A pre-feasibility study investigates whether a concept satisfies the objectives and the technical, economic, social and environmental constraints for a particular project. Preparation for the pre-feasibility study will include: -
    - Initial conceptual mine planning
    - Planning the infrastructure requirements
    - Environmental management planning
    - Financial modelling
    - Market analysis
    - Analysis of transport logistics to market
    - Assessment of personnel and training requirements
    - Assessment of socio-economic factors
    - Permitting requirements

4.1.1.5 Phase 5

- **5.1 Feasibility study: [Year 5; Duration: 6 Months**]: A feasibility study is multidisciplinary by nature requiring the highest levels of expertise available. Such studies are both costly and time-consuming.

4.1.2 Invasive Activities

It is of significance to note that the specific exploration methods to be employed will depend on the results generated from previous phases and this programme assumes that the results are positive in each stage. It should also be noted that the first step in any exploration programme is to attempt to acquire and compile any existing exploration data in the area. Should this be successful, certain items in the programme could be reduced or could even become redundant and the pace of the entire programme could be accelerated.

- **2.1 – 2.2 Ground geophysics and soil geochemical sampling: [Year 2; Duration: 10 months]:** Geochemical sampling campaigns with pre-designed sampling grids of 250 m x 250 m will be undertaken on the prospecting areas. The collected samples will be analysed for major elements with the use of a portable XRF to enable the creation of geochemical anomaly maps. Ground magnetic surveys will be carried out to delineate structural features which may control mineralisation in the prospect area.
    - The sample points will be 250 m apart from each other. Two soil samples will be taken at each sample point from the same source. The soil sample will usually entail the removal of the top 20-30 cm of soil using a hand shovel, and 2 samples of 3-5 kg each will be bagged. A GPS point will be taken. The hole from where the sample is taken does not exceed 1m in depth, and will be a maximum of 1 m^2. The hole will be filled once the sample is taken with the material that was initially removed. The location test holes will usually be shifted slightly as not to affect the vegetation in the immediate vicinity. The work is carried out on foot, with a hand shovel and does not entail the use of any machinery on the sample area. The soil test area will be photographed before, during, and after the sample collection is complete.
    - The 250 m grid will not be established over the entire area, but will be selected based on the findings from the year 1 desktop study.
- **Trenching: [Year 2; Duration: 5 months]:** Eight short (25 x 2 x 2 m) trenches will be excavated over the outcrop positions of the defined orebodies. The trenches will be geologically mapped and the sidewalls of the trenches will be sampled. Once this is complete, the trenches will be refilled. During the trenching and mapping, temporary barriers will be erected around the excavation to prevent people/animals from falling into the trenches.

- **3.1 and 4.1 Resource drilling: [Year 3; Duration: 8 months]:** Drilling (diamond or RC) of the prospective areas will commence establishing the presence of mineralisation in the prospect areas. Geological borehole logging, downhole geophysical logging, core magnetic susceptibility measurement and sampling will also be carried out. It is anticipated that initially approximately 4 drill holes will be drilled. Drill holes could vary in depth from 150 to 350 m, with an average depth of 250 meters. The total amount of drilling to be budgeted for at this stage is 750 meters depth. Depending on the results of this drilling further 1 drill hole totalling 250 meters depth may be required.

Sample analysis of all the potential intersections will be carried out by a certified commercial laboratory. For budgeting purposes, it is estimated that about 50% of the drilled meters will be sampled.

The geological information generated will be used to model and estimate the resource. The resources will at least be expected to be in the Indicated Category according to the JORC code.

4.1.3 Description of Pre-/Feasibility Studies

It is envisaged that a Pre-Feasibility Study (PFS) will commence following Phase 3 exploration. A PFS will be done to investigate various options and to be able to choose the most appropriate option to conduct a full Feasibility Study on. The study will comprise of, inter alia, the following:

- Geological modelling and geological resource statement.
- Mine planning and preliminary design.
- Study of surface infrastructural requirements and general engineering.
- Metallurgical studies and preliminary plant design.
- Studies relating to water availability and usage.
- Studies relating to electricity requirements and availability.
- Environmental Impact Studies.

The results of the studies will form the basis of a financial model to test the viability of the various options and the proposed project.

All studies will be conducted by independent professionals.

5 LISTED AND SPECIFIED ACTIVITIES

The listed and specified activities are outlined in the Table below.

Table 5-1: Listed Activities

NAME OF ACTIVITY *(E.g. For prospecting – drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route*	**AERIAL EXTENT OF THE ACTIVITY** Ha or m²	**LISTED ACTIVITY** *(Mark with an **X** where applicable or affected).*	**APPLICABLE LISTING NOTICE**	**WASTE MANAGEMENT AUTHORIZATION** *(Indicate whether an authorization is required in terms of the Waste Management Act). (Mark with an X)*
Drill Site	10 m x 10 m Drill Sites 1 Drill site= 100 m² Total Drill Site Areas (4) = 400 m²	X	GNR 983 (as amended 07 April 2017) Listed Activity 20	
Trenching	25 m x 2 m Trench Sites 1 Trench = 50 m² Total Trench Areas (25) = 400 m²	X	GNR 983 (as amended 07 April 2017) Listed Activity 20	

NAME OF ACTIVITY *(E.g. For prospecting – drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route*	**AERIAL EXTENT OF THE ACTIVITY** Ha or m²	**LISTED ACTIVITY** *(Mark with an **X** where applicable or affected).*	**APPLICABLE LISTING NOTICE**	**WASTE MANAGEMENT AUTHORIZATION** *(Indicate whether an authorization is required in terms of the Waste Management Act). (Mark with an X)*
Total potential Vegetation clearance as a result of Drilling and trenching in CBA2 area – an area of 400 m2 was added for a potential contractor's camp	1 200 m²	X	GNR 324 (as amended) 7April 2017	Total potential Vegetation clearance as a result of Drilling and trenching in CBA2 area – an area of 400 m2 was added for a potential contractor's camp
Rehabilitation and Closure	1200 m²	X	GNR 983 (as amended 07 April 2017) Listed Activity 31	

6 POLICY AND LEGISLATIVE CONTEXT

Table 6-1: Applicable Legislation and Guidelines taken into consideration

Applicable legislation and guidelines used to compile the report	**Reference where applied**	**How does this development comply with and respond to the legislation and policy context**
(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);		*(E.g., In terms of the National Water Act a Water Use License has/ has not been applied for)*
The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) Section 2 of the Constitution states that: "This Constitution is the supreme law of the Republic; law or conduct inconsistent with it is invalid, and the obligations imposed by it must be fulfilled." Section 24 of the CA, states that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: • prevent pollution and ecological degradation; • promote conservation; and • secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. Section 24 guarantees the protection of the environment through reasonable legislative (and other measures) and such legislation is continuously in the process of being promulgated. Section 33(1) concerns administrative justice which includes the constitutional right to administrative action that is lawful, reasonable and procedurally fair.	The BAR and EMPr was accordingly prepared and considered within the constitutional framework set by Section 24 and 33 of the Constitution.	The prospecting application has been submitted in terms of the National Environmental Management Act
The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Environmental Assessment Regulations, 2014 (as amended) The overarching principle of the NEMA is sustainable development. It defines sustainability as meaning the integration of social, economic and environmental factors into planning, implementation and decision making so as to ensure the development serves present and future generations. Section 2 of NEMA provides for National Environmental Management Principles. These principles include: • Environmental management must place people and their needs at the forefront of its concern. • Development must be socially, environmentally and economically sustainable. • Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated.	The BAR and EMPr was distributed for public review for periods stipulated in NEMA as part of the environmental impact assessment process. The document was also compiled to ensure compliance with the requirements as per the EIA regulations. Refer to Table 5-1 of the BAR for the listed activities applicable to the proposed project.	According to the EIA Regulations (GNR 982, 2014) as amended the following will be submitted in support of the application for Environmental Authorisation: BAR / EMP (this document) together with the results of consultation with Interested and Affected Parties (IAPs) and State Departments.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
• Environmental justice must be pursued. • Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing must be pursued. • Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle. • The participation of all Interested and Affected Parties (I&APs) in environmental governance must be promoted. • Decisions must take into account the interests, needs and values of all I&APs. The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment. • Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law. • The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage. • The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment. The EIA process to be undertaken in respect of the authorization process of the proposed mining operations complies with the MPRDA, as well as the NEMA read with the Environmental Impact Assessment Regulations of 2014 (as amended). The proposed development involves 'listed activities', as identified in terms of the NEMA and in terms of section 24(1), the potential consequences for or impacts on the environment of listed activities must be considered, investigated, assessed and reported on to the Minster of Mineral Resources or to the relevant office of the Department responsible for mineral resources, except in respect of those activities that may commence without having to obtain an environmental authorisation in terms of the NEMA.		
GNR 1147 (20 November 2015) of the NEMA - Financial Provisioning Regulations In accordance with the above legislation, the holder of a mining right must make the prescribed financial provision for the costs associated with the undertaking of the management, rehabilitation and remediation of the negative environmental impacts due to prospecting,	The Final Rehabilitation, Decommissioning and Mine Closure plan will be compiled	Section 21 of Part A of this report details the calculated financial liability that Sylvania Northern Mining

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
exploration and mining activities and the latent or residual environmental impacts that may become known in future.	in accordance with GNR 1147.	(Pty) Ltd must provide for the rehabilitation of the area that is going to be disturbed.
Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) Previously South African mineral rights were owned either by the State or the private sector. This dual ownership system represented an entry barrier to potential new investors. The current Government's objective is for all mineral rights to be vested in the State, with due regard to constitutional ownership rights and security of tenure. The MPRDA was passed in order to make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources, and to provide for matters connected therewith. The Preamble to the MPRDA inter alia affirms the State's obligation to: • protect the environment for the benefit of present and future generations; • ensure ecologically sustainable development of mineral and petroleum resources; and • promote economic and social development. The aforesaid preamble affirms the general right to an environment provided for in section 24 of the Constitution (as set out hereinabove). The objects of the MPRDA, as set out in section 2 thereof serve as a guide to the interpretation of the Act. The objects of the MPRDA are as follows: • recognise the internationally accepted right of the State to exercise sovereignty over all the mineral and petroleum resources within the Republic; • give effect to the principle of the State's custodianship of the nation's mineral and petroleum resources; • promote equitable access to the nation's mineral and petroleum resources to all the people of South Africa; • substantially and meaningfully expand opportunities for historically disadvantaged persons, including women, to enter the mineral and petroleum industries and to benefit from the exploitation of the nation's mineral and petroleum resources; • promote economic growth and mineral and petroleum resources development in the Republic;	An integrated application in terms of the MPRDA and NEMA is being undertaken. The NEMA process for the proposed project is described below.	An application for a Prospecting Right was submitted to the DMR for which an acceptance letter to continue to apply was issued. Should the BAR and EMPr be approved a Prospecting right will be issued.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
• promote employment and advance the social and economic welfare of all South Africans; • provide for security of tenure in respect of prospecting, exploration, mining and production operations; • give effect to section 24 of the Constitution by ensuring that the nation's mineral and petroleum resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development; and • ensure that holders of mining and production rights contribute towards the socio-economic development of the areas in which they are operating. The national environmental management principles provided for in section 2 of the NEMA apply to all prospecting and mining operations and any matter relating to such operation. These principles apply throughout the Republic to the actions of all organs of state including inter alia the Department of Mineral Resources that may significantly affect the environment. Any prospecting or mining operation must be conducted in accordance with generally accepted principles of sustainable development by integrating social, economic and environmental factors into the planning and implementation of prospecting and mining projects in order to ensure that exploitation of mineral resources serves present and future generations. Section 38 of the MPRDA states that the holder of inter alia, a prospecting right, mining right or mining permit: • Must at all times give effect to the general objectives of integrated environmental management laid down in Chapter 5 of NEMA; • Must consider, investigate, assess and communicate the impact of his or her prospecting or mining on the environment as contemplated in section 24(7) of NEMA; • Must manage all environmental impacts – o In accordance with an environmental management plan or approved environmental management programme, where appropriate, and o As an integral part of the prospecting or mining operations, unless the Minister directs otherwise. • Must as far as reasonably practicable, rehabilitate the environment affected by the prospecting or mining operations to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and		

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
• Is responsible for any environmental damage, pollution or ecological degradation as a result of prospecting or mining operations and which may occur inside and outside the boundaries of the area to which such right, permit or permission relates.		
National Water Act, 1998 (Act No. 36 of 1998 (NWA) In terms of the NWA, the National Government, acting through the Minister of Water Affairs, is the public trustee of South Africa's water resources, and must ensure that water is protected, used, development, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons (section 3(1)). In terms of the NWA a person may only use water without a license under certain circumstances. All other use, provided that such use qualifies as a use listed in section 21 of the Act, require a water use license. A person may only use water without a license if such water use is permissible under Schedule 1 (generally domestic type use) if that water use constitutes a continuation of an existing lawful water use (water uses being undertaken prior to the commencement of the NWA, generally in terms of the Water Act of 1956), or if that water use is permissible in terms of a general authorisation issued under section 39 (general authorisations allow for the use of certain section 21 uses provided that the criteria and thresholds described in the general authorisation is met). Permissible water use furthermore includes water use authorised by a license issued in terms of the NWA. Section 21 of the NWA indicates that "water use" includes: • taking water from a water resource (section 21(a)); • storing water (section 21(b)); • impeding or diverting the flow of water in a water course (section 21(c)); • engaging in a stream flow reduction activity contemplated in section 36 (section 21(d)); • engaging in a controlled activity which has either been declared as such or is identified in section 37(1) (section 21(e)); • discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit (section 21(f)); • disposing of waste in a manner which may detrimentally impact on a water resource (section 21(g); • disposing in any manner of water which contains waste from, or which has heated in, any industrial or power generation process (section 21 (h)); • altering the bed, banks, course or characteristics of a water course (section 21(i));	Refer to Section 0 where the baseline water resource of the project area is characterised.	No activities will take place within the regulated area in terms of the NWA therefore no authorisation is required.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
• removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people (section 21(j)); and • using water for recreational purposes (section 21(k)). In addition to the above and in terms of section 26 of the NWA, Regulations on the Use of Water for Mining and Related Activities Aimed at the Protection of Water Resources were published in GN R. 704 of 4 June 1999 (GN R. 704). The aforesaid GN R. 704 provides for inter alia the capacity requirements of clean and dirty water systems (Regulation 6), the protection of water resources by a person in control of a mine (Regulation 7), security and addition measures (Regulation 8) and temporary or permanent cessation of a mine or activity (Regulation 9). According to GN R. 704 “no person in charge of a mine may carry on any underground or opencast mining, prospecting or any other operation or activity under or within the 1:50 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, whichever is the greatest”. Insofar as the undertaking of section 21 water uses is concerned, it is anticipated that application for registration and water use licensing will be undertaken.		
National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) The NHRA established the South African Heritage Resources Agency (SAHRA) as well as Provincial Heritage Resources Agencies. In terms of the NHRA, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site. No person may damage, disfigure, alter, subdivide or in any other way develop any part of a protected area unless, at least 60 days prior to the initiation of such changes, he/she/it has consulted with the relevant heritage resources authority. Section 34 of the NHRA provides for the protection of immovable property by providing for a prohibition on altering or demolishing any structure or part of any structure, which is older than 60 years, without a permit issued by the relevant provincial heritage resources authority. Accordingly, should the proposed activities, prospecting or mining activities or the closure and rehabilitation of mined land involve the altering or demolishing of any structure or part of any structure, which is older than 60 years, a permit issued by the relevant provincial heritage resources authority is required.	Refer to Section 10.9.	Known Heritage sites were classified in terms of sensitivity and buffer zones were identified. None will be impacted by the proposed prospecting.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite; destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite; trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites. No person may, without a permit issued by SAHRA or a provincial heritage resources authority destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves; destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or bring onto or use at the burial ground or grave referred to above any excavation equipment or any equipment which assists in the detection or recovery of metals. Section 38 of the NHRA states that any person who intends to undertake developments categorised in Section 38 of the NHRA must at the very earliest stages of initiating such development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. By way of example, the developments referred to in Section 38 of the NHRA include: • the Site Establishment of a road, wall, power-line, pipeline, canal or other similar form of linear development or barrier exceeding 300 metres in length; • the Site Establishment of a bridge or similar structure exceeding 50 metres in length; • any development or other activity which will change the character of a site as specified in the regulations; • any other category of development provided for in regulations by SAHRA or the provincial heritage resources authority. However, the abovementioned provisions are subject to the exclusion that section 38 does not apply to a development as described in subsection (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation		

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
Act No. 73 of 1989 (EIA) (now presumably the NEMA in view of the repeal of the listed activities under the ECA: Provided that the consenting authority must ensure that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.		
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) The NEMBA aims to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith. The NEMBA provides for the publishing of various lists of species and ecosystems by the Minister of Environmental Affairs and Tourism (now the Minister of Water and Environmental Affairs) as well as by a Member of the Executive Council responsible for the conservation of biodiversity of a province in relation to which certain activities may not be undertaken without a permit. In terms of Section 57 of the NEMBA, no person may carry out any restricted activity involving any species which has been identified by the Minister as "critically endangered species", "endangered species", "vulnerable species" or "protected species" without a permit. The NEMBA defines "restricted activity" in relation to such identified species so as to include, but not limited to, "hunting, catching, capturing, killing, gathering, collecting, plucking, picking parts of, cutting, chopping off, uprooting, damaging, destroying, having in possession, exercising physical control over, moving or translocating".\ The Minister has made regulations in terms of section 97 of the NEMBA with regards to Threatened and Protected Species which came into effect on 1 June 2007. Furthermore, the Minister published lists of critically endangered, endangered, vulnerable and protected species in terms of section 56(1) of the NEMBA.	The legislation was considered throughout the EIA process and in particular the Ecological Impact Assessment which will comply with the NEMBA.	Once final layouts for the roads, trenches and drilling areas are available these will be assessed for any protected flora species.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
National Forestry Act, 1998 (Act No. 84 of 1998) The purpose of this Act is to promote the sustainable management of forests. Everyone has the constitutional right to have the environment protected for the benefit of present and future generations; Natural forests and woodlands form an important part of that environment and need to be conserved and developed according to the principles of sustainable management; Plantation forests play an important role in the economy; Plantation forests have an impact on the environment and need to be managed appropriately; The State's role in forestry needs to change; and The economic, social and environmental benefits of forests have been distributed unfairly in the past.	There are no natural or plantation forests applicable to the application area.	There are no natural or plantation forests applicable to the application area.
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEMAQA) The NEMAQA came into power on the 24th of February 2005. Additionally, the amendment to the Minimum Emission Standards (GN R 893) also came into effect on the 12 June 2015. This Notice provides a list of activities that may cause atmospheric emissions which have or may have a significant detrimental effect on the environment as well as the minimum emission standards ("MES") for these activities as contemplated in section 21 of NEMAQA. The effect of the commencement of the NEMAQA and the listed activities, listed in GN 964 is that an atmospheric emission licence (AEL) is now required for conducting these listed activities.	There are no listed activities that require registration/permitting for the proposed prospecting activities.	No listed activities in terms of the NEMAQA are triggered by the proposed project. Therefore, no AEL is required. Activities associated with the proposed project are unlikely to result in exceedances of the air quality standards.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEMWA) The NEMWA commenced on 1 July 2009 and as a result of its commencement the relevant provisions in the Environment Conservation Act No. 73 of 1989 (ECA) in respect of waste management, were repealed. The NEMWA sets out to reform the law regulating waste management and deals with waste management and control more comprehensively than was dealt with in the ECA. It also introduces new and distinct concepts never before canvassed within the realm of waste management in South Africa, such as the concept of contaminated land and extended producer responsibility. It also provides for more elaborate definitions to assist in the interpretation of the Act. Section 19 of the NEMWA provides for listed waste management activities and states in terms of section 19(1), the Minister may publish a list of waste management activities that have, or	There are no listed activities that require registration/permitting for the proposed prospecting activities.	No Listed activities in terms of NEMWA are triggered by the proposed project. Therefore, no Waste Management Licence (WML) is required. It is however noted that any minimal waste produced on site should be transferred to the nearest licensed waste disposal facility.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
are likely to have a detrimental effect on the environment. Such a list was published in GNR 921 of 29 November 2013. In accordance with section 19(3), the Schedule to GNR 921 provides that a waste management licence is required for those activities listed therein prior to the commencement, undertaking or conducting of same. In addition, GNR 921 differentiates between Category A, B, and Category C waste management activities. Category A waste management activities are those which require the conducting of a basic assessment process as stipulated in the EIA Regulations, 2014 promulgated in terms of the NEMA as part of the waste management licence application and Category B waste management activities are those that require the conducting of a scoping and environmental impact assessment process stipulated in the EIA Regulations, 2014 as part of the waste management licence application. Category C waste management activities do not require a waste management licence, however a person who wished to commence, undertake or conduct a waste management activity listed under this category, must comply with the relevant requirements and standards, Section 20 of the NEMWA pertains to the consequences of listing waste management activities and states that no person my commence, undertake or conduct a waste management activity, except in accordance with the requirements or standards for that activity as determined by the Minister or in accordance with a waste management licence issued in respect of that activity, if a licence is required. In terms of the current statutory framework with regards to waste management, a waste management licence is required for those waste management activities identified in the Schedule to GNR 921. Certain of the waste management activities listed in the Schedule are governed by specific thresholds. Where any process or activity falls below or outside the thresholds stipulated, a waste management licence is not required.		
Focus Areas for Protected Area Expansion – NPAES (2008) The goal of the National Protected Area Expansion Strategy (NPAES) is to achieve cost effective protected area expansion for ecological sustainability and adaptation to climate change. The NPAES sets targets for protected area expansion, provides maps of the most important areas for protected area expansion, and makes recommendations on mechanisms for protected area expansion. It deals with land-based and marine protected areas across all of South Africa's territory (SANBI, BGIS).	There are no listed activities that require registration/permitting for the proposed prospecting activities.	This was considered during identification of the general areas of prospecting overlain with sensitive areas as identified.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
National Biodiversity Assessment (NBA; 2018) The National Biodiversity Assessment (NBA) is the primary tool for monitoring and reporting on the state of biodiversity in South Africa and is prepared as part of the SANBI mandate under the National Environmental Management: Biodiversity Act (Act 10 of 2004). It is used to inform policies, strategies and actions in a range of sectors for managing and conserving biodiversity more effectively. The NBA focusses primarily on assessing biodiversity at the ecosystem and species level, and the two headline indicators of threat status and protection level are applied to both ecosystems and species in the four realms (terrestrial, inland aquatic, estuarine and marine) and in two cross-realm areas (the coast and South Africa's sub-Antarctic territory). These established headline indicators provide a way of comparing results meaningfully across the realms, and a standardised framework that links with policy and legislation in South Africa to facilitate an effective interface between science and policy. Underlying the headline indicators is a wealth of geographically detailed information that can be applied at the provincial and local level. The latest NBA (NBA 2018) was released in October 2019 and builds on the National Spatial Biodiversity Assessment 2004 and the NBA 2011.	There are no listed activities that require registration/permitting for the proposed prospecting activities.	This was considered during identification of the general areas of prospecting overlain with sensitive areas as identified.
Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003) (LEMA) The objectives of this Act are: • to manage and protect the environment in the Province; • to secure ecologically sustainable development and responsible use of natural resources in the Province; • generally, to contribute to the progressive realisation of the fundamental rights contained in section 24 of the Constitution of the Republic of South Africa Act, 1996 (Act No. 108 of 1996), and • to give effect to international agreements effecting environmental management which are binding on the Province. The LEMA deals with the conservation of wild animals, fresh water fish and the conservation and protection of flora in the Limpopo Province. Animals and plants are both listed in the schedules with different degrees of protection afforded to each. The LEMA (2003) contains schedules of specially protected Wild animals (Schedule 2), Protected Wild Animals (Schedule 3), specially protected plants (Schedule 11) and protected plants (Schedule 12).	There are no listed activities that require registration/permitting for the proposed prospecting activities.	This was considered during identification of the general areas of prospecting overlain with sensitive areas as identified.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to the legislation and policy context
This Act must be interpreted and applied in accordance with the national environmental management principles set out in Section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998).		
Integrated Development Plans and Environmental Management Frameworks		
Blouberg IDP[1] One of the objectives identified in the IDP is to achieve "*optimum organization and use of land resources in order to meet the social environment and economic needs of the present and future generations*" and the IDP proposes to achieve this by the implementation of the Spatial Development plan that includes Spatial transformation that are inclusive of sustainable developments. The IDP mentions specifically the Sylvania Platinum and Ironveld mining companies that have the potential to grow the economy of the municipality and to create the much-needed jobs to the locals.	The BAR and EMPr is addressing how the environment will be impacted and outline the proposed management measures.	Though not many employment opportunities will be created by prospecting activities, the potential or future employment should the resource be viable for full scale mining is in line with the IDP objective to grow the economy in a sustainable manner.

[1] https://www.blouberg.gov.za/sstaff/pages/sites/blouberg/documents/idp/FINAL%20REVIEWED%20IDP%202022-23%20BLM_111232.pdf 7 October 2022

7 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES.

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

The "need and desirability" of a project "is the consideration of the strategic context of a development proposal within the broader societal needs and the public interest"[2] and should be determined by considering the broader community's needs and interests as reflected in a credible Integrated Development Plan (IDP), Spatial Development Framework (SDF) and Environmental Management Framework (EMF) for the area where the project will be taking place (DEA, 2017).

The minerals included in the prospecting rights application are: Platinum Group Minerals and Gold; Nickel and Copper; Cobalt and Chrome. Purely on the minerals itself the exploitation of these are desirable due to the uses of these minerals and the potential employment opportunities that could be generated should future mining be identified as a viable option.

Metal	Potential uses
Chrome (Cr)	Chromium is used in the Electroplating industry, in and in paints and dyes[3].
Cobalt (Co)	Cobalt is a component of various alloys that are used in the manufacture of aircraft engines, gas turbines, high speed steels. It is also used in magnets and magnetic recording devises, a catalyst in the petroleum and chemical industries and as a drying agent in paints and ink. The radioactive isotope Co-60 is used in medical treatment and to irradiate food for preservation and consumer protection[4].
Copper (Cu)	Used in the creation of various alloys such as bronze. Other uses are: agricultural poison, algicide in water purification and in a number of goods such as coins, cans, cooking foil, saucepans, electricity cables, planes, and space vehicles[5].
Gold (Au)	Mainly used to manufacture jewellery, glass it is also used in different parts in electronics items, as reflecting material in windows, embroidery thread and in medicine[6].
Nickel (Ni)	Nickel has the capacity to resist erosion and thus is used in the production of coins (money), wires, gas turbines, rocket engines, and alloys used for armour plating, nails and pipes. In combination with copper (Monel alloys) it is resistant to sweater corrosion and thus is used in propeller shafts of boats and desalination plants.[7]
Platinum Group Metals (PGM)	Platinum Group Metals[8] are known for their purity, high melting points, catalytic / oxidation and reduction properties and corrosion resistance, PGMs are utilized in various industrial processes, technologies and commercial applications. Consumer and industrial products include flat panel monitors, glass fibre, medical tools, computer hard drives, nylon and razors. Platinum, palladium and rhodium are also used as autocatalysis and pollution control in the automotive sector.

From the Blouberg IDP[9] "*Employment rate of Blouberg declined by 1% from 9178 to 9130 between 2000 and 2010 before recovering by 6.7% to 13 655 in 2016*". The potential for employment should the prospecting indicate that mining is viable would be good for the Local Municipalities employment rate.

[2] https://cdn.slrconsulting.com/uploads/2020-06/TEPSA_11B12B_DSR_Chap5.pdf 23 June 2022
[3] https://byjus.com/chemistry/chromium/#uses-of-chromium 15 September 2022
[4] https://byjus.com/chemistry/cobalt/ 4 November 2021
[5] https://byjus.com/chemistry/copper/ 4 November 2021
[6] https://byjus.com/chemistry/gold/ 15 September 2022
[7] https://byjus.com/chemistry/nickel/ 4 November 2021
[8] https://www.platinumgroupmetals.net/pgm-markets/default.aspx 4 November 2021
[9] http://www.blouberg.gov.za/sstaff/pages/sites/blouberg/documents/idp/SUMMARY%20OF%20THE%20IDP.pdf 9 September 2022

8 FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVES WITHIN THE SITE

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

The identification of alternatives is a key aspect of the success of the evaluation process. All reasonable and feasible alternatives was identified and screened to determine the most suitable alternative to consider and assess. There are however some significant constraints that have to be considered when identifying alternatives for a project of this scope. Such constraints include financial, environmental and social issues, which will be discussed in the evaluation of the alternatives.

Alternatives can typically be identified according to:

- Location alternatives;
- Process alternatives;
- Technological alternatives; and
- Activity alternatives (including the No-go option).

For any alternative to be considered feasible such an alternative must meet the need and purpose of the development proposal without presenting significantly high associated impacts.

Alternatives can also be distinguished into discrete or incremental alternatives. Discrete alternatives are overall development options, which are typically identified during the pre-feasibility, feasibility and or basic assessment phases of the EIA process. Incremental alternatives typically arise during the EIA process and are usually suggested as a means of addressing identified impacts. These alternatives are closely linked to the identification of mitigation measures and are not specifically identified as distinct alternatives. This section provides information on the development footprint alternatives, the properties considered, as well as the type of activity, activity layout, technological and operational aspects of the activity.

8.1 DETAILS OF THE ALTERNATIVES CONSIDERED

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

8.1.1 Farms on which or location where it is proposed to undertake the activity

The farm on which the proposed prospecting activities will be located is Portion 2 of the Farm Schaffhausen 689 LR in the Blouberg District in the Limpopo Province, see Section 2 and Figure 3-1 as outlined above.

The type of minerals to be prospected for: Chrome Ore, Cobalt, Copper Ore, Gold Ore, Nickel Ore, and Platinum Group Metals.

No alternatives were considered as the DMRE takes into consideration existing mining rights / prospecting rights and the minerals applied for before approving that the application can continue to be processed.

8.1.2 Type of activity to be undertaken

Refer to Section 4 for a full description of proposed activities. Prospecting activities will follow a non-invasive as well as invasive methods. The aim of the proposed activities in a phased approach is to fine tune the following phase activities and the location of those activities, it may thus happen that some phases will not occur depending on the outcome of the previous phase's results. No alternatives were investigated.

8.1.3 Design or layout of the activity

The location of the proposed boreholes, trenches and access roads will take into consideration the presence of surface water resources and the applicable legislative buffer zone and these will be designated as no-go areas.

8.1.4 Technology to be used in the activity

- Desktop assessments will be used where necessary – no alternatives were considered.
- Ground geophysics and soil geochemical sampling will be done using hand shovels – no alternatives were considered.
- In all instances drilling would be:
    - An independent and experienced drilling contractor will be used to complete the drilling in compliance with the Mine Health and Safety Act, 1996 (Act No. 29 of 1996).
    - Under close supervision of an experienced geologist;
    - Conducted along best practice guidelines; and minimize environmental disturbance.
    - At this point in time, it is believed that a diamond drill rig may be used but cannot be confirmed – no alternatives were considered.
- Trenching will be done using heavy machinery e.g. front end loaders, excavators – no alternatives were considered.

All samples collected will be submitted for analyses to an accredited off-site laboratory to determine the mineral content.

8.1.5 Operational aspects of the activity.

A detailed activity plan was made available in the Prospecting Works Programme (PWP) provided to Prescali and is summarised below:

Table 8-1: Prospecting Works Programme

Phase	Activity	Timeframe	Outcome	Timeframe for outcome
	(What are the activities that are planned to achieve optimal prospecting)	*(In months for the Activity)*	*(What are the expected deliverables, e.g., Geological report, analytical results, feasibility study, etc.)*	*(Deadline for the expected outcome to be delivered)*
Non-invasive Prospecting				
1	1.1 Investigate historical and academic information	6 months	Geological characteristic of the prospect area, geological report	Month 6
	1.2 Liaison with local communities		Permission to prospect	
	1.3 Remote sensing		Prospecting targets	
	1.4 Desktop study of mineralization controls		Understanding of geological controls on mineralisation	
	1.5 Inventorise, capture, QA/QC available data and database creation		Quantification of data	
	1.6 Preliminary site visit for access establishment		Confirmation of general geology and field photographs, field visit report	
	1.7 Regional soil geochemistry		Soil geochemistry anomalies	
	1.8 Regional airborne geophysical interpretation		Prospecting targets/structural interpretation plans	
	1.9 Integrate information and prioritise exploration targets		Characterisation of potential targets, geological report	

Phase	Activity	Timeframe	Outcome	Timeframe for outcome
	(What are the activities that are planned to achieve optimal prospecting)	*(In months for the Activity)*	*(What are the expected deliverables, e.g., Geological report, analytical results, feasibility study, etc.)*	*(Deadline for the expected outcome to be delivered)*
Invasive Prospecting				
2	2.1 Ground geophysics	12 months	Geophysical anomalies with drill targets, geophysical report	Month 18
	2.2 Grid soil geochemistry		Geochemical anomalies	
	2.3 Trenching		Drilling targets, sidewall properties, profiles and average grades	
3	Invasive Prospecting			Month 36
	3.1 Drilling (DD or RC)	18 months	Drilled core or RC chips.	
	3.2 Logging, sampling, and analysis		Borehole log data, analytical data, geological sections	
	3.3 Geological modelling		Resource model	
4	Invasive Prospecting and Non-invasive			Month 54
	4.1 Resource drilling	18 months	Infill borehole log data, analytical data, geological sections	
	4.2 Estimation of resource		Final resource estimate	
	4.3 Pre-feasibility study		Pre-feasibility report (Mine plan, optimization, cash flows) Plan design, metallurgical reports	
5	Non-invasive Prospecting			Month 60
	5.1 Feasibility study	6 months	Feasibility report	

8.1.6 Option of not implementing the activity.

From the impact assessment it can be seen that the proposed activities and infrastructures will have a Low to Medium-High impact before mitigation and a Low to Medium impact following mitigation. As very little activities have impacted on the area the cumulative impact would be similar to the exploration activities – no additional cumulative impact is expected.

Should the prospecting application not be successful the potential extend of a viable resource will not be established and this could impact on future employment opportunities in the area.

9 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

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

The objectives of the Public Participation Process (PPP) include:

- Providing Interested and Affected parties (I&APs) with an opportunity to voice their support, concerns and raise questions regarding the project, application or decision;
- Providing an opportunity for I&APs, Environmental Assessment Practitioners (EAPs) and the Competent Authority (CA) to obtain clear, accurate and understandable information about the environmental, social and economic impacts of the proposed activity or implications of a decision;
- Providing I&APs with the opportunity of suggesting ways of reducing or mitigating negative impacts of an activity and for enhancing positive impacts; and
- Enabling the applicant to incorporate the needs, preferences and values of affected parties into the application.

The PPP must comply with the several important sets of legislation that require public participation as part of an application for authorisation or approval; namely:

- The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); and
- The National Environmental Management Act, 1998 (Act No. 107 of 1998).

Adherence to the requirements of the above-mentioned Acts will allow for an Integrated PPP to be conducted, and in so doing, satisfy the requirement for public participation referenced in the Acts.

The PPP was conducted in terms of Chapter 6 of the NEMA and included the following:

- Identification of key Interested and Affected Parties (affected and adjacent landowners) and other stakeholders (organs of state and other parties);
- Placement of site notices on farms, and other accessible public areas;
- Formal notification of the application to key Interested and Affected Parties and other stakeholders via email / fax / post;
- Consultation and correspondence with I&APs and Stakeholders and the addressing of their comments. This appendix will be included in the Final Basic Assessment; and
- Newspaper adverts.

During the process, the following methods are used to develop a stakeholder database which will be utilised to ensure a proper representation of stakeholders interested in or affected by the proposed Project.

- Search works and desktop searches are conducted in and around the project area to verify land ownership and obtain contact details;
- Responses received from newspaper advertisements, public notices and site notices;
- Responses received from distribution of the Background Information Document (BID);
- Identification and consultation with stakeholders including commenting authorities (local and district municipalities);
- Organs of state, other than the competent authority, such as the Department of Agriculture, Forestry and Fisheries (DAFF) having jurisdiction in respect of any aspect of the proposed project and affected authorities; and
- Consultations with affected landowners / tribal authorities.

The PPP commenced on 14 September 2022 with the placement of site notices. The notifications include:

- Newspaper advertisement:
    - Capricorn Voice: 14 – 20 September 2022;
    - Bosveld: 15 – 21 September 2022; and
- Site Notices were placed on 14 September 2022 on and around the relevant farm(s).
- Background information document: distributed to identified stakeholders, landowners and residence (where possible) on 12, 15 and 16 November 2021 and throughout the registration period.

Consultation meetings will be held with registered I&APs. These meetings will follow the format of an open day or will be online to ensure that COVID-19 restrictions are adhered to.

All pre-identified and registered I&APs was notified of the availability of the Basic Assessment Report for public view for a period of 30 days (11/11/2022 to 11/12/2022) within which the report can be reviewed and comments forwarded to the environmental consultant. Consultation sheets (if any are forwarded by IAPs) and a comments and issue register will be included in the final BAR as submitted to the DMRE.

Refer to Appendix 5 for details and photographic evidence pertaining to the public participation process to date.

9.1 MEETINGS

This section will be updated once meetings has been confirmed.

9.2 SUMMARY OF ISSUES RAISED BY I&APS.

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

This section will be updated as comments are received.

Table 9-1: Summary of issues raised by I&APs

Interested and Affected Parties **List the names of persons consulted in this column, and** **Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
AFFECTED PARTIES					
Landowners	X				
Lawful occupier/s of the land	X				
Landowners or lawful occupiers on adjacent properties	X				
Municipal councillor	X				
Municipality	X				
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA etc.)					
Communities	X				
Dept. Land Affairs					
Traditional Leaders					
Dept. Environmental Affairs					
Other Competent Authorities affected					
OTHER AFFECTED PARTIES					

10 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES.

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

10.1 CLIMATE

10.1.1 Regional Climate

The nearest town to the prospecting area is Baltimore (44 km north west) which has a Subtropical steppe climate (Classification: BSh). The district's yearly temperature is 23.26ºC and receives about 57.75 millimetres of precipitation annually[10].

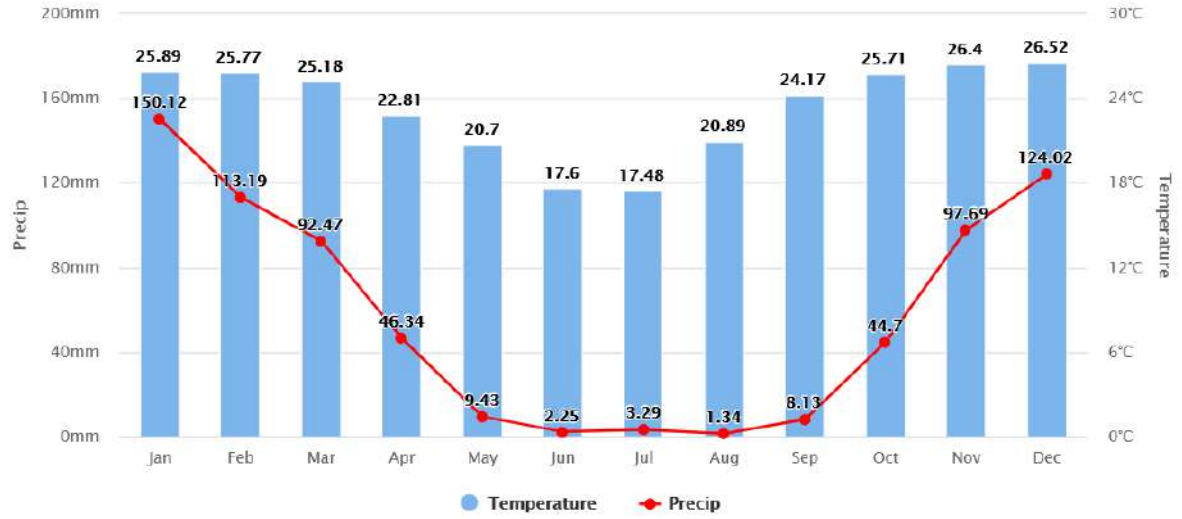


Figure 10-1: Baltimore Monthly Temperatures, Precipitation and Wind speed[10]

10.1.1.1 Precipitation and Evaporation

From the information from tcktcktck.org the average rainfall figures are provided in Table 10-1. Mean Annual Precipitation for the Sylvania Northern Mining (Pty) Ltd is indicated in Figure 10-2 and from WR2012 it ranges from 441 mm to 453 mm across the boundaries as indicated. With regards to evaporation, the proposed Sylvania Northern Mining (Pty) Ltd operations is located within the 2200 – 2600 mm A-pan evaporation zone, Figure 10-3.

Table 10-1: Mean climatic rainfall conditions for the project area [10]

Month	Average precipitation mm	Average precipitation days (≥ 1.0 mm)	Average relative humidity (%)
Jan	150.12	15.24	71.12
Feb	113.19	12.3	71.54
Mar	92.47	11.45	70.36
Apr	46.34	6.71	68.99
May	9.43	2.46	61.29
Jun	2.25	0.19	59.6
Jul	3.29	0.95	59.63
Aug	1.34	0.37	51.65
Sep	8.13	1.8	49.05
Nov	44.7	6.82	52.69
Oct	97.6	11.36	59.41
Dec	124.02	15.33	66.85
Year	57.75	7.08	61.85

[10] https://tcktcktck.org/south-africa/limpopo/baltimore 02/08/2022

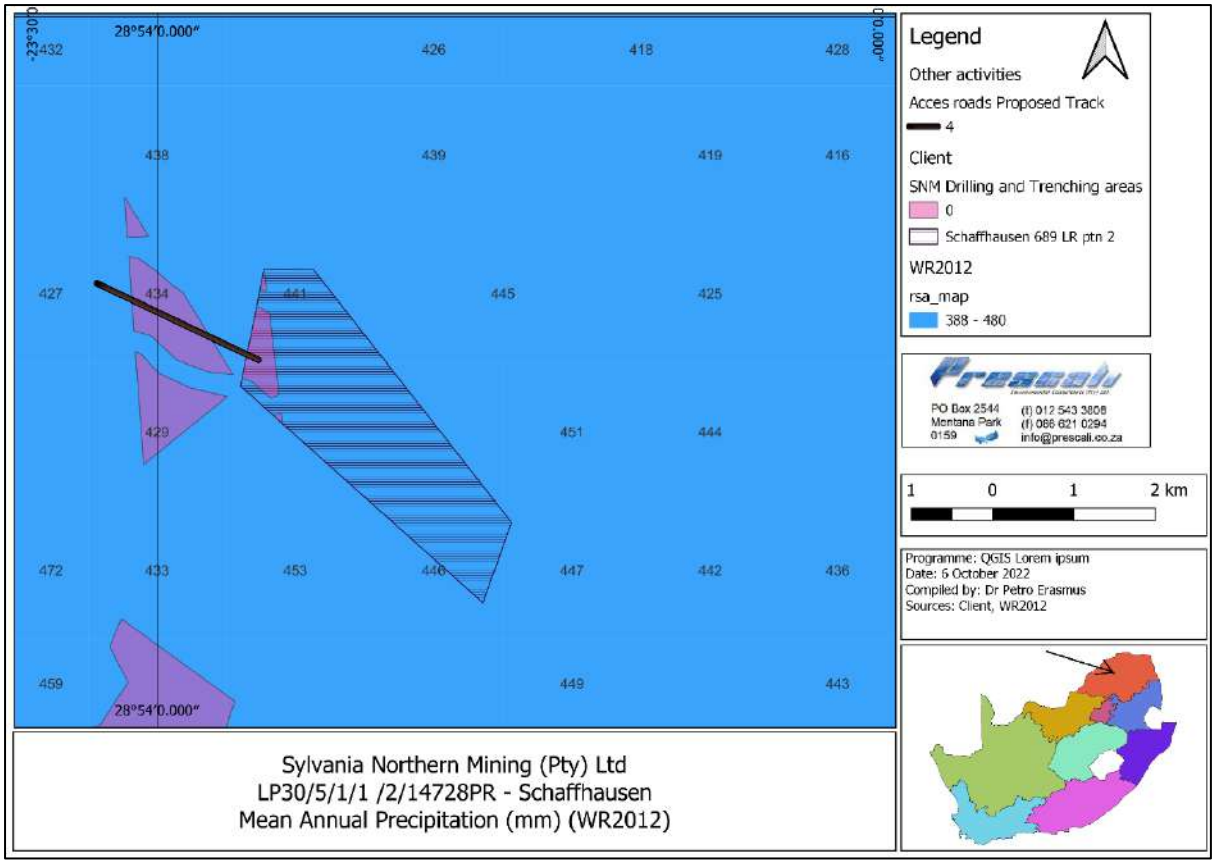


Figure 10-2: Mean annual Precipitation (WR2012)

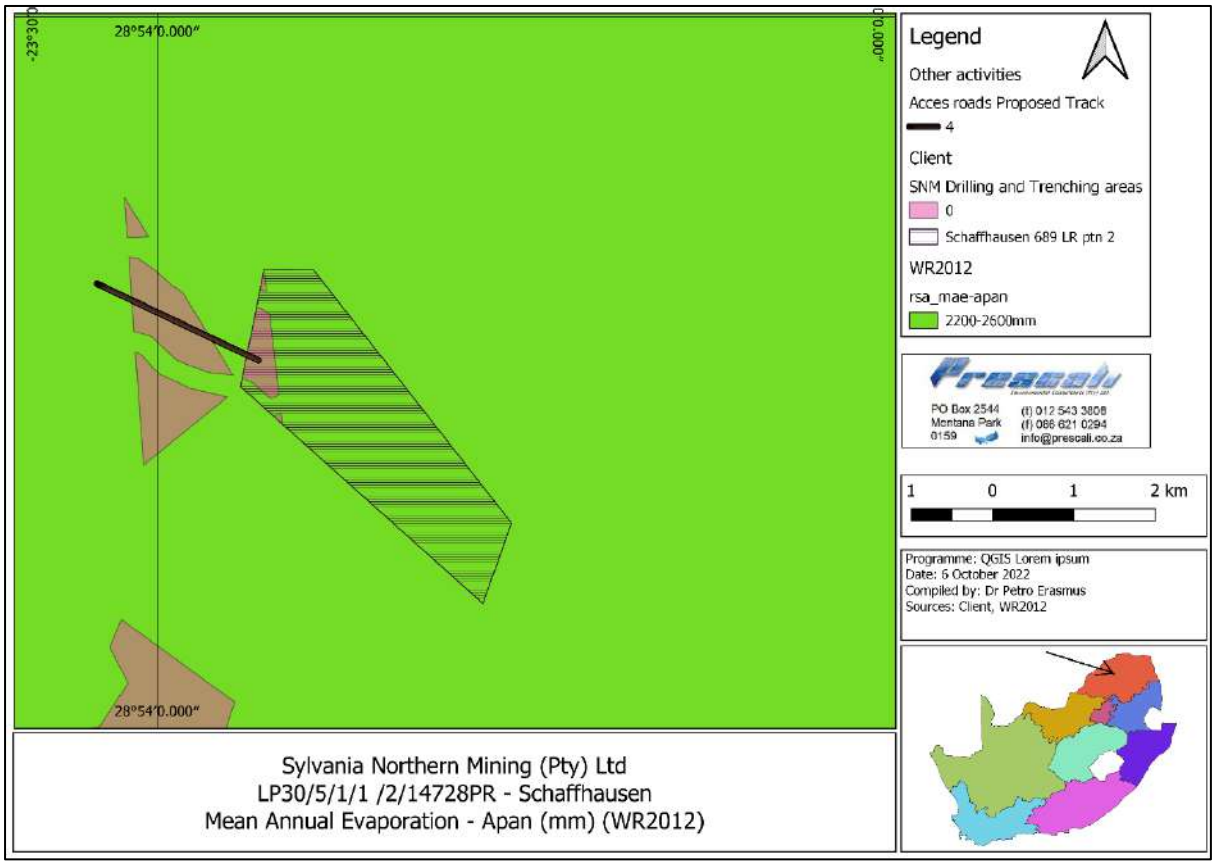


Figure 10-3: Mean Annual A-Pan Evaporation (WR2012)

10.2 TOPOGRAPHY

The topography of the prospecting rights application area is indicated in Figure 10-5 and Figure 10-4. The application area appears to be adulating with a slope of 1.5 – 1.2%.

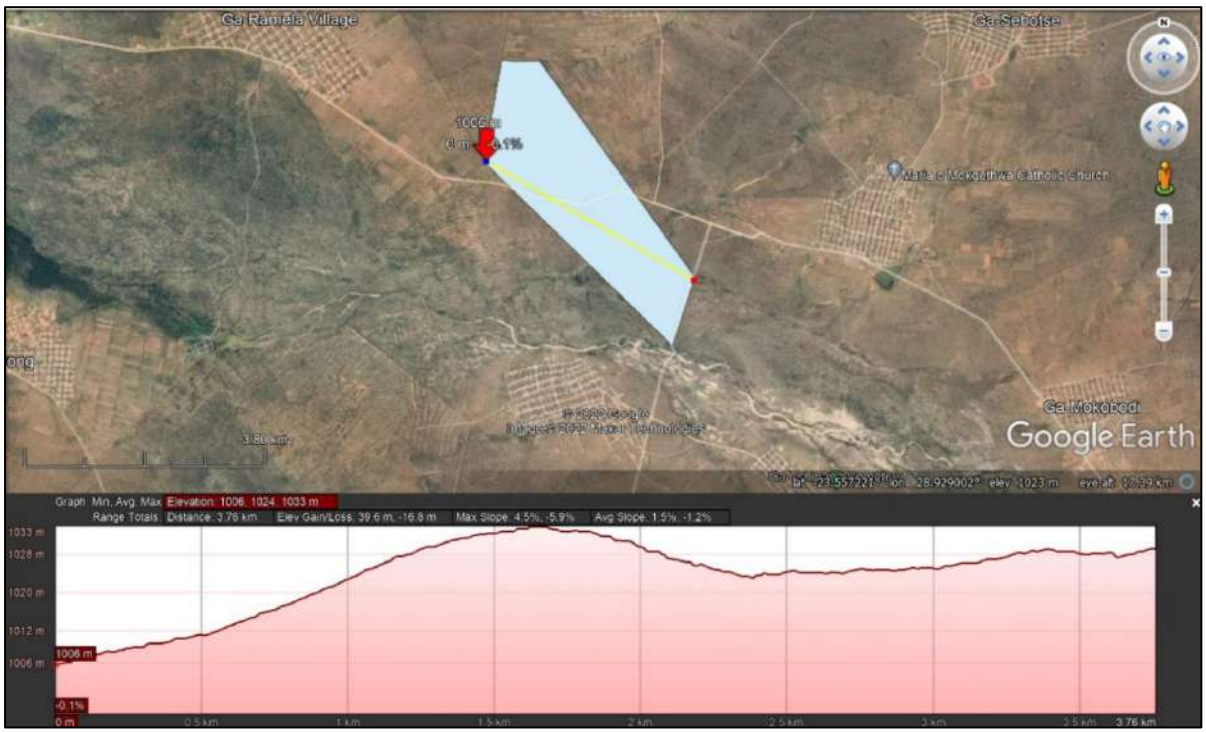


Figure 10-4: Topography profiles (Goole Earth™)

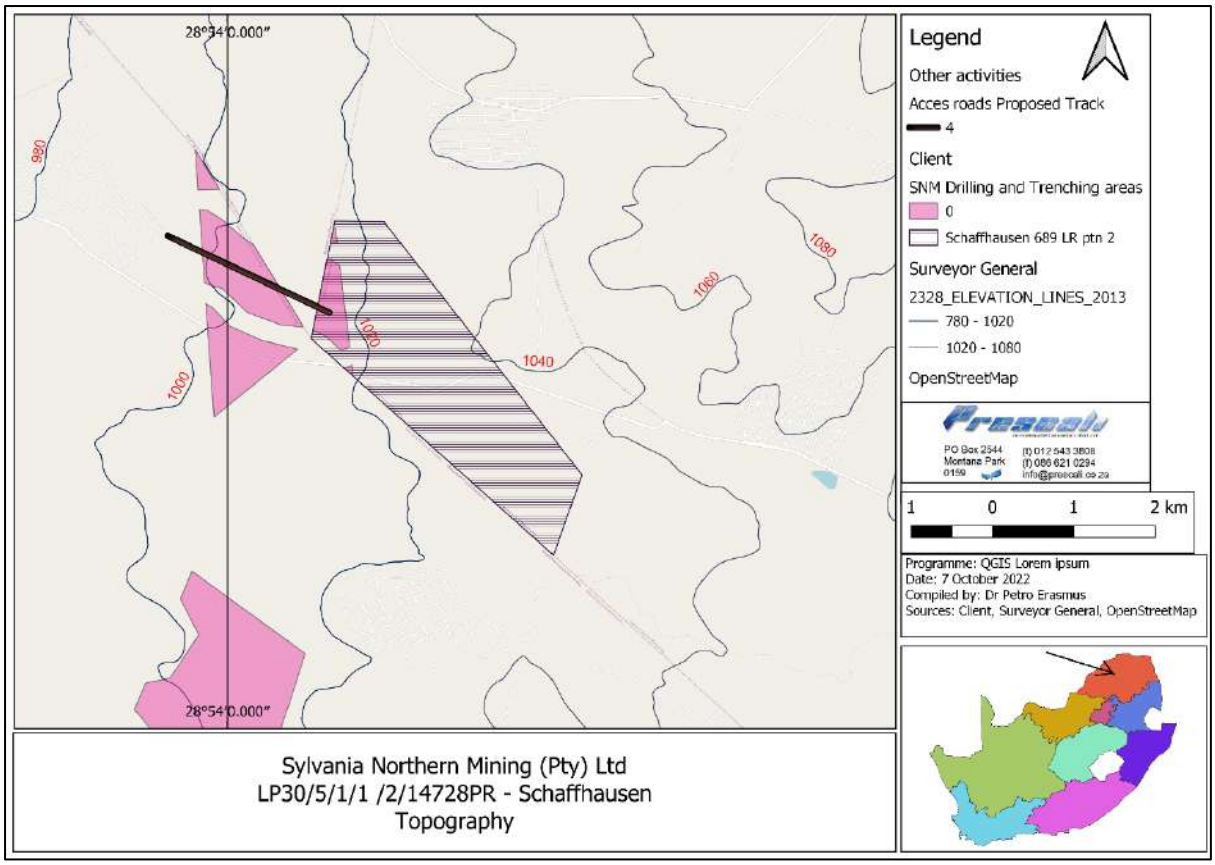


Figure 10-5 : Elevation lines and topography of the prospecting application area

10.3 GEOLOGY

Information in this section was sourced from the Prospecting Works Programme. The prospecting application area is underlain by the Main and Upper Zones of the Bushveld Igneous Complex.

At the base of the Main Zone of the Rustenburg Layered Suite (RLS), near its contact with the Archean granite rocks, host PGM, Au, Co, Cu and Ni bearing sulphides which is located on the general strike with the Platreef found to the south of the project area. Mineralisation of the Platreef is developed north of the town of Mokopane as a 10–400 m thick package of generally pyroxenitic lithologies with Platinum Group Elements PGE) and Ni-Cu base-metal sulphide (BMS) mineralisation, located at the base of the RLS and overlain by norites and gabbronorites assigned to the Main Zone. As the Platreef strikes northwards from Mokopane it rests upon a succession of progressively older units of the Transvaal Supergroup: quartzites and shales of the Silverton and Timeball Hill Formations; shales of the Duitschland Formation; the Penge banded iron formation; dolomites of the Malmani Subgroup; and finally, on the farm Zwartfontein, the Platreef rests on Archaean basement granites and gneisses.

The project area is located down-dip of the outcropping mineralization overlaying the Archaean Basement found on the farms Kransplaats, Nonnenwerth and La Pucella located immediately to the east.

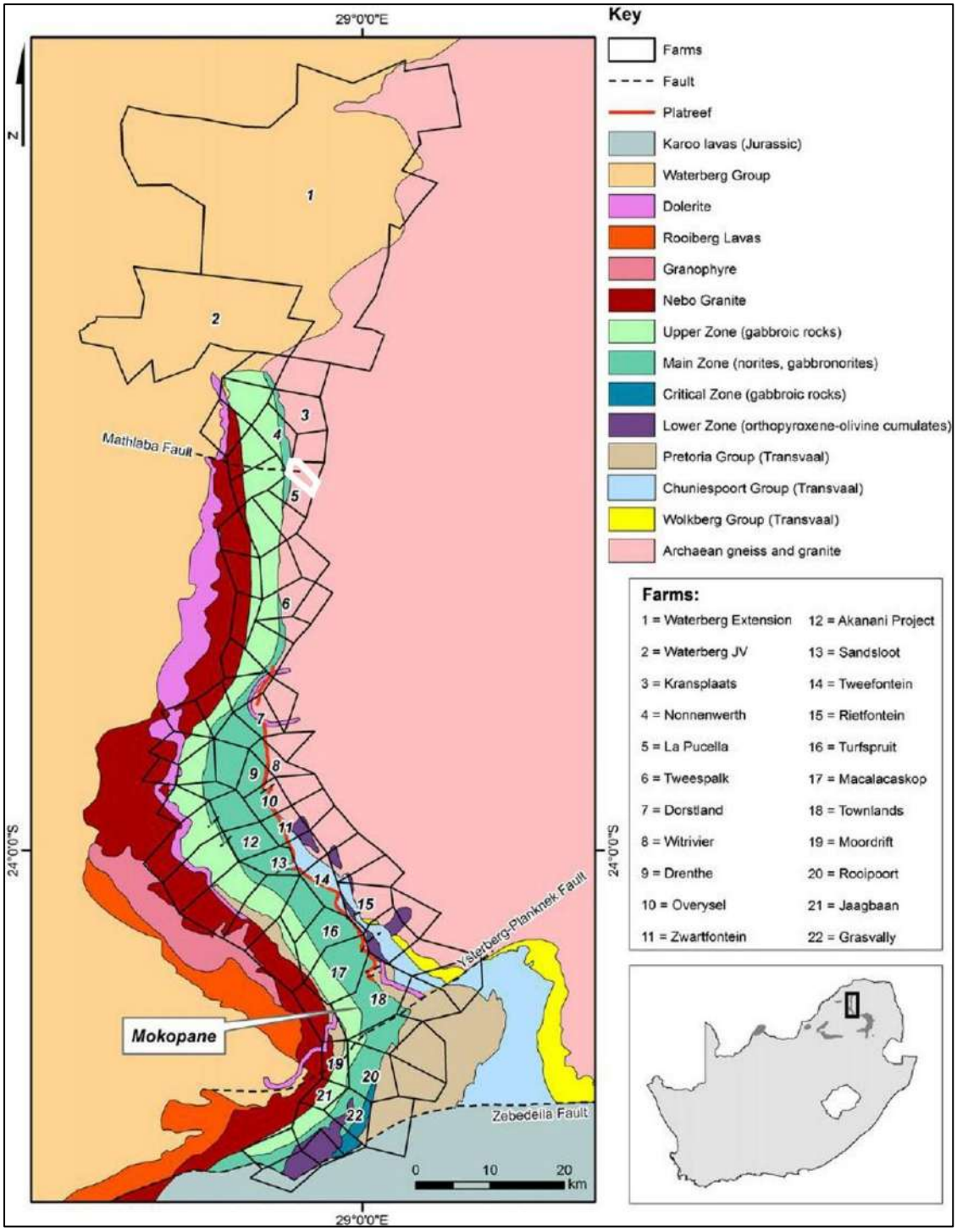


Figure 10-6 : Project area (in white), located in the north of the Northern Limb of the Bushveld Igneous Complex (after McDonald *et al*, 2016 as cited in the PWP)

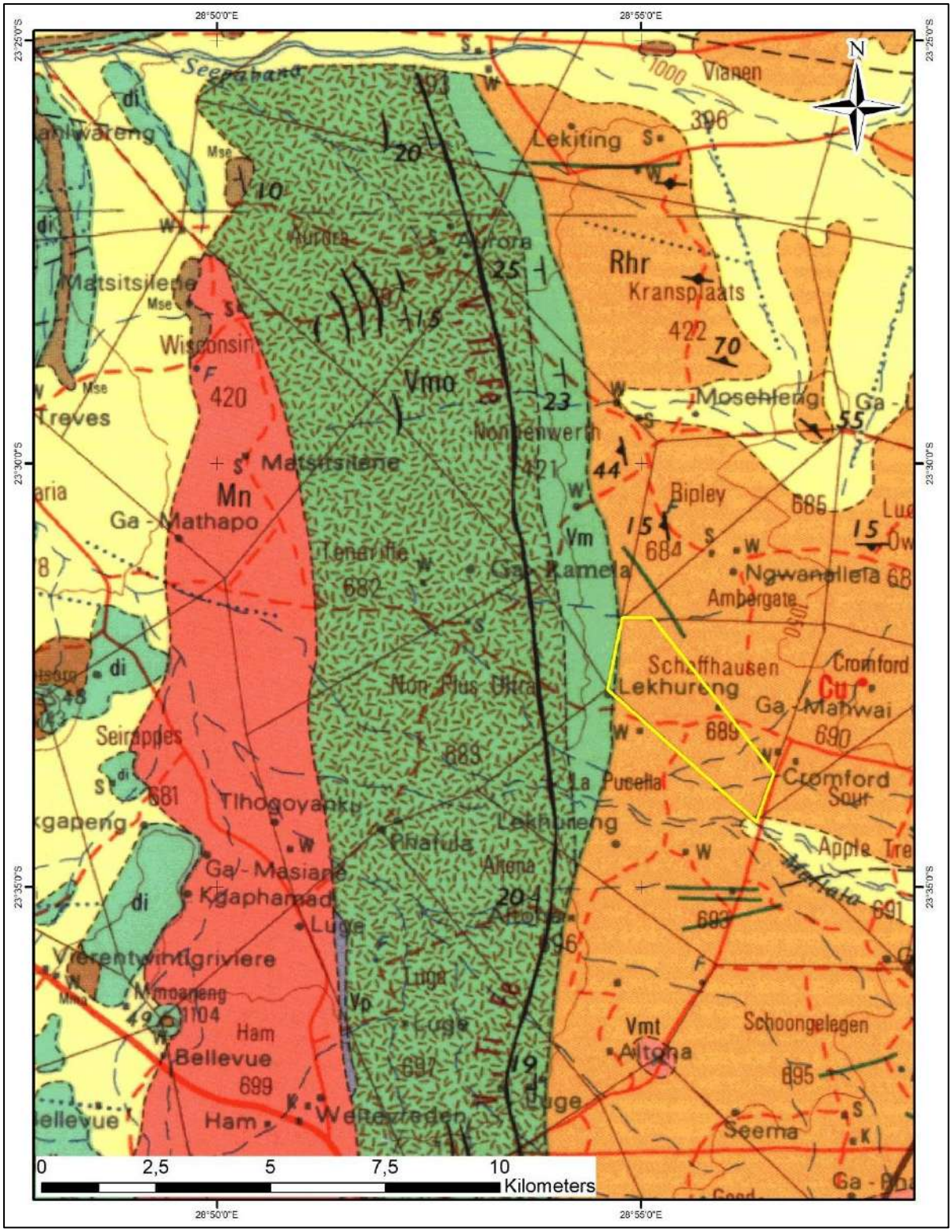


Figure 10-7: Geology of project area (yellow boundaries) from 1:250 000 Geology plan (2328 Pietersburg).

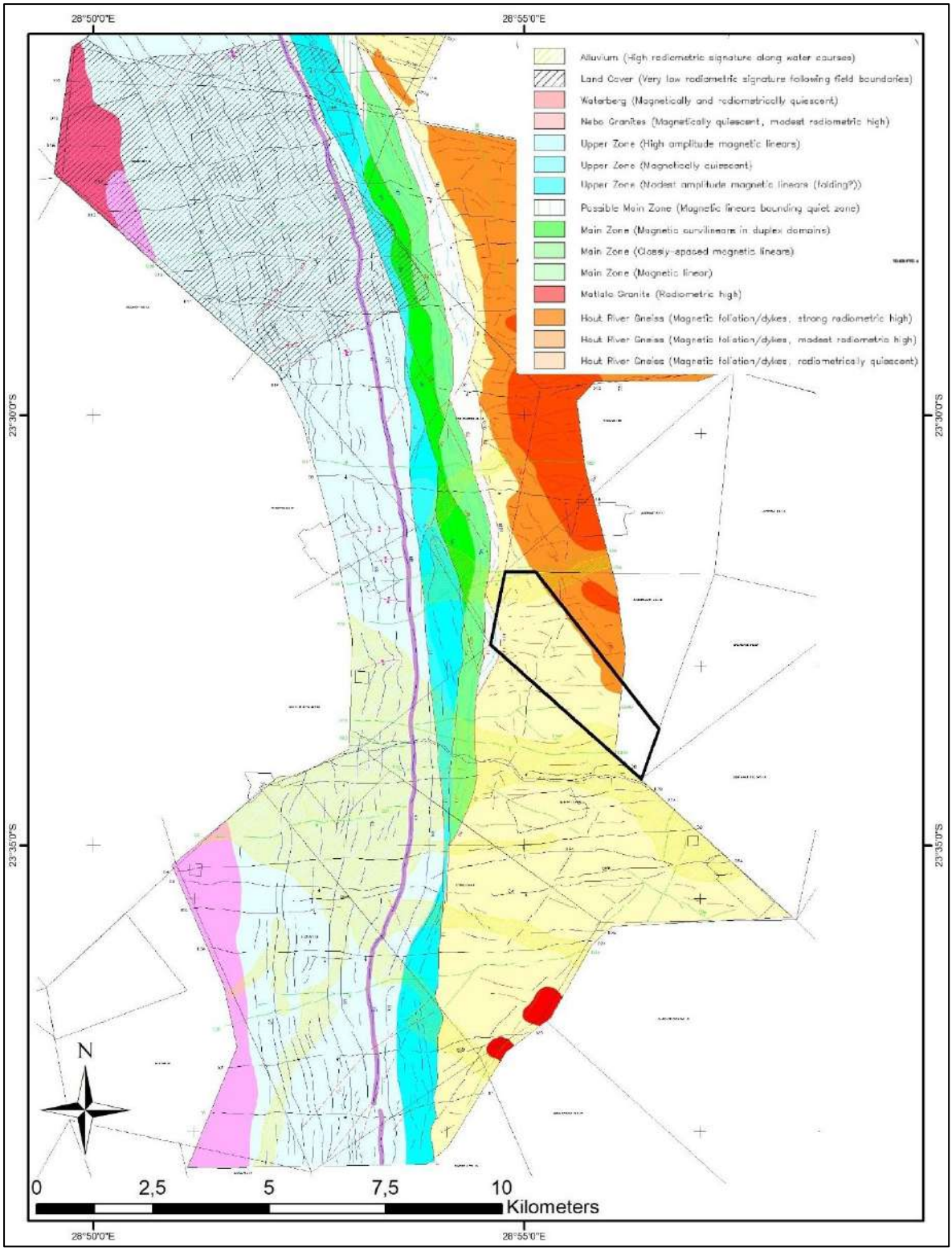


Figure 10-8: Geophysics interpretation of geology over project area (Sylvania internal report, 2012 as cited in the PWP)

10.4 FLORA

A desktop study was conducted by RedKite Environmental Solutions (Pty) Ltd in 2022 to establish whether any potentially sensitive flora species or species of conservation concern may possibly occur on site (Refer to Appendix 6).

10.4.1 Biomes

The project area lies within the Savanna Biome, which is the largest biome in South Africa, covering 46% of the country (about 435 000 km^2). It is a mixture of grasses and trees or shrubs. The Savanna Biome stretches from the Kalahari in the north-west across to the lowveld in the north-east and southwards to the lowlands of KwaZulu Natal and the Eastern Cape. It is found from sea level to about 2 000 metres above sea level. More than 5 700 plant species grow in the Savanna Biome. They include various types of grasses (e.g. Rooigras) and trees like the Baobab, Mopane, Camel Thorn and Knob Thorn.

10.4.2 Vegetation Types

Two vegetation types (SANBI) occur in the project area, namely Makhado Sweet Bushveld (SVcb20).

The Makhado Sweet Bushveld vegetation type is found in the Limpopo Province and occurs on the plains south of the Soutpansberg, east of the Waterberg and on the apron surrounding the Blouberg and Lerataupje Mountains, and north of the Polokwane Plateau and west of the escarpment, with extensions to Mokopane to the south and to the north near Vivo. The vegetation type is found on slightly to moderately undulating plains sloping generally down to the north, with some hills in the southwest. Makhado Sweet Bushveld is characterised by short and shrubby bushveld with a poorly developed grass layer.

Expected common and dominant species in undisturbed vegetation includes the following (those with a "d" are considered to be dominant) (Mucina & Rutherford, 2006):

- Trees: *Senegalia erubescens* (d), *Vachellia gerrardii* (d), *Senegalia mellifera* subsp. *detinens* (d), *Vachellia rehmanniana* (d), *Boscia albitrunca* (d), *Combretum apiculatum* (d), *Vachellia tortilis* subsp. *heteracantha*, *Terminalia sericea*.
- Shrubs: *Commiphora pyracanthoides*, *Dichrostachys cinerea*, *Grewia flava*, *Hibiscus calyphyllus*, *Lycium shawii*, *Rhigozum obovatum*, *Barleria lancifolia*, *Hirpicium bechuanense, Indigofera poliotes, Melhania rehmannii, Pechuel-Loeschea leubnitziae.*
- Graminoids: *Anthephora pubescens* (d), *Aristida stipitata* subsp. *graciliflor*a (d), *Cenchrus ciliaris* (d), *Enneapogon scoparius* (d), *Brachiaria nigropedata*, *Eragrostis trichophora, Panicum coloratum, P. maximum, Schmidtia pappophoroides, Urochloa mosambicensis*.
- Herbs: *Chamaecrista absus, Corbichonia decumbens, Geigeria acaulis, Harpagophytum procumbens* subsp. *transvaalense, Heliotropium steudneri, Hemizygia elliottii, Hermbstaedtia odorata, Leucas sexdentata, Osteospermum muricatum, Tephrosia purpurea* subsp. *leptostachya.*

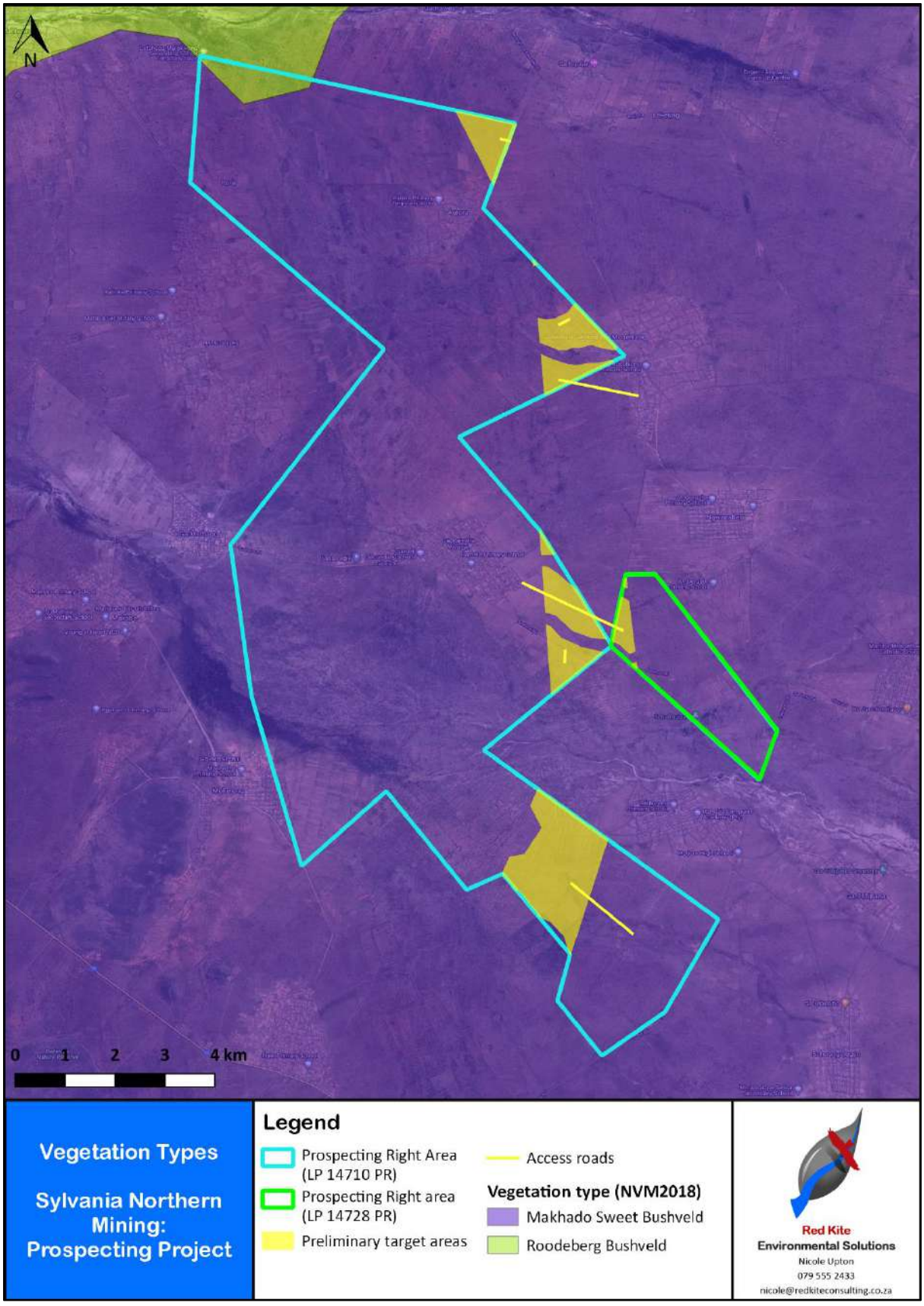


Figure 10-9: Vegetation types of the study site

10.4.3 Vegetation Conservation Status

The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under NEMBA, lists national vegetation types that are afforded protection on the basis of rates of transformation. Makhado Sweet Bushveld vegetation type is not listed in the "National List of

Ecosystems that are Threatened and need of protection", and as Least Concern by the 2018 National Biodiversity Assessment.

There is one main conservation management plan for the province, namely the Limpopo Conservation Plan (LCP) (LCPv2, 2013 as cited by Red Kite). The LCP comprises two spatial components: (i) maps of terrestrial and freshwater critical biodiversity areas (CBAs); and (ii) a set of land-use guidelines that are important for maintaining and supporting the inherent biodiversity values of these critical biodiversity areas. The LCP has been updated consecutively and individually for the Waterberg (2015), Mopani (2016), Vhembe (2017), Sekhukhune (2018) and Capricorn (2018) district municipalities as part the compilation of bioregional plans for these municipalities. Each bioregional plan produced an updated Critical Biodiversity Area (CBA) map for the district. Protection of the priority areas identified in the LCP and bioregional plans would contribute to meeting national biodiversity targets for the South African vegetation types.

The Prospecting Right area contains the following classes from the LCP and District Bioregional Plans: Critical Biodiversity Area (CBA2)[11], Ecological Support Area (ESA2)[12], No Natural Remaining (NNR[13]) and Other Natural Area (ONA[14]). No protected areas in terms of the NEMPAA are located within 10 km of the project area. The Prospecting Right area is located in the transition zone of the Vhembe Biosphere Reserve.

[11] (CBA2): Best Design Selected Sites. Areas selected to meet biodiversity pattern and/or ecological process targets. Alternative sites may be available to meet targets. Maintain in a natural state with limited or no biodiversity loss. Maintain current agricultural activities. Ensure that land use is not intensified and that activities are managed to minimize impact on threatened species.

[12] (ESA2): Areas with no natural habitat that is important for supporting ecological processes. Avoid additional / new impacts on ecological processes.

[13] Areas with no significant direct biodiversity value. Not Natural or degraded natural areas that are not required as ESA, including intensive agriculture, urban, industry; and human infrastructure. No management objectives, land management recommendations or land-use guidelines are prescribed.

[14] Natural and intact but not required to meet targets, or identified as CBA or ESA. No management objectives, land management recommendations or land-use guidelines are prescribed.

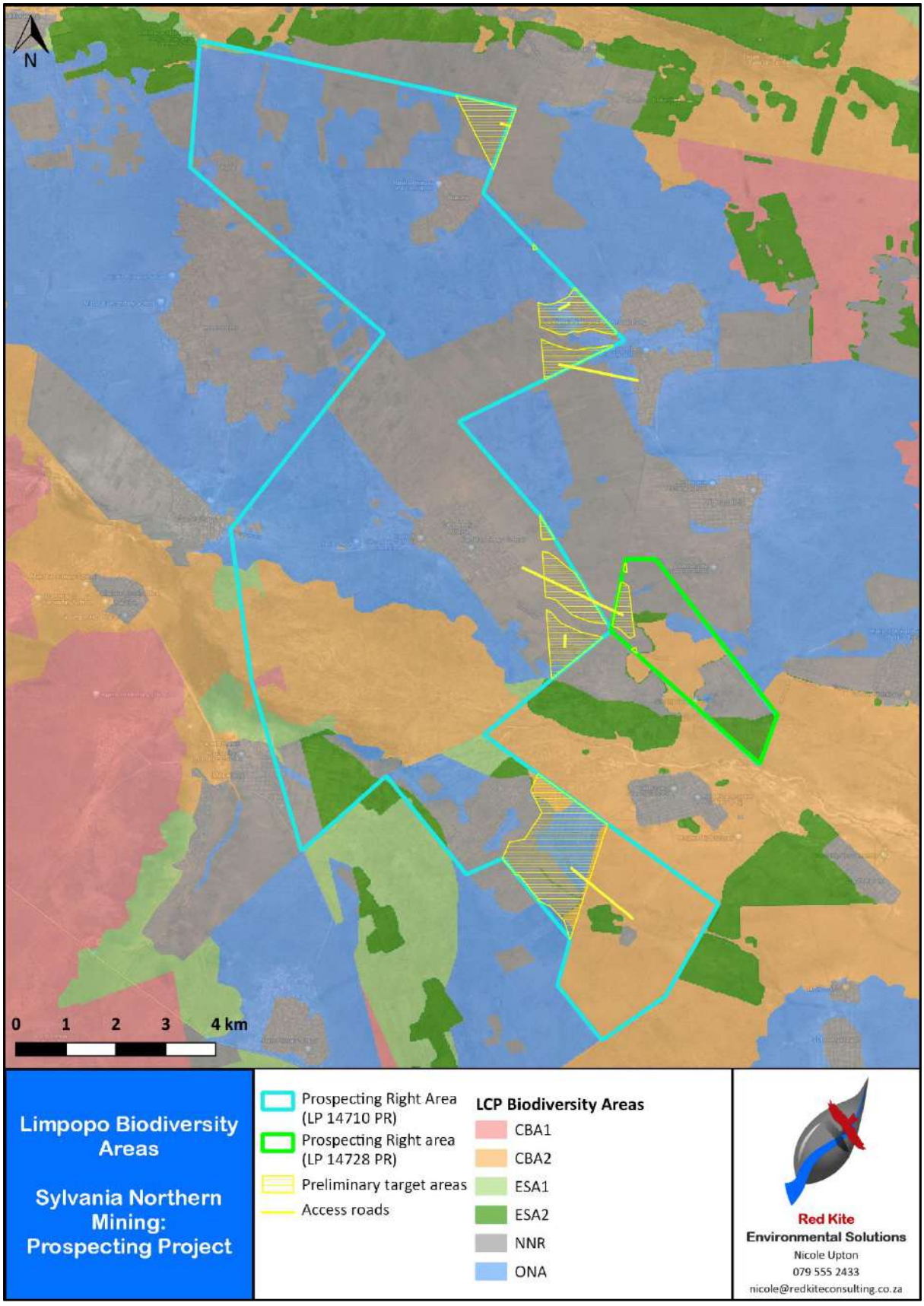


Figure 10-10: LCP (v2) Biodiversity areas on the project area

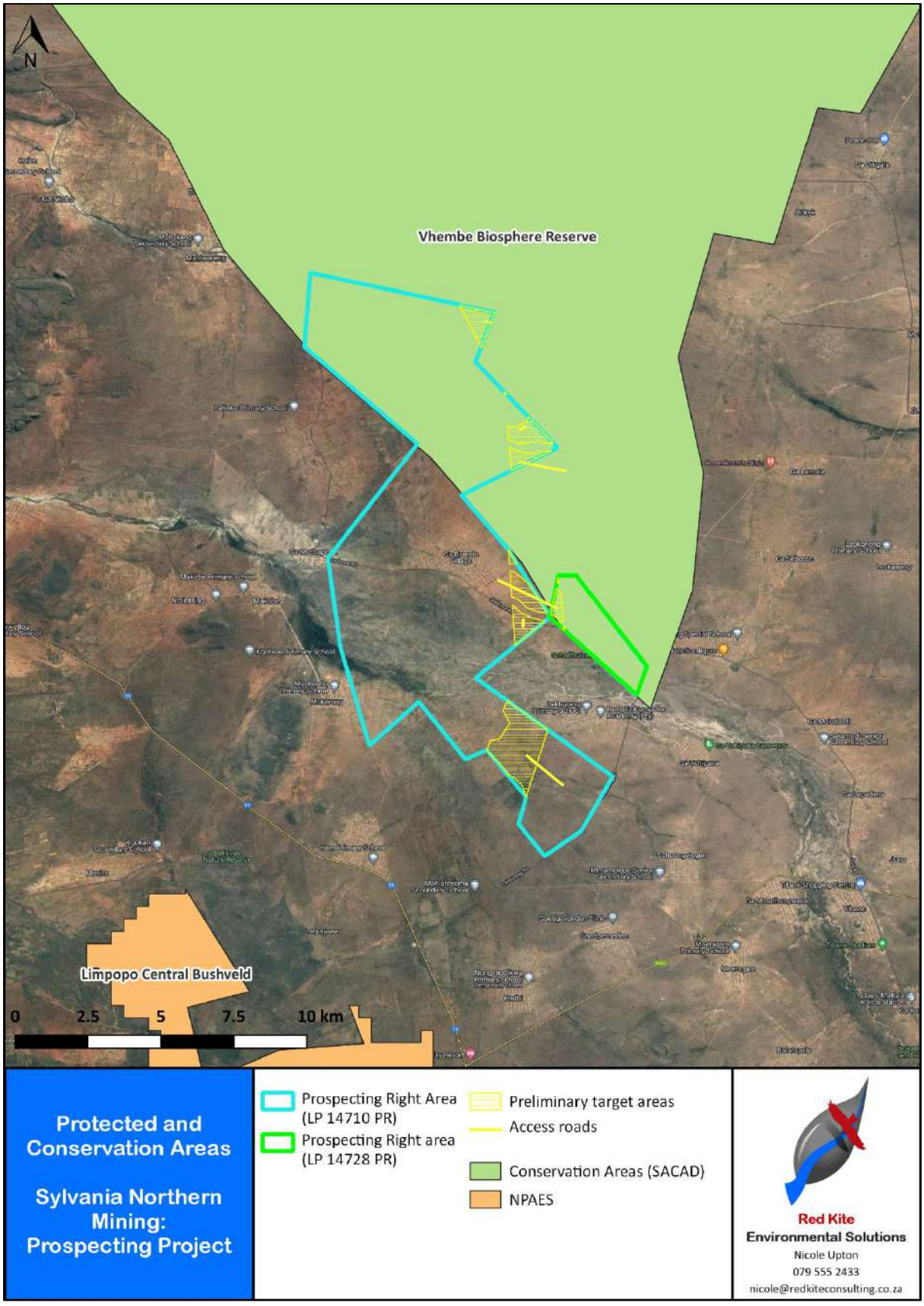


Figure 10-11: Protected and conservation areas

10.4.4 POSA Plant Species

Information on plant species previously recorded for the project area was extracted from the POSA online database hosted by SANBI. A list of plant species that have previously been recorded in the project area is provided in Appendix C of the RedKite reports (in Appendix 6). The results indicate that

78 plant species have been recorded in the area queried, consisting of 13 families. The most prominent family is *Poaceae*, with 60 species.

Of the 78 species previously recorded for the area, none are Species of Conservation Concern (SCC) in terms of their Red List status. Furthermore, the Environmental Screening Tool Report for the project area does not list any SCC. The aforementioned is supported by the findings of previous ecology assessments undertaken on the project area (M2 Environmental Connections, 2014 & Scientific Aquatic Services, 2013 as cited by Red Kite). None of the flora species recorded on POSA for the area are listed as protected in the LEMA.

Three protected species, in terms of the NFA, has been recorded on POSA for the area queried, namely:

- *Boscia albitrunca* (Shepherd's tree)
- *Combretum imberbe* (Leadwood)
- *Sclerocarya birrea* (Marula)

The above protected tree species as well as *Vachellia erioloba* (Camel thorn) were identified to occur on the project footprint during previous studies carried out on the project footprint (M2 Environmental Connections, 2014 & Scientific Aquatic Services, 2013 as cited by Red Kite).

Four of the flora species recorded on POSA for the area are known to have medicinal uses:

- *Ehretia rigida*: Puzzle bush (Eng.); Deurmekaarbos (Afr.); umHlele (Zulu); Morobe (Northern Sotho); iBotshane (Xhosa); Mutepe (Venda);
- *Sclerocarya birrea*: Marula
- *Senna italica*: Eland's Pea (e), Swartstorm (a), Wild Senna (e), Wilde Ertjies (a)
- *Terminalia sericea*: Mususu (Venda); Silver cluster-leaf or Silver terminalia (Eng.); Vaalboom (Afr.)

Various additional flora species that have medicinal or cultural uses were identified to occur on the project footprint during previous studies carried out on the project footprint (M2 Environmental Connections, 2014 & Scientific Aquatic Services, 2013).

None of the flora species listed on POSA for the project area are endemic to South Africa.

10.5 FAUNA

A desktop study was conducted by RedKite in 2022, to establish whether any potentially sensitive faunal species or species of conservation concern (SCC) may possibly occur on site. The Virtual Museum and Animal Demography Unit (ADU) was used to compile species lists based on the sightings and data gathered from the South African Biodiversity Institute for the 328BD and 2328DB Quarter Degree Squares (QDS). The avifaunal species list was obtained from SABAP2 for the pentads applicable to the project area.

It is important to note that a QDS covers a large area: ± 27 x 25 km (± 693 km²) and a pentad (SABAP2 Protocol) an area of ± 8 x 7.6 km (± 60.8 km²) and it is possible that suitable habitat will exist for a certain Red Data avifaunal species within this wider area surrounding the study site. However, the specific habitat(s) found on site may not suit Red Data species, even though it has been recorded for the QDS or pentad.

Species and habitat were identified as possibly sensitive within the framework of this study. Sensitive species were determined according to their close relationship and dependence on the vegetation type and habitat found to occur on the project site.

Appendix D in the Specialist report (attached in Appendix 6) list the faunal species for the five QDS applicable to the project. National SCC include mammalian, reptilian, amphibian and avifaunal species which are known to occur in the regional area where the project is proposed (Table 10-2).

Table 10-2: Fauna SCC found in QDS that may be relevant to the Sylvania Northern Mining PR

Scientific Name	Common Name	Red Data List Category
Mammalia		
Mellivora capensis	Honey Badger	LC, LEMA Schedule 3 Protected, TOPS 2007
Crocidura maquassiensis	Makwassie musk shrew	VU (2016) - As per Screening Tool Report
Dasymys robertsii	Robert's Marsh Rat	NT (2016)- As per Screening Tool Report
Avifauna		
Oxyura maccoa	Duck, Maccoa	NT (Regional), VU (Global)
Falco biarmicus	Falcon, Lanner	VU (Regional), LC (Global)
Certhilauda chuana	Lark, Short-clawed	NT (Regional), LC (Global)
Ciconia nigra	Stork, Black	VU (Regional), LC (Global)
Gyps coprotheres	Vulture, Cape	EN (Regional), EN (Global), TOPS EN
Torgos tracheliotos	Vulture, Lappet-faced	EN (Regional), EN (Global), TOPS EN
Gyps africanus	Vulture, White-backed	CR (Regional), CR (Global), TOPS EN
Aquila rapax	Eagle, Tawny	EN (Regional), LC (Global), Flagged by STR
Reptiles		
Platysaurus monotropis	Orange-throated Flat Lizard	EN (SARCA 2014), LEMA Schedule 3
Homopholis mulleri	Muller's Velvet Gecko	VU (SARCA 2014), LEMA Schedule 3
Lygodactylus soutpansbergensis	Soutpansberg Dwarf Gecko	NT (SARCA 2014), LEMA Schedule 3
Amphibian		
Pyxicephalus edulis	African/Lesser Bull Frog	LC (SARCA 2014), LEMA Schedule 3, TOPS 2007

10.5.1 Mammals

According to the SANBI Animal Demographic Unit (ADU), one (1) mammal species was found to possibly occur in the area queried, which is a provincial SCC (LEMA) and listed Nationally under TOPS 2007:

Honey Badger	*Mellivora capensis*	LC TOPS LEMA Schedule 3 Protected

Two (2) additional mammalian SCC were listed in the Environmental Screening Tool Report for the project:

Makwassie musk shrew)	*Crocidura maquassiensis*	VU (2016)
Robert's Marsh Rat)	*Dasymys robertsii*	NT (2016)

10.5.2 Avifaunal

According to data collected during the Southern African Bird Atlas Project 2 (SABAP2), the site is located within pentads 2325_2845, 2325_2850, 2330_2850 and 2335_2850 and hundred and sixty-eight (168) bird species have been recorded to occur within this area.

Eight (8) avifaunal SCC were listed for the area queried:

Duck, Maccoa	*Oxyura maccoa*	NT (Regional), VU (Global)
Falcon, Lanner	*Falco biarmicus*	VU (Regional), LC (Global)
Lark, Short-clawed	*Certhilauda chuana*	NT (Regional), LC (Global)
Stork, Black	*Ciconia nigra-*	VU (Regional), LC (Global)
Vulture, Cape	*Gyps coprotheres*	EN (Regional), EN (Global)
Vulture, Lappet-faced	*Torgos tracheliotos*	EN (Regional), EN (Global)
Vulture, White-backed	*Gyps africanus-*	CR (Regional), CR (Global)
Eagle, Tawny-	*Aquila rapax-*	EN (Regional), LC (Global)

The site is located a significant distance away from Important Birding and Biodiversity Areas (IBAs). The Waterberg IBA is located 45 km south-west of the project area and the Blouberg IBA is located 30 km north of the project area.

10.5.3 Butterflies

Thirteen (13) butterfly species were recorded in for the 2328BD and 2328DB QDS, all of which were categorized as LC by SANBI.

10.5.4 Other Invertebrates

Three (3) Dung beetle species were recorded for the QDS, all of which were categorized as LC by SANBI.

10.5.5 Reptiles

Thirty-six (36) reptile species were recorded for the QDS. Three (3) of the species have are SCC:

Orange throated Flat Lizard	*Platysaurus monotropis*	Endangered (SARCA 2014)
Muller's Velvet Gecko	*Homopholis mulleri*	Vulnerable (SARCA 2014)
Soutpansberg Dwarf Gecko	*Lygodactylus soutpansbergensis*	Near Threatened (SARCA 2014)

Almost all species of Reptiles are protected in terms of LEMA: Schedule 3, excluding the water monitor, rock monitor, and all indigenous snakes not listed in the Act otherwise.

10.5.6 Amphibians

Nine (9) amphibian species were reported within the QDS, of which one is listed as an SCC in terms of TOPS 2007:

African/Lesser Bull Frog	*Pyxicephalus edulis*	Least Concern (SARCA 2014), LEMA Schedule 3, TOPS 2007

Desktop surface water assessment was conducted by Prescali (Prescali, 2022), refer to Appendix 6.

10.6 SURFACE WATER RESOURCE

10.6.1 Affected River basin

The Sylvania Northern Mining (Pty) Ltd Prospecting Right application area is situated in the Limpopo Water Management Area (WMA) (A primary catchment), specifically quaternary catchment A62E, A62F, A62G and A62H of the Mogalakwena River catchment (Figure 10-12) (DWAF, 2004).

From the 2016 reconciliation strategy (Lombaard, J., 2016), the Mogalakwena River (A61 to A63) catchment has limited surface water resources but large groundwater resources, which have already been extensively exploited by the irrigation sector. The mining sector is expanding rapidly in this catchment and the water supply to these mines must be secured as a matter of priority. Additional water resources are groundwater and transfers from the Olifants River catchment.

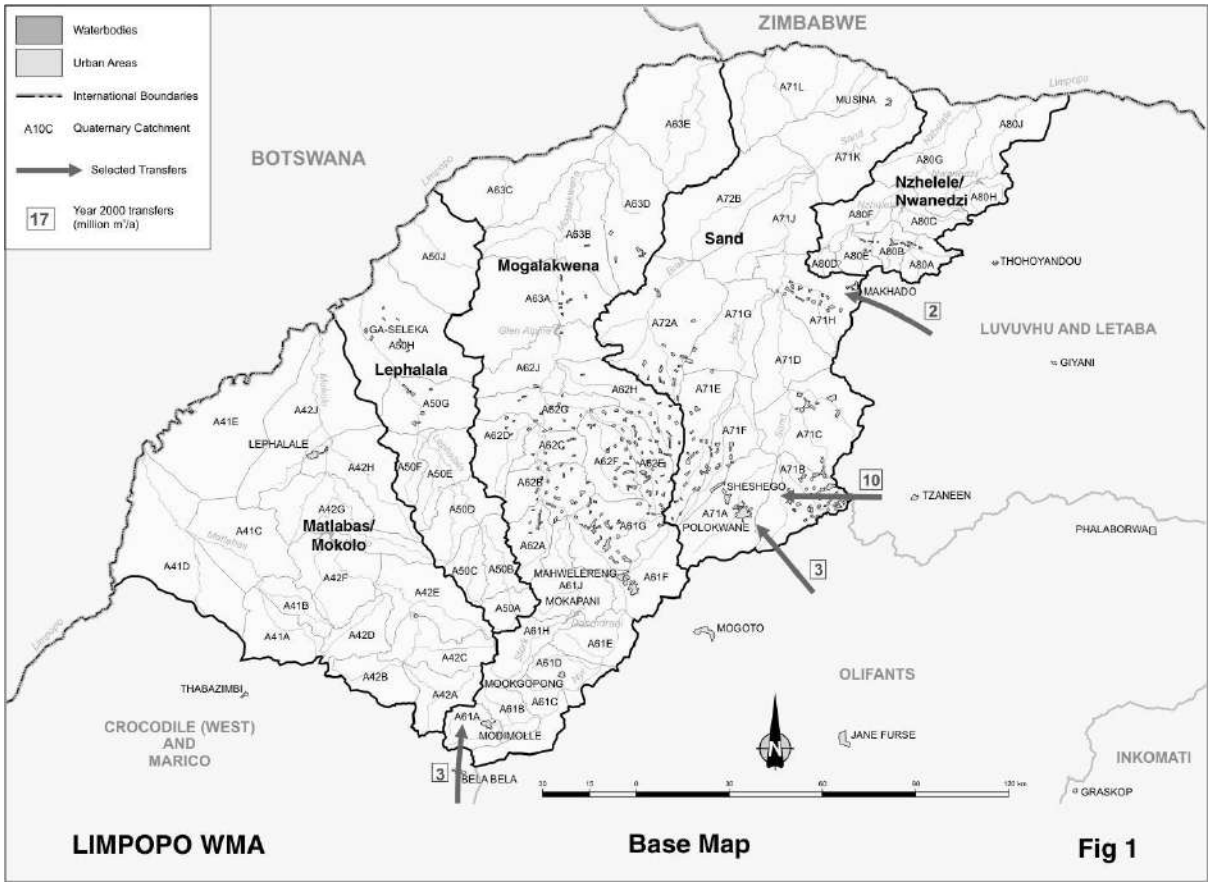


Figure 10-12: Base map of the Limpopo water management area and its sub-areas (DWAF, 2004))

10.6.2 Quaternary catchment

The proposed Sylvania Northern Mining (Pty) Ltd Schaffhausen prospecting area is located within the A62E quaternary catchment (Mogalakwena River catchment).

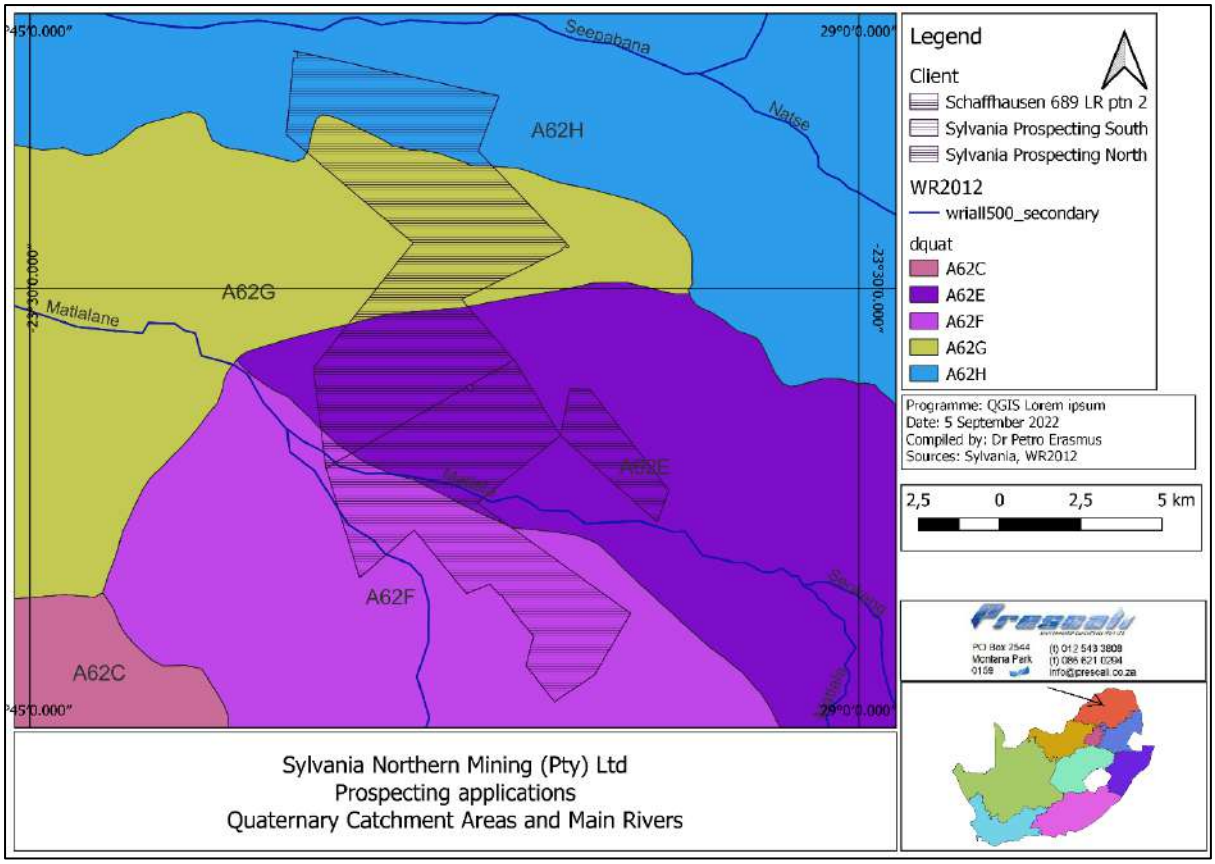


Figure 10-13: Quaternary catchments and primary and secondary Rivers (WR2012)

Though the Mogalakwena catchment has a large potential for growth, it has insufficient water supply to meet current needs and the Doorndraai Dam is over-allocated, while all water resources in the Mogalakwena catchment have been fully developed.

The middle of this catchment is densely populated with informal settlements that are mainly supplied from groundwater, posing a risk to surface water quality, as well as groundwater quality due to the high concentration of pit latrines. This can lead to long-term contamination of underlying aquifers with *E.coli* and nitrate as well as unsafe concentrations of bacteria, viruses and chemicals.

Groundwater is also threatened by mine water decant and naturally occurring fluorides emanating from the underlining granite in some areas. With an increase of development within the mining sector the potential of more mine water decant is a high risk. Additional water quality determinants associated with the gold and base-metal mines as well as smelters are antimony, pH, TDS, total suspended solids (TSS) and tin.

Large scale irrigation around the dams in this catchment can lead to deterioration of water quality due to runoff of potential agro-chemical pollutants into the water source.

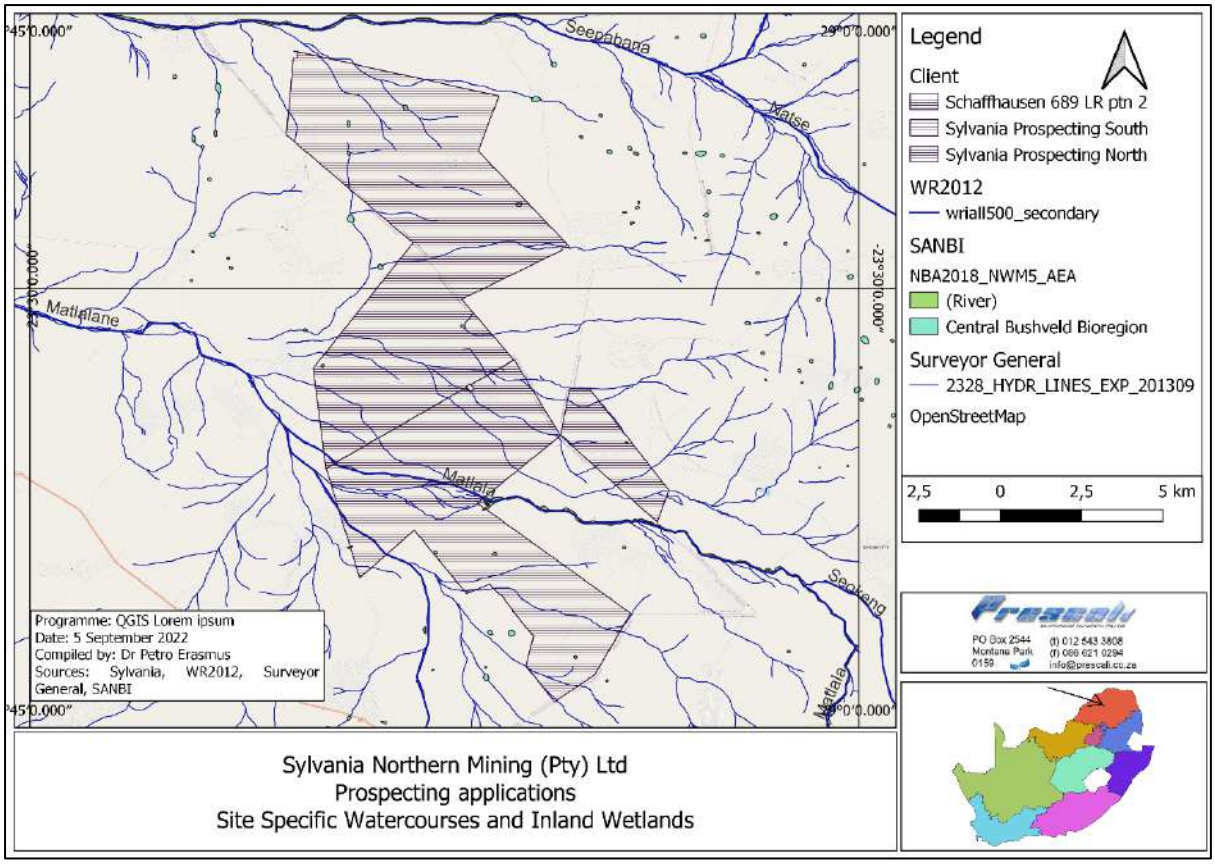


Figure 10-14: Location of Sylvania Northern Mining (Pty) Ltd site-specific surface water resources and inland wetland areas

The Mean Annual Evaporation, Mean Annual precipitation and MAR for the applicable quaternary catchment is indicated in Table 10-3.

Table 10-3: Applicable catchment areas MAR, MAP and MAE information (Baily & Pitman, 2015)

Area	Catchment area		MAE (mm) (S-pan)	MAP (mm)	MAR (million m^3/a)
	Gross (km^2)	Net (km^2)			
A62	5795	5584	1883	479	75,99
A62E	621	621	1850	460	5,51
A62E - Schaffhausen only	60,172				0,534

10.6.3 River Resource Classification

The ecological status (EcoStatus) of a river refers to its overall condition or health, i.e., the totality of the features and characteristics of the river and its riparian areas, which manifests in its ability to support a natural array of species. This ability relates directly to the capacity of the system to provide a variety of goods and services.

The Minister of Water and Sanitation is required to establish a classification system, and to determine the class and resource quality objectives for all or part of the resources considered to be significant.

From the desktop data assessment is can be seen that the Present Ecological Status (PES) for both the rivers closes to the prospecting right area decreased in classification from the 1999 assessment to

the 2018 assessment. The Ecological Importance and Sensitivity Class (EI and ES) of the rivers in the applicable reaches are Moderate and Very Low respectively[15] (Figure 10-15).

Table 10-4: Classification of the River Reaches (CSIR, 2018) (CSIR, 2011)

	Matlala	**Seepabana**	**Mogalakwena**
Flow	Ephemeral	Perennial	Perennial
Order	2	2	3
Mainstem	1	1	1
PES1999	B: Large Natural	B: Largely Natural	D
Ecoregion	5	1	1
Geomorphic Zone	E	D	F
River Type	5_N_L	1_P_U	1_P_F
FFRID	0	0	0
FFRREGION	0	0	0
FFRFlagship	0	0	0
PES_2018	C	D	D
NBA2018ETS	CR	LT	CR
NBA2018PL	NP	WP	PP
FRID_2018	0	0	0
FRFAG_2018	0	0	0
FEPA Code	4	4	2

- FFRID: Free flowing river identification. Each system and its tributaries have the same identifier.
- FFRREGION: The lumped ecoregion into which free-flowing rivers fall, used to achieve representation of free-flowing rivers across the country.
- FFRFlagship: Flagship free-flowing rivers as identified through an expert review process.
- PES_2018: Data that became available between 2011 and 2017 from Reserve or Ecological Water Requirement (EWR) and Water Resource Classification System (WRCS) studies.
- NBA2018ETS: Ecosystem threat status (ETS) of river ecosystem types: this was based on the extent to which each river ecosystem type had been altered from its natural condition.
- NBA2018PL: Ecosystem protection level (EPL) of river ecosystem types: river ecosystem types in protected areas needed to be in good condition rivers (A or B ecological category) to be considered as protected. Well protected, moderately protected, poorly protected river ecosystem types have at least 100%, 50%, 5% of their biodiversity target in protected areas and in natural or near-natural ecological condition; not protected river ecosystem types have < 5%.
- FRID_2018: Free-flowing river ID. Each system and its tributaries have the same identifier.
- FRFAG_2018: In NBA 2018 where no river condition changes were recorded the free-flowing/flagship rivers remained unchanged.

Ecoregion 1 (39 383,5 km^2), Limpopo Plain, consists of plains and lowlands with a low to moderate relief. Vegetation consists mainly of Bushveld types and Mopane veld (Kleynhans, Thirion, & Moolman, 2005).

Ecoregion 5 (7 245.9 km^2), Northern Plataea have the following vegetation types: Mixed Bushveld (main); Clay Thorn Bushveld (limited) and North Eastern Mountain Grassland (Limited). The topography is dominated by plains with low to moderate relief (Kleynhans, Thirion, & Moolman, 2005).

No biomonitoring was conducted for this report; from the Freshwater Biodiversity Organisation website one sampling result was available for the Matlala River (below Debengeni falls: A6N0KA-00001) and fish species were recorded[16]:

[15] http://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx 9 September 2020

[16] https://freshwaterbiodiversity.org/map/#site-detail/taxon=&search=MATLALA&siteId=30447&collector=&category=&yearFrom=&yearTo=&months=&boundary=&userBoundary=&referenceCategory=&spatialFilter=&reference=&endemic=&conservationStatus=[]&modules=1&validated=&sourceCollection=[%22fbis%22,%22gbif%22,%22virtual_museum%22]&abioticData=&ecologicalCategory=&rank=&siteIdOpen=30447&orderBy=name&polygon=&thermalModule=&dst= 9 September 2022

Taxon	Occurrences	Origin	Endemism	Cons. Status (Global)
Amphilius natalensis Boulenger, 1917	1	Native	Widespread	Least concern
Amphilius uranoscopus (Pfeffer, 1889)	1	Native	Subregional endemic	Least concern

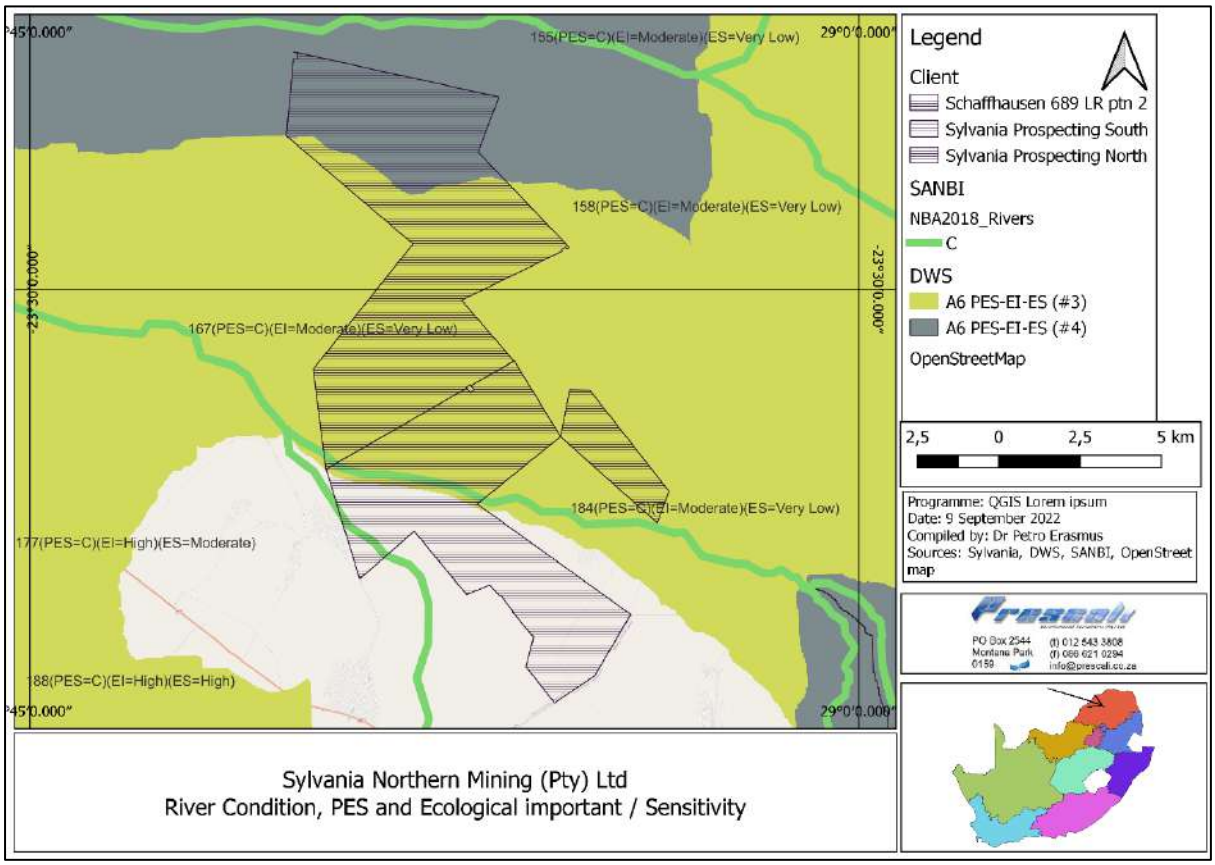


Figure 10-15: River condition, Present Ecological Status, Ecological Importance and Sensitivity

The quaternary catchments have a NFEPA code 0 classification: Not classified.

- It does not fall within a fish sanctuary area for threatened species;
- It does not fall within a fish relocation area for threatened species;
- It does not fall within a fish translocation area for threatened species;
- It does not fall within a fish rehabilitation area for threatened species; and
- It does not fall within a fish Corridor area for threatened species.

10.6.4 Background Water Quality

The DHSWS has monitoring points in the Mogalakwena Rivers and the average concentrations are provided in Table 10-5:

- WMS A62_1000004250 (1-4250): Uitzicht Verstooteling 670 LR Bridge on Mogalakwena River 0.6 km Before Confluence with Matlalane (2009-01-22 to 2009-02-25); and
- WMS A62_90366: Glen Alpine Dam on Mogalakwena River: near Dam Wa (ncwq NEMP) (1975-11-12 to 2018-05-14) downstream of the confluence with the Seepabana River.

Table 10-5: Average background surface water quality (DWAF, 1996) (DWAF, 1996) (DWAF, 1996) (DWAF, 1996)

Parameter		A62-90366[17]	A62-1000004250[18]	Aquatic	Domestic	Agriculture	
						Livestock	Irrigation
Alkalinity	mg $CaCO_3$/l)	87,185	1221	N/A	N/A	N/A	N/A
Aluminium	mg/l	0,07	0,05	≤ 0.005	≤ 0.015	≤5	<5
Calcium	mg Ca/l	20,069	22	N/A	< 32	< 1000	N/A
Chlorine (free)	mg/l	48,79	ND	N/A	N/A	N/A	N/A
Electrical conductivity	mS/m	35,928	1059,5	15% from normal	< 70	156 (Dairy Pigs and Poultry), 313 Cattle & Horses, 469 (Sheep)	6,25
Fluoride	mg/l	0,328	1,1	< 0.75	< 1	< 2 All other livestock; < 6 ruminants	< 2
Magnesium	mg/l	9,674	90	N/A	< 30	< 500	N/A
pH	pH units	7,917	8,85	5% from normal	6 - 9	N/A	6.5 - 8.4
Phosphorus (inorganic)	mg/l	0,084	ND	0,005	N/A	N/A	N/A
Potassium	mg/l	3,578	53,5	N/A	< 50	N/A	N/A
Silica	mg/l	5,405		N/A	N/A	N/A	N/A
Sodium	mg/l	34,221	2140	N/A	< 100	< 2000	< 70
Sulphate	mg/l	8,299	510	N/A	< 200	< 1000	N/A

[17] www.dwa.gov.za/iwqs/wms/data/A62/A62_90366.zip 9 September 2022
[18] www.dwa.gov.za/iwqs/wms/data/A62/A62_1000004250.zip 9 September 2022

The water quality at the Glen Alpine Dam is of good quality complying with the Water Quality Guidelines except for Aluminium and for Phosphorus (inorganic). The upstream site indicates very poor water quality but only two samples' results were available, it may be that the samples were taken from stagnant water which could affect the quality thereof.

10.6.5 Surface Water Quantity

10.6.5.1 Mean Annual Runoff

The MAR is indicated in Table 10-3.

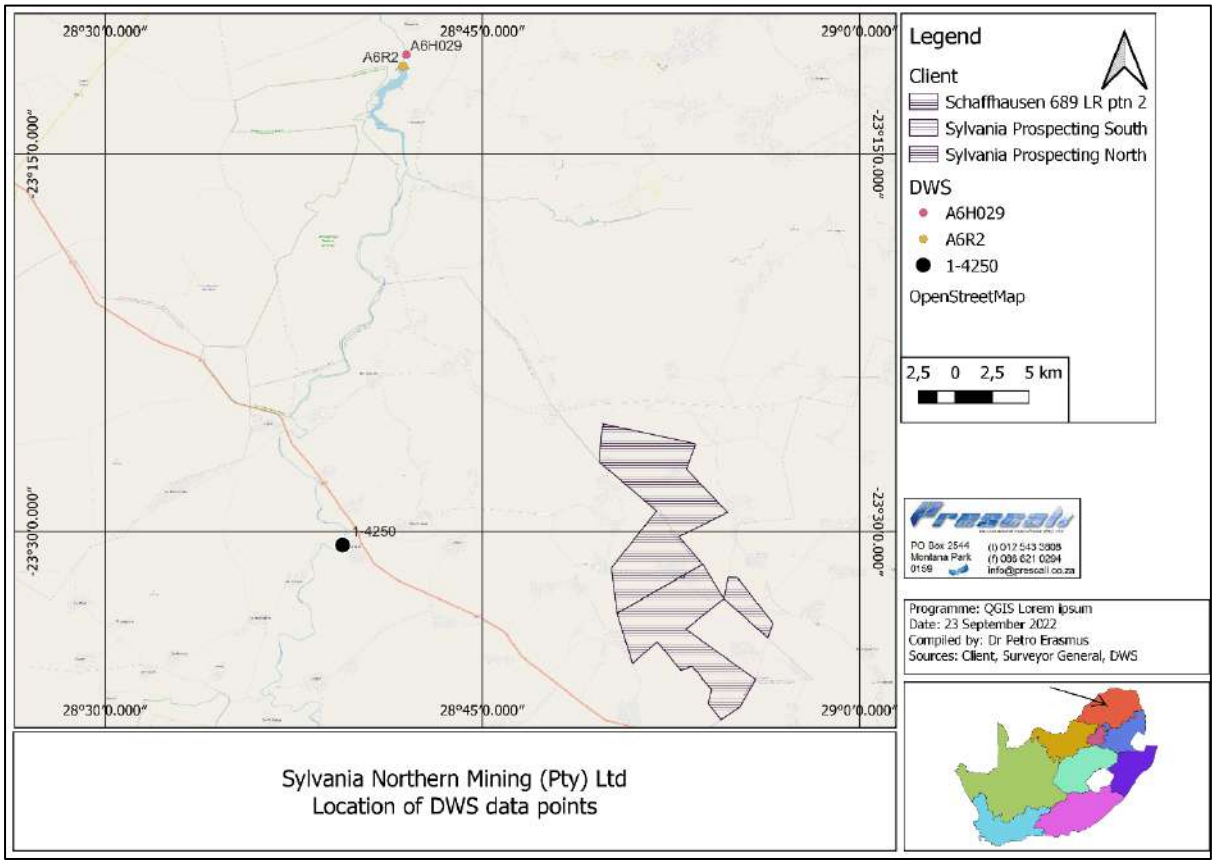
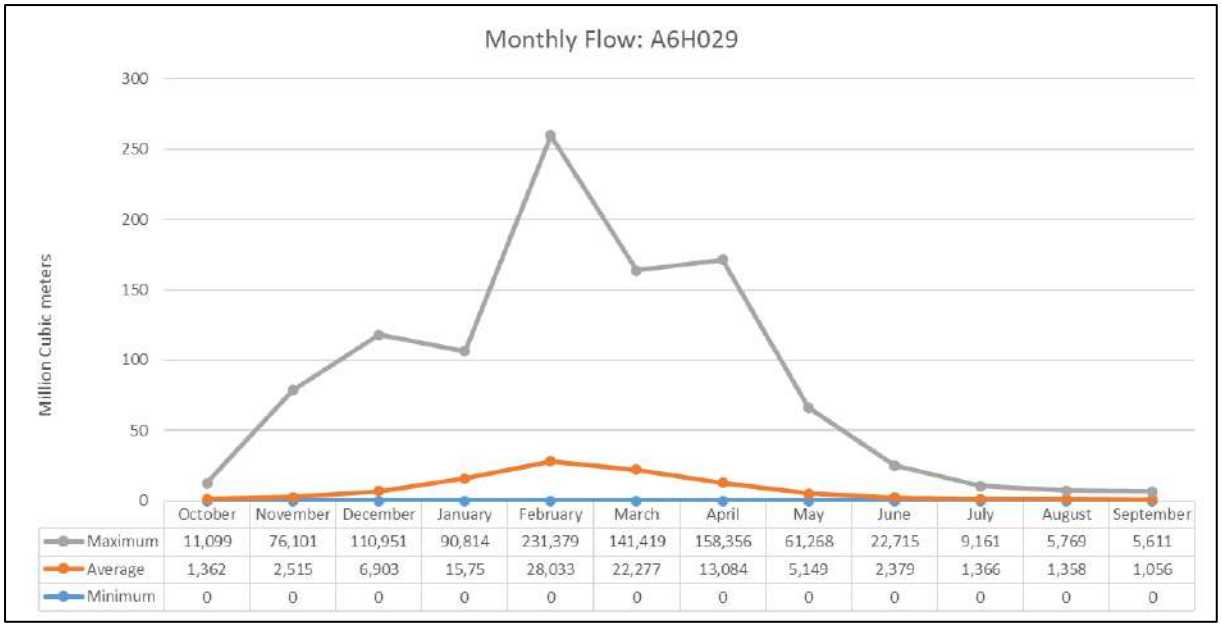


Figure 10-16: Location of DWS data sites in relation to the Sylvania Northern Mining (Pty) Ltd's Prospecting Right area

10.6.5.2 Flow

No flow data is available for the Matlala and Seepabana Rivers. Monthly flow data in the Mogalakwena River was provided by DWS[19] for site A6H029 Glen Alpine Dam from 1 May 1975 till 28 February 2022 and is indicated in Figure 10-17 per month and in Figure 10-18 (Annual).

[19] Email correspondence dated 9 September 2022 from Nhlapo Elias



	October	November	December	January	February	March	April	May	June	July	August	September
Maximum	11,099	76,101	110,951	90,814	231,379	141,419	158,356	61,268	22,715	9,161	5,769	5,611
Average	1,362	2,515	6,903	15,75	28,033	22,277	13,084	5,149	2,379	1,366	1,358	1,056
Minimum	0	0	0	0	0	0	0	0	0	0	0	0

Figure 10-17: Mogalakwena River Monthly flow volume (million cubic meters)

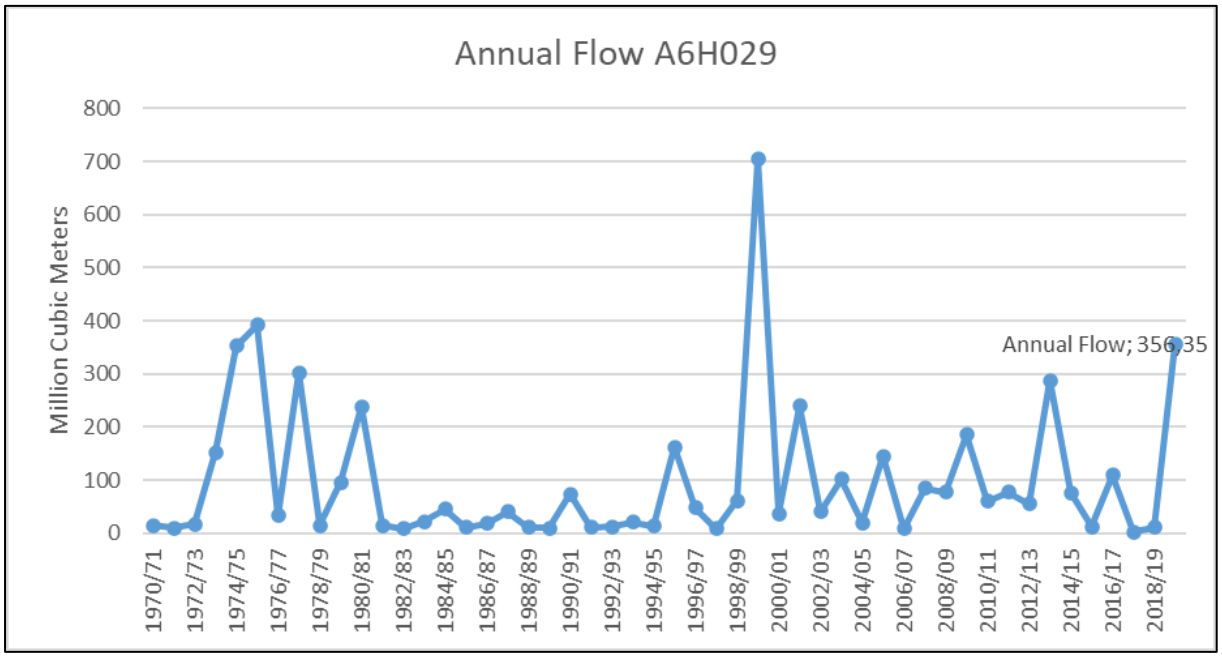


Figure 10-18: Total Annual flow in the Mogalakwena River (million cubic meters)

10.6.6 Flood Lines

Flood lines were sourced from assessment done for other Prospecting Right applications in the area, these include the Seepabana (Element Consulting Engineers, 2014) and Matlala Rivers (Element Consulting Engineers, 2014) and are indicated below.

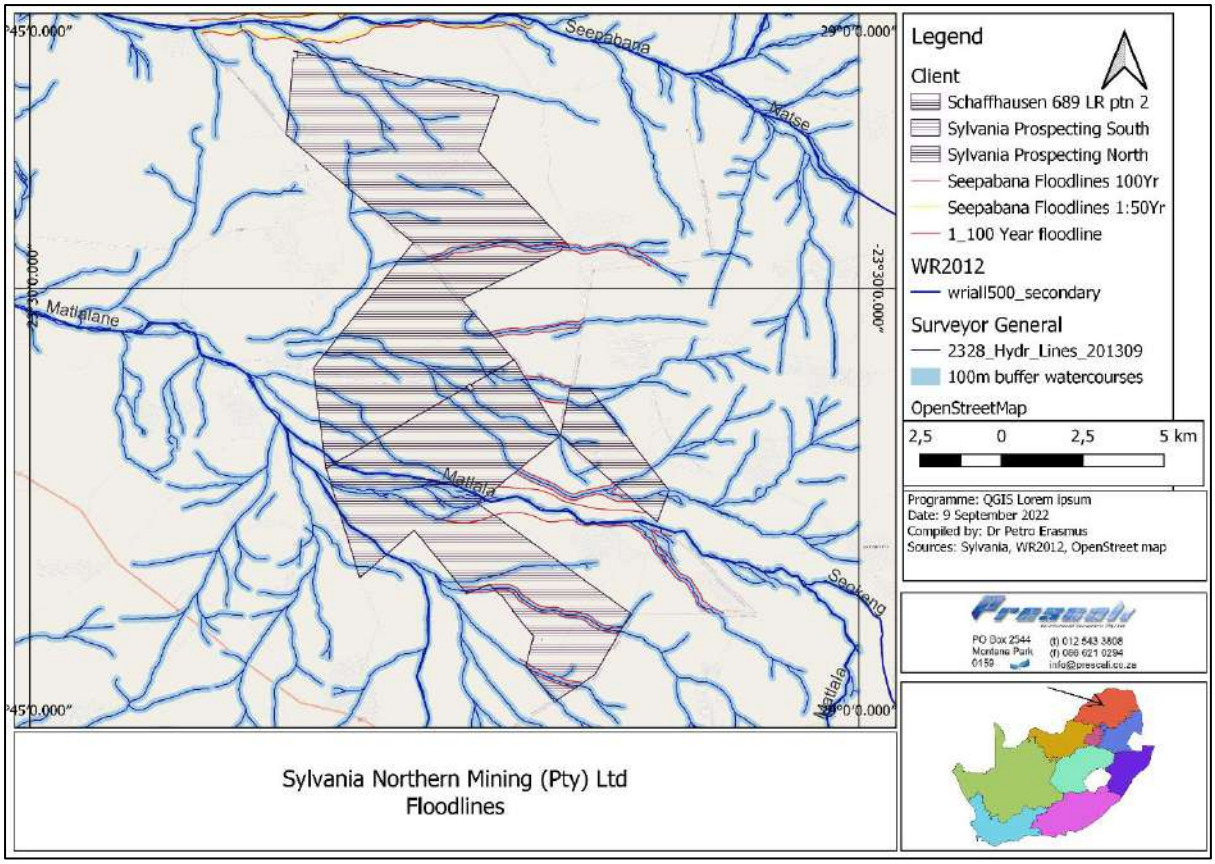


Figure 10-19: Flood lines

From the flood line report conducted for the Matlala River it is noted that in general the catchments of the tributaries are so small that the 100 m buffer is sufficient to encompass the 1 in 100-year flood line.

10.6.7 Site specific Aquatic Ecosystem Descriptions

10.6.7.1 Aquatic Ecosystem Types

Aquatic ecosystems can be classified into two types namely:

- Lentic Ecosystems: and
- Lotic Ecosystems.

10.6.7.2 Lentic Ecosystems – Wetlands, Impoundments, Lakes

Lentic ecosystems refer to standing or basin ecosystems and include lakes, impoundments and wetlands[20].

- Lakes: Generally, lakes are formed in basins created by geological activities e.g. warping and faulting of the earth's crust or as a result of glacial activities[20]. There are no lakes at the Sylvania Northern Mining (Pty) Ltd Prospecting Right area.
- Impoundments, or dams are manmade infrastructures and can be on-stem (i.e., the watercourse itself is dammed) or off-stem (i.e., the dam is located a distance from the watercourse and water is pumped from the watercourse / underground reservoir to the dam)[20]. There are no major dams in the Mogalakwena River catchment (DWS, 2004) and the Glen Alpine Dam that was constructed mainly for irrigation purposes are located on the Mogalakwena River.
- Wetlands: A wetland as defined by the NWA means "land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the

[20] http://www.egyankosh.ac.in/bitstream/123456789/16255/1/Unit-8.pdf 18 August 2020

land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil". As described by (DWAF, 2005) the word "wetland" refers to ecosystems of which the primary driving force is water. Its prolonged presence in wetlands is a fundamental determinant of soil characteristics and plant and animal species composition. Any part of the landscape where water accumulates for long enough and often enough to influence the plants, animals and soils occurring in that area, is thus a wetland. The objective of the delineation procedure is to identify the outer edge of the temporary zone. This outer edge marks the boundary between the wetland and adjacent terrestrial areas.

Wetlands must have one or more of the following indicators:

- Wetland (hydromorphic) soils that display characteristics resulting from prolonged saturation;
- The presence, at least occasionally, of water loving plants (hydrophytes);
- A high-water table that results in saturation at or near the surface, leading to anaerobic conditions developing in the top 50 cm of the soil; and
- Terrain Unit indicator to identify the locality of the wetland within the landscape.

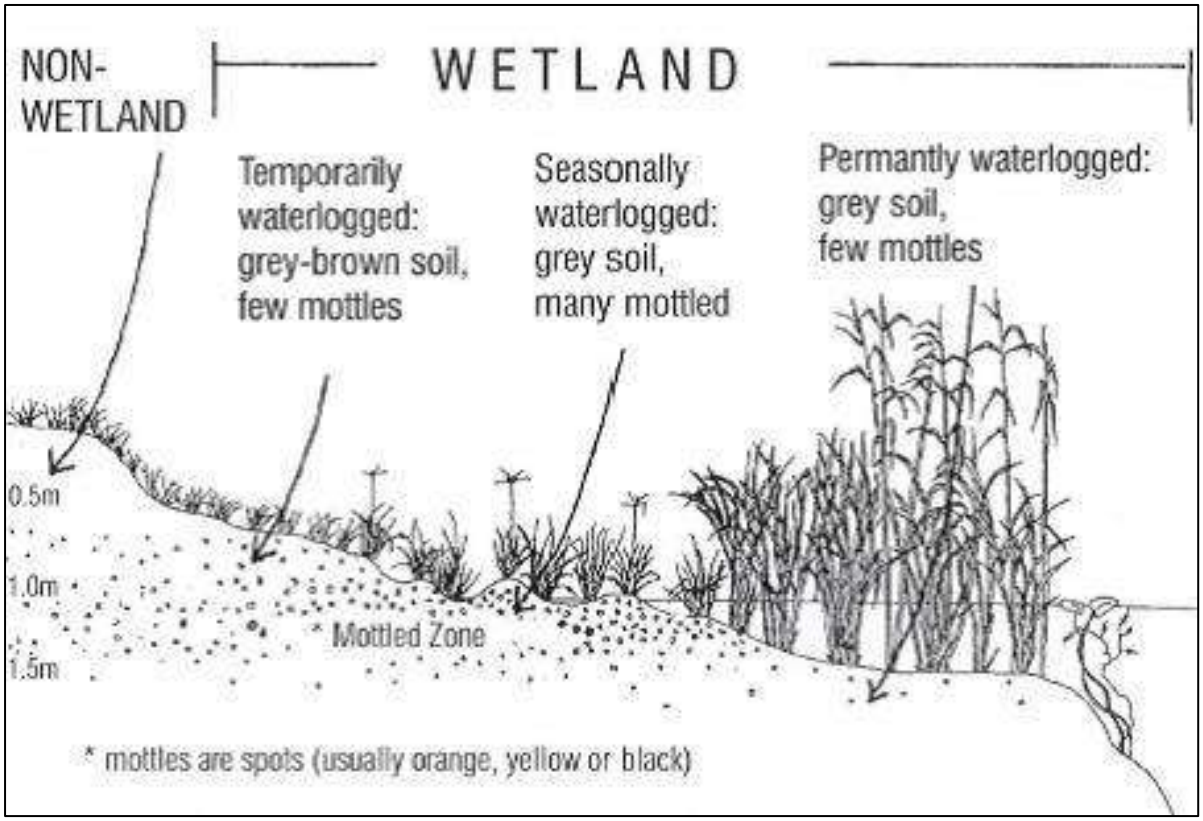


Figure 10-20: Cross section through a wetland (DWAF, 2005)

From the 2018 National Wetland Map 5 Ecosystem threat status and protection level data map (CSIR, 2018) several natural wetlands were identified at the Sylvania Northern Mining (Pty) Ltd Prospecting Right area (not visually confirmed using Google Earth™), refer to Figure 10-14.

10.6.7.3 Lotic ecosystems – Rivers, streams etc.

Lotic systems include rivers and the most outstanding feature of such habitats are flowing water which moulds the characteristics of the water bed and influences the distribution of the organisms therein[20].

A water course is defined by the NWA as:

- River or spring;
- A natural channel in which water flows regularly, or intermittently;
- A wetland, lake or dam into which, or from which water flows (refer to Section 10.6.7.2); and

- Any collection of water that the Minister may, by notice in the Gazette, declare to be a water course, and a reference to a watercourse includes where relevant, its bed and banks.

For the purpose of this assessment, the applicable river / watercourse reaches were classified according to the guidelines by DWS in "*A practical field procedure for identification and delineation of wetlands and riparian areas*" as shown in Figure 10-21. Using this classification, three sections along the length of a watercourse are defined based on their position relative to the zone of saturation in the riparian area:

- Section “A” is defined as being above the zone of saturation and it therefore does not carry baseflow. They are mostly too steep to be associated with alluvial deposits and are not flooded with sufficient frequency to support riparian habitat or wetlands. This type does however carry storm runoff during fairly extreme rainfall events, but the flow is of short duration, in the absence of baseflow. The “A” watercourse sections are the least sensitive watercourses in terms of impacts on water yield from the catchment.
- Section B reaches are in the zone of the fluctuating water table, baseflow is intermittent and dependant on the current height of the water table and as the channel bed is in contact with or in close proximity to the water table residual pools are often observed when flow cease. The top end of the B Section is marked by the most headward extent of base flow in the channel during wet periods, when the water table is high, and the bottom end of the B Section is marked by the most downstream extent of zero flow during dry periods (when the water table is low). With regards to slope, the channel bed is flat enough to allow for the deposition of material and initial signs of flood plain development may be observed.
- Section C streams are perennial streams and thus always have contact with the zone of saturation (except during extreme drought conditions). These sections are very flat and a flood plain is usually present.

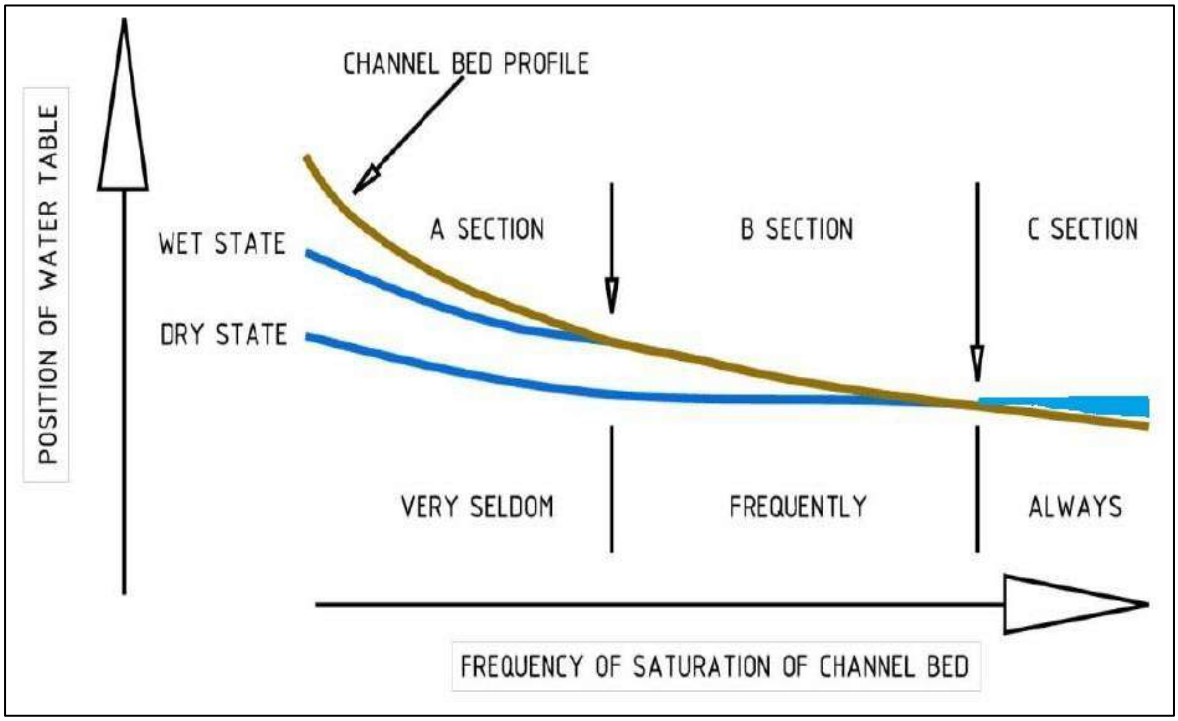


Figure 10-21: River Classification (DWAF, 2005)

The Matlala River crosses the Sylvania Northern Mining (Pty) Ltd Prospecting Right application area (Figure 10-14) and are preliminary classified as Section B watercourse, while the Seepabana directly to the north is classified as Section C due its classification as Perennial. The unnamed tributaries crossing the prospecting area can be classified as Section A taking note that the Matlala River 100 year flood crosses the southern corner point of the prospecting application area.

10.7 GROUNDWATER

Information in this section was sourced from GPT (2015).

Potentially two types of aquifers may occur across the prospecting application area (GPT, 2015)., these are:

- Shallow saprolific aquifer: "*The main source of recharge into the shallow aquifer is rainfall that infiltrates the aquifer through the unsaturated (vadose) zone. Vertical movement of water is faster than lateral movement in this system as water moves predominantly under the influence of gravity. The shallow regolith aquifer consists of between 9 and 36 m of weathered bedrock in the Polokwane area. The upper portion of this aquifer is generally fractured and has a high porosity and low permeability. The alluvial aquifers occur along drainage courses and form an intergranular aquifer which usually consists of red sandy clay (that is calcified in places) overlying sand, gravel and pebbles"*; and
- Deeper fractures aquifers: "*The host geology of the area consists of mafic and acidic rocks of the Bushveld Igneous Complex, the Paleoarchean rocks of the Hout River Gneiss and the consolidated sandstones of the Waterberg Group. Most of the groundwater flow will be along the fracture zones that occur in the relatively competent host rock. The geology map does not indicate any major fractures zones in this area, but from experience it can be assumed that numerous major and minor fractures do exist in the host rock. These conductive zones effectively interconnect the strata of the bedrock, both vertically and horizontally into a single, but highly heterogeneous and anisotropic unit. 52 percent of boreholes in these aquifer systems have yields of 0.1l/s. Groundwater quality in the area is also expected to be intermediate to poor with EC values ranging from 4.4 to 120 mS/m and possibly elevated Ca, Mg, Cl, and SO_4 as well as carbonate alkalinity concentrations (*http://www.dwaf.gov.za/iwqs/wms/data/WMS_*WMA_txt - as cited by GPT, 2015).*" "*Both the porosity (ratio of the volume of void space to the total volume of the rock or earth material) and the hydraulic conductivity (Measure of the ease with which water will pass through the earth's material; defined as the rate of flow through a cross-section of one square metre under a unit hydraulic gradient at right angles to the direction of flow (m/d)) of the Rustenburg Layered Suite fractured aquifers are known to be low. The commonly expected values of porosity and permeability for igneous rock types, similar to those present in the Rustenburg Layered Suite, are 0.05 (porosity) and 10-5 $m.d^{-1}$ (hydraulic conductivity) respectively (Kruseman & de Ridder, 1994 as cited by GPT, 2015). Movement of groundwater in this aquifer will be preferential in secondary structures such as joints, faults and fractures*."

An outline of boreholes identified by GPT (2015) and their location is provided in Figure 10-22 and Table 10-6. However as this was done on only a portion of the application area it is believed that there will be many more boreholes applicable.

The GPT (2015) report concluded the following with regards to groundwater quality (Table 10-7):

- The major cations in the groundwater samples are sodium and calcium
- The major anions in the groundwater samples are chloride and bi-carbonate with the exception of PAN-LEK1 at which nitrate is an additional major anion
- The groundwater quality of most samples can be described as unpolluted sodium chloride or sodium bicarbonate waters while PAN-MOS4, PAN-MOS2, PAN-ALT1, PAN-ATL2 and PAN-LEK1can be described as calcium chloride waters.

Table 10-6: Hydrocensus boreholes (GPT, 2015)

ID	Latitude	Longitude	Elevation	Owner	Property	Static water level (mbgl)	Static water level (mamsl)	Sampled (Y/N)	Use	Comments
Groundwater										
NW18	-23.463	28.88553	993.37	Pan Palladium	Kransplaats	-	-	No	Not in use	Blocked at 4 m; No casing
NW14	-23.4629	28.88538	993.34	Pan Palladium	Kransplaats	-	-	No	Not in use	Backfilled with sand
NW12	-23.4629	28.88509	992.94	Pan Palladium	Kransplaats	-	-	No	Not in use	Blocked at 12 m; No casing
NONO17RC-A	-23.4628	28.8835	997	Pan Palladium	Kransplaats	Dry	-	No	Not in use	Dry at 17 m
NONO17RC-B	-23.4628	28.8835	995	Pan Palladium	Kransplaats	Dry	-	No	Not in use	Dry at 23 m
NW01	-23.47186	28.88727	995	Pan Palladium	Kransplaats	22	973	Yes	Not in use	Black viscous water sampled; No casing
NW02	-23.4719	28.88673	994.1	Pan Palladium	Kransplaats	-	-	No	Not in use	Blocked at 8 m
NW05	-23.4809	28.88982	993.37	Pan Palladium	Kransplaats	-	-	No	Not in use	Backfilled with sand
NW03	-23.4809	28.88673	992.1	Pan Palladium	Kransplaats	-	-	No	Not in use	Blocked at 8 m
PAN-MOS1	-23.49607	28.91469	1027	J. H. Mothiba	Mosehleng	-	-	Yes	Livestock	Windmill. Pumping at low wind speed
PAN-MOS2	-23.49012	28.91637	1034	Provincial Government	Mosehleng	-	-	Yes	Domestic	School with a hundred learners and staff
PAN-MOS3	-23.49018	28.91595	1028	Provincial Government	Mosehleng	-	-	Yes	Domestic	Pumps to the same eight tanks as PAN-MOS2
PAN-MOS4	-23.48495	28.92015	1027	Blouberg Municipality	Mosehleng	-	-	Yes	Domestic	Supplies three villages; Constantly pumping
PAN-MOS5	-23.48764	28.90943	1015	Provincial Government	Mosehleng	13.818	1001.182	Yes	Not in use	Recently drilled
H04-R1400	-23.48607	28.91666	1024	Provincial Government	Mosehleng	-	-	Yes	Domestic	Mesehleng Clinic with nine staff members
H04-R1400-1	-23.48621	28.91668	1024	Provincial Government	Mosehleng	-	-	Yes	Domestic	Composite sample with H04-R1400
NW26	-23.49431	28.89144	995	Pan Palladium	Nonnenwerth	22	973	Yes	Not in use	Black viscous water sampled
NW27	-23.49432	28.89101	995	Pan Palladium	Nonnenwerth	-	-	No	Not in use	Blocked at 1.5 m
NW06	-23.489792	28.890718	992.7	Pan Palladium	Nonnenwerth	-	-	No	Not in use	Blocked at 19 m
NW11	-23.5169	28.89573	992.84	Pan Palladium	Nonnenwerth	-	-	No	Not in use	Blocked at 1.1 m
NW13	-23.5168	28.89469	991.65	Pan Palladium	Nonnenwerth	-	-	No	Not in use	Blocked at 18 m
NW15	-23.5171	28.89488	992.05	Pan Palladium	Nonnenwerth	-	-	No	Not in use	Blocked at 20 m
NW17	-23.5169	28.89477	991.89	Pan Palladium	Nonnenwerth	-	-	No	Not in use	Blocked at 20 m
PAN-ALT1	-23.6119	28.88917	998	S. Ramagosha	Altona	20.6	977.4	Yes	Livestock and domestic	In use since 2010
PAN-ALT2	-23.6117	28.8891	996	S. Ramagosha	Altona	-	-	Yes	Domestic	Occupants renting
PAN-ALT3	-23.62589	28.88212	1005	S. Ramagosha	Altona	Dry	-	No	Not in use	Dry at 100 m
LP06	-23.574	28.89836	999.74	Pan Palladium	La Pucella	-	-	No	Not in use	Backfilled with sand
LP05	-23.5741	28.89847	999.57	Pan Palladium	La Pucella	-	-	No	Not in use	Blocked at 6 m
LP04	-23.574	28.89817	999	Pan Palladium	La Pucella	-	-	No	Not in use	Blocked at 24 m
LP07	-23.565	28.89871	1002	Pan Palladium	La Pucella	-	-	No	Not in use	Blocked at 25 m
LP08	-23.565	28.89861	1002	Pan Palladium	La Pucella	24	978	Yes	Not in use	Bail test performed
LP09	-23.565	28.89868	1002	Pan Palladium	La Pucella	-	-	No	Not in use	Blocked at 6 m
LP10	-23.5655	28.89858	1002	Pan Palladium	La Pucella	-	-	No	Not in use	Blocked at 22.5 m

ID	Latitude	Longitude	Elevation	Owner	Property	Static water level (mbgl)	Static water level (mamsl)	Sampled (Y/N)	Use	Comments
LP11	-23.5655	28.89873	1002	Pan Palladium	La Pucella	-	-	No	Not in use	Backfilled with sand
LP12	-23.5655	28.89871	1002	Pan Palladium	La Pucella	-	-	No	Not in use	Blocked at 8 m
PAN-LEK1	-23.57637	28.92247	1032	Provincial Government	Lekhureng	-	-	Yes	Domestic	Poor yield; Dry between August and September
PAN-LEK2	-23.57688	28.92247	1031	Provincial Government	Lekhureng	-	-	Yes	Domestic	Composite sample with PAN-LEK3
PAN-LEK3	-23.57127	28.92072	1017	Provincial Government	Lekhureng	-	-	Yes	Domestic	Purification system on site
H04-2141	-23.57127	28.92072	1017	Provincial Government	Lekhureng	-	-	Yes	Domestic	Composite sample with PAN-LEK3
H04-1499	-23.53159	28.8782	987	Blouberg Municipality	Ga-Ramella	-	-	Yes	Livestock and domestic	Very poor yield
H03-R0111	-23.53156	28.87882	985	Blouberg Municipality	Ga-Ramella	Dry	-	No	Not in use	Dry at 15 m; Pump stolen
PAN-GAR1	-23.53465	28.88235	987	Amaloba Horticulture	Ga-Ramella	-	-	Yes	Irrigation and domestic	Use discontinued due to poor yield
H04-08883	-23.51623	28.93717	1056	Provincial Government	Ngwanallela	8.3	1047.7	Yes	Domestic	Use discontinued due to poor yield
H04-2067	-23.5166	28.93722	1055	Provincial Government	Ngwanallela	-	-	Yes	Irrigation and domestic	100 square meter yard
PAN-NGW1	-23.51766	28.9358	1057	R. Rampedi	Ngwanallela	7.5	1049.5	No	Not in use	Not enough water to sample; Use discontinued
Average						**16.89**	**999.97**			
Surface water										
PAN-MATLALA1	-23.57176	28.93944	1024	Unknown	La Pucella			Yes	Livestock	Upstream sample
PAN-MATLALA2	-23.52418	28.81264	946	Unknown	Teneriffe			Yes	Livestock	Downstream sample

Table 10-7: Water quality data (GPT, 2015)

Water Quality Constituents		NW01	PAN-MOS2	PAN-MOS4	PAN-MOS5	NW26	PAN-MATLALA 1	LP08	PAN-LEK12	PAN-LEK3	PAN-ALT1	PAN-ALT2	PAN-MATLALA 2	H04-1499	PAN-GAR1	H04-08883	TWQR	Tolerable	Exceeding TWQR
Total Alkalinity	M Alk. [mg/l CaCO3]	951.00	170.00	419.00	442.00	140.00	0.00	558.00	255.00	448.00	351.00	353.00	102.00	500.00	472.00	212.00	*Not available*		
Aluminium	Al [mg/l]	11.80	0.00	0.00	0.00	0.00	14.90	0.06	0.00	0.00	0.00	0.00	0.81	0.00	0.00	0.00	0 - 0.15	0.15 - 0.5	> 0.5
Calcium	Ca [mg/l]	231.00	292.00	87.10	107.00	1.44	7.85	53.20	246.00	84.40	212.00	214.00	14.50	49.10	46.40	50.00	0 - 32	32 - 80	> 80
Chloride	Cl [mg/l]	347.00	1480.00	362.00	475.00	460.00	35.10	239.00	651.00	240.00	816.00	831.00	18.70	234.00	217.00	361.00	0 - 100	100 - 600	> 600
Chromium	Cr^{6+} [mg/l]	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0 - 0.050		> 0.050
Electrical Conductivity	EC [mS/m]	196.00	441.00	184.00	217.00	31.50		167.00	325.00	168.00	307.00	309.00	24.10	169.00	160.00	190.00	*Not available*		
Fluoride	F [mg/l]	0.00	0.00	0.00	0.00	0.20	0.66	0.00	0.00	1.22	0.00	0.00	0.36	0.00	0.00	0.00	0 - 1.0	1.0 - 1.5	> 1.5
Iron	Total Fe [mg/l]	48.70	0.06	0.00	0.00	0.00	6.89	0.32	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0 - 0.1	0.1 - 1.0	> 1.0
Magnesium	Mg [mg/l]	152.00	128.00	85.40	84.30	0.81	5.87	41.20	152.00	66.70	102.00	102.00	4.71	59.90	55.00	53.50	0 - 30	30 - 70	> 70
Manganese	Mn [mg/l]	11.90	0.30	0.00	0.33	0.00	0.17	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0 - 0.05	0.05 - 1.0	> 1.0
Nitrate	NO_3 as N [mg/l]	0.00	0.00	12.80	0.00	32.20	0.50	0.00	113.00	30.50	0.00	0.00	0.00	0.00	0.00	0.00	0 - 6		> 6
pH	pH units	6.61	7.29	7.95	7.53	8.43	7.20	7.92	7.24	7.93	7.54	7.52	7.72	7.79	7.84	7.38	6.0 - 9.0		<6, >9
Potassium	K [mg/l]	15.10	9.01	18.60	18.70	1.13	5.76	12.40	99.80	13.30	11.30	11.70	8.68	16.50	16.80	15.90	0 - 50	50 - 100	> 100
Sodium	Na [mg/l]	269.00	501.00	208.00	262.00	8.52	79.60	304.00	168.00	222.00	331.00	329.00	31.10	263.00	252.00	298.00	0 - 100	100 - 200	> 200
Sulphate	SO_4 [mg/l]	40.80	147.00	50.10	94.90	173.00	11.30	72.60	141.00	58.40	142.00	148.00	8.65	62.30	54.10	163.00	0 - 200	200 - 400	> 400
Total Dissolved Solids	TDS [mg/l]	1370.00	3080.00	1290.00	1519.00	221.00	No EC value	1170.00	2270.00	1180.00	2148.30	2170.00	168.70	1183.00	1119.30	1332.10	0 - 450	450 - 1 000	> 1000
Zinc	Zn [mg/l]	0.90	0.05	0.09	0.00	0.15	0.00	0.00	0.00	1.03	2.40	0.79	0.00	0.21	0.00	0.05	0 - 3	3 - 10	> 10
Cation/Anion Balance %		10.80	-3.64	-1.20	-0.05	-95.00	14.00	-2.30	-3.40	-2.27	1.07	-1.72	-1.29	-0.19	0.18	0.47	*Error should not exceed 5%*		

Notes: A value of zero indicates that the analysis was below the detection limit

TWQR- Target water quality range

Tolerable - Suitable for short-term intake, in some instances health problems can occur during extensive long-term intake in sensitive individuals such as infants

Exceeeding TWQR- Exceedance of target water quality range may lead to adverse affects

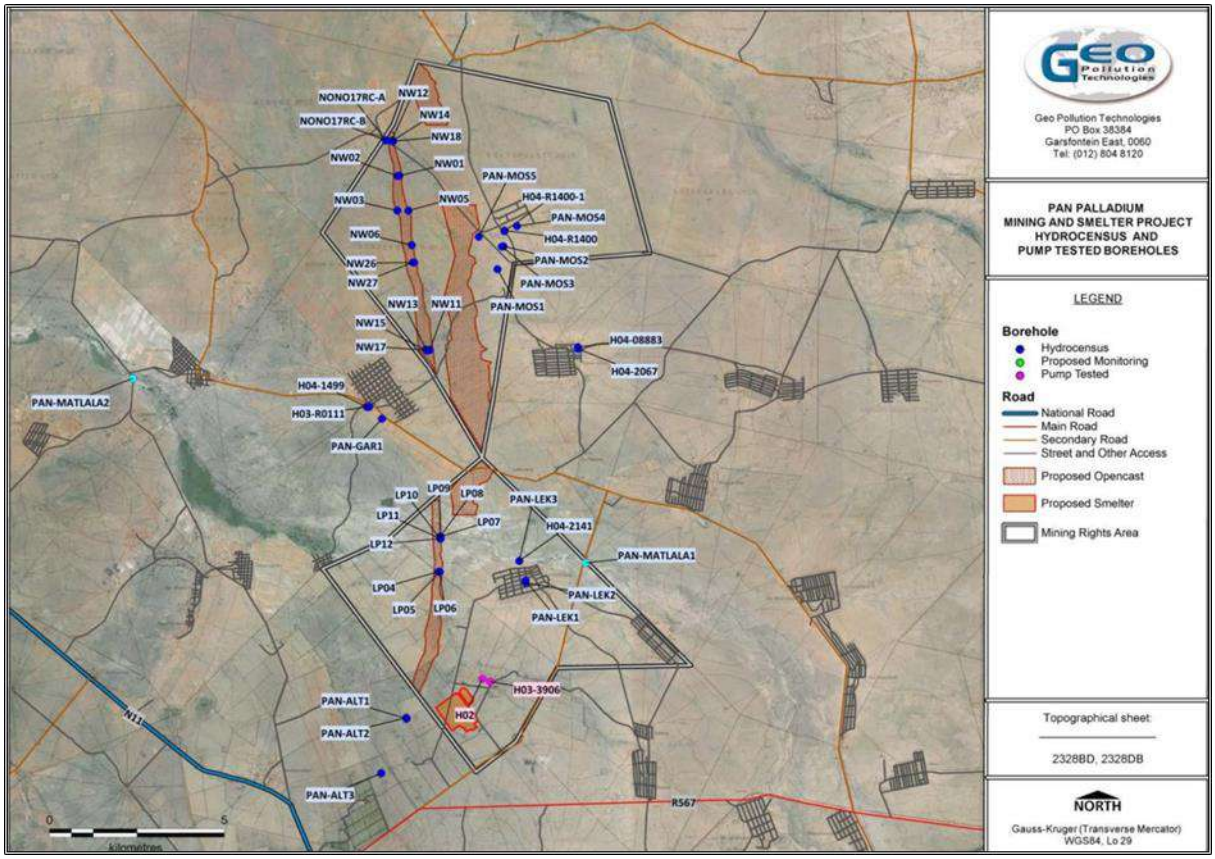


Figure 10-22: Location of hydrocensus boreholes (GPT, 2015)

10.8 AIR QUALITY

Given the rural nature of the area, current levels of particulate matter (PM) in the atmosphere are expected to be low. Existing land uses such as agriculture contribute to baseline pollutant concentrations via the following sources:

- Unpaved and paved roads: Emissions from unpaved roads constitute a major source of emissions to the atmosphere in the South African context. Dust emissions from unpaved roads vary in relation to the vehicle traffic and the silt loading on the roads. Emission from paved roads is significantly less than those originating from unpaved roads, however they do contribute to the particulate load of the atmosphere. Particulate emissions occur whenever vehicles travel over a paved surface. The fugitive dust emissions are due to the re-suspension of loose material on the road surface.
- Wind erosion and open areas: Windblown dust generates from natural and anthropogenic sources. Erodible surfaces may occur as a result of agriculture and/or grazing activities.
- Vehicle tailpipe emissions: Emissions resulting from motor vehicles can be grouped into primary and secondary pollutants. While primary pollutants are emitted directly into the atmosphere, secondary pollutants form in the atmosphere as a result of chemical reactions. Significant primary pollutants emitted combustion engines include carbon dioxide (CO_2), carbon (C), sulphur dioxide (SO_2), oxides of nitrogen (mainly NO), particulates and lead. Secondary pollutants include NO_2, photochemical oxidants such as ozone, sulphur acid, sulphates, nitric acid, and nitrate aerosols (particulate matter).

Real-time air quality data[21] for Mokopane (approximately 70 km south of the application area indicate that the air quality is considered to be Good.

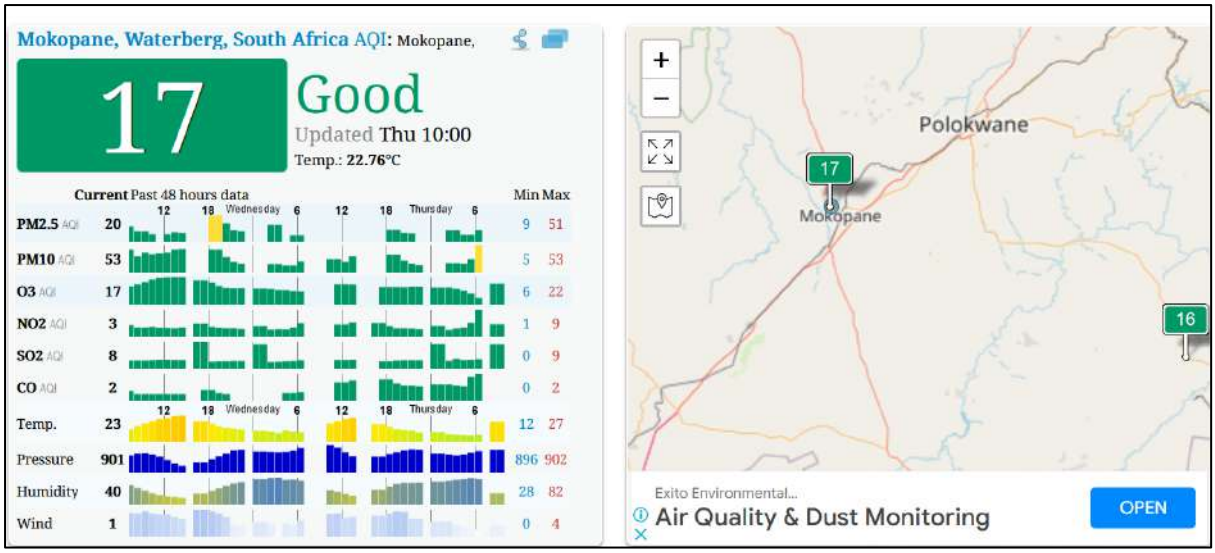


Figure 10-23: Air Quality in Mokopane[21]

10.9 NOISE LEVELS

Background noise levels will be informed by the roads and the residential areas within and surrounding the prospecting application area. Based on previous assessments done near the prospecting area it is believed that the area will have a sound level character typical of a sub-urban noise district in terms of the SANS 10103:2008 rating levels (EARES, 2013).

10.10 HERITAGE AND CULTURAL RESOURCES

A desktop assessment was conducted by Mr Anton Pelser in 2022 based on field work conducted in 2013 and 2014. From the report the following is noted:

- No Stone Age sites (including rock art) are known to occur in the immediate study area. The closest known Stone Age sites are located near Blouberg on the Makgabeng Plateau dating to the Later Stone Age (Bergh 1999: 4 as cited by A. Pelser). A very large number of significant rock art sites (numbering in their hundreds) are located on the Makgabeng Plateau and on farms directly north of the study area. These rock art sites are representative of the San, Khoi and Northern-Sotho rock art traditions (J.van Schalkwyk Pers.Comm 2012-12-11 as cited by A. Pelser) and is located on farms such Disseldorp 369LR and Bayswater 370LR north of the farms that form part of the current study (Eastwood et.al 2004; 2005 as cited by A. Pelser), as well as other farms including Groenepunt, Kirstenspruit and Rosamond.]
- There are no known Iron Age sites in the immediate study area. A large number of Early Iron Age and Late Iron Age sites are known to exist to the north of the study area on the Makgabeng Plateau (J.van Schalkwyk Pers.Comm. 2013-10-15 as cited by A. Pelser). Tom Huffman's research work shows that Early Iron Age, Middle Iron Age and Late Iron Age sites, features or material could possibly be found in the area. This could include the so-called Happy Rest facies of the Kalundu Tradition dating to between AD500 and AD750 (Huffman 2007: 219); Diamant facies of the same tradition dating to between AD750 and AD1000 (p.223); Eiland facies of Kalundu dating to between AD1000 and AD1300 (p.227); the Icon facies of the Urewe Tradition dating to between AD1300 & AD1500 (p.183) and finally the Letsibogo facies of the same tradition dating to between AD1500 and AD1700 (Huffman 2007: 187 as cited by A. Pelser).
- The historical age started with the first recorded oral histories in the area. It includes the moving into the area of people that were able to read and write. The first European group to pass close by the area was that of Coenraad de Buys in 1821 and again 1825, followed by the Voortrekkers

[21] https://aqicn.org/city/south-africa/waterberg-dm/mokopane/ 15 September 2022

after 1844 (Bergh 1999: 12; 14). By 1848 the area formed part of the Soutpansberg Magisterial District (Bergh 1999: 17 as cited by A. Pelser).

During previous assessments in the area by the author of this report (2013 and 2014), some cultural heritage sites and features were identified. These included mainly recent historical settlement remains as well as graveyards and single graves. No Stone Age or Iron Age sites or remains were identified during these previous field assessments. The location of sites found are indicated below:

- Sites 1 and 2 are ruins of recent historical settlement;
- Sites 3 & 4 – Sections of low, stone-packed walls dating to recent historical periods (Low Cultural Heritage Significance);
- Sites 5, 6 and 7 are graveyards / cemeteries (High Cultural Significance). Site 7 is located very close to the prospecting right application area.

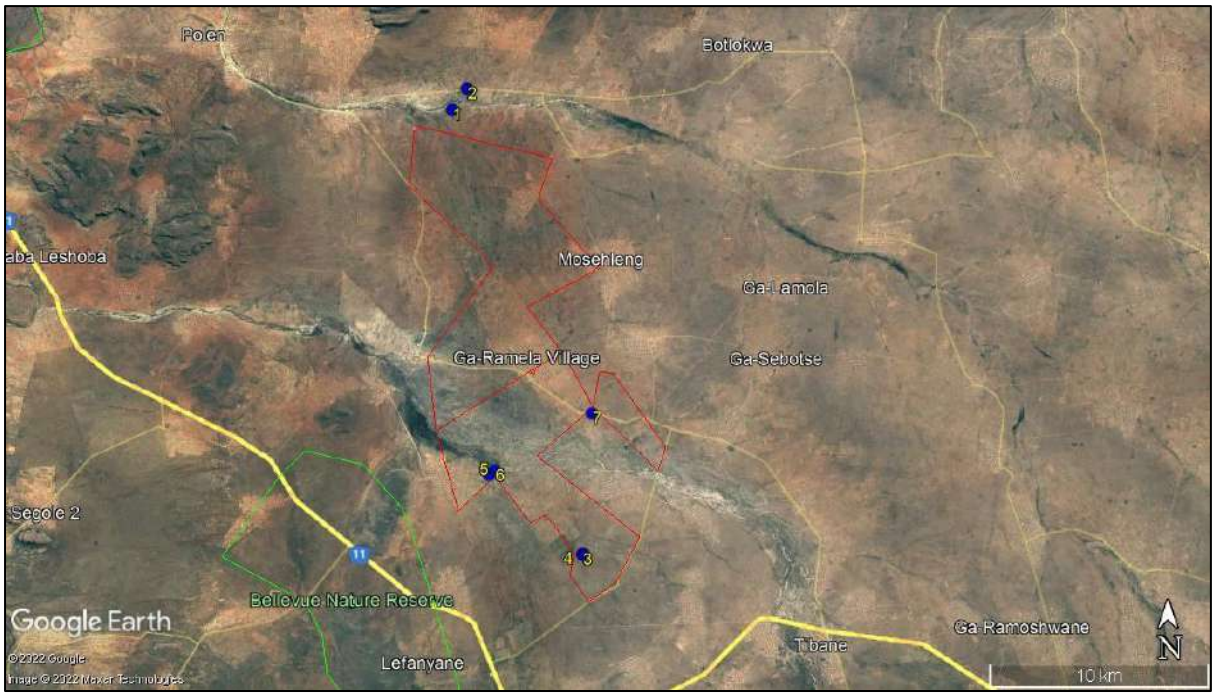


Figure 10-24: Location of historical sited identified during previous assessments

10.11 SOIL, LAND USE AND LAND CAPABILTY

10.11.1 Land types and Soil Series

The proposed prospecting application area traverses through Two (d) land types (Figure 10-25):

- Land Type Ae335: This land type has three (3) different terrain positions and the underlying geology is described as Medium-grained, yellowish, laminated sandstone of the Makgabeng Formation of the Waterberg Group, also sand of the Quaternary System. Soil series and the depth present are:
  - Rock;
  - Portsmouth Hu35, Zwartfontein Hu34: >1200 mm;
  - Shorrocks Hu36, Portsmouth Hu35, Zwartfontein Hu34, Blinkklip Cv36: 400-600 mm;
  - Platt Gs14, Glenrosa Gs15, Williamson Gs16: 200-400 mm; and
  - Herschel Va30, Arniston Va31, Valsrivier Va40: >900 mm.
- Land Type Ia169: This land type has two (2) different terrain positions and the underlying geology is described as sand alluvium and calcrete of the Quaternary System. Soil series and the depth present are:
  - Jozini Oa36, Limpopo Oa46, Dundee Du10, Calueque Oa45: 900-1200 mm;
  - Letaba Oa26, Shigalo Hu46, Shorrocks Hu36, Portsmouth Hu35, Blinkklip Cv36: 900-1200 mm;

- Mutale Oa47, Arniston Va31, Lindley Va41, Glengazi Bo31, Inhoek Ik20: >1200 mm;
- Vaalrivier Oa33, Levubu Oa34, Sandspruit Cv31, Dundee Du10: >1200 mm;
- Zuiderzee Va20, Sunnyside Va10: >1200 mm;
- Arcadia Ar40, Antioch Ss27, Willowbrook Wo11: >1200 mm;
- Lomondo Gs25, Lekfontein Gs26, Kalkbank Ms22: 300-500 mm; and
- Stream beds.

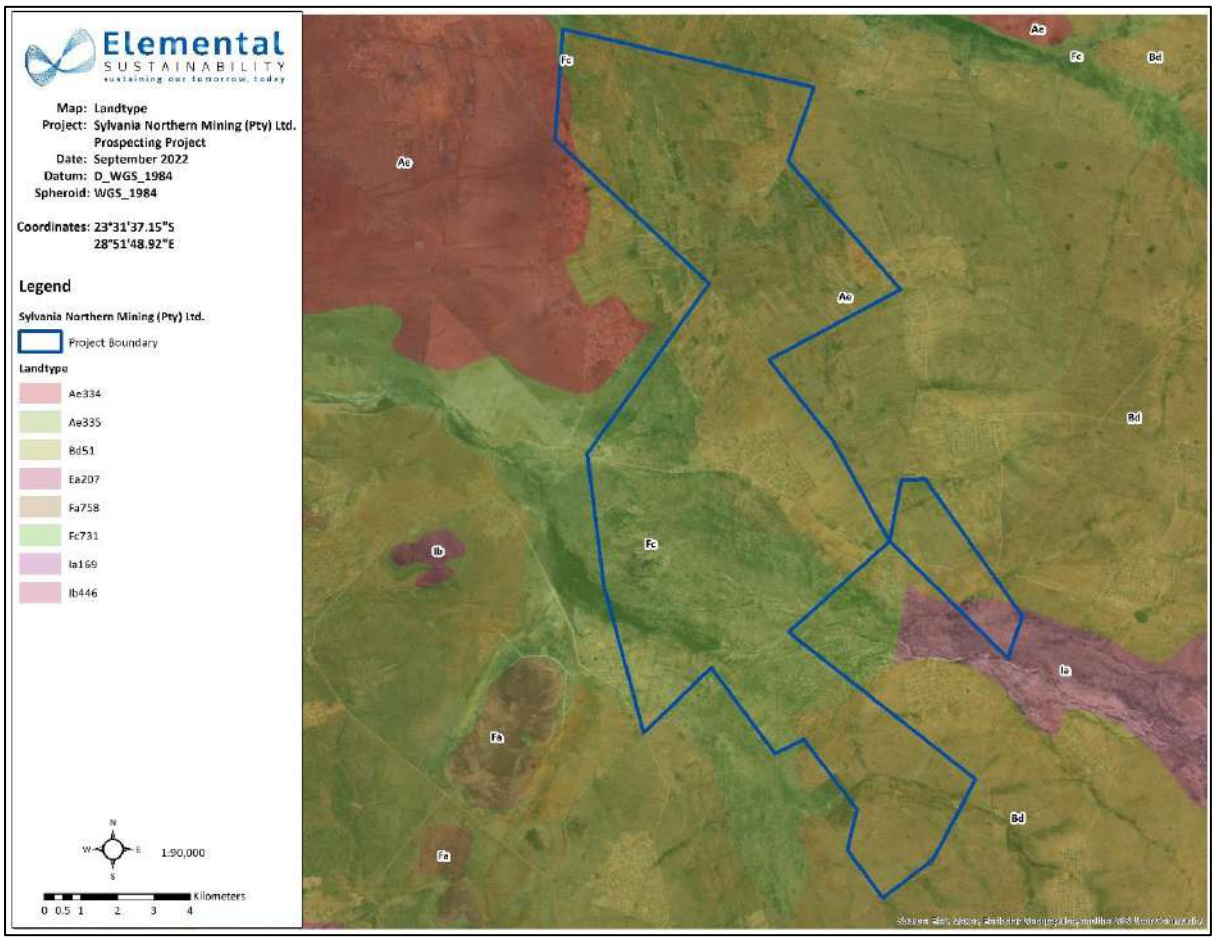


Figure 10-25: Land Types across the prospecting application area

10.11.2 SOTER Soil terrain, Generalised Soil Patterns and Landscape information

According to the Soil and Terrain (SOTER) Landform database, the proposed prospecting right area is situated on two landform types, namely LP3 type landform (level land, plain at a medium level) and the LV3 type landform (level land, valley at a medium level) forming most of the site (Figure 10-26).

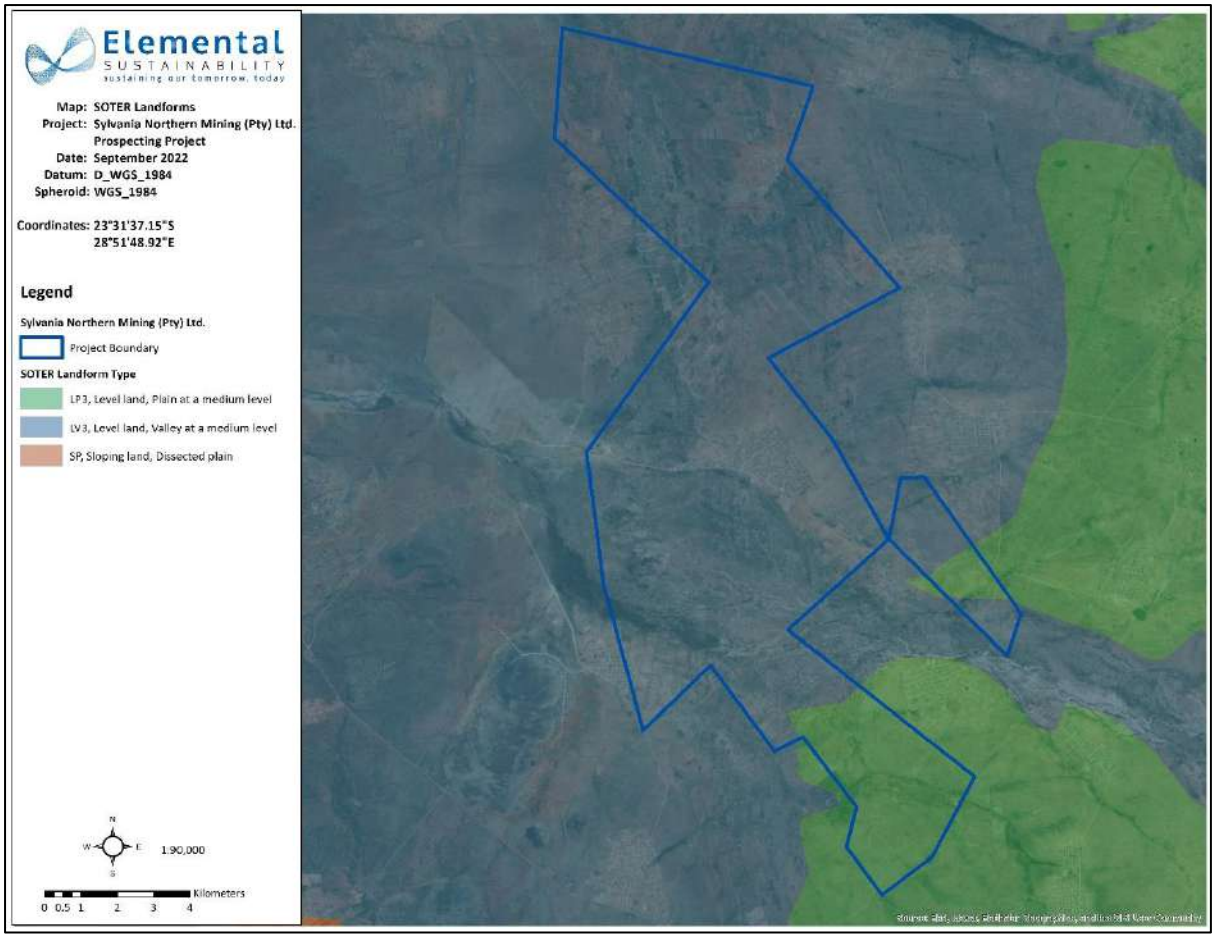


Figure 10-26: SOTER landform

With reference to SOTER Generalised Soil Patterns associated with the area, the proposed prospecting project application area consists of three soil patterns (Figure 10-27). Most of the northern part of Schaffhausen consists of red-yellow, well drained soils, soils with a high base status. The middle part of the Schaffhausen application area consists of Sandy Soils with little or no profile development, these soils are usually shallow, on hard or weathering rock. The southern part of the Schaffhausen application area consists of soils with a plinthic horizon, these are red, yellow and / or greyish soils with a high base status.

The SOTER Soil Association map categorises the proposed prospecting project application area as an "A4" type landscape (Figure 10-28). "A4" type landscape is characterised by "*Red, massive or weakly structured soils with high base status (association of well drained Lixisols, Cambisols and Luvisols)*".

The dominant soil types, according to the SOTER database, are Ferric Luvisols (LVf) (Figure 10-29).

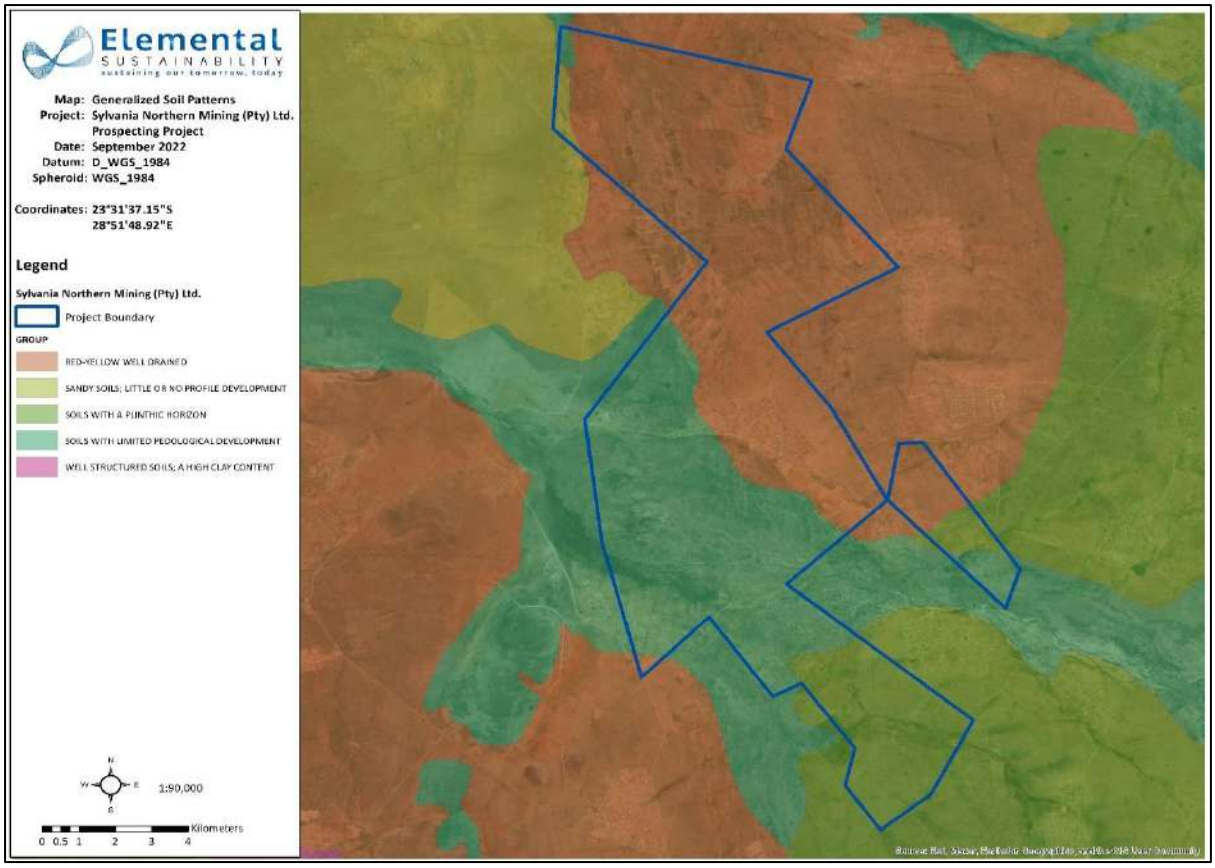


Figure 10-27: Generalised Soil Patterns

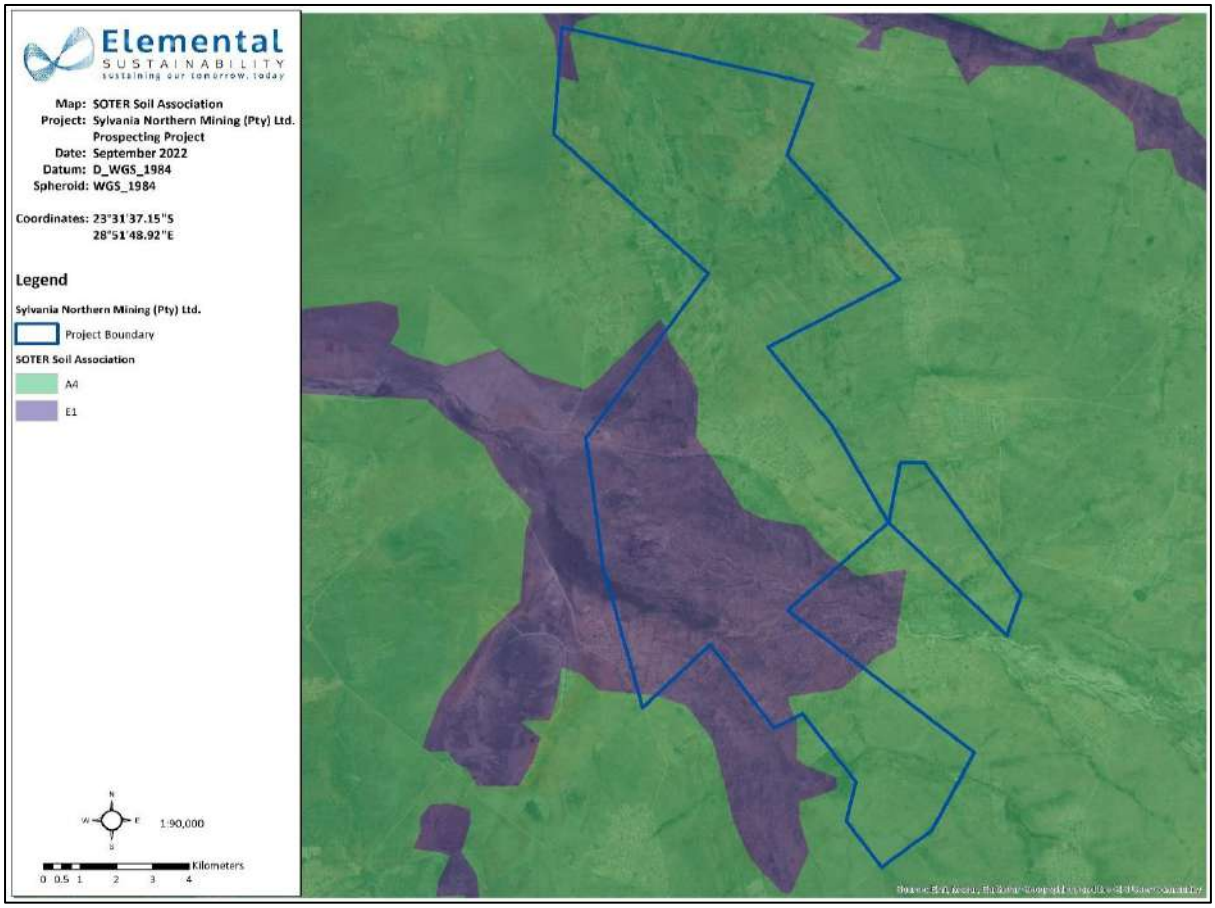


Figure 10-28: SOTER Soil association map

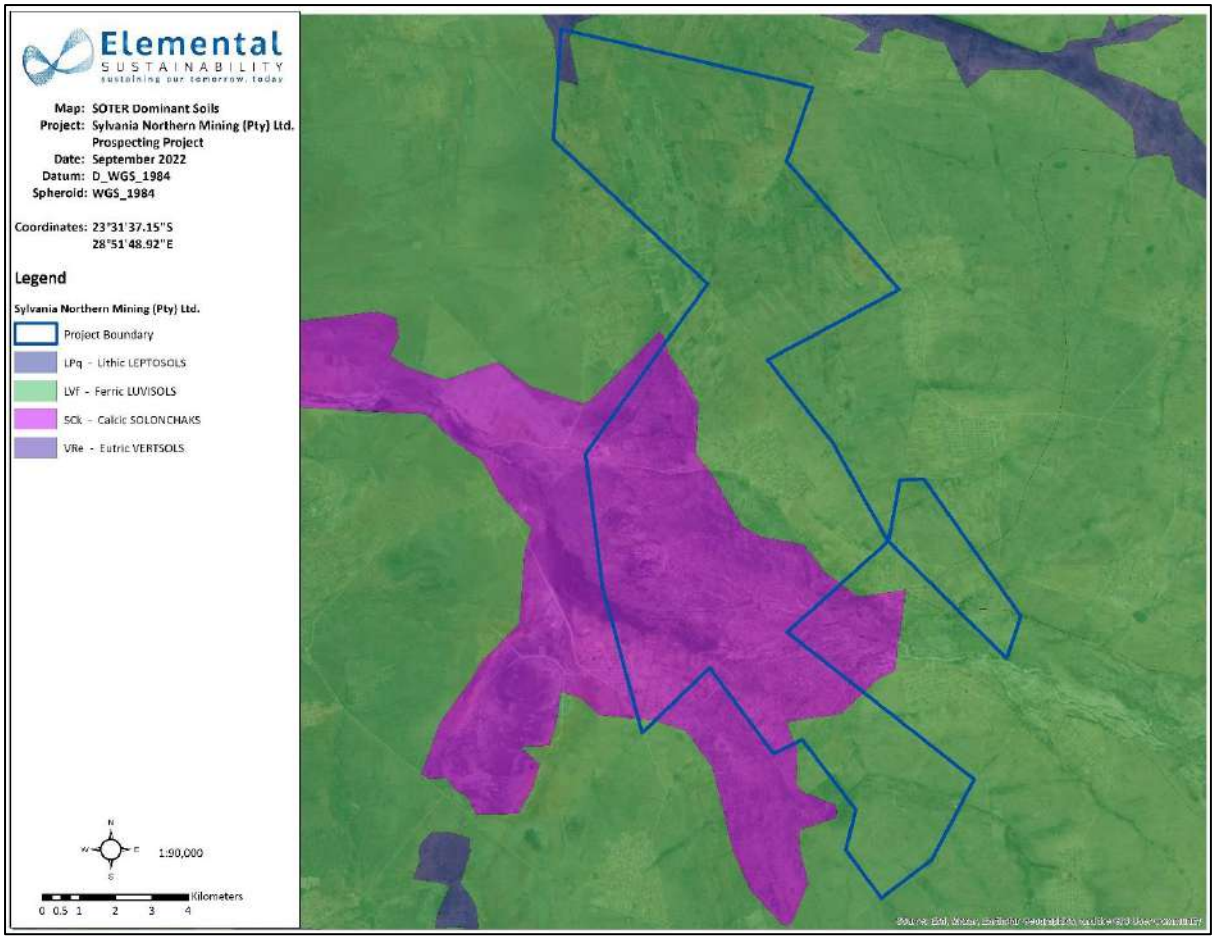


Figure 10-29: Dominant Soils

10.11.3 Land Capability Classification and Agricultural Potential

The distribution of the various land capability classes for the proposed application area, as defined in the National Land Capability for South Africa (Figure 10-30). The area proposed for prospecting is mostly classed as 06. Low-Moderate and 09. Moderate-High/10. Moderate-High to the National Land Capability Assessment (DAFF, 2017 as cited by Elemental Sustainability). Classes 1 to 7 are of very low land capability making it only suitable for wilderness and grazing with a variety of management measures. Classes 8 to 15 are considered to have arable land capability with the potential for high yields increasing with the number of the land capability class.

However, in accordance with Scotney *et al.*`s (1987) 8 classes, as cited by Elemental Sustainability, the proposed prospecting area has a Land Capability Class of 4 (IV) (Figure 10-31). This means that the land is classed as Arable but has severe limitations. These areas are suitable for the following: Wildlife (W), Forestry (F), Light Grazing (LG), Moderate Grazing (MG), Intensive Grazing (IG), and Light Cultivation (LC). A Land Capability Class of 5 (V) is present in the southern central areas. This means that the land is classed as Grazing but has wetness limitations.

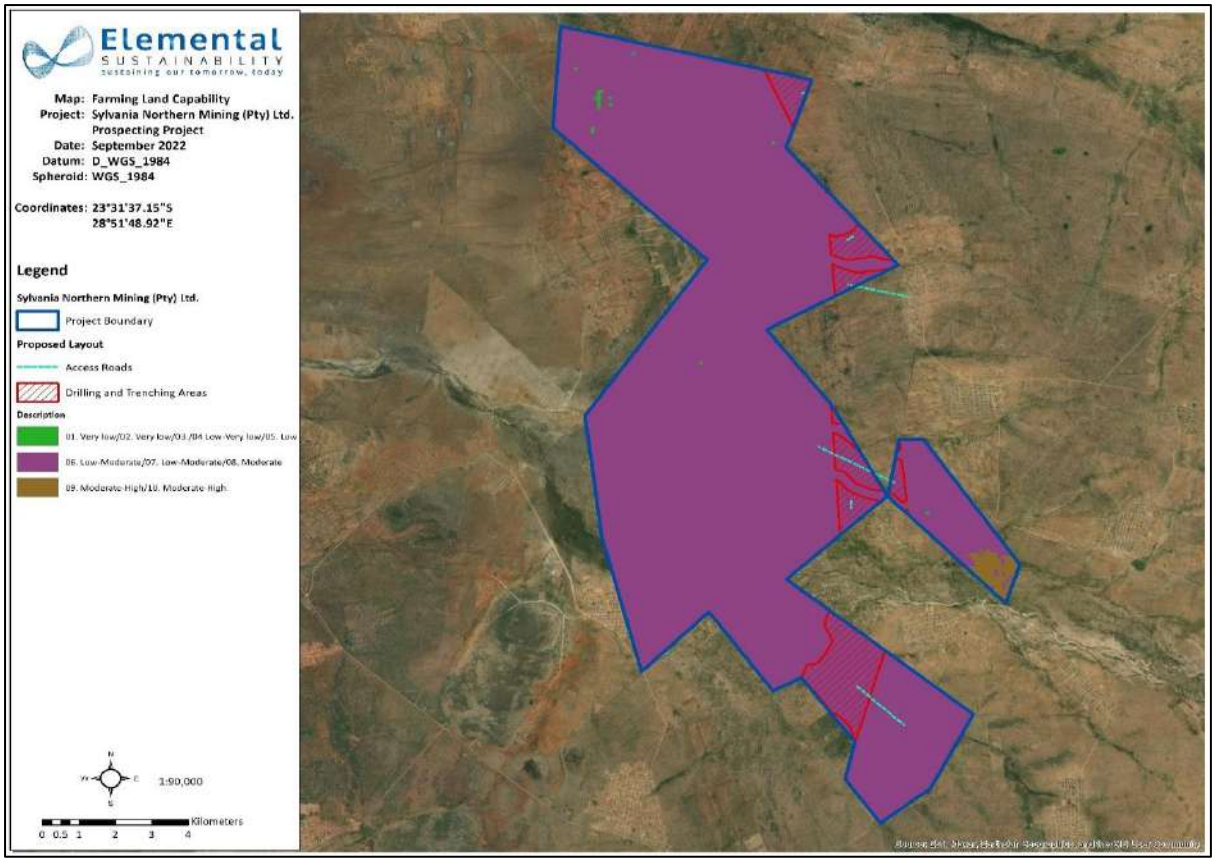


Figure 10-30: Farming Land Capability of the proposed prospecting project application area (DEA – Screening Tool

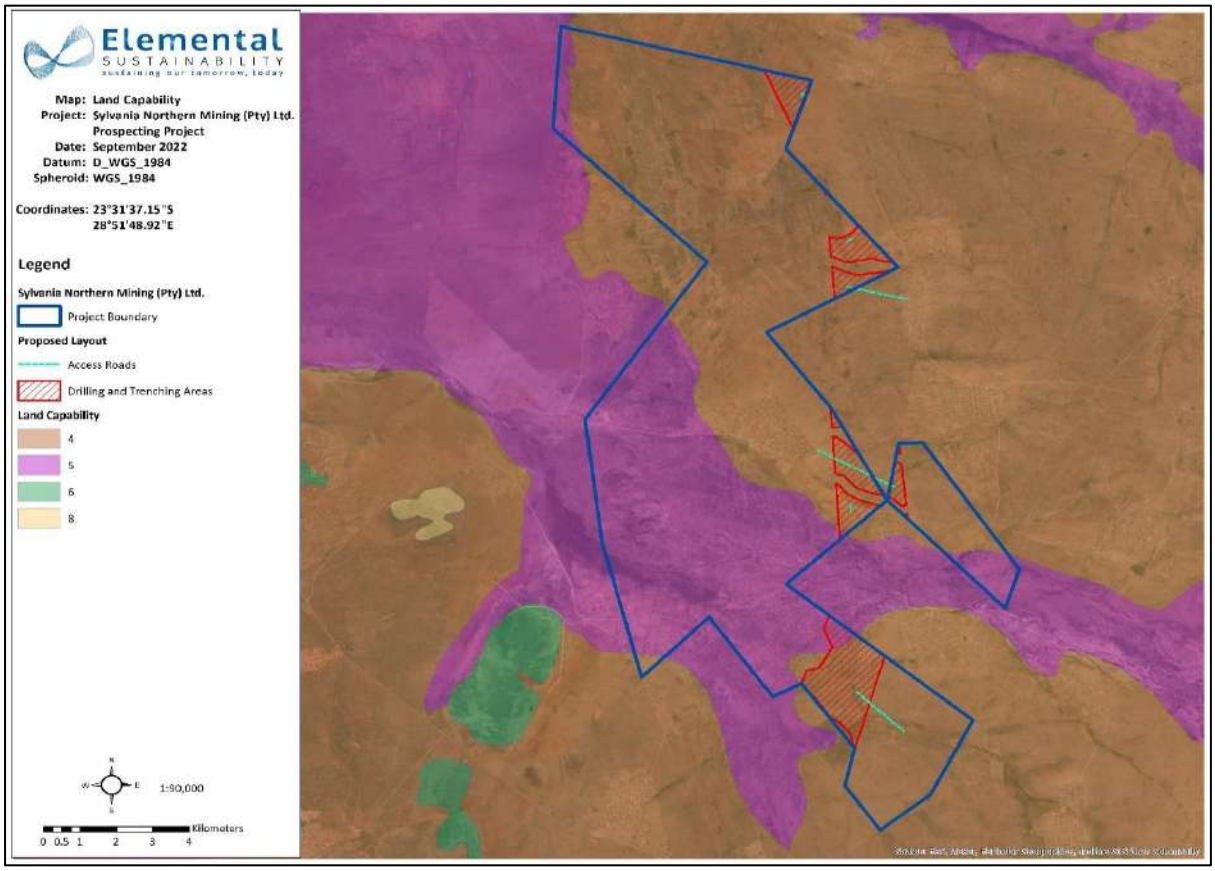


Figure 10-31: Land Capability of the area according to Scotney *et al*. (1987) as cited by Elemental Sustainability

10.11.3.1 Class IV: Arable

Land in Class IV has very severe limitations that restrict the choice of plants, require very careful management, or both. It may be used for cultivated crops, but more careful management is required than for Class III and conservation practices are more difficult to apply and maintain. Restrictions to land use are greater than those in Class III and the choice of plants is more limited. It may be well suited to only two or three of the common crops or the harvest produced may be low in relation to inputs over long period of time. In sub-humid and semiarid areas, land in Class IV may produce good yields of adapted cultivated crops during years of above average rainfall and failures during years of below average rainfall. Use for cultivated crops is limited because of the effects of one or more permanent features such as:

- Steep slopes
- Severe susceptibility to water or wind erosion or severe effects of past erosion
- Shallow soils
- Low water-holding capacity
- Frequent flooding accompanied by severe crop damage
- Excessive wetness with continuing hazard of waterlogging after drainage
- Severe salinity or sodicity
- Moderately adverse climate

10.11.3.2 Class V: Grazing

Land in Class V has little or no erosion hazard but have other limitations impractical to remove, that limits its use largely to pasture, range, woodland or wildlife food and cover. These limitations restrict the kind of plants that can be grown and prevent normal tillage of cultivated crops. Pastures can be improved and benefits from proper management can be expected. It is nearly level. Some occurrences are wet or frequently flooded. Other are stony, have climatic limitations, or have some combination of these limitations. Examples of Class V are:

- Bottomlands subject to frequent flooding that prevents the normal production of cultivated crops.
- Nearly level land with a growing season that prevents the normal production of cultivated crops.
- Level or nearly level stony or rocky land.
- Ponded areas where drainage for cultivated crops is not feasible but which are suitable for grasses or trees.

10.12 SOCIO ECONOMY SITUATION

10.12.1 Capricorn District Municipality: Blouberg Local Municipality

Based on previous census data, it can be concluded that the population of the Blouberg[22] LM declined from 182 003 in 2000 to 176 135, before declining further to 172 601 in 2016. This decline was attributed to the low fertility rate, high mortality rate compared to birth rate or the out migration by the economically active population to the industrial centres such as Polokwane and Gauteng to seek better economic prospects.

Information was sourced from the Community survey done in 2016 as summarised by wazimap.co.za[23].

The most common language in the area is Sepedi (95%) followed by Afrikaans (1%) and not applicable (3%).

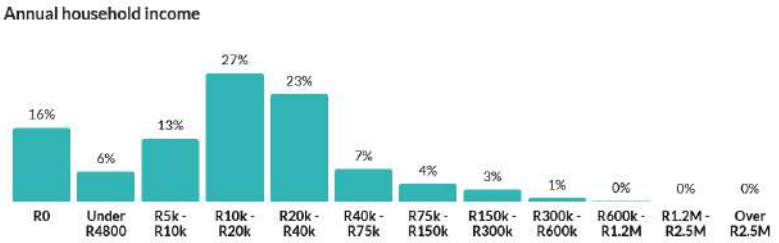
With regards to service delivery[23] the following is important to note:

[22] http://www.blouberg.gov.za/?q=node/12 15 September 2022
[23] h https://wazimap.co.za/profiles/municipality-LIM351-blouberg/ 15 September 2022

- 72.4% of the population receive water from a regional or a local service provider and 38% has piped water inside the yard;
- 2.2% of the population has no access to electricity, of those supplied with electricity 95% have in-house prepaid meters;
- 4.5% of the population has access to flush or chemical toilets and 6.1% has no access to toilets;
- 15.6% are getting refuse disposal from a local authority, private company or community members.

In terms of economics the following is noted:

- The annual household income average is R14 600 per annum and the distribution is indicated in the figure below:



- 17.7% is employed and 64% are classified as Other / Not economically active. The main sector of employment is Formal sector (53%).
- 6.4% of children between the ages 15 and 17 are in the labour force

With regards to education 57.7% completed grade 9 or higher and 24.8% completed Matric or higher.

10.13 DESCRIPTION OF THE CURRENT LAND USES

The predominant land uses in this area are cultivated and degraded lands followed by Built up areas (Villages) with some Natural area, please refer to Figure 10-32.

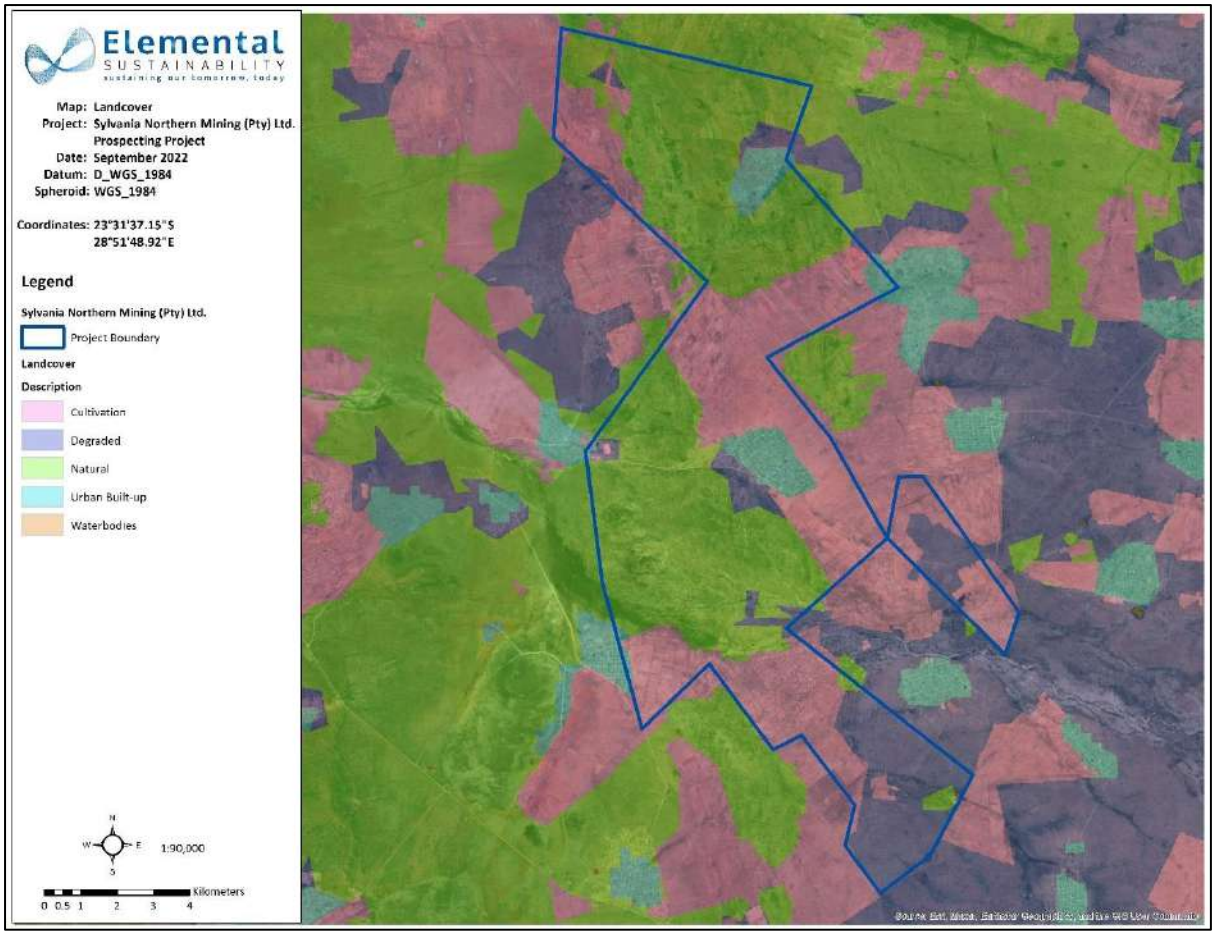


Figure 10-32: Land cover used to infer land uses

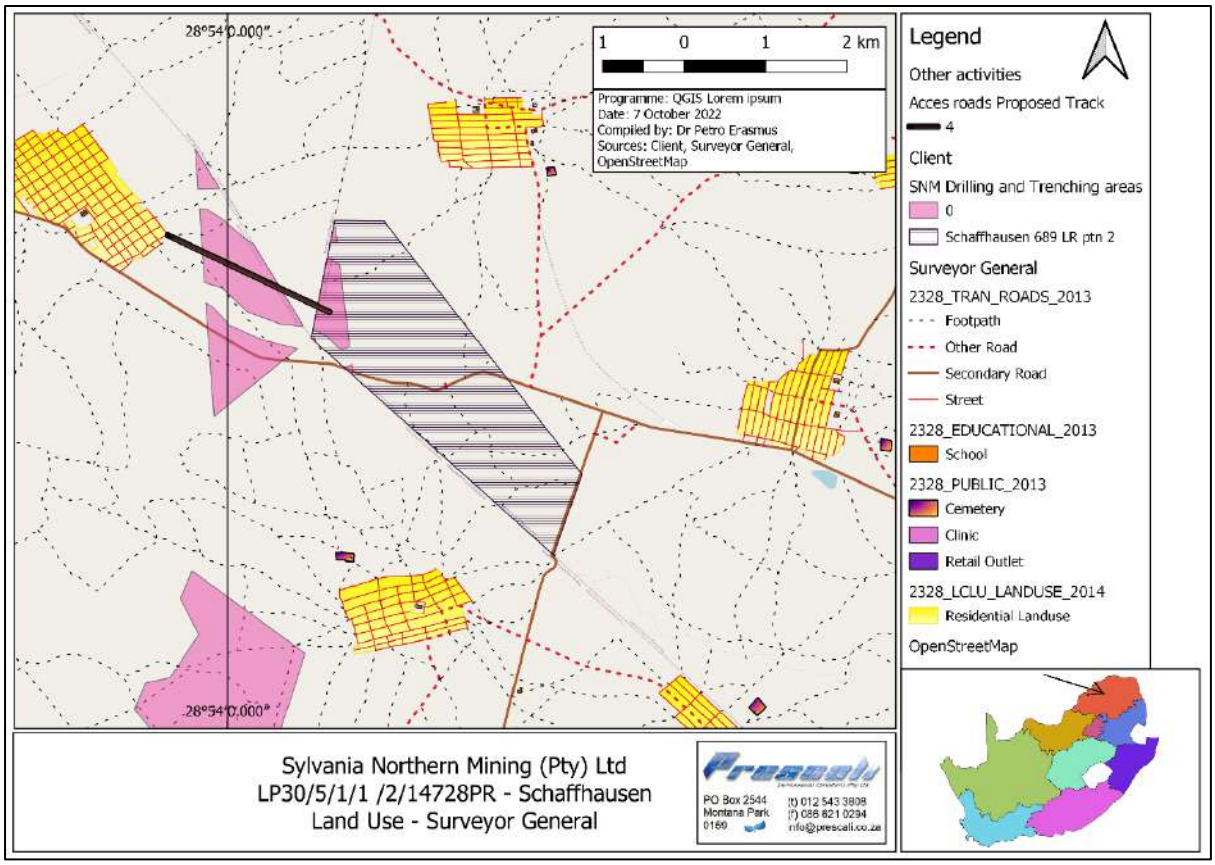


Figure 10-33: Land use identified by Surveyor General

10.14 DESCRIPTION OF SPECIFIC ENVIRONMENTAL FEATURES AND INFRASTRUCTURE ON THE SITE

From the information available it seems that only infrastructure in the application area is the Provincial gravel road and from Google EarthTM imagery there appears to be dryland irrigation fields / grazing areas.

10.14.1 Surface water features

As per the Desktop Surface Water Assessment conducted by Prescali, November 2021, environmentally sensitive areas are defined as landscape elements or places which are vital to the long-term maintenance of biological diversity, soil, water or other natural resources both on the site and in a regional context, includes:

- Wildlife habitat areas inclusive of:
    - focus areas for contributing to biodiversity thresholds that are likely to become future protected areas;
    - private nature reserves, conservancies, core areas of biosphere reserves and other protected areas that are part of a stewardship programme or provincial protected area expansion strategy;
    - National and Provincial Parks and Reserves as defined in the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003), as amended;
    - National Parks view-shed protection areas that contain sensitive view areas around National Parks as identified by SANParks;
    - priority areas in the vicinity of National Parks that have been identified for the long-term survival of biodiversity around the National Parks or upon which the long-term survival of the parks depend to a significant extent; and
    - critically endangered and endangered ecosystems as identified by the South African National Biodiversity Institute in the Limpopo;
- Steep slopes consisting of:
    - all areas with a slope of 8 degrees or steeper; and
    - important topographical features topographical features that were delineated using the 20 m contour interval terrain model of South Africa and based on the inherent scenic value of these features;
- Rivers, wetlands and other water bodies consisting of rivers with a potential zone of influence buffer of 32 metres on each side from the banks of the rivers, wetlands with a potential zone of influence of 10 metres from the edge of the wetlands and dams with a potential zone of influence of 10 metres from their high-water lines, please refer to the sections below; and
- Prime agricultural lands.

Also included in the sensitive features are the regulated areas as per the NWA:

- 1 in 100-year flood;
- 100 m buffer for watercourses;
- 500m buffer for wetlands; and
- Riparian area.

The interconnectivity of these sensitive areas creates greenway corridors that consist of networks of linked landscape elements that provide ecological, recreational, and cultural benefits to a community. Taking into consideration that riparian vegetation visible using Google Earth™ is located in the bed / within a very close distance to the bed of watercourses, the 32 m buffer area for all watercourses and natural wetlands are classified as High sensitivity. The 100 m regulated area for watercourses and the 500 m buffer for natural wetlands are considered to be Medium sensitivity. A 500 m area around the Molatedi Dam was deemed to have a high sensitivity due to the international importance of the dam. From the Screening tool mapping information Aquatic Critical Biodiversity areas were also included as High sensitivity.

Based on the above assessment, the high and very high sensitivity areas are thus as indicated in Figure 10-34 below.

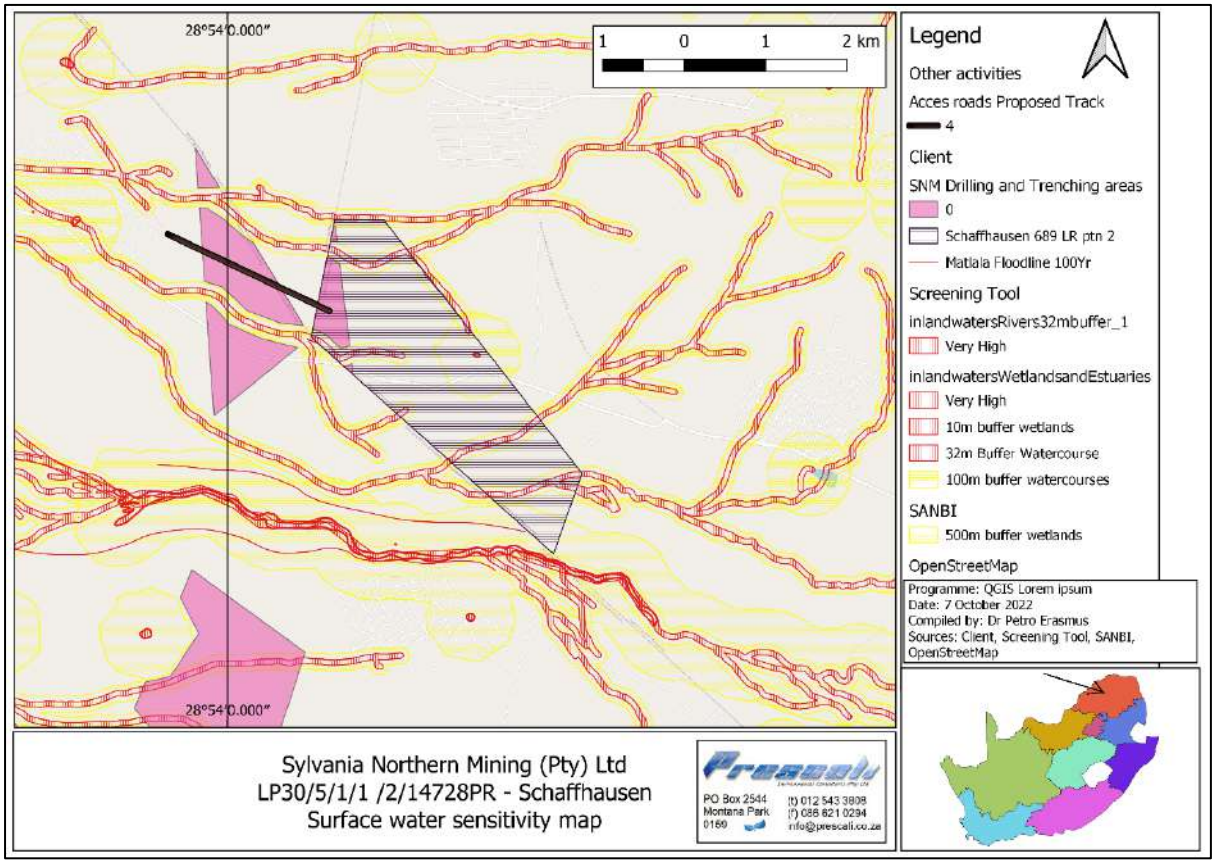


Figure 10-34: Surface water sensitivity classification

The Prospecting Right areas contains the following classes from the LCP and District Bioregional Plans: CBA1, CBA2, ESA1, ESA2, NNR and ONA. The Schaffhausen application area is located in areas classified as CBA2, ESA2, NNR and ONA (Figure 10-10).

None of the flora species previously recorded for the area on POSA are Species of Conservation Concern (SCC) in terms of their Red List status. However, fifteen (15) faunal species previously recorded in the area queried are categorised as SCC.

From satellite imagery of the Prospecting Right areas the following impacts are apparent:

- Numerous dirt roads. Impacts from human and vehicle movement on these roads are expected.
- Extensive dryland crop farming has taken place on the Prospecting Right area.
- A number of villages and residences are located on and adjacent to the Prospecting Right area.
- Heavy livestock grazing and wood harvesting is expected, as reported in previous ecological studies conducted on the study area (M2 Environmental Connections, 2014 and Scientific Aquatic Services, 2013 as cited by Red Kite).
- Exotic and Alien Invasive Plant species proliferation is expected, as reported in previous ecological studies conducted on the study area (M2 Environmental Connections, 2014 and Scientific Aquatic Services, 2013 as cited by Red Kite).

The National Web Based Environmental Screening Tool indicated that the project footprint is of low and high sensitivity in terms of animal species and low sensitivity in terms of plant species sensitivity. The terrestrial biodiversity theme for the project area is indicated as low and very high (refer to figures below).

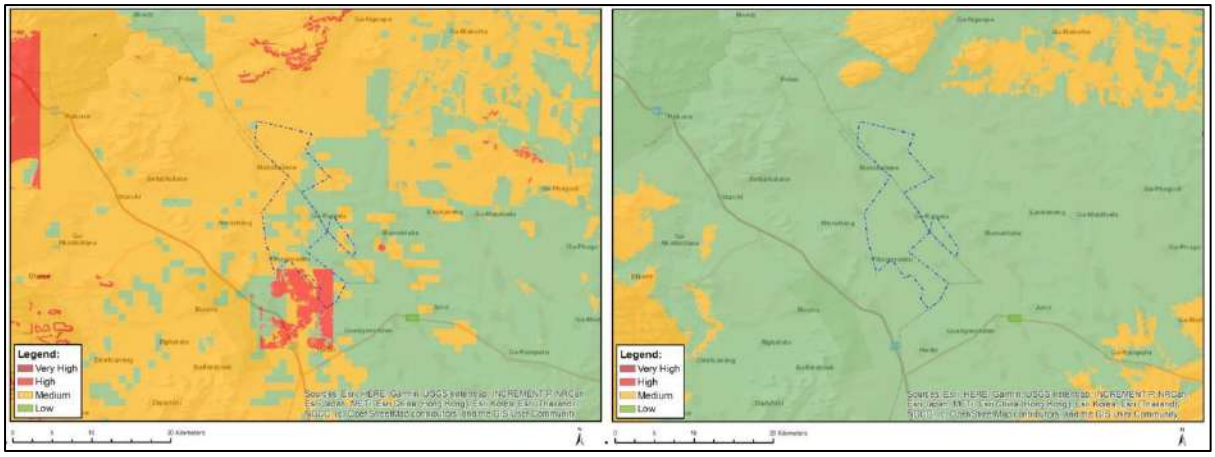


Figure 10-35: Map of animal species (left) and plant species (right) theme sensitivity as per the Environmental Screening Tool Report

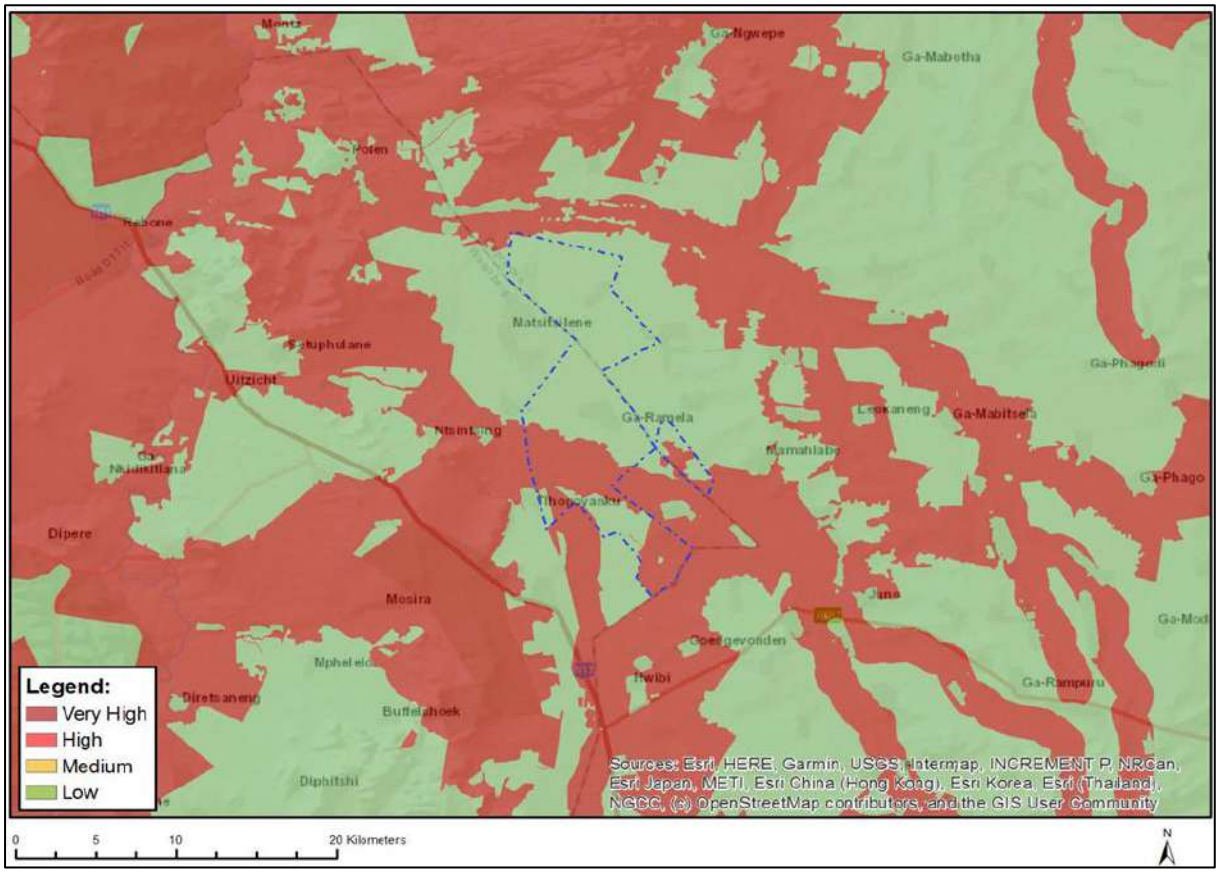


Figure 10-36: Environmental Screening Tool maps of terrestrial ecology themes sensitivity

Based on the desktop assessment findings, the Terrestrial Ecology sensitivity is considered as follows:

- All untransformed areas indicated as Critical Biodiversity Areas are considered high sensitivity;
- All watercourses and their associated riparian zones are considered high sensitivity; and
- The remainder of the Prospecting Right area is considered low sensitivity.

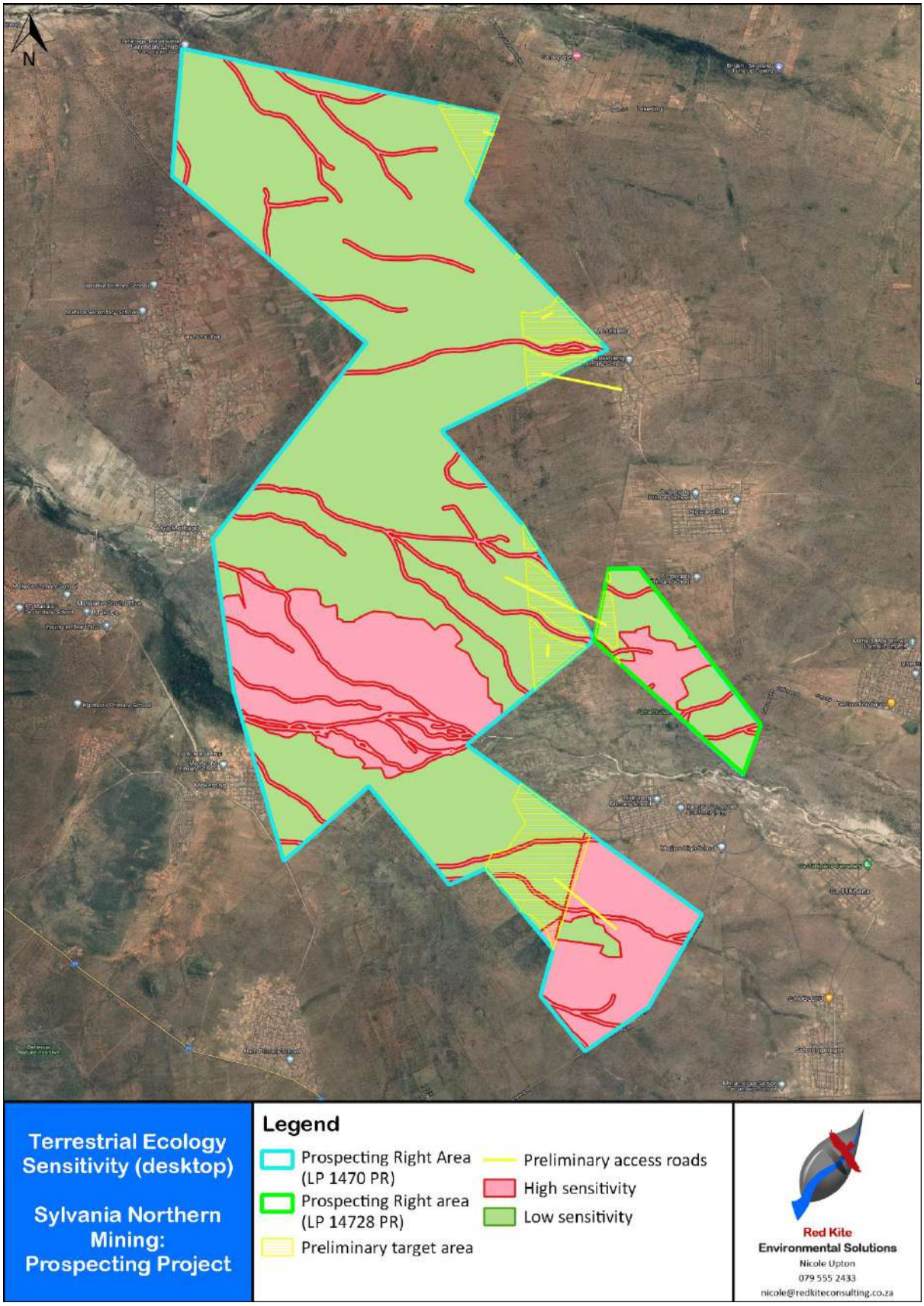


Figure 10-37: Terrestrial Ecological Sensitivity map

10.14.2 Archaeological

Based on the report the following significant ratings were attributed to the sites identified and that could occur within the prospecting application area:

- Ruins of recent historical settlement (due to location outside of the application area these were given a low significance;
- Sections of low, stone-packed walls dating to recent historical periods (Low Cultural Heritage Significance);
- Graveyards / cemeteries (High Cultural Significance);
- 50 m buffer zone around High cultural significance rating site were given a High Cultural Significance rating; and
- 50 – 100 buffer zone around High Cultural significance rating site were given a Medium Cultural Significance rating.

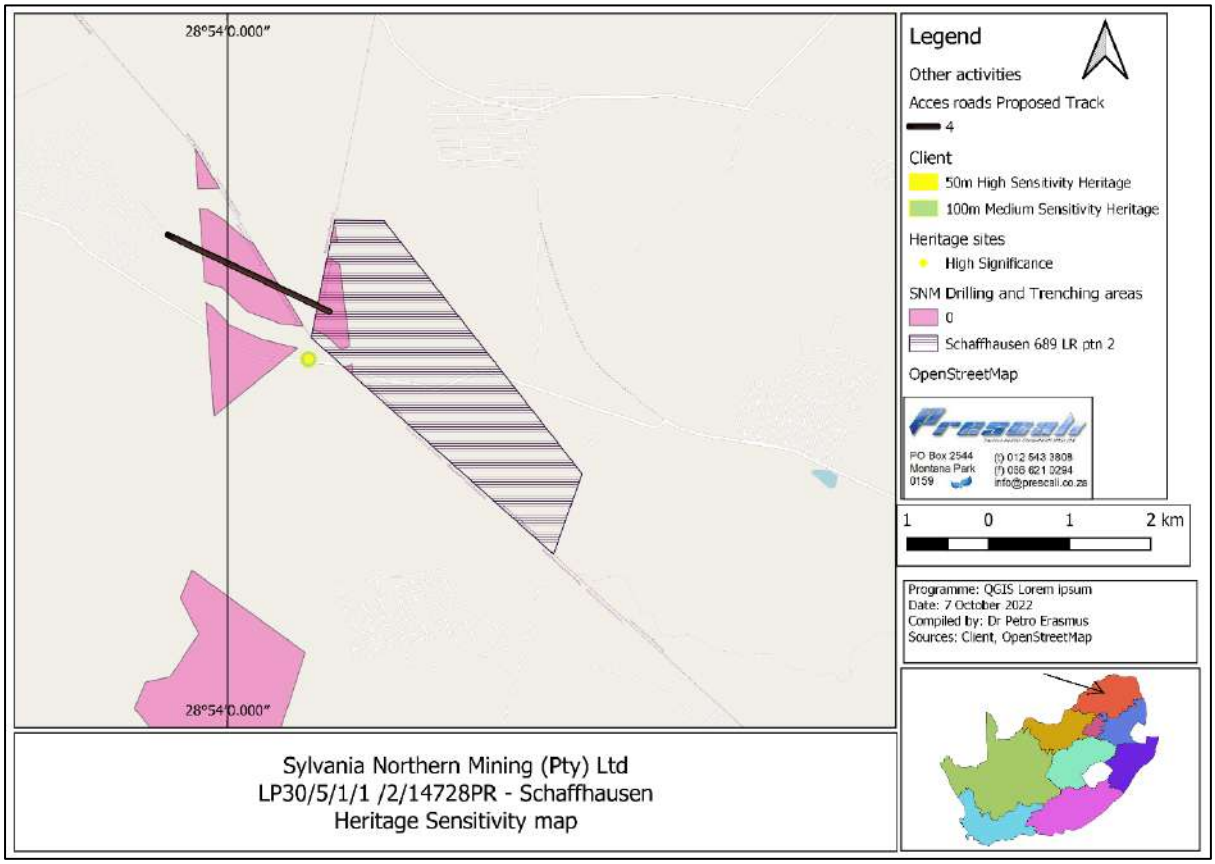


Figure 10-38: Heritage resources significance rating

10.14.3 Agricultural Sensitivity

In accordance with the Land Capability Classification (LCC), Figure 10-39 indicates that the areas where the proposed prospecting activities are to take place is situated in areas of Medium Agricultural Sensitivity and overlaps with areas of High Field Crop Sensitivity for Subsistence Farming (Figure 10-40).

Considering all the baseline properties of the soils, and the weather conditions of the region, the areas proposed for the prospecting application is suitable for small-scale and subsistence dry land agriculture and impacts are expected to be moderate. These baseline land capabilities are also used as a benchmark for rehabilitation, and thus the area can be returned to Class 4 (IV) and 5 (V) during project decommissioning and rehabilitation if effective mitigation is applied. The proposed activities may impact on the subsistence farming, as it overlaps with suitable areas.

Any pivot irrigation (Very High) agricultural area (none located on Schaffhausen) should be considered as no-go areas and no prospecting activities should take place in these areas. No other areas have been identified within the application area that can be classified as no-go areas based on the sensitivity of the soils or agricultural potential.

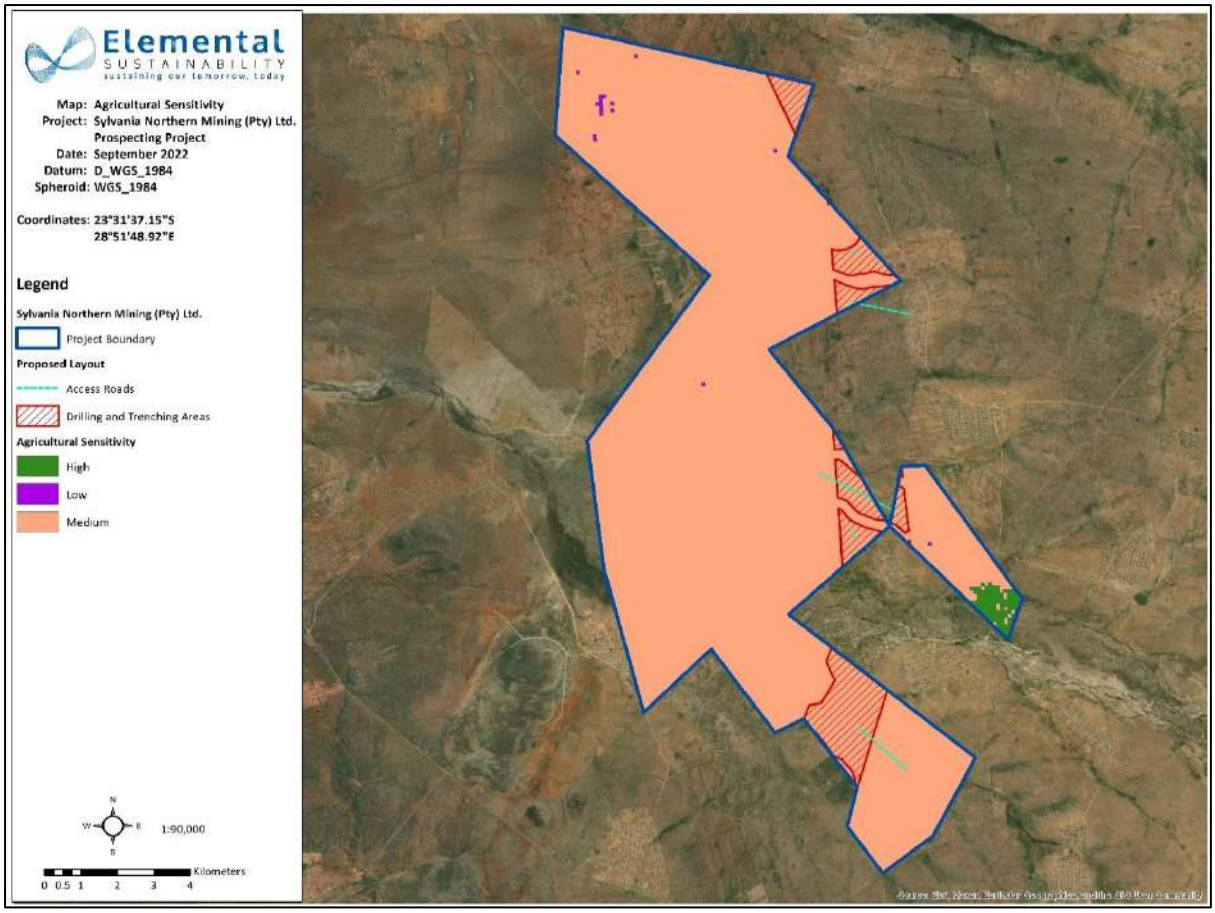


Figure 10-39: Agricultural sensitivity of the proposed prospecting project application area (DEA – Screening Tool).

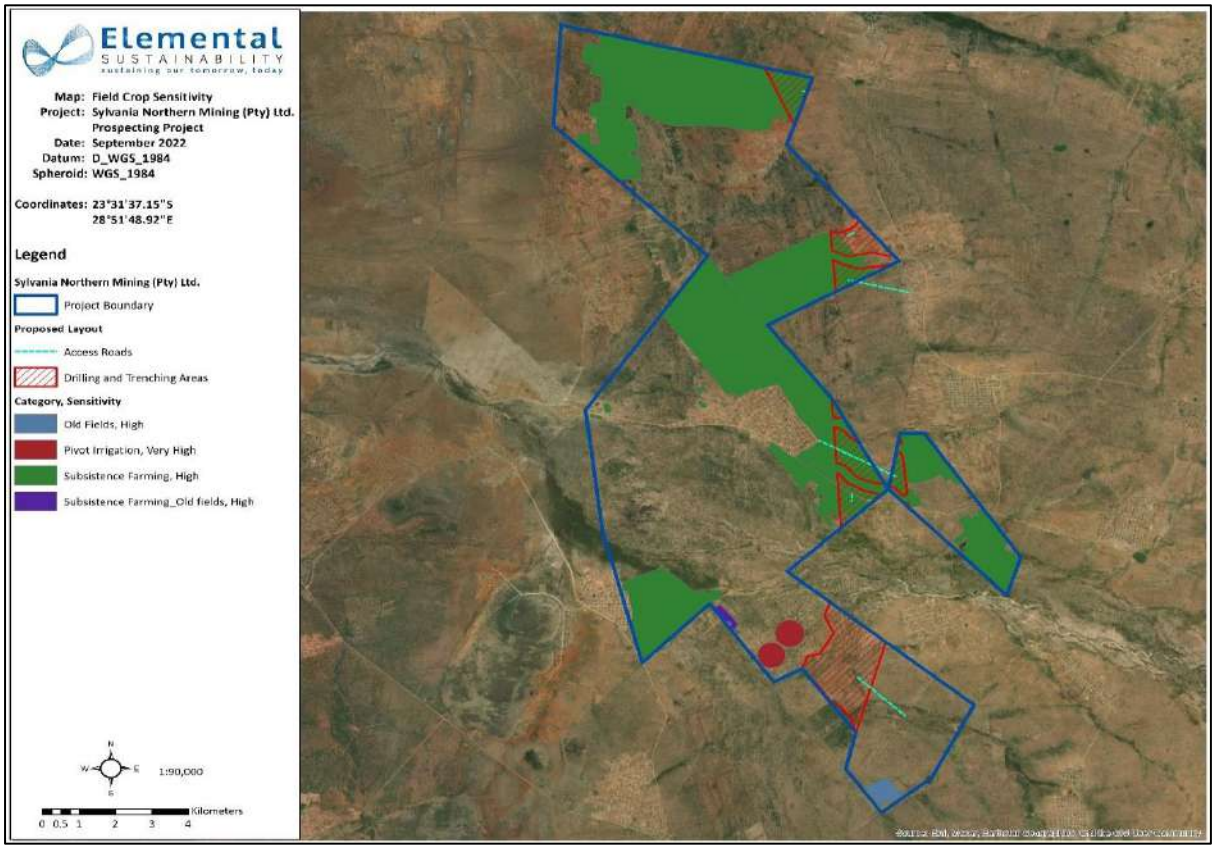


Figure 10-40: Crop Fields sensitivity of the proposed prospecting project application area (DEA – Screening Tool).

10.15 ENVIRONMENTAL AND CURRENT LAND USE MAP

(Show all environmental, and current land use features)

Please refer to Figure 10-41.

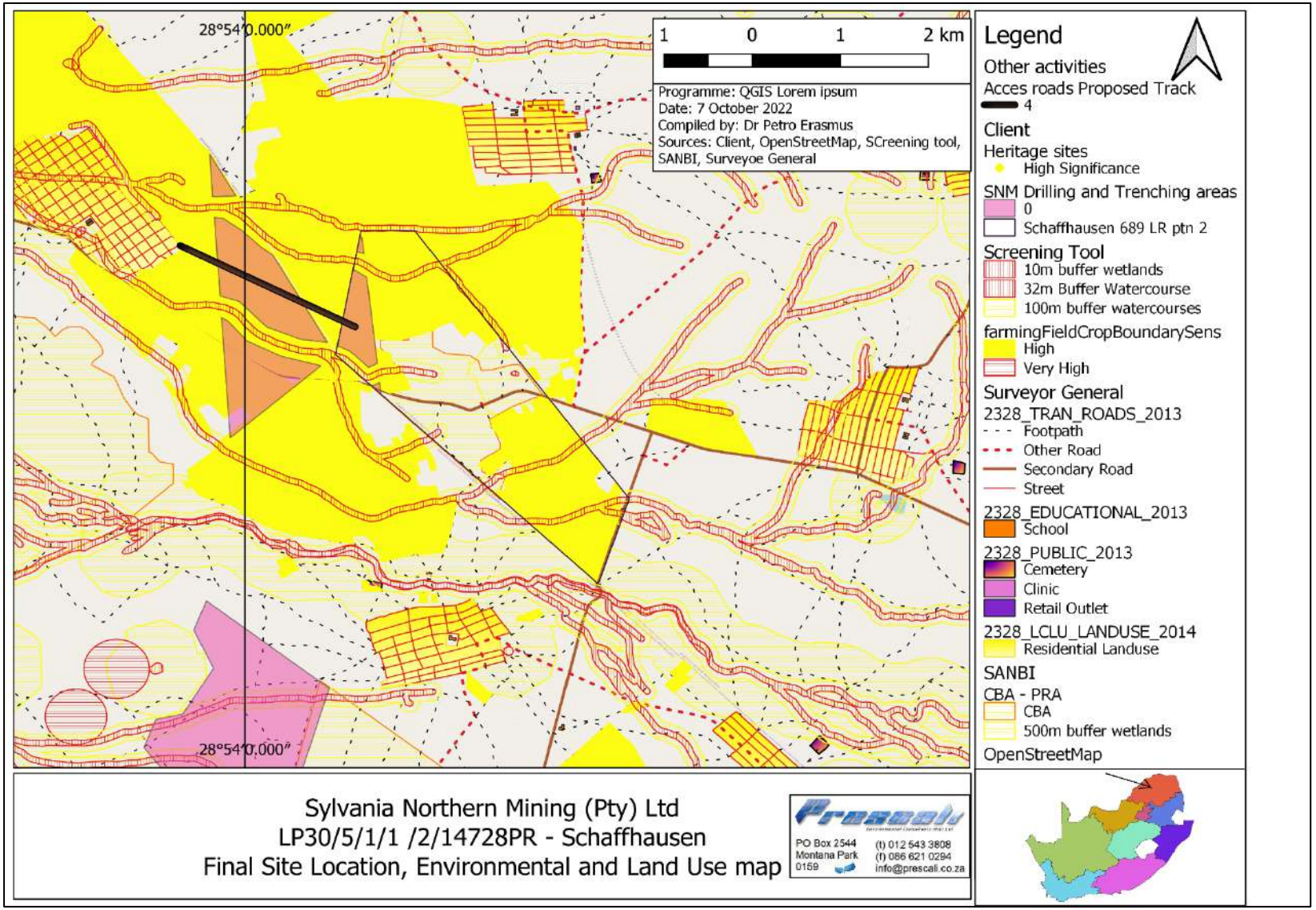


Figure 10-41: Final site, Environmental and Land Use Map

11 POSITIVE AND NEGATIVE IMPACTS IDENTIFIED THAT THE PROPOSED ACTIVITY AND ALTERNATIVES WILL HAVE ON THE ENVIRONMENT AND THE COMMUNITY THAT MAY BE AFFECTED

The proposed prospecting activities to be undertaken include the use of both invasive and non-invasive prospecting techniques. A summary of the positive (+) and negative impacts of the proposed activity are provided in below.

Table 11-1: Identified Positive and Negative Impacts

Aspect	Activity	Activity	Impact	Phase
Topography	All prospecting activities	All prospecting activities	Impact on topography that result in water ponding - area not free-draining	C, O, R, Cl
Geology	All prospecting activities	All prospecting activities	Sterilisation of mineral resource as a result of prospecting activities.	C, O, R, Cl
Groundwater	All prospecting activities	All prospecting activities	Impact on groundwater quality as a result of hydrocarbon spills from machinery.	C, O, R, Cl
Groundwater	All prospecting activities	All prospecting activities	Impact on groundwater levels	C, O, R, Cl
Air quality	All prospecting activities	All prospecting activities	Dust generated as a result of the prospecting activities including travelling on road could impact on local PM10 levels.	C, O, R, Cl
Noise	All prospecting activities	All prospecting activities	The operation of machinery could result in increased noise levels in an area that is rural in nature. This noise could become a nuisance to the residents.	C, O, R, Cl
Socio-Economic	All prospecting activities	All prospecting activities	(+) Very few employment opportunities will be created during prospecting. However, it is anticipated that a few (<10) could be created that will result in a positive economic impact.	C, O, R, Cl
Socio-Economic	All prospecting activities	All prospecting activities	The proposed prospecting activities could create awareness of the area by people seeking employment and result in people moving to the area in case of future employment opportunities should the mineral be viable for full scale mining. This could negatively affect the existing social aspects of the area and impact on the sustainability of services such as schools, clinics, police etc.	C, O, R, Cl
Surface water quality	Ground geophysics and soil geochemical sampling	Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality	C

Aspect	Activity	Activity	Impact	Phase
			of the water in the watercourse.	
Surface water quality	Ground geophysics and soil geochemical sampling	Topsoil stockpiling	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C, O
Surface water quality	Ground geophysics and soil geochemical sampling	Topsoil stockpiling/ Vegetation removal & General activities	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O
Surface water quality	Ground geophysics and soil geochemical sampling	Replace topsoil	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	R
Surface water quality	Ground geophysics and soil geochemical sampling	Replace topsoil	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	R
Surface water quality	Trenching	Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C
Surface water quality	Trenching	Topsoil stockpiling	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C, O
Surface water quality	Trenching	Topsoil stockpiling/ Vegetation removal & General activities	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O
Surface water quality	Trenching	Overburden stockpiling	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality	C, O

Aspect	Activity	Activity	Impact	Phase
			of the water in the watercourse.	
Surface water quantity	Trenching	Containment of rainwater in trench	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	O
Surface water quality	Trenching	Heavy machinery equipment on site	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	C, O
Surface water quality	Trenching	Chemical toilets and sewage waste management	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	C, O
Surface water quality	Trenching	General waste generation	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	C, O
Surface water quality	Resource drilling: drill pad and sump	Heavy machinery equipment on site	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	C, O
Surface water quality	Resource drilling: drill pad and sump	Drilling sludge	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	O
Surface water quality	Resource drilling: drill pad and sump	Vegetation removal & General activities	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O
Surface water quality	Resource drilling: drill pad and sump	Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C
Surface water quantity	Resource drilling: drill pad and sump	Operation of drill pad sump	Removal of run-off from the surface water resource could reduce surface flow in	O

Aspect	Activity	Activity	Impact	Phase
			watercourses which in turn could impact on the habitat and biota within this area.	
Surface water quality	Resource drilling: drill pad and sump	Chemical toilets and sewage waste management	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	C, O
Surface water quality	Resource drilling: drill pad and sump	Capping of Borehole	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	R
Surface water quality	Resource drilling: drill pad and sump	Rip impacted area	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	R
Surface water quality	Resource drilling: drill pad and sump	Rip impacted area	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	R
Surface water quality	Resource drilling: drill pad and sump	General waste generation	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	C, O
Surface water quality	Access road	Vegetation removal (all access roads combined)	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	C
Surface water quality	Access road	Daily travelling to prospecting site	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O
Surface water quality	Access road	Daily travelling to prospecting site	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	C, O
Surface water quality	Access road	Rip road area	Silt generation during rainfall events could reach surface water resources result in in	R

Aspect	Activity	Activity	Impact	Phase
			siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	
Surface water quality	Contractor camp	Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C
Surface water quality	Contractor camp	Diesel storage	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	O
Surface water quality	Contractor camp	Chemical toilets and sewage waste management	Contamination from spills from chemical toilets / emptying of septic tank (if applicable) could impact on water quality which in turn could impact on the biota and habitat as well.	O
Surface water quality	Contractor camp	Storage of material	Contaminated water from material storage area could detrimentally impact on watercourses quality, biota and habitat.	O
Surface water quality	Contractor camp	Storage of general and hazardous waste	Contaminated water from waste storage area could detrimentally impact on watercourses quality, biota and habitat.	O
Surface water quality	Contractor camp	Topsoil stockpiling/Vegetation removal & General activities	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O
Surface water quality	Contractor camp	Vehicle maintenance	Hydrocarbon spills from vehicles and other equipment could negative impact water quality, habitat and biota.	C, O
Surface water quality	Contractor camp	Removal of all infrastructures	Potential for spills from e.g. hydrocarbon tanks, septic tank, chemical toilets could impact on the surface water resource quality, habitat and biota if not managed.	R
Surface water quality	Contractor camp	Rip impacted area	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality	R

Aspect	Activity	Activity	Impact	Phase
			of the water in the watercourse.	
Surface water quantity	Contractor camp	Camp area (whole off)	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	C, O
Surface water quality	Prospecting activities (all)	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	C, O
Surface water quantity	Prospecting activities (all)	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	O
Surface water quality	Prospecting activities (all)	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	During the rehabilitation phase water quality could be impacted as a result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.	R
Heritage and Archaeological	Prospecting activities (all)	Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on open-air Stone Age sites that could be found in the area, most likely in the form of individual stone tools or small scatters. The possibility of Iron Age sites (especially stone-walled Late Iron Age sites) in the areas can also not be excluded, although this is less likely	C, O
Heritage and Archeologically	Prospecting activities (all)	Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on Iron Age sites (especially stone-walled Late Iron Age sites) although this is less likely than Stone Age sites.	C,O
Heritage and Archeologically	Prospecting activities (all)	Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on recent historical sites and features as the possibility of their presence the area is High, and will most be represented by the remnants of individual homesteads and rural settlements.	C,O
Heritage and Archeologically	Prospecting activities (all)	Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on both formal & informal cemeteries, individual graves and even previously unknown & unmarked graves.	C,O

Aspect	Activity	Activity	Impact	Phase
Terrestrial biodiversity	Development activities	Drilling, Roads, Trenching and geochemical sampling	Invasive prospecting and associated activities will lead to destruction and damage of habitats and vegetation communities and overall loss of biodiversity and ecosystem function within the clearance and operational area. Destruction of habitat may lead to faunal species migrating to other more favourable areas.	O
Terrestrial biodiversity	Development activities	Drilling, Roads, Trenching and geochemical sampling	The continuous human activity over a longer-term period may further impact on the faunal communities within the area. Associated noise, waste, the smell of humans and physical infiltration into remaining natural areas are problematic and may lead to declining populations (where the disturbance of habitat has caused habitat remaining to become unfavourable).	O
Terrestrial biodiversity	Development activities	Vegetation clearance	Vegetation clearance will destroy indigenous vegetation and lead to possible invasive and/or exotic species establishing in the area and edge-effects occurring surrounding the prospecting activities. Bare areas may become vulnerable to Alien and Invasive Plant species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat.	C, O
Terrestrial biodiversity	Development activities	Drilling, Roads, Trenching and geochemical sampling	Invasive prospecting and associated activities may impact on areas designated as high sensitivity, including critical biodiversity areas and watercourses situated in and around the Prospecting Right area. The majority of the proposed target areas are located in area categorised as ONA and NNR. The layout of the prospecting target areas appear to have been designed to avoid most of the non-perennial tributaries. The activity may lead to the loss of species of conservation concern. Based on the desktop study findings, no flora SCC are considered to be likely to occur on the	O

Aspect	Activity	Activity	Impact	Phase
			project area. However, fifteen (15) faunal species previously recorded in the area queried are categorised as SCC.	
Terrestrial biodiversity	Development activities	Rehabilitation	Rehabilitation could be ineffective if rehabilitation actions are not effectively implemented. Without the necessary mitigation measures, rehabilitation will be less successful and the ecology of the impacted areas may not recover to a pre-prospecting state. Without mitigation the alien invasive species may increase and result in a degraded veld condition making the property less viable for post-closure land use activities such as wilderness, grazing and agriculture.	CI, Post CI
Soil, Land Use and Land Capability	All	Soil stripping	Soil Erosion	C
Soil, Land Use and Land Capability	All	Vehicles driving on the soil surface	Compaction and loss of soil structure	C
Soil, Land Use and Land Capability	All	Spillages of hydrocarbons	Soil pollution and contamination	C
Soil, Land Use and Land Capability	All	Soil stripping	Soil Erosion	O
Soil, Land Use and Land Capability	All	Soil Stripping / Trenching and Drilling	Dilution of topsoil through mixing with subsoil; Loss of topsoil as a resource	O
Soil, Land Use and Land Capability	All	Soil Stripping / Trenching and Drilling	Decline in organic matter & biological activity	O
Soil, Land Use and Land Capability	All	Soil Stripping /Trenching and Drilling	Loss of water holding capacity	O
Soil, Land Use and Land Capability	All	Vehicles driving on the soil surface	Compaction and loss of soil structure	O
Soil, Land Use and Land Capability	All	Soil Stripping / Trenching and Drilling	Loss of land capability and land use	O
Soil, Land Use and Land Capability	All	Spills from vehicles, accidental spills of hazardous chemicals	Soil pollution and contamination	O
Soil, Land Use and Land Capability	All	Stockpiling of Soil	Loss of Topsoil as a Resource: Compaction and Erosion	CI, R
Soil, Land Use and Land Capability	All	Backfilling of soil material layers	Loss of land capability	CI, R

11.1 METHODOLOGY USED IN DETERMINING AND RANKING THE NATURE, SIGNIFICANCE, CONSEQUENCES, EXTENT, DURATION AND PROBABILITY OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS

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

11.1.1 Assessment Criteria

The criteria for the description and assessment of environmental impacts were drawn from the EIA Guidelines (DEAT, 1998) and as amended from time to time (DEAT, 2002).

The level of detail as depicted in the EIA Guidelines (DEAT, 2002) was fine-tuned by assigning specific values to each impact. In order to establish a coherent framework within which all impacts could be objectively assessed, it was necessary to establish a rating system, which was applied consistently to all the criteria. For such purposes each aspect was assigned a value, ranging from one (1) to five (5), depending on its definition. This assessment is a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

An explanation of the impact assessment criteria is defined below.

Table 11-2: Impact Assessment Criteria

EXTENT	
Classification of the physical and spatial scale of the impact	
Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
Site	The impact could affect the whole, or a significant portion of the site.
Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
National	The impact could have an effect that expands throughout the country (South Africa).
International	Where the impact has international ramifications that extend beyond the boundaries of South Africa.
DURATION	
The lifetime of the impact that is measured in relation to the lifetime of the proposed development.	
Short term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the Site Establishment phase.
Short to Medium term	The impact will be relevant through to the end of a Site Establishment phase (1.5 years).
Medium term	The impact will last up to the end of the development phases, where after it will be entirely negated.
Long term	The impact will continue or last for the entire operational lifetime i.e. exceed 30 years of the development, but will be mitigated by direct human action or by natural processes thereafter.
Permanent	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
INTENSITY	
The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself. The intensity is rated as	
Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.
High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
PROBABILITY	

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:	
Improbable	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0 %).
Possible	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25 %.
Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50 %.
Highly Likely	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.
Definite	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.

The status of the impacts and degree of confidence with respect to the assessment of the significance must be stated as follows:

- **Status of the impact:** A description as to whether the impact would be positive (a benefit), negative (a cost), or neutral.
- **Degree of confidence in predictions:** The degree of confidence in the predictions, based on the availability of information and specialist knowledge.

Other aspects to take into consideration in the specialist studies are:

- Impacts should be described both before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for the full-lifecycle of the proposed development, including Site Establishment, operation and decommissioning.
- The impact evaluation should take into consideration the cumulative effects associated with this and other facilities which are either developed or in the process of being developed in the region.
- The specialist studies must attempt to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

11.1.2 Mitigation

The impacts that are generated by the development can be minimised if measures are implemented in order to reduce the impacts. The mitigation measures ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.

11.1.3 Determination of Significance-Without Mitigation

Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as “positive”. Significance is rated on the following scale:

Table 11-3: Significance-Without Mitigation

NO SIGNIFICANCE	The impact is not substantial and does not require any mitigation action.
LOW	The impact is of little importance, but may require limited mitigation.
MEDIUM	The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.

HIGH	The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

11.1.4 Determination of Significance- With Mitigation

Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation is rated on the following scale:

Table 11-4: Significance-With Mitigation

NO SIGNIFICANCE	The impact will be mitigated to the point where it is regarded as insubstantial.
LOW	The impact will be mitigated to the point where it is of limited importance.
LOW TO MEDIUM	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels.
MEDIUM	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
MEDIUM TO HIGH	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.
HIGH	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

11.1.5 Assessment Weighting

Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it was necessary to weigh and rank all the criteria.

11.1.6 Ranking, Weighting and Scaling

For each impact under scrutiny, a scaled weighting factor is attached to each respective impact (refer Table 11-5).

The purpose of assigning weights serves to highlight those aspects considered the most critical to the various stakeholders and ensure that each specialist's element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance.

Table 11-5: Description of assessment parameters with its respective weighting

EXTENT		DURATION		INTENSITY		PROBABILITY		WEIGHTING FACTOR (WF)		SIGNIFICANCE RATING (SR)	
Footprint	1	Short term	1	Low	1	Improbable	1	Low	1	Low	0-19
Site	2	Short to Medium	2			Possible	2	Low to Medium	2	Low to Medium	20-39
Regional	3	Medium term	3	Medium	3	Likely	3	Medium	3	Medium	40-59
National	4	Long term	4			Highly Likely	4	Medium to High	4	Medium to High	60-79
International	5	Permanent	5	High	5	Definite	5	High	5	High	80-100

MITIGATION EFFICIENCY (ME)		SIGNIFICANCE FOLLOWING MITIGATION (SFM)	
High	0.2	Low	0 - 19
Medium to High	0.4	Low to Medium	20 - 39
Medium	0.6	Medium	40 - 59
Low to Medium	0.8	Medium to High	60 - 79
Low	1.0	High	80 - 100

11.1.7 Identifying the Potential Impacts Without Mitigation Measures (WOM)

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1:

Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x Weighting Factor

11.1.8 Identifying the Potential Impacts with Mitigation Measures (WM)

In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it was necessary to re-evaluate the impact.

11.1.8.1 Mitigation Efficiency (ME)

The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation efficiency (ME) rating (refer to *Table* 11-5).

The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and Empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2:

Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency

or WM = WOM x ME

11.1.9 Significance Following Mitigation (SFM)

The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact is therefore seen in its entirety with all aspects considered.

11.2 THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK.

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

The mitigation measures are provided in Part A Section 15. Please also refer to Table 5-1 in Part B.

11.3 MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED

Minerals are site specific. 4 boreholes and 8 trenches will be developed and though the exact location is not available, the general areas in which they will be located have been identified based on the current knowledge of the geology of the area. Exclusion areas have been identified and no prospecting activities will take place in these areas, refer to Figure 3-3.

11.4 STATEMENT MOTIVATING THE ALTERNATIVE DEVELOPMENT LOCATION WITHIN THE OVERALL SITE

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

Since prospecting is temporary in nature no permanent structures will be constructed, negotiations and agreements will be made with the farm owners / surface right users to use any existing infrastructure like accommodation for the explorers, access roads, etc. In addition to the information provided, each of the phases is dependent on the results and success of the preceding phase. The location and extent of sampling will be determined based on information derived from the surveys. Sampling sites will be selected to avoid water courses.

The proposed application area has been selected due to the geology of the site and the anticipated favourable tectono-stratigraphic setting of the prospect area. There are no protected areas within the application area. No prospecting will occur in close proximity to watercourses.

Based on the exclusion zones and the known geology the following priority areas were identified where the prospecting activities will take place. Location of potential access roads were also inferred, please refer to Figure 3-3.

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

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

In order to identify the potential impacts associated with the proposed prospecting activities the following steps were undertaken:

- The stakeholder consultation process is currently undertaken in a manner to be interactive, providing landowners and identified stakeholders with the opportunity to provide input into the project. This is a key focus, as the local residents has capabilities of providing site specific information, which may not be available in desktop research material. Stakeholders are requested to provide their views on the project and any potential concerns which they may have. All comments and concerns are captured and formulated into the impact assessment.
- A detailed desktop investigation was undertaken to determine the environmental setting in which the project is located. Based on the desktop investigations various resources were used to determine the significance and sensitivity of the various environmental considerations. The desktop investigation involved the use of:
  - Detailed mapping based on existing data sources applicable to the study area;
  - Geographic Information System base maps;
  - Literature and existing data/reports for the study area
- A site visit was conducted to ensure that the information gathered as part of the desktop investigation reflects the current status of the land.
- Desktop specialist studies were undertaken in aspects that has been specifically identified within the Environmental Screening Report for the area.
- The ratings of the identified impacts were undertaken in a quantitative manner as provided in Impact Assessment Section. The ratings were undertaken in a manner to calculate the significance of each of the impacts. The EAP also assesses the outcomes of the calculation to determine whether the outcome reflects the perceived and the actual views.
- The identification of management measures is done based on the significance of the impacts and measures that have been considered appropriate and successful, specifically as Best Practical and Economical Options.

The issues and risks identified were rated and the results of the assessment before and after the implementation of management measures are outlined in Part A Section 12. Please also refer to Part A for how the Very High and High Sensitivity areas were taken into consideration during the final site layout plan compilation.

12 ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

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

Please also refer to Figure 3-3 and Part A, Section 5 for additional information. Based on the above the following impacts were identified to occur on the identified farm, the impacts quantification is per borehole.

Table 12-1: Impact Assessment Rating as a result of invasive prospecting activities
(E: Extend, D: Duration, I: Intensity, P: Probability, WF: Weighing Factor, SWOM: Significance without mitigation, ME: Mitigation efficiency, SWM; Significance with mitigation, C: Construction, O: Operational, R: Rehabilitation, Cl: Closure)

Aspect	Impact	Phase	E	D	I	P	WF	SWOM	ME	SWM
Topography	Impact on topography that result in water ponding - area not free draining	C, O, R, Cl	1	3	1	2	1	Low	0,4	Low
Geology	Sterilisation of mineral resource as a result of prospecting activities.	C, O, R, Cl	1	4	1	1	1	Low	0,4	Low
Groundwater	Impact on groundwater quality as a result of hydrocarbon spills from machinery.	C, O, R, Cl	1	1	1	1	1	Low	0,4	Low
Groundwater	Impact on groundwater levels	C, O, R, Cl	1	1	1	1	1	Low	0,4	Low
Air quality	Dust generated as a result of the prospecting activities including travelling on road could impact on local PM10 levels.	C, O, R, Cl	2	4	1	2	2	Low	0,4	Low
Nosie	The operation of machinery could result in increased noise levels in an area that is rural in nature. This noise could become a nuisance to the residents.	C, O, R, Cl	3	4	3	4	2	Low - Medium	0,4	Low
Socio-Economic	(+) Very few employment opportunities will be created during prospecting. However, it is anticipated that a few (<10) could be created that will result in a positive economic impact.	C, O, R, Cl	3	4	3	4	5	Medium - High	1	Medium - High
Socio-Economic	The proposed prospecting activities could create awareness of the area by people seeking employment and result in people moving to the area in case of future employment opportunities should the mineral be viable for full scale mining. This could negatively affect the existing social aspects of the area and impact on the sustainability of services such as schools, clinics, police etc.	C, O, R, Cl	3	4	3	3	5	Medium - High	0,6	Low - Medium
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat,	C	1	1	1	2	2	Low	0,4	Low

Aspect	Impact	Phase	E	D	I	P	WF	SWOM	ME	SWM
	flow regime and the physico & chemical quality of the water in the watercourse.									
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C, O	1	1	1	2	2	Low	0,4	Low
Surface water quality	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O	1	1	1	2	2	Low	0,4	Low
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	R	1	1	1	2	2	Low	0,4	Low
Surface water quality	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	R	1	1	1	2	2	Low	0,4	Low
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C	1	2	2	2	2	Low	0,4	Low
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C, O	1	2	2	2	2	Low	0,4	Low
Surface water quality	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O	1	2	2	2	2	Low	0,4	Low
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C, O	1	2	2	2	2	Low	0,4	Low
Surface water quantity	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	O	1	2	3	2	2	Low	0,4	Low

Aspect	Impact	Phase	E	D	I	P	WF	SWOM	ME	SWM
Surface water quality	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	C, O	1	2	2	2	2	Low	0,4	Low
Surface water quality	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	C, O	1	2	2	2	2	Low	0,4	Low
Surface water quality	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	C, O	1	2	2	2	2	Low	0,4	Low
Surface water quality	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	C, O	1	2	2	2	2	Low	0,4	Low
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	O	1	2	2	2	2	Low	0,4	Low
Surface water quality	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O	1	2	2	2	2	Low	0,4	Low
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C	1	2	2	2	2	Low	0,4	Low
Surface water quantity	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	O	1	2	3	2	2	Low	0,4	Low
Surface water quality	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	C, O	1	2	2	2	2	Low	0,4	Low
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat,	R	1	2	2	2	2	Low	0,4	Low

Aspect	Impact	Phase	E	D	I	P	WF	SWOM	ME	SWM
	flow regime and the physico & chemical quality of the water in the watercourse.									
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	R	1	2	2	2	2	Low	0,4	Low
Surface water quality	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	R	1	2	2	2	2	Low	0,4	Low
Surface water quality	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	C, O	1	2	2	2	2	Low	0,4	Low
Surface water quality	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	C	1	3	2	2	2	Low	0,4	Low
Surface water quality	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O	1	3	2	2	2	Low	0,4	Low
Surface water quality	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	C, O	1	3	2	2	2	Low	0,4	Low
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	R	1	3	2	2	2	Low	0,4	Low
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	C	1	3	2	2	2	Low	0,4	Low
Surface water quality	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	O	1	3	2	2	2	Low	0,4	Low
Surface water quality	Contamination from spills from chemical toilets / emptying of septic tank (if applicable) could impact on	O	1	3	2	2	2	Low	0,4	Low

Aspect	Impact	Phase	E	D	I	P	WF	SWOM	ME	SWM
	water quality which in turn could impact on the biota and habitat as well.									
Surface water quality	Contaminated water from material storage area could detrimentally impact on watercourses quality, biota and habitat.	O	1	3	2	2	2	Low	0,4	Low
Surface water quality	Contaminated water from waste storage area could detrimentally impact on watercourses quality, biota and habitat.	O	1	3	2	2	2	Low	0,4	Low
Surface water quality	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	C, O	1	3	2	2	2	Low	0,4	Low
Surface water quality	Hydrocarbon spills from vehicles and other equipment could negative impact water quality, habitat and biota.	C, O	1	3	2	2	2	Low	0,4	Low
Surface water quality	Potential for spills from e.g. hydrocarbon tanks, septic tank, chemical toilets could impact on the surface water resource quality, habitat and biota if not managed.	R	1	3	2	2	2	Low	0,4	Low
Surface water quality	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	R	1	3	2	2	2	Low	0,4	Low
Surface water quantity	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	C, O	1	3	2	2	2	Low	0,4	Low
Heritage and archaeological	The proposed prospecting activities could impact on open-air Stone Age sites that could be found in the area, most likely in the form of individual stone tools or small scatters. The possibility of Iron Age sites (especially stone-walled Late Iron Age sites) in the areas can also not be excluded, although this is less likely	C, O	1	1	3	2	3	Low - Medium	0,2	Low
Heritage and archaeological	The proposed prospecting activities could impact on Iron Age sites (especially stone-walled Late Iron Age sites) although this is less likely than Stone Age sites.	C,O	1	1	3	2	3	Low - Medium	0,2	Low
Heritage and archaeological	The proposed prospecting activities could impact on recent historical sites and features as the possibility of their presence the area is High, and will most be	C,O	1	1	3	4	3	Low - Medium	0,2	Low

Aspect	Impact	Phase	E	D	I	P	WF	SWOM	ME	SWM
	represented by the remnants of individual homesteads and rural settlements.									
Heritage and archaeological	The proposed prospecting activities could impact on both formal & informal cemeteries, individual graves and even previously unknown & unmarked graves.	C,O	2	3	5	4	5	Medium - High	0,2	Low
Terrestrial biodiversity	Invasive prospecting and associated activities will lead to destruction and damage of habitats and vegetation communities and overall loss of biodiversity and ecosystem function within the clearance and operational area. Destruction of habitat may lead to faunal species migrating to other more favourable areas.	O	2	2	2	5	2	Low - Medium	0,8	Low
Terrestrial biodiversity	The continuous human activity over a longer-term period may further impact on the faunal communities within the area. Associated noise, waste, the smell of humans and physical infiltration into remaining natural areas are problematic and may lead to declining populations (where the disturbance of habitat has caused habitat remaining to become unfavourable).	O	3	2	2	4	3	Low - Medium	0,8	Low - Medium
Terrestrial biodiversity	Vegetation clearance will destroy indigenous vegetation and lead to possible invasive and/or exotic species establishing in the area and edge-effects occurring surrounding the prospecting activities. Bare areas may become vulnerable to Alien and Invasive Plant species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat.	C, O	4	3	3	3	3	Low - Medium	0,6	Low - Medium
Terrestrial biodiversity	Invasive prospecting and associated activities may impact on areas designated as high sensitivity, including critical biodiversity areas and watercourses situated in and around the Prospecting Right area. The majority of the proposed target areas are located in area categorised as ONA and NNR. The layout of the prospecting target areas appears to have been designed to avoid most of the non-perennial tributaries. The activity may lead to the loss of species of conservation concern. Based on the desktop study findings, no flora SCC are considered to be likely to occur on the project area. However, fifteen (15) faunal	O	3	4	3	2	3	Low - Medium	0,4	Low

Aspect	Impact	Phase	E	D	I	P	WF	SWOM	ME	SWM
	species previously recorded in the area queried are categorised as SCC.									
Terrestrial biodiversity	Rehabilitation could be ineffective if rehabilitation actions are not effectively implemented. Without the necessary mitigation measures, rehabilitation will be less successful and the ecology of the impacted areas may not recover to a pre-prospecting state. Without mitigation the alien invasive species may increase and result in a degraded veld condition making the property less viable for post-closure land use activities such as wilderness, grazing and agriculture.	CI, Post CI	2	3	3	3	3	Low - Medium	0,6	Low - Medium
Soil, Land Use and Land Capability	Soil Erosion	C	1	2	1	2	2	Low	0,2	Low
Soil, Land Use and Land Capability	Compaction and loss of soil structure	C	1	2	1	2	3	Low	0,2	Low
Soil, Land Use and Land Capability	Soil pollution and contamination	C	1	2	1	2	3	Low	0,2	Low
Soil, Land Use and Land Capability	Soil Erosion	O	2	3	3	4	4	Medium	0,4	Low
Soil, Land Use and Land Capability	Dilution of topsoil through mixing with subsoil; Loss of topsoil as a resource	O	2	4	2	3	3	Low - Medium	0,4	Low
Soil, Land Use and Land Capability	Decline in organic matter & biological activity	O	2	3	2	3	4	Medium	0,4	Low
Soil, Land Use and Land Capability	Loss of water holding capacity	O	2	3	2	3	4	Medium	0,4	Low
Soil, Land Use and Land Capability	Compaction and loss of soil structure	O	2	4	3	4	4	Medium	0,6	Low - Medium
Soil, Land Use and Land Capability	Loss of land capability and land use	O	2	4	4	4	4	Medium	0,8	Medium

Aspect	Impact	Phase	E	D	I	P	WF	SWOM	ME	SWM
Soil, Land Use and Land Capability	Soil pollution and contamination	O	2	3	3	4	3	Low - Medium	0,2	Low
Soil, Land Use and Land Capability	Loss of Topsoil as a Resource: Compaction and Erosion	Cl, R	1	2	2	3	3	Low - Medium	0,2	Low
Soil, Land Use and Land Capability	Loss of land capability	Cl, R	1	2	2	3	3	Low - Medium	0,4	Low

Table 12-2: Cumulative impact prospecting activities and potential contractors camp

Aspect	Impact	Phase	E	D	I	P	WF	SWOM	ME	SWM
Surface water quality	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	C, O	1	3	3	4	2	Low - Medium	0,4	Low
Surface water quantity	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	O	1	3	3	3	2	Low	0,4	Low
Surface water quality	During the rehabilitation phase water quality could be impacted as a result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.	R	1	3	3	4	2	Low - Medium	0,4	Low
Soil, Land Use and Land capability	The impact on the local food security on the areas where prospecting activities will take place, will be moderate as the capacity of the area to sustain large number of grazing animals is moderate and high for subsistence farming. With the expected soil degradation occurring and most areas proposed for prospecting overlapping with high subsistence farming potential, a decline in the overall soil quality and health is expected and may hinder the future land use for grazing and crop production on the areas where prospecting will take place.	C, O	2	3	3	4	4	Medium	0,4	Low
Terrestrial biodiversity	The prospecting activity could impact on the fauna and Flora biodiversity of the area and result in increased AIPs infestation.	C, O	2	3	3	4	4	Medium	0,4	Low

13 SUMMARY OF SPECIALIST REPORTS.

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

Table 13-1: Summary of Specialist reports (Desktop)

List of studies undertaken	**Recommendations of specialist reports**	**Specialist recommend-dations that have been included in the EIA report*(mark with an x where applicable)***	**Reference to applicable section of report where specialist recommendations have been included.**
Surface water	If the management measures and recommendation as outlined in this report is implemented it is recommended that the proposed prospecting activities be authorized	X	Part A Section 15 Part B Sections 5 and 6
Terrestrial biodiversity	It is the reasoned opinion of the specialist that the development may continue if all recommended mitigation measures are implemented from the onset of the development. A field assessment is recommended to assess the habitat conditions and to ascertain whether any Species of Conservational Concern (SCC) occur on the project footprint before construction begins.	X	Part A Section 15 Part B Sections 5 and 6
Soil and Land capability	The identified impacts can be reduced by keeping the footprints minimised where possible and strictly following soil management measures. If the soil management measures are followed and the land rehabilitated to the highest standard possible, grazing or even crop production will be possible on the rehabilitated land. The main mitigation of the expected impacts will consist of compensation to the farmer, equivalent to the possible loss of agricultural income and food security. It is therefore the opinion of the author that the activity should be authorised, and that the layout proposed for the development is acceptable from a soil and agricultural potential perspective if mitigation is applied. It follows that the recommendations and mitigation requirements as set out in this report should form part of the conditions of the environmental authorisation for the proposed project.	X	Part A Section 15 Part B Sections 5 and 6
Heritage	That the proposed Sylvania Northern Mining (Pty) Ltd Prospecting/Mining Rights Application on Portion 2 of Schaffhausen 689 LR in the Blouberg Magisterial District, be allowed to continue with the condition that once the final detailed locations of the Prospecting Boreholes and Trenches has been determined that detailed field-based assessments be carried out in these areas to determine the impacts of these activities on any possible cultural heritage (archaeological	x	Part A Section 15 Part B Sections 5 and 6

List of studies undertaken	Recommendations of specialist reports	Specialist recommend-dations that have been included in the EIA report*(mark with an x where applicable)*	Reference to applicable section of report where specialist recommendations have been included.
	and/or historical) sites and remains. Any resultant proposed future mining activities and related developments and operations will have to then be assessed as well.		

14 ENVIRONMENTAL IMPACT STATEMENT

14.1 SUMMARY OF THE KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The findings are that the proposed prospecting activities will result in a Low to Medium-High impact for all aspects of the physical and socio-economic environment before the implementation of management / mitigation measures. With the implementation of mitigation measures the impact is reduced to Low and Medium (Agriculture impact). As far as possible all High and Very High sensitive features are to be avoided. However the location of the geological feature that will be investigated is located on a High sensitivity area that thus cannot be avoided.

Monitoring of the required mitigation measures is to take place on site at a continuous basis by the project manager, contractors and Environmental Control Officer.

14.1.1 Final Site Map

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

Please refer to Figure 10-41.

14.1.2 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives

Refer to Part A Table 11-1 which highlights all the positive and negative impacts for the proposed prospecting activities. The proposed activities have a Low to Medium-High significance impact before management is implemented, after the implementation of management measures the risk is Low to Medium (Agriculture). The probability of occurrence of an impact was determined and most of these activities can be controlled and impacts can be reduced or avoided.

As far possible existing roads will be used to access the four main areas identified where prospecting will take place, the proposed locations already exclude the surface water buffer areas.

15 PROPOSED IMPACT MANAGEMENT OBJECTIVES AND THE IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR

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

Impact management objectives are described in terms of the Mitigation Hierarchy as adopted by Prescali Environmental Consultants. The mitigation hierarchy is as follows:

- **Avoid at Source:** Reduce at Source: avoiding or reducing at source through the design of the Project (e.g., avoiding by placing or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).
- **Abate on Site:** add something to the design to abate the impact (e.g., pollution control equipment, installation of noise silencers, operate in daylight hours).
- **Abate at Receptor:** if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site).
- **Repair or Remedy:** some impacts involve unavoidable damage to a resource (e.g. agricultural land due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.
- **Compensate in Kind; Compensate Through Other Means:** where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of resources, recreation and amenity space)

The EMPr will seek to achieve a required end state and describe how activities could have an adverse impact on the environment will be mitigated, controlled and monitored. The EMPr will address the environmental impacts during the Construction, Operational, and Decommissioning Phases of the proposed project. Due regard will be given to environmental protection during the entire project. A number of environmental recommendations will therefore be made to achieve environmental protection. The environmental and social objectives will be set to allow prospecting in an environmental and socially responsible manner while ensuring that sustainable closure can be achieved. To achieve closure, the correct decisions need to be taken during the planning phase of the project.

The overall goal for environmental management for the proposed is to manage and operate the project in a manner that:

- Minimises the ecological footprint of the project on the local environment;
- Facilitates harmonious co-existence between the project and other land uses in the area;
- Contributes to the environmental baseline and understanding of environmental impacts of Prospecting activities in a South African context.

The following environmental management objectives are recommended for the proposed mineral prospecting development and associated infrastructure:

- Monitor soils so as to avoid unnecessary erosion, and implement erosion control measures to preserve the quality of the soil for rehabilitation;
- Development planning must restrict the area of impact to minimum and designated areas only;
- Monitor and prevent contamination, and undertake appropriate remedial actions;
- Limit the visual and noise impact on receptors;
- Avoid impact on possible heritage and archaeological resources;
- Ensure that accurate information regarding the prospecting activities to be undertaken and the resultant lack of requirements for site access and labour is communicated to I&APs;
- Prevent the unnecessary destruction of, and fragmentation, of the vegetation community (including portions of CBA2 and surface water areas classed as High and Very High biodiversity importance);
- Adhere to an open and transparent communication procedure with stakeholders at all times;
- Enhance project benefits and minimise negative impacts through consultation with stakeholders;
- To limit interference with existing land uses as far as possible during prospecting;
- Limit the impact on the groundwater and surface water features through the implementation of the EMPr and the impact mitigation measures;
- Promote health and safety of workers; and
- Limit dust and other emissions to within acceptable limits.

16 ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION.

Any aspects which must be made conditions of the Environmental Authorisation

Refer to Section 18.2 for the main management measures that should be included in the authorisation.

17 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE.

(Which relate to the assessment and mitigation measures proposed)

- A detailed site layout plan with location of the contractor's camp, drilling sites and trenches was not available, assumptions was thus made with regards to the location of potential access road.
- No site visit was conducted by specialist and available desktop information was used.

17.1 TERRESTRIAL ASSESSMENT

The desktop study was conducted with up to date resources. It might however be possible that additional information become available in time, because environmental impact assessments deal with dynamic natural ecosystems. It is therefore important that the report be viewed and acted upon with these limitations in mind.

No field survey was conducted for the assessment and all results given within this document are based on desktop findings and assessments. Therefore, the results, typical flora, herpetofauna, avifauna and mammalian communities found within the study should/can therefore only be used as a general guideline.

The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

17.2 SOIL, LAND USE AND LAND CAPABILTIY ASSESSMENT

Assumptions:

- It is assumed that there are no alternative locations for the proposed activities and that the assessment, therefore, focussed only on the proposed prospecting application area.
- The prospecting activities will only take place in the focus areas as identified. The specific locations of the activities will be identified during phase 1 and the sensitivity of the specific locations will be assessed by the ECO to ensure that the impacts are kept to a minimal and no-go areas are avoided.
- The assessment was undertaken during the planning stage of the project and is based on the information available at that time.

Limitations

- This study was done only via desktop methodologies and no site assessment or in-field soil sampling took place.
- The study does not include a land contamination assessment to determine preconstruction soil pollution levels (should there be any present).

17.3 SURFACE WATER ASSESSMENT

This report and assessment are based on available information as provided by Sylvania Northern Mining (Pty) Ltd as outlined in Section 2.1 and throughout Section 5 of the Surface water report. No specific points for drilling / areas for trenching was provided thus assumptions with regards to access roads were made.

It is assumed that the information sourced from open source data is correct.

18 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

18.1 REASONS WHY THE ACTIVITY SHOULD BE AUTHORIZED OR NOT.

No fatal flaws were identified in terms of this project as long as the mitigation and recommendations proposed are adhered to. The impact assessment indicated no critical issues that cannot be lowered to an acceptable level through the suggested mitigation measures, resulting in a fatal flaw.

It is recommended by the EAP that the proposed prospecting could be authorised, on the assumption that the environmental and social management commitments included in this BAR/EMPr are adhered to, the project description remains as per the description provided in this document and considering the positive social impacts associated with the project. It should also be ensured that proper rehabilitation is provided for and that risks are controlled by having emergency plans in place.

It is therefore the opinion of the EAP that the proposed activity should be authorised.

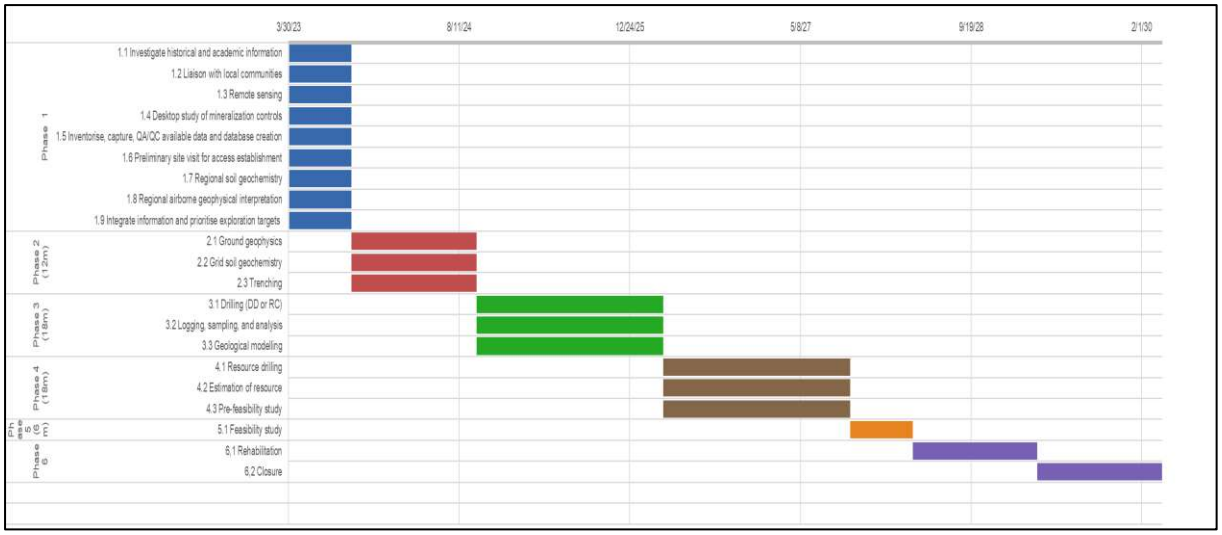
18.2 CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION

Sylvania Northern Mining (Pty) Ltd should comply with all environmental legislations. Specific environmental legislation to be adhered to include; National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as amended in 2017 and Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)

- Notice must be given to communities, landowners and surrounding landowners 1 month prior to any prospecting activities being conducted on their areas of responsibility;
- Landowners and land occupiers should be engaged at least 1 month prior to any site activities being undertaken;
- Formal agreement between applicant and land owner to be in place before activities commence;
- A map detailing the sampling locations and contractor's camp should be provided to the landowners as well as the DMRE prior to commencement of prospecting activities;
- Once the sampling and contractor camp locations have been finalised the site needs to be assessed by an Archaeologist and a Flora specialist to determine if there are heritage sites and protected trees that could be impacted by the proposed activities;
- A record must be kept of the implementation of the EMPr measures and monitoring of the efficiency of the implemented measures;
- An Environmental Control Officer should be appointed to do regular monitoring as suggested in the EMPr;
- In the unlikely event that graves are identified, these should be protected *in situ* and a 50 m buffer area should be applied where no prospecting activities may take place;
- All wetlands and watercourses should be protected *in situ* and no prospecting to take place within 100m from a watercourse or 500m from a wetland;
- Rehabilitation should take place immediately after work has ceased and should be done in a responsible manner; and
- Once rehabilitation has been completed the site needs to be assessed by a Flora specialist to determine that rehabilitation was done successfully and that no Alien invasive plant species are present.

19 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED.

The Prospecting Right has been applied for a period of five (5) years. The Environmental Authorisation should therefore allow for the five years of prospecting and an additional two (2) years for decommissioning and rehabilitation and the closure activities. An outline of the proposed timeline is provided below:



20 UNDERTAKING

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

The EAP undertakes that the information provided is correct, and that the comments and inputs from stakeholders and Interested and Affected parties have been correctly recorded in the report. Please refer to Part B Section 14.

21 FINANCIAL PROVISION

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

The preliminary estimate of the rehabilitation cost is (inclusive of contingencies and VAT): **R159 655,12**.

Table 21-1: Quantum calculations

Calculation of the Quantum			
Applicant:	Sylvania Northern Mining (Pty) Ltd	**Reference:**	LP30/5/1/1 /2/14728PR
EAP:	Dr Petro Erasmus	**Date:**	26/09/2022

No	Description	Unit	A Quantity	B Master rate 2022	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines) - Vermiculite and SSP plant	m^3	0	R17,84	1	1	R0,00
2 (A)	Demolition of steel buildings and structures (including floor slabs)	m^2	0	R248,55	1	1	R0,00
2 (B)	Demolition of reinforced concrete buildings and structures (gate house, admin office, truckers ablution, clinic)	m^2	0	R366,29	1	1	R0,00
3	Rehabilitation of access roads	m^2	0	R44,48	1	1	R0,00
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	R431,70	1	1	R0,00
4(B)	Demolition and rehabilitation of non-electrified railway lines	m	0	R235,47	1	1	R0,00
5	Demolition of housing/and or administration facilities	m^2	**50**	R497,10	1	1	R24 855,24
6	Opencast rehabilitation including final voids and ramps	ha	0	R253 000,22	1	0,04	R0,00
7	Sealing of shafts adits and inclines	m^3	0	R133,43	1	1	R0,00
8(A)	Rehabilitation of overburden and spoils	ha	0	R173 725,08	1	1	R0,00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	R216 371,44	1	1	R0,00
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	R628 445,23	1	1	R0,00
9	Rehabilitation of subsided areas	ha	0	R145 468,59	1	1	R0,00
10	General surface rehabilitation, including grassing of all denuded areas	ha	**0,5668**	R137 619,56	1	1	R78 002,77
11	River diversions	ha	0	R137 619,56	1	1	R0,00
12	Fencing	ha	0	R156,98	1	1	R0,00
13	Water management		0	R52 326,83	1	1	R0,00
14	2 to 3 years of maintenance and aftercare	ha	**0,5668**	R18 314,39	1	1	R10 380,60
15 (A)	Specialist study		0	R0,00	1	1	R0,00
15 (B)	Specialist study		1	R0,00	1	1	R0,00
						Sub Total 1 (Sum of items 1 to 15)	**R113 238,61**
1	Preliminary and General	6% of Subtotal 1 if ≥ R 100 000 000			**Weighting factor 2 (Step 4.4)**		
		12% of Subtotal 1 if ≤ R 1 000 000		R13 588,63	1,05		R14 268,06
2	Contingency	10.0% of Subtotal 1					R11 323,86
						Sub Total 2 (Sub Total 1 plus sum of management and contingency)	R138 830,54
						VAT (15%)	**R20 824,58**
						GRAND TOTAL (Subtotal 3 plus VAT)	**R159 655,12**

21.1 EXPLAIN HOW THE AFORESAID AMOUNT WAS DERIVED.

The Regulations Pertaining to the Financial Provision for Prospecting, Mining or Production Operations promulgated under section 44(aE), (aF), (aG), (aH) read with sections 24(5)(b)(ix), 24(5)(d), 24N, 24P and 24R of the National Environmental Management Act, 1998 (Act No.107 of 1998) (20 November 2015) have been considered and this is anticipated to result in an increase in the rehabilitation costs estimated using above mentioned quantum.

The methodology as described in the 2005 DMR guideline was followed and the rates as contained therein was escalated on an annual basis.

The financial provisioning was determined using the following areas:

Farm	Borehole area (m^2)	Trench Area (m^2)	Road area (m^2)	Impact area (m^2)
Schaffhausen	400	400	4468	5268
Schaffhausen (contractors camp)	0	0	0	400

21.2 Confirm that this amount can be provided for from operating expenditure.

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

The Applicant has direct access to sufficient financial resources required as per the budget to enable it to conduct the proposed prospecting operation optimally in accordance with the Prospecting Work Program. The applicant has provided proof of financial ability during the application phase on the DMR SAMRAD system.

22 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

22.1 COMPLIANCE WITH THE PROVISIONS OF SECTIONS 24(4)(A) AND (B) READ WITH SECTION 24 (3) (A) AND (7) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998) THE EIA REPORT MUST INCLUDE THE: -

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

Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an Appendix.

Land claims have been lodged for the following:

Property	Claimant	KRP(s)	Claim Status
Schaffhausen 689 LR	Bakoni ba Matlala a Thaba tribe	1756	Research Report Approved

The potential impact on the socio-economic aspects of the claimants during the proposed prospecting activities due to the non-invasive nature was determines as Low-Medium after the implementation of management measures. A positive impact will be the creation of temporary employment opportunities during the prospecting activities.

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

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

This BAR and EMPr has been compiled in accordance with the NEMA (1998), EIA Regulations (2014, amended April 2017) and MPRDA (2002). The EAP managing the application confirms that this BAR and EMPr is being submitted for Environmental Authorisation in terms of the National Environmental Management Act, 1998 in respect of listed activities that have been triggered by application in terms of the Mineral and Petroleum Resources Development Act, 2002 (MPRDA) (as amended). Should the DMRE require any additional information, this will be provided upon request. No reasonable or feasible alternatives exist for this Prospecting Right Application and as such, motivation for no alternatives has been provided in the relevant sections above**.**

PART B
ENVIRONMENTAL MANGEMENT PROGRAMME REPORT

1 DETAILS OF EAP

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

The information is provided in Part A Section 1.

Name of the Practitioner: Prescali Environmental Consultants.
The report was compiled by Dr Petero Erasmus.
Tel No.: 012 543 3808
Fax No. :086 621 0294
e-mail address: info@prescali.co.za

2 DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

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

The requirement to describe the aspects of the activity that are covered by the final environmental management programme is already included in Part A Section 4.

3 COMPOSITE MAP

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

Refer to Figure 10-41 and Appendix 4.

4 DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

4.1 DETERMINATION OF CLOSURE OBJECTIVES.

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

Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must consider the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.

- Rehabilitation of areas disturbed as a consequence of prospecting to a land capability that will support and sustain a predetermined post-closure land use especially for the high sensitivity agriculture areas as identified;
- Removal of all infrastructure/equipment that cannot be beneficially re-used, as per agreements established, and returning the associated disturbed land to the planned final land use;
- Removal of existing contaminated material from affected areas;
- Establishment of final landforms that are free-draining, stable and safe in the long run; and
- Establishment and implementation of measures that meet specific closure related performance objectives.

4.2 VOLUMES AND RATE OF WATER USE REQUIRED FOR THE OPERATION.

Water use will be required for the prospecting work programme.

It is not foreseen that any water will be needed for the activities other than potable water for the employees.

4.3 HAS A WATER USE LICENCE HAS BEEN APPLIED FOR?

It is not anticipated that a water use licence will be needed at this point in time based on the location of the proposed prospecting boreholes and trenches. The proposed contractors camp may need water for sanitation and vehicles but this can be arranged with the land owners.

5 IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

Measures to rehabilitate the environment affected by the undertaking of any listed activity.

The identified mitigation measures for the identified impacts are outlined in the table below.

Table 5-1: Mitigation measures

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
Topography	All prospecting activities	Impact on topography that result in water ponding - area not free draining	During rehabilitation make sure that impacted area is free draining,	N/A	During Rehabilitation
Geology	All prospecting activities	Sterilisation of mineral resource as a result of prospecting activities.	None	N/A	None
Groundwater	All prospecting activities	Impact on groundwater quality as a result of hydrocarbon spills from machinery.	Remove contaminated soil as soon as incident occur. Dispose contaminated soil and suitable landfill site. Keep safe disposal certificates. Place drip trays / plastic liner with soil cover underneath parked machinery / vehicles.	SANS214:2015 DWAF: Domestic water quality guidelines	Continuous
Groundwater	All prospecting activities	Impact on groundwater levels	Should groundwater be found during the prospecting phase (especially borehole drilling) the depth of the water table should be recorded and a water sample needs to be submitted for analyses to an accredited laboratory.	N/A	Continuous
Air quality	All prospecting activities	Dust generated as a result of the prospecting activities including travelling on road could impact on local PM10 levels.	Keep travel speeds on provincial / regional roads to the prescribed speed limit. For site access roads keep speed limit to below 60 km/hr. For the topsoil heaps created by the trenching activities cover the topsoil stockpile with tarps or implement dust suppression.	Regional Air quality limits SANS 1929: 2005	Continuous
Nosie	All prospecting activities	The operation of machinery could result in increased noise levels in an area that	Keep travel speeds on provincial / regional roads to the prescribed speed limit.	ECA Noise regulations	Continuous

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
		is rural in nature. This noise could become a nuisance to the residents.	Conduct prospecting activities during daylight hours (07h00 - 17h00).	SANS 10103:2008	
Socio-Economic	All prospecting activities	(+) Very few employment opportunities will be created during prospecting. However, it is anticipated that a few (<10) could be created that will result in a positive economic impact.	N/A	N/A	None
Socio-Economic	All prospecting activities	The proposed prospecting activities could create awareness of the area by people seeking employment and result in people moving to the area in case of future employment opportunities should the mineral be viable for full scale mining. This could negatively affect the existing social aspects of the area and impact on the sustainability of services such as schools, clinics, police etc.	Open channels with the local communities, ward councillor and tribal authorities must be maintained. This will ensure that their needs and expectations are taken into consideration during all phases of the prospecting activities and should inform the impact assessment and social and labour plan should full scale mining be viable.	N/A	Continuous
Surface water quality	Ground geophysics and soil geochemical sampling - Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Clear vegetation only if needed and if no alternative site is available close by.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quality	Ground geophysics and soil geochemical sampling - Topsoil stockpiling	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Conduct sampling in dry season as far as possible.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quality	Ground geophysics and soil geochemical sampling - Topsoil stockpiling/Vegetati	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Place a tarp over topsoil stockpile during windy conditions.	SANS214:2015 DWAF: Domestic water quality guidelines	As needed

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
	on removal & General activities			Reserve determination	
Surface water quality	Ground geophysics and soil geochemical sampling - Replace topsoil	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	If possible wet topsoil once off to assist with vegetations establishment and to reduce dust generation.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quality	Ground geophysics and soil geochemical sampling - Replace topsoil	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	If possible wet topsoil once off to assist with vegetations establishment and to reduce dust generation.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quality	Trenching - Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Conduct sampling in dry season as far as possible.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quality	Trenching -Topsoil stockpiling	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Conduct sampling in dry season as far as possible.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quality	Trenching - Topsoil stockpiling/Vegetation removal & General activities	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	If stockpiles will be in use for more than 1 month, see if vegetation can be established. Implement dust suppression during high wind times.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
Surface water quality	Trenching - Overburden stockpiling	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Conduct sampling in dry season as far as possible.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quantity	Trenching - Containment of rainwater in trench	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Place overburden stockpiles on the upstream side of the trench to prevent storm water ingress into the trench. Conduct trenching in the dry season as far as possible.	Reserve determination	Continuous
Surface water quality	Trenching - Heavy machinery equipment on site	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Clean any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quality	Trenching - Chemical toilets and sewage waste management	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	Maintain chemical toilets. Clean up any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quality	Trenching - General waste generation	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Have a waste bag on site that can be kept in one of the vehicles and dispose all general waste therein. Remove daily from site. Dispose at suitable landfill site / of the volume is little dispose in a local waste bin / skip.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quality	Resource drilling: drill pad and sump -	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons	Clean any spills immediately and place in special marked bag for hazardous waste.	SANS214:2015 DWAF: Domestic water	As needed

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
	Heavy machinery equipment on site	enter the watercourses, this could impact on the biota and habitat as well.	Dispose hazardous waste at registered landfill site. Sub-soil under drill rig to be protected by either spill kits under it / placement of PVD material topped with soil that can be removed if contaminated. Keep safe disposal certificates on file.	quality guidelines Reserve determination	
Surface water quality	Resource drilling: drill pad and sump - Drilling sludge	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Contain sludge in a suitably constructed area.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quality	Resource drilling: drill pad and sump - Vegetation removal & General activities	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Only clear area that is needed. If dust is noted during high winds implement dust suppression.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quality	Resource drilling: drill pad and sump - Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Only clear area that is needed. Conduct activity in dry season.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quantity	Resource drilling: drill pad and sump - Operation of drill pad sump	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Ensure that sludge is contained.	Reserve determination	Continuous
Surface water quality	Resource drilling: drill pad and sump - Chemical toilets	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any	Maintain chemical toilets. Clean up any spills immediately and place in special marked bag for	SANS214:2015 DWAF: Domestic water	As needed

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
	and sewage waste management	watercourse and this could impact on the biota.	hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file.	quality guidelines Reserve determination	
Surface water quality	Resource drilling: drill pad and sump - Capping of Borehole	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Conduct activity in dry season.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quality	Resource drilling: drill pad and sump - Rip impacted area	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Conduct activity in dry season.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quality	Resource drilling: drill pad and sump - Rip impacted area	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Wet affected area to assist with vegetation establishment and to reduce potential for dust generation in the short term.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quality	Resource drilling: drill pad and sump - General waste generation	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Have a waste bag on site that can be kept in one of the vehicles and dispose all general waste therein. Remove daily from site. Dispose at suitable landfill site / of the volume is little dispose in a local waste bin / skip.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quality	Access road - Vegetation removal (all access roads combined)	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Clean any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site.	SANS214:2015 DWAF: Domestic water quality guidelines	As needed

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
			Keep safe disposal certificates on file.	Reserve determination	
Surface water quality	Access road Daily travelling to prospecting site	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Implement dust suppression if complaints are received. Implement speed limit suitable to access road and as prescribed by existing provincial road notices.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quality	Access road Daily travelling to prospecting site	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Clean any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quality	Access road Rip road area	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Wet affected area to assist with vegetation establishment and to reduce potential for dust generation in the short term.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quality	Contractor camp Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Clear vegetation only if needed and if no alternative site is available close by. Implement sump to capture silt if needed.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quality	Contractor camp Diesel storage	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Comply with relevant legislation and SANS standards,	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
Surface water quality	Contractor camp Chemical toilets and sewage waste management	Contamination from spills from chemical toilets / emptying of septic tank (if applicable) could impact on water quality which in turn could impact on the biota and habitat as well.	Maintain chemical toilets. Clean up any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quality	Contractor camp Storage of material	Contaminated water from material storage area could detrimentally impact on watercourses quality, biota and habitat.	Comply with relevant legislation and SANS standards. Implement storm water sump if needed.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quality	Contractor camp Storage of general and hazardous waste	Contaminated water from waste storage area could detrimentally impact on watercourses quality, biota and habitat.	Comply with relevant legislation and SANS standards. Implement storm water sump if needed.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quality	Contractor camp Topsoil stockpiling/Vegetation removal & General activities	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Implement dust suppression if complaints are received.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quality	Contractor camp Vehicle maintenance	Hydrocarbon spills from vehicles and other equipment could negative impact water quality, habitat and biota.	Clean any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file. Vehicle parking bays sub-soil to be protected by either spill kits under	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
			each vehicle / placement of PVD material topped with soil that can be removed if contaminated.		
Surface water quality	Contractor camp Removal of all infrastructures	Potential for spills from e.g. hydrocarbon tanks, septic tank, chemical toilets could impact on the surface water resource quality, habitat and biota if not managed.	Follow the waste hierarchy: Re-Use, Reduce, Recycle as far as possible. Comply with any relevant legislation and standards.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quality	Contractor camp Rip impacted area	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Wet affected area to assist with vegetation establishment and to reduce potential for dust generation in the short term. Follow up 1 year after ripping to determine extend of vegetation establishment.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	As needed
Surface water quantity	Contractor camp Camp area (whole off)	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Have upstream clean water diversion channel in place. Keep "dirty" footprint area as small as possible.	Reserve determination	Continuous
Heritage and archaeological	Prospecting activities (all) Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on open-air Stone Age sites that could be found in the area, most likely in the form of individual stone tools or small scatters. The possibility of Iron Age sites (especially stone-walled Late Iron Age sites) in the areas can also not be excluded, although this is less likely	Before setting final drilling and trenching locations (as well as access roads) an archaeologist must conduct a site assessment to confirm the presence of any sites of importance. Any sites of importance should be avoided, a 50 m buffer is recommended.	No impacts on important sites	Continuous
Heritage and archaeological	Prospecting activities (all) Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on Iron Age sites (especially stone-walled Late Iron Age sites) although this is less likely than Stone Age sites.	Before setting final drilling and trenching locations (as well as access roads) an archaeologist must conduct a site assessment to confirm the presence of any sites of importance. Any sites of importance should be	No impacts on important sites	Continuous

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
			avoided, a 50 m buffer is recommended.		
Heritage and archaeological	Prospecting activities (all) Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on recent historical sites and features as the possibility of their presence the area is High, and will most be represented by the remnants of individual homesteads and rural settlements.	Before setting final drilling and trenching locations (as well as access roads) an archaeologist must conduct a site assessment to confirm the presence of any sites of importance. Any sites of importance should be avoided, a 50 m buffer is recommended.	No impacts on important sites	Continuous
Heritage and archaeological	Prospecting activities (all) Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on both formal & informal cemeteries, individual graves and even previously unknown & unmarked graves.	Before setting final drilling and trenching locations (as well as access roads) an archaeologist must conduct a site assessment to confirm the presence of any sites of importance. Delineate boundaries of any graves / cemeteries / graveyards identified during the site inspection by the archaeologist. No activities to be conducted within 50 m from the boundary of any grace, cemetery, graveyard.	No impacts on important sites	Continuous
Terrestrial biodiversity	Development activities Drilling, Roads, Trenching and geochemical sampling	Invasive prospecting and associated activities will lead to destruction and damage of habitats and vegetation communities and overall loss of biodiversity and ecosystem function within the clearance and operational area. Destruction of habitat may lead to faunal species migrating to other more favourable areas.	The vegetation removal should be controlled, very specific and the clearance area kept as small as possible. A control of access should be implemented for all remaining natural areas to prevent unnecessary destruction of habitats or disturbance of species. It is also vital that no unnecessary fragmentation occurs and that all roads are clearly demarcated and kept to without any exceptions. No vehicles or personnel are permitted	Maintain terrestrial biodiversity and comply the EMPr management requirements.	Continuous

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
			outside of these demarcated roads. To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled. Continuous rehabilitation of the area should occur, where infilling of trenches and replacement of topsoil should be prioritised.		
Terrestrial biodiversity	Development activities Drilling, Roads, Trenching and geochemical sampling	The continuous human activity over a longer-term period may further impact on the faunal communities within the area. Associated noise, waste, the smell of humans and physical infiltration into remaining natural areas are problematic and may lead to declining populations (where the disturbance of habitat has caused habitat remaining to become unfavourable).	Animals may get used to movement by people in designated areas if the it is predictable. A control of access should be implemented for all remaining natural areas to prevent infiltration of remaining natural habitats or disturbance of species. To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled, removed, killed or interfered with. Prevent impacts and waste from reaching the surface water systems and areas outside the footprint areas. Hazardous wastes should be stored in impermeable and bunded areas. Domestic waste and other waste should be managed in the appropriate manner and apply good housekeeping practices will aid this issue. Adequate waste storage and disposal must be implemented at the development. Littering must be prevented and regularly cleaned up and form part of good housekeeping practices to be	Maintain terrestrial biodiversity and comply the EMPr management requirements. SANAS Waste management requirements	Continuous

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
			implemented around site. Ensure awareness amongst all staff, contractors and visitors to site to not needlessly harm or hinder animals or damage flora. No additional fragmentation should occur and all roads should be clearly demarcated and kept to without any exceptions and within the proposed footprints where possible. All footprint areas should remain as small as possible. The vegetation removal should be controlled and should be very specific. It is vital that if any SCC occurs on the proposed site that these species should be protected and/or left undisturbed as far as possible. Only as an exception can these species be relocated to favourable sites with the use of a specialist prior to vegetation and habitat removal. If at any point any SCC is encountered, a specialist should be consulted as to determine the best way forward and a permit should be obtained if any intervention is required. • Prior to finalisation of the activities and closuR, an AIP survey must be undertaken to determine whether AIP are present in and around the project footprint. • Rehabilitation plans should be planned long before the closure phase is due. Continuous		

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
			rehabilitation should also take place during the operational phase, with infilling of trenches and replacement of topsoil being the priority. • Ensure that an acceptable aesthetic scenario is created post closure. • When closure is considered successful and rehabilitation complete, unnecessary fences/barriers should be lifted to restore larger foraging areas. • Re-vegetation of all degraded areas and bare patches is advised to speed recovery to natural, self-sustaining state as soon as possible.		
Terrestrial biodiversity	Development activities Vegetation clearance	Vegetation clearance will destroy indigenous vegetation and lead to possible invasive and/or exotic species establishing in the area and edge-effects occurring surrounding the prospecting activities. Bare areas may become vulnerable to Alien and Invasive Plant species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat.	Alien Invasive Plant (AIP) control measures should be implemented for the control of invasive and exotic plant species. Sensitive watercourses and associated riparian zone habitats constitute the most important features which make up the area identified as increased sensitivity. Invasive prospecting activities should be planned to keep clear of these zones. A survey for protected tree species on the clearance footprint should be undertaken by a suitably qualified specialist prior to the start of construction / clearance. Based on the findings of the survey, the relevant permits, if applicable, for each protected tree species	Maintain terrestrial biodiversity and comply the EMPr management requirements. No increase in AIP species and density.	Continuous

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
			identified within the proposed clearance footprint, which may be damaged or destroyed, should be applied for		
Terrestrial biodiversity	Development activities Drilling, Roads, Trenching and geochemical sampling	Invasive prospecting and associated activities may impact on areas designated as high sensitivity, including critical biodiversity areas and watercourses situated in and around the Prospecting Right area. The majority of the proposed target areas are located in area categorised as ONA and NNR. The layout of the prospecting target areas appear to have been designed to avoid most of the non-perennial tributaries. The activity may lead to the loss of species of conservation concern. Based on the desktop study findings, no flora SCC are considered to be likely to occur on the project area. However, fifteen (15) faunal species previously recorded in the area queried are categorised as SCC.	The vegetation removal should be controlled, very specific and the clearance area kept as small as possible. If any SCC are encountered within the subject property in the future, the following should be ensured: o If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas or within designated open space on the subject property. o All rescue and relocation plans should be overseen by a suitably qualified specialist. o Obtain relevant permits/consent, if applicable, for each protected or endangered floral species identified within the proposed development area that will be destroyed. Placement of the infrastructure and activities should be planned to avoid sensitive areas such as CBAs and rivers and streams.	Maintain terrestrial biodiversity and comply the EMPr management requirements. No increase in AIP species and density.	Continuous
Terrestrial biodiversity	Development activities Rehabilitation	Rehabilitation could be ineffective if rehabilitation actions are not effectively implemented. Without the necessary mitigation measures, rehabilitation will be less successful and the ecology of the impacted areas may not recover to a pre-prospecting state. Without mitigation the alien invasive species may increase and result in a degraded veld condition making the	Alien Invasive Plant (AIP) control measures should be implemented for the control of invasive and exotic plant species. Prior to finalisation of the activities and closure, an AIP survey must be undertaken to determine whether AIP are present in and around the project footprint. Rehabilitation plans should be	Maintain terrestrial biodiversity and comply the EMPr management requirements. No increase in AIP species and density.	Continuous

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
		property less viable for post-closure land use activities such as wilderness, grazing and agriculture.	planned long before the closure phase is due. Continuous rehabilitation should also take place during the operational phase, with infilling of trenches and replacement of topsoil being the priority.	Final site assessment after rehabilitation is finalised.	
Soil, Land Use and Land Capability	All Soil stripping	Soil Erosion	Land clearance must only be undertaken within the prospecting footprint. Follow adequate soil stripping guidelines. Unnecessary land clearance must be avoided. Only the designated access routes are to be used. The Stormwater Management measures to be implemented where required Any loss in production or agricultural potential to be compensated where applicable. Revegetate cleared areas as soon as possible after site establishment. Keep the project footprint as small as possible.	EMPr GN704	During construction
Soil, Land Use and Land Capability	All Vehicles driving on the soil surface	Compaction and loss of soil structure			
Soil, Land Use and Land Capability	All Spillages of hydrocarbons	Soil pollution and contamination			
Soil, Land Use and Land Capability	All Soil stripping	Soil Erosion	Current land use practices should not be impacted by proposed activities. All proposed activities must take place on the outer edges of current land use practices, 500 m from any wetlands and 100 m from any rivers or riparian habitats. Main mitigation of the expected impacts will consist of compensation to the farmer equivalent to the possible loss of agricultural income and food	EMPr GN704	Continuous
Soil, Land Use and Land Capability	All Soil Stripping / Trenching and Drilling	Dilution of topsoil through mixing with subsoil; Loss of topsoil as a resource			
Soil, Land Use and Land Capability	All Soil Stripping / Trenching and Drilling	Decline in organic matter & biological activity			

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
Soil, Land Use and Land Capability	All Soil Stripping / Trenching and Drilling	Loss of water holding capacity	security. Follow adequate stripping guidelines. Unnecessary land clearance must be avoided. Topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks. If possible, topsoil should be stripped when soil is dry, as to reduce compaction. Ensure topsoil is stored in dedicated stockpiles, 5 m high and away from drainages lines and surface water. Soil stockpiles must be dampened with dust suppressant or equivalent. Soil stockpiles must be located away from any waterway or preferential water flow path in the landscape, to minimise soil erosion from these. The Stormwater Management measures should provide for a drainage system sufficiently designed to prevent water run-off which will cause soil erosion. Revegetate cleared areas, which will not form part of operational areas, as soon as possible. Only the designated access routes are to be used. Stockpiles are to be maintained in a fertile and erosion free state. High level maintenance must be undertaken on all vehicles and construction/maintenance		
Soil, Land Use and Land Capability	All Vehicles driving on the soil surface	Compaction and loss of soil structure			
Soil, Land Use and Land Capability	All Soil Stripping / Trenching and Drilling	Loss of land capability and land use			
Soil, Land Use and Land Capability	All Spills from vehicles, accidental spills of hazardous chemicals	Soil pollution and contamination			

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
			machinery to prevent hydrocarbon spills. Spills of fuel and lubricants from vehicles and equipment must be contained using a drip tray with plastic sheeting filled with adsorbent material. Spill kits should be available on site and should be serviced regularly. Waste disposal at the site and during operation must be avoided by separating, trucking out and recycling of waste. Potentially contaminating fluids and other wastes must be contained in containers stored on hard surface levels in bunded locations. Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately by trained staff with the correct equipment and protocols. Concurrent rehabilitation and re-vegetation of the excavated areas should take place.		
Soil, Land Use and Land Capability	All Stockpiling of Soil	Loss of Topsoil as a Resource: Compaction and Erosion	All trenches and drill sites must be backfilled and rehabilitated. Backfill should be done in such a manner that topsoil is not mixed with subsoil or material containing rocks. Deep rip compacted areas to allow for natural vegetation regrowth. Ensure proper storm water management designs are in place. Soils must be replaced according to the soil types. Compaction of the topsoil should be	EMPr	During Rehabilitation
Soil, Land Use and Land Capability	All Backfilling of soil material layers	Loss of land capability			

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
			avoided. Post-closure monitoring and maintenance to be undertaken. Area to be rehabilitated, re-vegetated and soil amelioration to be undertaken. Contour slopes to minimise erosion and run-off.		
Cumulative impacts					
Surface water quality	Prospecting activities (all) Cumulative impact: Big area (Areas 1, 2, 3 and 4)	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	Implement as above. Conduct prospecting activities consecutively and rehabilitate areas immediately after the prospecting activities have been finalised and is moved to the next area.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Surface water quantity	Prospecting activities (all) Cumulative impact: Big area (Areas 1, 2, 3 and 4)	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	Implement as above. Conduct prospecting activities consecutively and rehabilitate areas immediately after the prospecting activities have been finalised and is moved to the next area.	Reserve determination	Continuous
Surface water quality	Prospecting activities (all) Cumulative impact: Big area (Areas 1, 2, 3 and 4)	During the rehabilitation phase water quality could be impacted as a result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.	Implement as above. Conduct prospecting activities consecutively and rehabilitate areas immediately after the prospecting activities have been finalised and is moved to the next area.	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination	Continuous
Soil, Land Use and Land capability	Prospecting activities (all) Cumulative impact: Big area (Areas 1, 2, 3 and 4)	The impact on the local food security on the areas where prospecting activities will take place, will be moderate as the capacity of the area to sustain large number of grazing animals is moderate and high for subsistence farming. With the expected soil degradation occurring and most areas proposed for	As per Soil and Land Use in previous table	As per Soil and Land Use above	As per Soil and Land Use above

Aspect	Activity	Impact	Mitigation Measures	Compliance with Standards	Time period for implementation
		prospecting overlapping with high subsistence farming potential, a decline in the overall soil quality and health is expected and may hinder the future land use for grazing and crop production on the areas where prospecting will take place.			

6 IMPACT MANAGEMENT ACTIONS AND OUTCOMES

Identified impacts managements and anticipated outcomes are provided in the Table below.

Table 6-1: Summary of Impact Management Actions and Outcomes

Aspect	Activity	Impact	Mitigation Type	Standard to be achieved
Topography	All prospecting activities	Impact on topography that result in water ponding - area not free draining	Management	Free draining area
Geology	All prospecting activities	Sterilisation of mineral resource as a result of prospecting activities.	None	N/A
Groundwater	All prospecting activities	Impact on groundwater quality as a result of hydrocarbon spills from machinery.	Management	SANS214:2015 DWAF: Domestic water quality guidelines
Groundwater	All prospecting activities	Impact on groundwater levels	Management	N/A
Air quality	All prospecting activities	Dust generated as a result of the prospecting activities including travelling on road could impact on local PM10 levels.	Management	Regional Air quality limits SANS 1929: 2005
Noise	All prospecting activities	The operation of machinery could result in increased noise levels in an area that is rural in nature. This noise could become a nuisance to the residents.	Management	ECA Noise regulations SANS 10103:2008
Socio-Economic	All prospecting activities	(+) Very few employment opportunities will be created during prospecting. However, it is anticipated that a few (<10) could be created that will result in a positive economic impact.	None	None

Aspect	Activity	Impact	Mitigation Type	Standard to be achieved
Socio-Economic	All prospecting activities	The proposed prospecting activities could create awareness of the area by people seeking employment and result in people moving to the area in case of future employment opportunities should the mineral be viable for full scale mining. This could negatively affect the existing social aspects of the area and impact on the sustainability of services such as schools, clinics, police etc.	Management	N/A
Surface water quality	Ground geophysics and soil geochemical sampling Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Ground geophysics and soil geochemical sampling Topsoil stockpiling	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Planning	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Ground geophysics and soil geochemical sampling Topsoil stockpiling/Vegetation removal & General activities	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Ground geophysics and soil geochemical sampling Replace topsoil	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Ground geophysics and soil geochemical sampling Replace topsoil	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Trenching Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Planning	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination

Aspect	Activity	Impact	Mitigation Type	Standard to be achieved
Surface water quality	Trenching Topsoil stockpiling	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Planning	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Trenching Topsoil stockpiling/Vegetation removal & General activities	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Trenching Overburden stockpiling	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Planning	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quantity	Trenching Containment of rainwater in trench	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Management	Reserve determination
Surface water quality	Trenching Heavy machinery equipment on site	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Trenching Chemical toilets and sewage waste management	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Trenching General waste generation	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Resource drilling: drill pad and sump Heavy machinery equipment on site	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination

Aspect	Activity	Impact	Mitigation Type	Standard to be achieved
Surface water quality	Resource drilling: drill pad and sump Drilling sludge	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Resource drilling: drill pad and sump Vegetation removal & General activities	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Management Planning	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Resource drilling: drill pad and sump Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Management Planning	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quantity	Resource drilling: drill pad and sump Operation of drill pad sump	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Management	Reserve determination
Surface water quality	Resource drilling: drill pad and sump Chemical toilets and sewage waste management	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Resource drilling: drill pad and sump Capping of Borehole	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Planning	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Resource drilling: drill pad and sump Rip impacted area	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Planning	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Resource drilling: drill pad and sump Rip impacted area	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination

Aspect	Activity	Impact	Mitigation Type	Standard to be achieved
Surface water quality	Resource drilling: drill pad and sump General waste generation	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Access road Vegetation removal (all access roads combined)	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Access road Daily travelling to prospecting site	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Access road Daily travelling to prospecting site	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Access road Rip road area	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Contractor camp Vegetation removal	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Management Planning	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Contractor camp Diesel storage	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Contractor camp Chemical toilets and sewage waste management	Contamination from spills from chemical toilets / emptying of septic tank (if applicable) could impact on water quality which in turn could impact on the biota and habitat as well.	Management	SANS214:2015 DWAF: Domestic water quality

Aspect	Activity	Impact	Mitigation Type	Standard to be achieved
				guidelines Reserve determination
Surface water quality	Contractor camp Storage of material	Contaminated water from material storage area could detrimentally impact on watercourses quality, biota and habitat.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Contractor camp Storage of general and hazardous waste	Contaminated water from waste storage area could detrimentally impact on watercourses quality, biota and habitat.	Management	SANS10228/10229/10230/10231/10234
Surface water quality	Contractor camp Topsoil stockpiling/Vegetation removal & General activities	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Contractor camp Vehicle maintenance	Hydrocarbon spills from vehicles and other equipment could negative impact water quality, habitat and biota.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Contractor camp Removal of all infrastructures	Potential for spills from e.g. hydrocarbon tanks, septic tank, chemical toilets could impact on the surface water resource quality, habitat and biota if not managed.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quality	Contractor camp Rip impacted area	Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Management	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quantity	Contractor camp Camp area (whole off)	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Management	Reserve determination
Heritage and archaeological	Prospecting activities (all) Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on open-air Stone Age sites that could be found in the area, most likely in the form of individual stone tools or small scatters. The possibility of Iron Age sites (especially stone-walled Late Iron Age sites) in the	Management Planning	No impacts on important sites

Aspect	Activity	Impact	Mitigation Type	Standard to be achieved
		areas can also not be excluded, although this is less likely		
Heritage and archaeological	Prospecting activities (all) Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on Iron Age sites (especially stone-walled Late Iron Age sites) although this is less likely than Stone Age sites.	Management Planning	No impacts on important sites
Heritage and archaeological	Prospecting activities (all) Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on recent historical sites and features as the possibility of their presence the area is High, and will most be represented by the remnants of individual homesteads and rural settlements.	Management Planning	No impacts on important sites
Heritage and archaeological	Prospecting activities (all) Drilling, Roads, Trenching and geochemical sampling	The proposed prospecting activities could impact on both formal & informal cemeteries, individual graves and even previously unknown & unmarked graves.	Management Planning	No impacts on important sites
Terrestrial biodiversity	Development activities Drilling, Roads, Trenching and geochemical sampling	Invasive prospecting and associated activities will lead to destruction and damage of habitats and vegetation communities and overall loss of biodiversity and ecosystem function within the clearance and operational area. Destruction of habitat may lead to faunal species migrating to other more favourable areas.	Management Planning	Maintain terrestrial biodiversity and comply the EMPr management requirements.
Terrestrial biodiversity	Development activities Drilling, Roads, Trenching and geochemical sampling	The continuous human activity over a longer-term period may further impact on the faunal communities within the area. Associated noise, waste, the smell of humans and physical infiltration into remaining natural areas are problematic and may lead to declining populations (where the disturbance of habitat has caused habitat remaining to become unfavourable).	Management Planning	Maintain terrestrial biodiversity and comply the EMPr management requirements. SANAS Waste management requirements
Terrestrial biodiversity	Development activities Vegetation clearance	Vegetation clearance will destroy indigenous vegetation and lead to possible invasive and/or exotic species establishing in the area and edge-effects occurring surrounding the prospecting activities. Bare areas may become vulnerable to Alien and Invasive Plant species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat.	Management Planning	Maintain terrestrial biodiversity and comply the EMPr management requirements. No increase in AIP species and density.

Aspect	Activity	Impact	Mitigation Type	Standard to be achieved
Terrestrial biodiversity	Development activities Drilling, Roads, Trenching and geochemical sampling	Invasive prospecting and associated activities may impact on areas designated as high sensitivity, including critical biodiversity areas and watercourses situated in and around the Prospecting Right area. The majority of the proposed target areas are located in area categorised as ONA and NNR. The layout of the prospecting target areas appear to have been designed to avoid most of the non-perennial tributaries. The activity may lead to the loss of species of conservation concern. Based on the desktop study findings, no flora SCC are considered to be likely to occur on the project area. However, fifteen (15) faunal species previously recorded in the area queried are categorised as SCC.	Management Planning	Maintain terrestrial biodiversity and comply the EMPr management requirements. No increase in AIP species and density.
Terrestrial biodiversity	Development activities Rehabilitation	Rehabilitation could be ineffective if rehabilitation actions are not effectively implemented. Without the necessary mitigation measures, rehabilitation will be less successful and the ecology of the impacted areas may not recover to a pre-prospecting state. Without mitigation the alien invasive species may increase and result in a degraded veld condition making the property less viable for post-closure land use activities such as wilderness, grazing and agriculture.	Management Planning	Maintain terrestrial biodiversity and comply the EMPr management requirements. No increase in AIP species and density. Final site assessment after rehabilitation is finalised.
Soil, Land Use and Land Capability	All: Soil stripping	Soil Erosion	Management Planning	Maintain terrestrial biodiversity and comply the EMPr management requirements. No increase in AIP species and density. Final site assessment after rehabilitation is finalised.
Soil, Land Use and Land Capability	All: Vehicles driving on the soil surface	Compaction and loss of soil structure		
Soil, Land Use and Land Capability	All: Spillages of hydrocarbons	Soil pollution and contamination		
Soil, Land Use and Land Capability	All: Soil stripping	Soil Erosion	Management Planning	Maintain terrestrial biodiversity and

Aspect	Activity	Impact	Mitigation Type	Standard to be achieved
Soil, Land Use and Land Capability	All: Soil Stripping / Trenching and Drilling	Dilution of topsoil through mixing with subsoil; Loss of topsoil as a resource		comply the EMPr management requirements. No increase in AIP species and density. Final site assessment after rehabilitation is finalised.
Soil, Land Use and Land Capability	All: Soil Stripping / Trenching and Drilling	Decline in organic matter & biological activity		
Soil, Land Use and Land Capability	All: Soil Stripping / Trenching and Drilling	Loss of water holding capacity		
Soil, Land Use and Land Capability	All: Vehicles driving on the soil surface	Compaction and loss of soil structure		
Soil, Land Use and Land Capability	All: Soil Stripping / Trenching and Drilling	Loss of land capability and land use		
Soil, Land Use and Land Capability	All: Spills from vehicles, accidental spills of hazardous chemicals	Soil pollution and contamination		
Soil, Land Use and Land Capability	All: Stockpiling of Soil	Loss of Topsoil as a Resource: Compaction and Erosion	Management Planning	Maintain terrestrial biodiversity and comply the EMPr management requirements. No increase in AIP species and density. Final site assessment after rehabilitation is finalised.
Soil, Land Use and Land Capability	All: Backfilling of soil material layers	Loss of land capability		
Cumulative impacts				
Surface water quality	Prospecting activities (all): Cumulative impact: Big area (Areas 1, 2, 3 and 4)	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	Management Planning	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination
Surface water quantity	Prospecting activities (all): Cumulative impact: Big area (Areas 1, 2, 3 and 4)	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	Management Planning	Reserve determination
Surface water quality	Prospecting activities (all): Cumulative impact: Big area (Areas 1, 2, 3 and 4)	During the rehabilitation phase water quality could be impacted as a result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.	Management Planning	SANS214:2015 DWAF: Domestic water quality guidelines Reserve determination

Aspect	Activity	Impact	Mitigation Type	Standard to be achieved
Soil, Land Use and Land capability	Prospecting activities (all): Cumulative impact: Big area (Areas 1, 2, 3 and 4)	The impact on the local food security on the areas where prospecting activities will take place, will be moderate as the capacity of the area to sustain large number of grazing animals is moderate and high for subsistence farming. With the expected soil degradation occurring and most areas proposed for prospecting overlapping with high subsistence farming potential, a decline in the overall soil quality and health is expected and may hinder the future land use for grazing and crop production on the areas where prospecting will take place.	Management Planning	As above
Terrestrial biodiversity	Prospecting activities (all): Cumulative impact: Big area (Areas 1, 2, 3 and 4)	The prospecting activity could impact on the fauna and Flora biodiversity of the area and result in increased AIPs infestation.	Management Planning	As above

7 FINANCIAL PROVISION

7.1 DETERMINATION OF THE AMOUNT OF FINANCIAL PROVISION.

On the 20th of November 2015 the Minister promulgated the Financial Provisioning Regulations under the NEMA, which will come into effect in 2022. The regulations aim to regulate the determine and making of financial provision as contemplated in the NEMA for the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts from prospecting, prospecting, mining or production operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future. These regulations provide for, *inter alia*:

- Determination of financial provision: An applicant or holder of a right or permit must determine and make financial provision to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of prospecting, prospecting, mining or production operations, as contemplated in the Act and to the satisfaction of the Minister responsible for mineral resources.
- Scope of the financial provision: Rehabilitation and remediation; decommissioning and closure activities at the end of operations; and remediation and management of latent or residual impacts.
- Regulation 6: Method for determining financial provision – An applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for:
    - Annual rehabilitation – annual rehabilitation plan
    - Final rehabilitation, decommission and closure at end of life of operations – rehabilitation, decommissioning and closure plan; and
    - Remediation of latent defects.
- Regulation 10: An applicant must:
    - Ensure that a determination is made of the financial provision and the plans contemplated in regulation 6 are submitted as part of the information submitted for consideration by the Minister responsible for mineral resources of an application for environmental authorisation, the associated environmental management programme and the associated right or permit in terms of the MPRDA; and
    - Provide proof of payment or arrangements to provide the financial provision prior to commencing with any prospecting, prospecting, mining or production operations.
- Regulation 11: Requires annual review, assessment and adjustment of the financial provision. The review of the adequacy of the financial provision including the proof of payment must be independently audited (annually) and included in the audit of the EMPR as required by the EIA regulations.

Please refer to Section 21 in Part A.

7.2 DESCRIBE THE CLOSURE OBJECTIVES AND THE EXTENT TO WHICH THEY HAVE BEEN ALIGNED TO THE BASELINE ENVIRONMENT DESCRIBED UNDER THE REGULATION.

Considering the relatively limited impact of the proposed prospecting activities and contractor camp, the closure objectives are aimed at re-instating the landform, land use and vegetation units to the same as before prospecting operations take place unless a specific, reasonable alternate land use is requested by the landowner / lawful occupier. As such, the intended end use for the disturbed prospecting areas and the closure objectives will be defined in consultation with the relevant landowner / occupier. The overall aim of the rehabilitation plan is to rehabilitate the environment to a condition as close as possible to that which existed prior to prospecting. This shall be achieved with a number of specific objectives.

i. **Making the area safe**. i.e., Decommission prospecting activities so as to ensure that the environment is safe for people and animals. This entails refilling excavations, sealing boreholes, etc.

ii. **Recreating a free draining landform**. This entails earthworks infilling, reshaping, levelling, etc. to recreate as close as possible the original topography and to ensure a free draining landscape.
iii. **Re-vegetation.** This involves either reseeding or allowing natural succession depending on the area, climate etc.
iv. **Storm water management and erosion control**. Management of stormwater and prevention of erosion during rehabilitation. E.g. cut off drains, berms etc. and erosion control where required.
v. **Verification of rehabilitation success**. Entails monitoring of rehabilitation.
vi. **Successful closure.** Obtain closure certificate.

8 CONFIRM SPECIFICALLY THAT THE ENVIRONMENTAL OBJECTIVES IN RELATION TO CLOSURE HAVE BEEN CONSULTED WITH LANDOWNER AND INTERESTED AND AFFECTED PARTIES.

The environmental objectives in relation to closure was consulted with the interested and affected parties as this document was made available for comment. It should be considered that should the prospecting yield negative results, then the end use for area will revert to its pre-prospecting land use (minutes to be incorporated on the final report). The end-use of the area will therefore not be changed by the prospecting operations.

9 PROVIDE A REHABILITATION PLAN THAT DESCRIBES AND SHOWS THE SCALE AND AERIAL EXTENT OF THE MAIN PROSPECTING ACTIVITIES, INCLUDING THE ANTICIPATED PROSPECTING AREA AT THE TIME OF CLOSURE.

The following main strategies will be implemented:

- Rehabilitation of areas disturbed as a consequence of prospecting and the contractor's camp to a land capability that will support and sustain a predetermined post-closure land use;
- Removal of all infrastructure/equipment that cannot be beneficially re-used, as per agreements established, and returning the associated disturbed land to the planned final land use;
- Removal of existing contaminated material from affected areas;
- Establishment of final landforms that are stable and safe in the long run;
- Establishment and implementation of measures that meet specific closure related performance objectives.

9.1 INTEGRATED REHABILITATION AND CLOSURE PLAN

The main aim in developing this rehabilitation plan is to mitigate the impacts caused by the prospecting activities and to restore land back to a satisfactory standard. It is best practice to develop the rehabilitation plan as early as possible so as to ensure the optimal management of rehabilitation issues that may arise. It is important that the project's closure plan is defined and understood from before starting the process and is complementary to the rehabilitation goals. Rehabilitation and closure objectives need to be tailored to the project at hand and be aligned with the EMPr. The overall rehabilitation objectives for this project are as follows:

- Maintain and minimise impacts to the ecosystem within the prospecting area;
- Re-establishment of the pre-developed land capability to allow for a suitable post-prospecting land use;
- Prevent soil, surface water and groundwater contamination;
- Comply with the relevant local and national regulatory requirements; and
- Maintain and monitor the rehabilitated areas.

Successful rehabilitation must be sustainable, and requires an understanding of the basic baseline environment, as well as project management to ensure that the rehabilitation program is a success.

It is noted that a separate application for environmental authorisation must be submitted for closure in accordance with EIA Regulations, 2014 Listing Notice 1 Activity 22: The decommissioning of any activity requiring:

i. A closure certificate in terms of Section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); or
ii. A prospecting right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure.

The above closure application was submitted as part of the Environmental authorisation, refer to Part A Table 5-1as well as the proposed timeframe for the authorisation in Part A Section 19.

9.2 PHASE 1: MAKING SAFE

All prospecting boreholes that will not be required for later monitoring or other useful purposes should be plugged and sealed with cement to prevent possible cross flow and contamination between aquifers. Cement and liquid concrete are hazardous to the natural environment on account of the very high pH of the material, and the chemicals contained therein. As a result, the contractor shall ensure that:

- Concrete shall not be mixed directly on the ground;
- The visible remains of concrete, either solid, or from washings, shall be physically removed immediately and disposed of as waste, (Washing of visible signs into the ground is not acceptable); and
- All excess aggregate shall also be removed.

All backfilled trenches will be levelled, a follow up visit should be made one year after backfilling to determine if additional backfilling is needed in the event of subsidence.

All infrastructures not requested by the land owner / lawful occupiers to be left on site will be removed. The contractor's camp area. The area will then be sloped and no excavated areas will remain on site as it will be backfilled.

9.3 PHASE 2: LANDFORM DESIGN, EROSION CONTROL AND REVEGETATION

Landform, erosion control and re-vegetation is an important part of the rehabilitation process. Landform and land use are closely interrelated, and the landform should be returned as closely as possible to the original landform. Community expectations, compatibility with local land use practices and regional infrastructure, or the need to replace natural ecosystems and faunal habitats all support returning the land as closely as possible to its original appearance and productive capacity. This requires the following:

- Shape, level and de-compact the final landscape after removing all the project infrastructure / backfilling areas as applicable, dress with topsoil and, where necessary, vegetate with indigenous species. Commission specialists to assist in planning re-vegetation and the management of environmental impact, as required.
- Remove access roads with no beneficial re-use potential by deep ripping, shaping and levelling after the removal and disposal of any culverts, drains, ditches and/or other infrastructure. Natural drainage patterns are to be reinstated as closely as possible.
- Shape all channels and drains to smooth slopes and integrate into the natural drainage pattern.
- Construct contour banks and energy dissipating structures as necessary to protect disturbed areas from erosion prior to stabilisation.
- Promote re-vegetation through the encouragement of the natural process of secondary succession.
- Natural re-vegetation is dependent on de-compaction of subsoils and adequate replacement of the accumulated reserves of topsoil (for example, over the sampling sites), so as to encourage the establishment of pioneer vegetation.

- Remove alien and/or exotic vegetation.
- Undertake a seeding programme only where necessary, and as agreed with the re-vegetation specialist

9.4 PHASE 3: MONITORING AND MAINTENANCE

The post-operational monitoring and management period following decommissioning of prospecting activities must be implemented by a suitable qualified independent party for a minimum of one (1) year unless otherwise specified by the competent authority. The monitoring activities during this period will include but not be limited to:

- Biodiversity monitoring; and
- Re-vegetation of disturbed areas where required.

Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed prospecting activities and incorporated into post closure monitoring and management.

9.5 POST-CLOSURE MONITORING AND MAINTENANCE

Prior to decommissioning and rehabilitation activities, a monitoring programme shall be developed and submitted to the relevant authority for approval, as a part of the Final Rehabilitation Plan. It is recommended that the post-closure monitoring include the following:

- Confirmation that any waste, wastewater or other pollutants that is generated as a result of decommissioning will be managed appropriately, as per the detailed requirements set out in the Final Rehabilitation Plan,
- Confirmation that all de-contaminated sites are free of residual pollution after decommissioning.
- Confirmation that acceptable cover has been achieved in areas where natural vegetation is being re-established. 'Acceptable cover' means re-establishment of pioneer grass communities over the disturbed areas at a density similar to surrounding undisturbed areas, non-eroding and free of invasive alien plants.

Annual environmental reports will be submitted to the Competent Authority and other relevant Departments for at least one-year post-decommissioning. The frequency and duration of this reporting period may be increased to include longer term monitoring, at intervals to be agreed with the Designated Authority. The monitoring reports shall include a list of any remedial action necessary to ensure that infrastructure that has not been removed remains safe and pollution free and that rehabilitation of project sites are in a stable, weed and free condition.

9.6 EXPLAIN WHY IT CAN BE CONFIRMED THAT THE REHABILITATION PLAN IS COMPATIBLE WITH THE CLOSURE OBJECTIVES.

The rehabilitation plan is compatible with the closure objectives in that is seeks to ensure that negative impacts on the receiving environment that could not be prevented or mitigated during prospecting are rehabilitated. The appropriate disposal of waste will ensure that land is usable, in alignment with surrounding land uses and that no hazardous materials are left on site post-prospecting.

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

Please refer to Part A Section 21.

9.7 CONFIRM THAT THE FINANCIAL PROVISION WILL BE PROVIDED AS DETERMINED.

Sylvania Northern Mining (Pty) Ltd can fund the prospecting activities internally.

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

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

The proposed monitoring requirements are provided in the Table below.

Table 10-1: Mechanisms for monitoring compliance

Source activity monitoring and reporting	Impacts requiring monitoring programmes	Functional requirements for monitoring	Roles and Responsibilities	Frequency and time periods for implementing impact management actions
Contaminated water from waste storage area could detrimentally impact on watercourses quality, biota and habitat.	Waste water generation	Waste water quality and quantity	Contractor, ECO, PRH	As needed
Contamination from spills from chemical toilets / emptying of septic tank (if applicable) could impact on water quality which in turn could impact on the biota and habitat as well.	Waste generation	Waste generation	Contractor, ECO, PRH	As needed
Dust generated as a result of the prospecting activities including travelling on road could impact on local PM10 levels.	Complaints received	Dust levels if complaints are received	Contractor, ECO, PRH	As needed
Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Complaints received	Dust levels if complaints are received	Contractor, ECO, PRH	As needed
General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Waste generation (contaminated soil)	Waste generation	Contractor, ECO, PRH	As needed
Hydrocarbon spills from vehicles and other equipment could negative impact water quality, habitat and biota.	Waste generation	Waste generation	Contractor, ECO, PRH	As needed
Impact on groundwater levels	Background water quality and groundwater levels.	Background water quality and groundwater levels.	Contractor, ECO, PRH	Continuously
Impact on groundwater quality as a result of hydrocarbon spills from machinery.	Waste generation (contaminated soil)	Amount of waste generated.	Contractor, ECO, PRH	Continuously
Invasive prospecting and associated activities may impact on areas designated as high sensitivity, including critical biodiversity areas and	Vegetation disturbance and presence of Alien Invasive Plants	Protected Fauna and Flora species observed	Specialist PRH, Contractor, ECO	Before prospecting activities on site commence.

Source activity monitoring and reporting	Impacts requiring monitoring programmes	Functional requirements for monitoring	Roles and Responsibilities	Frequency and time periods for implementing impact management actions
watercourses situated in and around the Prospecting Right area. The majority of the proposed target areas are located in area categorised as ONA and NNR. The layout of the prospecting target areas appears to have been designed to avoid most of the non-perennial tributaries. The activity may lead to the loss of species of conservation concern. Based on the desktop study findings, no flora SCC are considered to be likely to occur on the project area. However, fifteen (15) faunal species previously recorded in the area queried are categorised as SCC.		on site. AIPs on site.		During the Operational phase
Invasive prospecting and associated activities will lead to destruction and damage of habitats and vegetation communities and overall loss of biodiversity and ecosystem function within the clearance and operational area. Destruction of habitat may lead to faunal species migrating to other more favourable areas.	Vegetation disturbance and presence of Alien Invasive Plants	Protected Fauna and Flora species observed on site. AIPs on site.	Specialist PRH, Contractor, ECO	Before prospecting activities on site commence. During the Operational phase
Loss of topsoil as a resource as a result of the prospecting activities	Loss of topsoil as a resource as a result of the prospecting activities	Loss of topsoil as a resource as a result of the prospecting activities	PRH, Contractor, ECO	During Rehabilitation phase
Rehabilitation could be ineffective if rehabilitation actions are not effectively implemented. Without the necessary mitigation measures, rehabilitation will be less successful and the ecology of the impacted areas may not recover to a pre-prospecting state. Without mitigation the alien invasive species may increase and result in a degraded veld condition making the property less viable for post-closure land use activities such as wilderness, grazing and agriculture.	Vegetation disturbance and presence of Alien Invasive Plants	Protected Fauna and Flora species observed on site. AIPs on site.	Specialist PRH, Contractor, ECO	During and After Rehabilitation
Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Spills from sludge containment facilities at the drilling site	Volume and quality of sludge generated	Contractor, ECO, PRH	As needed

Source activity monitoring and reporting	Impacts requiring monitoring programmes	Functional requirements for monitoring	Roles and Responsibilities	Frequency and time periods for implementing impact management actions
Silt generation during rainfall events could reach surface water resources result in in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico & chemical quality of the water in the watercourse.	Spills from sludge containment facilities at the drilling site	Volume and quality of sludge generated	Contractor, ECO, PRH	As needed
Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Waste generation (contaminated soil)	Waste generation	Contractor, ECO, PRH	As needed
The continuous human activity over a longer-term period may further impact on the faunal communities within the area. Associated noise, waste, the smell of humans and physical infiltration into remaining natural areas are problematic and may lead to declining populations (where the disturbance of habitat has caused habitat remaining to become unfavourable).	Vegetation disturbance and presence of Alien Invasive Plants	Protected Fauna and Flora species observed on site. AIPs on site.	Specialist PRH, Contractor, ECO	Before prospecting activities on site commence. During the Operational phase
The operation of machinery could result in increased noise levels in an area that is rural in nature. This noise could become a nuisance to the residents.	Complaints received	Noise levels if complaints are received	Contractor, ECO, PRH	As needed
Vegetation clearance will destroy indigenous vegetation and lead to possible invasive and/or exotic species establishing in the area and edge-effects occurring surrounding the prospecting activities. Bare areas may become vulnerable to Alien and Invasive Plant species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat.	Vegetation disturbance and presence of Alien Invasive Plants	Protected Fauna and Flora species observed on site. AIPs on site.	Specialist PRH, Contractor, ECO	Before prospecting activities on site commence. During the Operational phase

As the areas of direct influence is located more than 100 m from a watercourse and more than 500 m from a delineated wetland no monitoring is proposed relating to natural watercourses.

11 INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT/ ENVIRONMENTAL AUDIT REPORT.

Regular monitoring of all the environmental management procedures and mitigation measures shall be carried out by Sylvania in order to ensure that the provisions of this EMPr are adhered to. Formal monitoring and performance assessment of the EMPr will be undertaken on an annual basis.

12 ENVIRONMENTAL AWARENESS PLAN

12.1 MANNER IN WHICH THE APPLICANT INTENDS TO INFORM HIS OR HER EMPLOYEES OF ANY ENVIRONMENTAL RISK WHICH MAY RESULT FROM THEIR WORK.

The following Environmental Awareness Training will be implemented by Sylvania Northern Mining in order to inform employees and contractors of the environmental risk that may result from their work, or the risk of their interaction with the sensitive environment. The training will be conducted as part of the induction process for all new employees (including contractors) that will perform work in terms of the proposed activities. Proof of all training provided must be kept on-site. The Environmental Awareness Training will, as a minimum cover the following topics within the table below.

Table 12-1: Environmental Awareness Plan

Air Quality	Activities that may result or mitigate impact on air quality; speeding on roads, the requirements for dust suppression, etc. Negative impacts on the receiving environment if mitigation measures are not implemented.
Surface and groundwater	Risks to surface and groundwater, e.g. fuel and chemical handling and further risks of erosion or damage to riparian vegetation. How incidents should be reported, and emergency requirements. The importance to re-use water and to prevent spillages. No-go areas.
Cultural Heritage	To respect all cultures and believes. How to report any sightings of heritage importance as identified during operation activities (e.g. fossils). No-go areas.
Fauna	Overview of the fauna found on/around site and the uniqueness thereof. Mitigation measures that all contractors and employees need to abide by. No contractor or personnel allowed to catch or kill any species, and how any sightings should be reported if further actions are required (e.g. to catch and release).
Flora	Overview of the flora diversity on site, and the rare and endangered nature thereof. Measures taken by the company to protect species. No contractor or personnel allowed to remove, harvest or destroy any flora species unless clearly instructed based on the operational plans. No-go areas.
Waste management	Measures to avoid waste generation and to participate in waste minimisation/reduction.
Traffic strategies.	To stay on designated roads and not create new roads on areas that will not be used for prospecting purposes. To be aware of the fauna species and to be on the lookout and avoid collisions.
Emergency Preparedness and Response	How to report any emergency or incident. Incident and emergency reporting requirements.
General rules and conduct	Respect for the sensitive environment. Do not litter. Respect for each other and for different cultures. Safety and health requirements
Soil preservation	How to manage topsoil areas to prevent soil degradation.

12.2 MANNER IN WHICH RISKS WILL BE DEALT WITH IN ORDER TO AVOID POLLUTION OR THE DEGRADATION OF THE ENVIRONMENT.

All employees must be provided with environmental awareness training to inform them of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment. Employees should be provided with environmental awareness training before prospecting operations start. All new employees should be provided with environmental awareness training. Induction courses will be provided to all employees by a reputable trainer.

13 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

(*Among others, confirm that the financial provision will be reviewed annually).*

An environmental audit report will be submitted annually as per DMRE requirements.

The financial provision will be updated on an annual basis and submitted to the DMRE.

14 UNDERTAKING

14.1 ENVIRONMENTAL ASSESSMENT PRACTIONER

The EAP herewith confirms

- **a)** the correctness of the information provided in the reports ☒
- **b)** the inclusion of comments and inputs from stakeholders and I&APs ; ☒
- **c)** the inclusion of inputs and recommendations from the specialist reports where relevant; ☒and
- **d)** that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected. parties are correctly reflected herein. ☒

Signature of the environmental assessment practitioner: _____

Name of company: Prescali Environmental Consultants (Pty) Ltd

Date: _____

14.2 PROSPECTING RIGHTS HOLDER

I, ……,
the undersigned and duly authorised thereto hereby:

a) Confirm that the financial provision as required will be available; and
b) Undertake to adhere to the requirements and to the conditions as set out in the EMPr submitted to the Director: Mineral Development and approved on ……

Signed at.....on this..... day……

Signature of applicant …….

Designation ……

-END-

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16 APPENDICES

Appendix 1: Qualifications of the EAP
Appendix 2: Experience of the EAP
Appendix 3: Locality Map

- Locality map at a scale not smaller than 1:250 000
- Regulation 2(2) map
- Location and area extend of main and listed activities

Appendix 4: Final Site Maps

- Schaffhausen

Appendix 5: Public Participation Process

- Issues and Response Report
- Site Notices
- Background Information Documents
- Newspaper Advert
- Proof of consultation (emails send and received)
- Letters / Registration forms received

Appendix 6: Specialist Reports

- Desktop Surface Water Assessment
- Desktop Terrestrial Ecology Assessment
- Desktop Heritage Impact Assessment
- Desktop Soil, Land Use and Land Capability

Appendix 1: Qualifications of the EAP

To protect personal information this will only be submitted in the final BAR to the DMRE

Appendix 2: Experience of the EAP

To protect personal information this will only be submitted in the final BAR to the DMRE

Appendix 3: Locality Map

Locality map at a scale not smaller than 1:250 000

Regulation 2(2) map

Location and area extend of main and listed activities

Appendix 4: Final Site Maps

Northern area

Southern area

Appendix 5: Public Participation Process

Issues and Response Report

In progress

Background Information Documents / Newspaper Advert

PUBLIC PARTICIPATION NOTIFICATION OF AN ENVIRONMENTAL IMPACT ASSESSMENT APPLICATION (BASIC ASSESSMENT PROCESS FOR A PROSPECTING RIGHT) IN TERMS OF SECTION 16 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT NO. 28 OF 2002) AS AMENDED BY SECTION 12 OF THE ACT NO. 49 OF 2008: ON PORTION 2 OF THE FARM SCHAFFHAUSEN 689 LR: WITHIN THE MAGISTERAL DISTRICT OF BLOUBERG.

Notice is hereby given in terms of the National Environmental Management Act, 1998 in respect of listed activities that have been triggered by application in terms of the Mineral and Petroleum Resources Development Act, 2002 (MPRDA) (As Amended).

Activity: Sylvania Northern Mining (Pty) Ltd are proposing to conduct prospecting activities for the following minerals: Chrome ore, Copper ore, Gold ore, Nickel ore and Platinum Group Metals.

Location: The proposed prospecting activities will be located on Portion 2 of Schaffhausen 689 LR in the Magisterial District of Blouberg.

Environmental Authorisation Process: Prescali Environmental Consultants (Pty) Ltd has been appointed to undertake the Environmental Authorisation process in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) read with the Environmental Impact Assessment Regulations, 2014 as amended in 2017 and 2021. The environmental authorisation application is subject to a Basic Assessment process and will be submitted for approval to the Department of Mineral Resources and Energy (DMRE), Polokwane. Listed activities to be applied for in terms of the NEMA are GNR983 listed activity 20 (prospecting application activities) and GNR983 Listed activity 22 (rehabilitation and closure for prospecting activities).

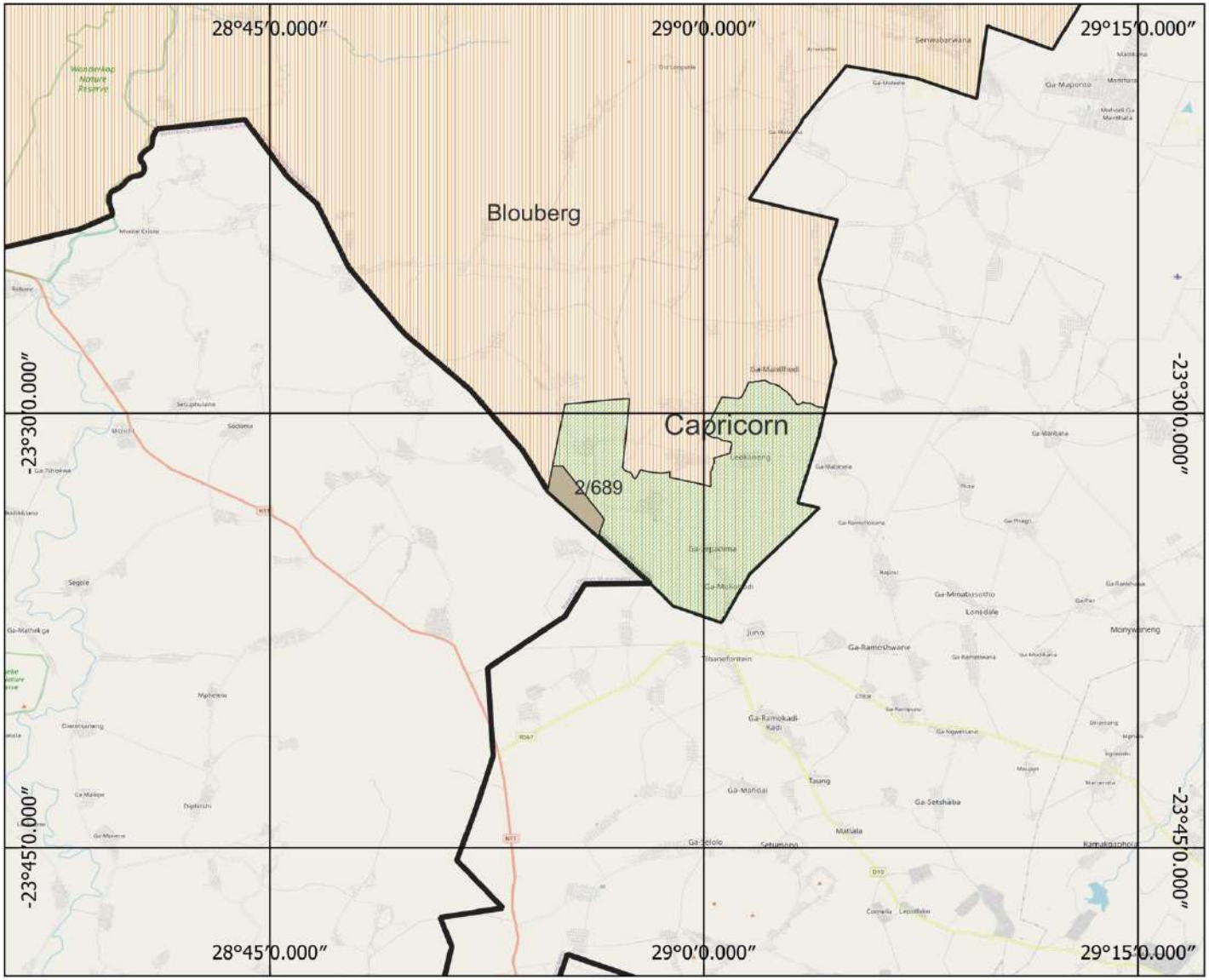
Public Participation: The purpose of the public participation process is to inform Interested and Affected Parties (IAPs) regarding the proposed prospecting right and environmental authorisation process. IAPs will also be provided with the opportunity to comment on and contribute to the identification of environmental impacts of the proposed activities. Registered IAPs will be granted an opportunity to review and comment on the Draft Basic Assessment/EMPr reports for a period of 30 days.

Public Meeting: Prescali will host a meeting in compliance with applicable regulations that may or may not prohibit large gatherings. Details pertaining to the date(s) and location(s) of the meeting(s) will be forwarded to registered Interested and Affected Parties. The purpose of the meeting(s) will be to introduce and discuss the proposed project and any identified environmental impacts.

Should you wish to register as an interested and/or affected party of if you require further information on the abovementioned application and/or proposed project activities; please submit your name, contact information, interest and comments or relevant issues on the matter in writing on or before the 30th of October 2022 to Prescali Environmental Consultants.

Consultants: Prescali Environmental Consultants (Pty) Ltd. P.O Box 2544, Montana Park, 0159. Tel: 012 543 3808. Fax: 086 621 0294. Email: info@prescali.co.za. For attention: Dr Petro Erasmus. Reference: LP30/5/1/1/2/14728PR

Please note: this does not serve as an offer of employment nor guarantee that the project will be implemented.



Legend

- Prospecting area
- SA_Wards2020
  - 22
- LocalMunicipalities2018_Final
  - Blouberg
- DistrictMunicipalities2018_Final
  - Capricorn
- OpenStreetMap

0 5 10 15 20 km

Programme: QGIS Lorem ipsum
Date: 26 August 2022
Compiled by: Dr Petro Erasmus
Sources: Sylvania, Municipal Demarcation Board, OpenStreetMap(TM)

Prescali Environmental Consultants (Pty) Ltd
PO Box 2544
Montana Park
0159
(t) 012 543 3808
(f) 086 621 0294
info@prescali.co.za

Sylvania Northern Mining (Pty) Ltd
Schaffhausen
Regional Location: Not smaller than 1 in 250 000

Sylvania Northern Mining (PTY) LTD (LP30/5/1/1/2/14728PR)			
REGISTRATION AND RESPONSE FORM FOR INTERESTED AND AFFECTED PARTIES			
DATE			
PARTICULARS OF THE INTERESTED AND AFFECTED PARTY			
NAME			
POSTAL ADDRESS			
		POSTAL CODE	
STREET ADDRESS			
		POSTAL CODE	
WORK/ DAY TELEPHONE NUMBER		**WORK/ DAY FAX NUMBER**	
CELL PHONE NUMBER		**E-MAIL ADDRESS**	
PLEASE IDENTIFY YOUR INTEREST IN THE PROJECT:			
PLEASE WRITE YOUR COMMENTS AND QUESTIONS HERE:			
Please return completed forms before or on 30 October 2022 to:			
Consultants: Prescali Environmental Consultants (Pty) Ltd P.O. Box 2544, Montana Park, 0159 Tel: 012 543 3808, Fax 086 621 0294, Email: info@prescali.co.za **Attention:** Dr Petro Erasmus **Reference:** LP30/5/1/1/2/14728PR			

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Public Participation: The purpose of the public participation process is to inform Interested and Affected Parties (IAPs) regarding the proposed prospecting right and environmental authorisation process. IAPs will also be provided with the opportunity to comment on and contribute to the identification of environmental impacts of the proposed activities. Registered IAPs will be granted an opportunity to review and comment on the Draft Basic Assessment/EMPr reports for a period of 30 days.

Public Meeting: Prescali will host a meeting in compliance with applicable regulations that may or may not prohibit large gatherings. Details pertaining to the date(s) and location(s) of the meeting(s) will be forwarded to registered Interested and Affected Parties. The purpose of the meeting(s) will be to introduce and discuss the proposed project and any identified environmental impacts.

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Consultants: Prescali Environmental Consultants (Pty) Ltd. P.O Box 2544, Montana Park, 0159. Tel: 012 543 3808. Fax: 086 621 0294. Email: info@prescali.co.za. For attention: Dr Petro Erasmus. Reference: LP30/5/1/1/2/14728PR

Please note: this does not serve as an offer of employment nor guarantee that the project will be implemented.

BOSVELD CLASSIFIEDS

Classified Advert Booking - Tel: (015) 590 4444

000 GENERAL NOTICES | 001 SERVICES | 002 FOR SALE | 003 PROPERTY TO LET | 004 PROPERTY FOR SALE | 005 VACANCIES | 006 MOTORING | 007 OFFICIAL NOTICES

Classified Department

Lerato Monareng
Tel: 015 590 4447
E-mail:
classad1@nmgroup.co.za

Junior Rebombo
Tel: 015 590 4470
E-mail:
classad@nmgroup.co.za

Cathrine Robberts
Tel: 015 590 4446
E-mail:
sales1@nmgroup.co.za

The deadlines for this publication

Classified Display:
Wednesday @ 09:00

Classified Lineage:
Wednesday @ 09:00

Legals:
Wednesday @ 09:00

PLEASE NOTE:
We reserve the right to change the above deadline at any given time!

Payment Methods

Adverts will only be accepted on a cash basis before being published.

PAYMENTS CAN BE MADE AS FOLLOWS:
a) At our offices at BV
b) Into: FNB
Name: CTP LTD t/a
Northern Media Group
Branch Code:
253145
Acc No:
621 049 275 72
(ALWAYS HAVE YOUR ID NO / CO REG NO READY)
All advertisers must have a telephone.

PLEASE NOTE THE FOLLOWING:
Proof of Payment MUST be emailed to:
magda@nmgroup.co.za.
Reference number or telephone number must appear on deposit slip.

CONDITIONS OF ACCEPTANCE. ADVERTISERS PLEASE NOTE:

1. Although every effort will be made to meet the client's wishes, the date of publication, distribution, the form and position of the entries, the name and/or title and format of the advertisement, the number of copies and place of distribution, shall be at the sole discretion of the publisher.

2. Errors and ommissions must be reported within the first week of insertion.

3. When querying an advertisement a reference number MUST be quoted.

4. Credit will not be given for typographical errors which do not lessen the effectiveness of the advertisement.

5. Cancellations & alterations must be phoned through before 15:00 a day before deadline prior to publication.

6. The Publisher is entitled to withhold any advertisement from publication and to cancel any advertisement order that has been accepted.

7. Space is sold to the advertiser for the purpose of making announcements concerning his own business and may not be used for attacking or making insidious comparisons with other advertisers, firms, institutions or persons.

0700 LEGALS

MOGALAKWENA MUNICIPALITY NOTICE OF A REZONING APPLICATION IN TERMS OF SECTION 16(1) OF THE MOGALAKWENA LAND USE MANAGEMENT BY- LAW, 2016

We, Kamekho Consulting CC, being the applicant of property, the Remaining Extent of Erf 279 Piet Potgietersrust Township, hereby give notice in terms of Section 16(1)(f) of the Mogalakwena Municipality Land Use Management By-law, 2016, that we have applied to the Mogalakwena Municipality for the amendment of the Mogalakwena Land Use Scheme, 2008 (Revised 2014), by the rezoning in terms of Section 16(1) of the Mogalakwena Municipality Land Use Management By-law, 2016 of the property as described above. The property is situated at: 22 Ruiter Street, Piet Potgietersrust. The rezoning is from `Residential 1` to `Residential 3` subject to applicable controls stipulated in Schedule 2 of the Mogalakwena Land Use Management Scheme, 2008. The intention of the applicant in this matter is to allow for the establishment of 7 dwelling units over the subject property. Any objection(s) and/or comment(s), including the grounds for such objection(s) and/or comment(s) with full contact details, without which the Municipality cannot correspond with the person or body submitting the objection(s) and/or comment(s), shall be lodged with, or made in writing to: Planning and Development, P.O. Box 34, Mokopane, 0600 or to ntshanis@mogalakwena.gov.za from 16 September until 15 October 2022. Full particulars and plans (if any) may be inspected during normal office hours at the Municipal offices as set out below, for a period of 28 days from the date of first publication of the notice in the Provincial Gazette/Bosvelder newspaper. Address of Municipal offices: P.O. Box 34, Mokopane, 0600 54 Relief Street, Mokopane 0601. Closing date for any objections and/or comments: 15 October 2022.

Address of applicant:
P.O. Box 4169
Polokwane, 0700
or Office 9, Unit 6
100 Marshall Street
Polokwane
Telephone No: 084 690 9479
Fax: 086 614 9265
Email:
bruce@kamekho.co.za
Dates on which notice will be published:
16 September
and
23 September 2022
REFERENCE: CPD
ITEM NO:
CR001541

MOGALAKWENA MUNISIPALITEIT KENNISGEWING VAN `N AANSOEK OOR HERSONERING INGEVOLGE ARTIKEL 16(1) VAN DIE MOGALAKWENA-VERORDENING OP GRONDGEBRUIKBESTUUR, 2016

Ons, Kamekho Consulting CC, synde die applikant van eiendom, gee die Resterende Gedeelte van Erf 279 Piet Potgietersrust Dorpsgebied hiermee kennis ingevolge Artikel 16(1)(f) van die Mogalakwena Munisipaliteit Grondgebruikbestuur sverordening, 2016 dat ons by die Mogalakwena Munisipaliteit aansoek gedoen het vir die wysiging van die Mogalakwena Grondgebruikskema, 2008 (Hersien 2014), deur die hersonering ingevolge Artikel 16 (1) van die Mogalakwena Munisipaliteit Grondgebruik-bestuursverordening, 2016 van die eiendom soos hierbo beskryf. Die eiendom is geleë te: Ruiterstraat 22, Piet Potgietersrust. Die hersonering is van `Residensieel 1` na `Residensieel 3` onderhewig aan toepaslike beheermaatreëls soos uiteengesit in Bylae 2 van die Mogalakwena Grondgebruikbestuurskema, 2008. Die voorneme van die aansoeker in hierdie saak is om voorsiening te maak vir die vestiging van 7 wooneenhede oor die onderwerp eiendom. Enige beswaar en/of kommentaar, insluitend die gronde vir sodanige beswaar en/of kommentaar met volledige kontakbesonderhede, waarsonder die Munisipaliteit nie kan korrespondeer met die persoon of liggaam wat die beswaar en/of kommentaar indien nie, moet ingedien word by, of skriftelik gerig word aan: Beplanning en Ontwikkeling, Posbus 34, Mokopane, 0600 of aan ntshanis@mogalakwena.gov.za vanaf 16 September tot 15 Oktober 2022 Volledige besonderhede en planne (indien enige) kan gedurende gewone kantoorure by die Munisipale kantore soos hieronder uiteengesit besigtig word vir `n tydperk van 28 dae vanaf die datum van eerste publikasie van die kennisgewing in die Provinsiale Koerant / Bosvelder koerant. Adres van Munisipale kantore: Posbus 34, Mokopane, 0600 Reliefstraat 54, Mokopane 0601 Sluitingsdatum vir enige besware en/of kommentaar: 15 Oktober 2022.

Adres van aansoeker:
Posbus 4169
Polokwane 0700
of
Kantoor 9, Eenheid 6
100 Marshallstraat
Polokwane
Telefoonnommer:
084 690 9479
Faks: 086 614 9265
e- pos:
bruce@kamekho.co.za
Datums waarop kennisgewing gepubliseer sal word:
16 September en
23 September 2022.
VERWYSING: CPD
ITEM NO:
CR001543

0704 ESTATE NOTICES

KENNISGEWING

BOEDEL WYLE **JACOBUS JOHANNES PIENAAR,** IDENTITEITSNOMMER **370823 5018 087**, GEBORE OP **23 AUGUSTUS 1937**; OORLEDE OP **10 APRIL 2022**, IN LEWE WOONAGTIG TE **VLAKLAAGTE PLAAS 544, ROEDTAN, LIMPOPO, 0601**

BOEDEL NOMMER: 005384/2022

ALLE persone wat vorderings het teen of geld verskuldig is aan bogemelde boedel word versoek om sodanige vorderings in te lewer en sodanige skulde te betaal by die ondergemelde firma binne `n tydperk van dertig dae vanaf datum van publikasie hiervan.

KRUGER BOEKHOUERS
1A THABO MBEKI STREET
MOKOPANE
LIMPOPO
POSBUS, 0600
Verwysing: Werner/ J.J PIENAAR
JR006148

KENNISGEWING

BOEDEL **WYLE STEPHANUS JACOBUS DE LANGE**, IDENTITEITSNOMMER **380509 5008 08 1,** GEBORE OP **9 MAY 1938**; OORLEDE OP **28 MAY 2022**, IN LEWE WOONAGTIG TE **58 VOORSTRAAT, MOKOPANE, LIMPOPO.**

BOEDEL NOMMER: 006566/2022

ALLE persone wat vorderings het teen of geld verskuldig is aan bogemelde boedel word versoek om sodanige vorderings in te lewer en sodanige skulde te betaal by die ondergemelde firma binne `n tydperk van dertig dae vanaf datum van publikasie hiervan.

KRUGER BOEKHOUERS
1A THABO MBEKI STREET
MOKOPANE.
LIMPOPO
POSBUS: 0600
Verwysing: Werner/ S.J DE LANGE
JR006147

NOTIFICATION OF DECISION TO GRANT TWO APPLICATIONS FOR PROSPECTING RIGHTS

Ref No: LP 30/5/1/1/3/2/1(14106) EM and LP 30/5/1/1/3/2/1(14051) EM

Notice is given in terms of Section 4(2.) of the National Environmental Management Act: Environmental Impact Assessment Regulation 362 enacted on 7 April 2017 as amended.

Nthuteng Minerals Pty (Ltd) and KS Mining (Pty) Ltd have been issued with decisions to grant prospecting rights for Copper Ore, Gold Ore, Molybdenum, and Nickel Ore, and Gold Ore respectively on the following properties situated in Mogalakwena Local Municipality, Limpopo.

1. **De Berg 35 KS, (LP 14106 PR)**
2. **Zwartkrans 38 KS (LP 14051 PR)**

Proposed Activity (ies): Activity 20; Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). The proposed prospecting activity entails drilling of 15 boreholes with the maximum depth of 150m for each application.

Your attention is drawn to the fact that an appeal may be lodged against the decision in terms of the National Appeal Regulations, if such appeal is available in the circumstances of the decision. Should you decide to appeal, you must comply with the National Appeal Regulation of 2014 in relation to notification of all registered interested and affected, and a copy of the official appeal form can be obtained from the Department of Environmental Affairs and Shanatsi Geoscience Africa (Pty) Ltd within 20 days from the date of this notice.

Submit or request more information on contacts below:
Shanatsi Geoscience Africa (Pty) Ltd
Name: Mr. Oscar Miyambu
Email: miyambumo@gmail.com
Cell: 072 506 4659
JR006146

PUBLIC PARTICIPATION NOTIFICATION OF AN ENVIRONMENTAL IMPACT ASSESSMENT APPLICATION (BASIC ASSESSMENT PROCESS FOR A PROSPECTING RIGHT) IN TERMS OF SECTION 16 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT NO. 28 OF 2002) AS AMENDED BY SECTION 12 OF THE ACT NO. 49 OF 2008: ON PORTION 2 OF THE FARM SCHAFFHAUSEN 689 LR: WITHIN THE MAGISTERAL DISTRICT OF BLOUBERG.

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Location: The proposed prospecting activities will be located on Portion 2 of Schaffhausen 689 LR in the Magisterial District of Blouberg.
Environmental Authorisation Process: Prescali Environmental Consultants (Pty) Ltd has been appointed to undertake the Environmental Authorisation process in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) read with the Environmental Impact Assessment Regulations, 2014 as amended in 2017 and 2021. The environmental authorisation application is subject to a Basic Assessment process and will be submitted for approval to the Department of Mineral Resources and Energy (DMRE), Polokwane. Listed activities to be applied for in terms of the NEMA are GNR983 listed activity 20 (prospecting application activities) and GNR983 Listed activity 22 (rehabilitation and closure for prospecting activities).
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Public Meeting: Prescali will host a meeting in compliance with applicable regulations that may or may not prohibit large gatherings. Details pertaining to the date(s) and location(s) of the meeting(s) will be forwarded to registered Interested and Affected Parties. The purpose of the meeting(s) will be to introduce and discuss the proposed project and any identified environmental impacts.
Should you wish to register as an interested and/or affected party or if you require further information on the above-mentioned application and/or proposed project activities; please submit your name, contact information, interest and comments or relevant issues on the matter in writing on or before the 30th of October 2022 to Prescali Environmental Consultants.
Consultants: Prescali Environmental Consultants (Pty) Ltd. P.O Box 2544, Montana Park, 0159. Tel: 012 543 3808. Fax: 086 621 0294. Email: info@prescali.co.za.
For attention: Dr Petro Erasmus. Reference: LP30/5/1/1/2/14728PR
Please note: this does not serve as an offer of employment nor guarantee that the project will be implemented.

Karabo Nedohe is the founder of Nedohe Attorneys.

‘Study smart right from the start’

MASEO NETHANANI

SOME people take many years to decide on a career path to follow, but others just know what they want to do with their lives from a young age.

In Karabo Nedohe’s case, she knew se wanted to study law and did not let anything stop her form achieving her goal.

Today she is a qualified attorney and founder of Nedohe Attorneys.

Nedohe, who is from Thohoyandou, holds a LLB degree from the University of Venda and furthered her studies with the University of South Africa when she obtained a Masters’ degree in tax law.

She explained a law firm is like any business, and you need to work long hours, complete tasks on time, have good business skills, good working relationships with judges, clerks and registrars and great communication skills.

“I became an attorney on August 15, 2019 at the Pretoria High Court. I administered deceased estates at a trust company for a year until I felt limited by doing just one thing with my time.

“Your marks secure you a spot in law school and ultimately, a job.”

KARABO NEDOHE
NEDOHE ATTORNEYS

“I started my law firm which is a general law practice. We deal with all civil and criminal matters, litigious and non-litigious matters, contracts, family and matrimonial law,” said Nedohe.

She added she became an attorney to show young girls that anything is possible, and explained that to become an attorney can get expensive and the requirements are very demanding.

“Achieving this huge milestone will always remain a highlight in my life. My goal is to open practices all over the country, to be a magistrate and then a judge,” she said.

She told ***CV*** the some of the challenges she faces in the industry are the long hours, clients’ reluctance to spend money on legal services and difficult clients.

“My family is extremely supportive. It is not easy to start a new business and it is extremely important to have your family’s support in every way possible. I work when it’s time to work and I close the office when it’s time for family.

“I make sure my family respects my work time, and likewise make my staff and clients respect my family time. It works pretty well,” she explained.

Nedohe encouraged girls to believe in themselves and study smart if they want to follow in her footsteps.

“Good marks in varsity are the foundation to a great future in this career. You don’t want to end up with an LLB degree that limits your potential.

“Good marks secure you a spot in law school, then good articles, then a pass in board exams and a good job. You need to study smart from start to finish,” she concluded.

Classified Department

Lerato Monareng
Tel: 015 590 4447
E-mail:
classad1@nmgroup.co.za

Junior Rebombo
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Cathrine Robberts
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The deadlines for this publication

Classified Display:
Monday @ 09:00

Classified Lineage:
Monday @ 09:00

Legals:
Monday @ 09:00

PLEASE NOTE:
We reserve the right to change the above deadline at any given time!

Payment Methods

Adverts will only be accepted on a cash basis before being published.
PAYMENTS CAN BE MADE AS FOLLOWS:
a) At our offices at NMG
b) By Credit Card
c) Into: FNB
Name: CTP LTD t/a Northern Media Group
Branch Code: 25 31 45
Acc No: 621 049 275 72
(ALWAYS HAVE YOUR ID NO / CO REG NR READY)
All advertisers must have a telephone
PLEASE NOTE THE FOLLOWING:
Proof of Payment MUST be emailed to magda@nmgroup.co.za. Reference number or telephone number must appear on deposit slip.

0700 LEGALS

0702 GENERAL NOTICES

MUSINA LOCAL MUNICIPALITY LAND USE MANAGEMENT SCHEME 2010, AMENDMENT SCHEME 427, NOTICE OF A REZONING APPLICATION

Rirothe Planning Consulting, being the authorised agent of the owner of the Erf mentioned below, hereby give notice in terms of Section 36 of the Musina Local Municipality Spatial Planning and Land Use Management Bylaw 2016 read together with the provision of Spatial Planning and Land Use Management Act of 2013 that we have applied Musina Local Municipality for the amendment of the Land Use Scheme known as the Musina Land Use Management Scheme 2010 by the rezoning of Erf 1840 Musina Ext 14 from Residential 1 to Residential 2 for the purpose of dwelling units.

Particulars of the applications will lie for inspection during normal office hours at the Town Planning Offices 21 Irwin Street, Musina, for a period of 28 days from 08 September 2022. Objections to or representations in respect of the application must be lodged with or made in writing to the Municipal Manager at the above address or Private Bag X611 Musina 0900 within a period of 28 days from 08 September 2022.

Address of Agent:
662 Seshego Zone 8
Polokwane 0742
P.O. Box 5
Tshidimbini 0972
Tel: 084 287 0467

———————LE004456

MUSINA PLAASLIKE MUNISIPALITEIT GRONDGEBRUIK-BESTUURSKEMA 2010, WYSIGINGSKEMA 427, KENNISGEWING VAN `N HERSONERING AANSOEK

Rirothe Planning Consulting, synde die gemagtigde agent van die eienaar van die Erf hieronder genoem, gee hiermee kennis ingevolge Artikel 36 van die Musina Plaaslike Munisipaliteit Ruimtelike Beplanning en Grondgebruikbestuur Verordening 2016 saamgelees met die bepaling van Ruimtelike Beplanning en Grondgebruikbestuur Wet van 2013 dat ons Musina Plaaslike Munisipaliteit aansoek gedoen het vir die wysiging van die Grondgebruikskema bekend as die Musina Grondgebruikbestuurskema 2010 deur die hersonering van Erf 1840 Musina Uitb 14 van Residensieel 1 na Residensieel 2 vir die doel van wooneenhede.

Besonderhede van die aansoeke le ter insae gedurende gewone kantoorure by die Stadsbeplanningskantore Irwinstraat 21, Musina, vir `n tydperk van 28 dae vanaf 08 September 2022. Besware teen of vertoe ten opsigte van die aansoek moet ingedien of gerig word in skryf aan die Munisipale Bestuurder by bogenoemde adres of Privaatsak X611 Musina 0900 binne `n tydperk van 28 dae vanaf 08 September 2022.

Adres van Agent:
662 Seshego Zone 8
Polokwane 0742
Posbus 5
shidimbini 0972
Tel: 084 287 0467

———————LE004458

TSEBISO KA TLHOMPO YA MOLAO WA DI PRODUCT TSA PETROL ACT 1977 (MOLAO NO. 120 WA 1977)

Tsebisho ye e tsebisha mekgahlo yeo e bego le kgahlego goba ye e amanago le SETLOGAPELE SA MEROPA (PTY) LTD, o tlisitse kgopelo ya **RETAIL license**. Nomoro ya kgopelo: F/2022/09/05/0002

FARM 606 LS LOCATIE VAN MALIETZIE STAND 6046 ROAD D3424 (GA-MATAMANYANE) ROAD R521 NATIONAL ROAD DENDRON GA-SEMENYA VILLAGE POLOKWANE

Maikemisetso a kgopelo ke go dumelela mokgopedi go fiwa license ya go dumelela go rekisa petrol, ka mo e beilwego godimo ga kgopelo dipeakanyo tsa go lebelela ditokomane di ka dirwa kao laetsa Molaodi wa di petrol go

Mogala (015) 230 3600, goba -Fax; goba -
E-mail:
Siyabulela.Magobongo@dmre.gov.za

Motho yo a bego kgahlanong le pego ya license ka tlhompo, a ka letsetsa nomoro ya ka godimo, wa letsetsa Molaodi wa di Petrol go se fete matsatsi a masome pedi a moshomo go tloga letsatsi leo tsebiso e hlagisitswego ka lona,di tla romelwa go:

Physical Address: Molaodi wa di products tsa petrol Lefapha la Mineral Resources & Energy 18A Landdros Mare Street

Postal Address:
Molaodi wa di product tsa petrol Lefapha la Mineral Resources & Energy Private Bag X 9712, Polokwane, 0700

———————CR001549

Tsebiso ka tlhompo ya molao wa di Product Tsa Petrol Act 1977 (Molao No. 120 Wa 1977)

Tsebisho ye e tsebisha mekgahlo yeo e bego le kgahlego goba ye e amanago le SETLOGAPELE SA MEROPA (PTY) LTD, o tlisitse kgopelo ya **SITE license**. Nomoro ya kgopelo: F/2022/09/05/0001

FARM 606 LS LOCATIE VAN MALIETZIE STAND 6046 ROAD D3424 (GA-MATAMANYANE) ROAD R521 NATIONAL ROAD DENDRON GA-SEMENYA VILLAGE POLOKWANE

Maikemisetso a kgopelo ke go dumelela mokgopedi go fiwa license ya go dumelela go rekisa petrol, ka mo e beilwego godimo ga kgopelo dipeakanyo tsa go lebelela ditokomane di ka dirwa kao laetsa Molaodi wa di petrol go

Mogala (015) 230 3600, goba -Fax; goba
- E-mail:
Siyabulela.Magobongo@dmre.gov.za

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Physical Address: Molaodi wa di products tsa petrol Lefapha la Mineral Resources & Energy 18A Landdros Mare Street

Postal Address: Molaodi wa di product tsa petrol Lefapha la Mineral Resources & Energy Private Bag X 9712, Polokwane, 0700

———————CR001550

PUBLIC PARTICIPATION NOTIFICATION OF AN ENVIRONMENTAL IMPACT ASSESSMENT APPLICATION (BASIC ASSESSMENT PROCESS FOR A PROSPECTING RIGHT) IN TERMS OF SECTION 16 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT NO. 28 OF 2002) AS AMENDED BY SECTION 12 OF THE ACT NO. 49 OF 2008: ON PORTION 2 OF THE FARM SCHAFFHAUSEN 689 LR: WITHIN THE MAGISTERAL DISTRICT OF BLOUBERG.

Notice is hereby given in terms of the National Environmental Management Act, 1998 in respect of listed activities that have been triggered by application in terms of the Mineral and Petroleum Resources Development Act, 2002 (MPRDA) (As Amended).

Activity: Sylvania Northern Mining (Pty) Ltd are proposing to conduct prospecting activities for the following minerals: chrome ore, copper ore, gold ore, nickel ore and platinum group metals.

Location: The proposed prospecting activities will be located on Portion 2 of Schaffhausen 689 LR in the Magisterial District of Blouberg.

Environmental Authorisation Process: Prescali Environmental Consultants (Pty) Ltd has been appointed to undertake the Environmental Authorisation process in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) read with the Environmental Impact Assessment Regulations, 2014 as amended in 2017 and 2021. The environmental authorisation application is subject to a Basic Assessment process and will be submitted for approval to the Department of Mineral Resources and Energy (DMRE), Polokwane. Listed activities to be applied for in terms of the NEMA are GNR983 listed activity 20 (prospecting application activities) and GNR983 Listed activity 22 (rehabilitation and closure for prospecting activities).

Public Participation: The purpose of the public participation process is to inform Interested and Affected Parties (IAPs) regarding the proposed prospecting right and environmental authorisation process. IAPs will also be provided with the opportunity to comment on and contribute to the identification of environmental impacts of the proposed activities. Registered IAPs will be granted an opportunity to review and comment on the Draft Basic Assessment/EMPr reports for a period of 30 days.

Public Meeting: Prescali will host a meeting in compliance with applicable regulations that may or may not prohibit large gatherings. Details pertaining to the date(s) and location(s) of the meeting(s) will be forwarded to registered Interested and Affected Parties. The purpose of the meeting(s) will be to introduce and discuss the proposed project and any identified environmental impacts.

Should you wish to register as an interested and/or affected party or if you require further information on the above-mentioned application and/or proposed project activities; please submit your name, contact information, interest and comments or relevant issues on the matter in writing on or before the 30th of October 2022 to Prescali Environmental Consultants.

Consultants: Prescali Environmental Consultants (Pty) Ltd. P.O Box 2544, Montana Park, 0159. Tel: 012 543 3808. Fax: 086 621 0294. Email: info@prescali.co.za.
For attention: Dr Petro Erasmus. Reference: LP30/5/1/1/2/14728PR

Please note: this does not serve as an offer of employment nor guarantee that the project will be implemented.

PUBLIC PARTICIPATION NOTIFICATION OF AN ENVIRONMENTAL IMPACT ASSESSMENT APPLICATION (BASIC ASSESSMENT PROCESS FOR A PROSPECTING RIGHT) IN TERMS OF SECTION 16 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT NO. 28 OF 2002) AS AMENDED BY SECTION 12 OF THE ACT NO. 49 OF 2008: ON PORTION 2 OF THE FARM SCHAFFHAUSEN 689 LR: WITHIN THE MAGISTERAL DISTRICT OF BLOUBERG.

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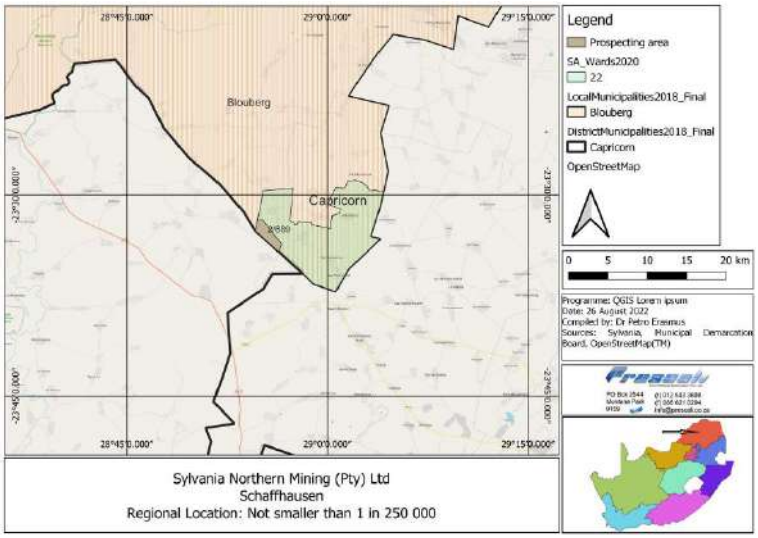
Location: The proposed prospecting activities will be located on Portion 2 of Schaffhausen 689 LR in the Magisterial District of Blouberg.



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Should you wish to register as an interested and/or affected party of if you require further information on the abovementioned application and/or proposed project activities; please submit your name, contact information, interest and comments or relevant issues on the matter in writing on or before the 30th of October 2022 to Prescali Environmental Consultants.

Consultants: Prescali Environmental Consultants (Pty) Ltd. P.O Box 2544, Montana Park, 0159. Tel: 012 543 3808. Fax: 086 621 0294. Email: info@prescali.co.za. For attention: Dr Petro Erasmus. Reference: LP30/5/1/1/2/14728PR

Please note: this does not serve as an offer of employment nor guarantee that the project will be implemented.

Point 1. Title: Schaffhausen SN1 📸 14Sep22 10:34
📸
🏷️ Ad-hoc
⌂Potgietersrus, LP, ZA
◷ 14-Sep-22 10:34:12
⌖ -23.53076, 28.87989
UTM:35s 691916 7396466
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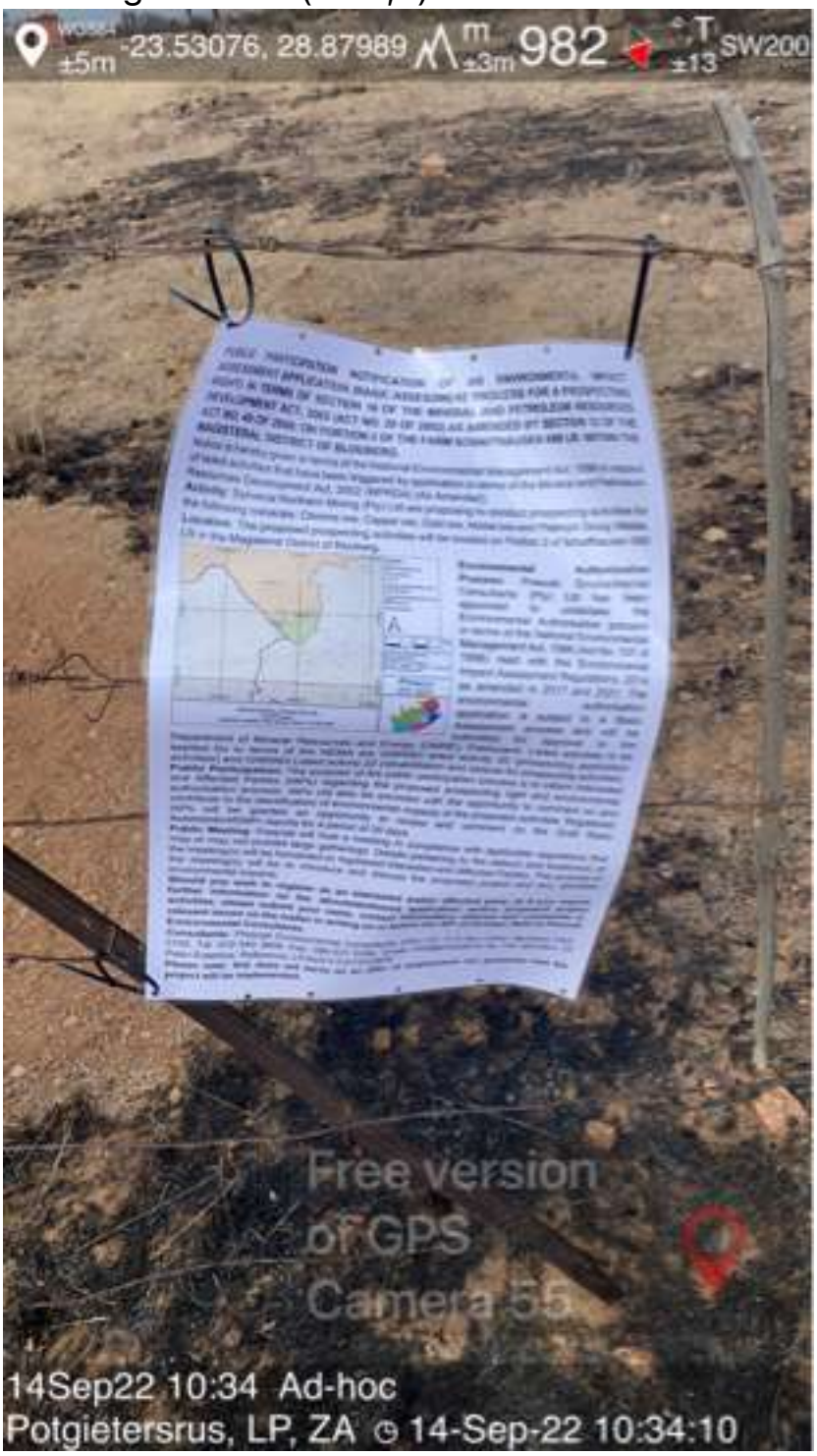
Altitude: 982 (±3m)
Heading: SW200 (±13°,T)



Point 2. Title: Schaffhausen SN2 📸 14Sep22 10:45
📸
🏷️ Ad-hoc
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◷ 14-Sep-22 10:45:39
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UTM:35s 691916 7396466
MGRS:35KPP9191596465 (±5m)
Altitude: 982 (±3m)
Heading: W277 (±13°,T)

Proof of consultation (emails send and received)

To protect personal information this will only be submitted in the final BAR to the DMRE

Letters / Registration forms received

To protect personal information this will only be submitted in the final BAR to the DMRE

Appendix 6: Specialist Reports

Desktop Surface Water Assessment

Desktop Surface Water Assessment Report

For

Sylvania Northern Mining (Pty) Ltd Investments

Situated on the Farms
Altona 696 LR, Gillemberg 861 LR, Non Plus Ultra 683 LR, Teneriffe 682 LR, Aurora 397 LR, Nonnenwerth 421 LR and Portion 2 of Schaffhausen 689 LR
within the
Magisterial Districts of Blouberg and Mogalakwena, Limpopo Province

Prepared by

Prescali
Environmental Consultants (Pty) Ltd

P.O. Box 2544
Montana Park
0159
Tel: 012 543 3808
Fax 086 621 0294
E-mail: info@prescali.co.za

Title Page

Desktop Surface Water Assessment Report for Sylvania Northern Mining (Pty) Ltd Investments - situated on the Farms Altona 696 LR, Gillemberg 861 LR, Non Plus Ultra 683 LR, Teneriffe 682 LR, Aurora 397 LR, Nonnenwerth 421 LR and Portion 2 of Schaffhausen 689 LR within the Magisterial Districts of Blouberg and Mogalakwena, Limpopo Province.

Compiled By:	**Compiled For:**
Prescali Environmental Consultants (Pty) Ltd P.O. Box 2544 Montana Park 0159 Tel: 012 513 3808 Fax: 086 621 0294 E-mail: info@prescali.co.za Web: www.prescali.co.za	Sylvania Northern Mining (Pty) Ltd P.O. Box 976 Florida Hills 1716 Tel: 011 673 1171 Fax: 011 673 0365

Authors:	Dr P. Erasmus (Ph.D. Zoology) *(EAPASA)(Pri.Sci.Nat* 
Reviewer:	E van der Linde *(EAPASA)(Pri.Sci.Nat)* 
Report Number:	Sylvania Northern Mining (Pty) Ltd/Surface.v1.
Report Date:	23 September 2022

Executive Summary

Prescali Environmental Consultants (Pty) Ltd was appointed by Sylvania Northern Mining (Pty) Ltd Investments to conduct a desktop surface water assessment for the proposed Prospecting Right activities within the Capricorn and Waterberg District Municipalities in the Limpopo Province.

The proposed prospecting activities will consist of non-invasive (desktop) and invasive (ground geophysics and soil geochemical samplings / drilling / trenching) activities. It is also possible that a contractor's camp may be established close to the prospecting activities.

	Altona 696 LR, Gillemberg 861 LR, Non Plus Ultra 683 LR, Teneriffe 682 LR, Aurora 397 LR, Nonnenwerth 421 LR	**Schaffhausen 689 LR**
Drill Site	10 m x 10 m Drill Sites 1 Drill site= 100 m^2 Total Drill Site Areas (6) = 600 m^2	10 m x 10 m Drill Sites 1 Drill site= 100 m^2 Total Drill Site Areas: (4) = 400 m^2
Trenching	25 m x 2 m x 2 m Trench Sites 1 Trench = 50 m^2 Total Trench Areas (25) = 1 250 m^2	25 m x 2 m x 2 m Trench Sites 1 Trench = 50 m^2 Total Trench Areas: (8) = 400 m^2
Contractor's camp	N/A	400 m^2
Rehabilitation and Closure	1 850 m^2	1 200 m^2

The Sylvania Northern Mining (Pty) Ltd Investments prospecting right application area is situated in the Limpopo Water Management Area (WMA) (A primary catchment), specifically quaternary catchment A62E, A62F, A62G and A62H of the Mogalakwena River catchment. The Present Ecological Status (PES) for both the perennial rivers (Seepabana and Matlala Rivers) closest to the prospecting right area, decreased in classification from the 1999 assessment to the 2018 assessment. The Ecological Importance and Sensitivity Class (EI and ES) of the rivers in the applicable reaches are Moderate and Very Low respectively.

Based on the desktop assessment the proposed prospecting activities will have a low to medium risk / impact before mitigation / management measures are implemented and a low risk following the implementation.

If the management measures and recommendation as outlined in this report is implemented it is recommended that the proposed prospecting activities be authorized.

Main Activity	Secondary activity	Phase	Impact	Aspect	Risk Rating	Risk after management
Ground geophysics and soil geochemical sampling	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Low	Low
	Topsoil stockpiling	C, O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Low	Low
	Topsoil stockpiling/vegetation removal & general activities	C, O	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	Low	Low
	Replace topsoil	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Low	Low
	Replace topsoil	R	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	Low	Low
Trenching	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Low	Low
	Topsoil stockpiling	C, O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Low	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Risk Rating	Risk after management
	Topsoil stockpiling/vegetation removal & general activities	C, O	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	Low	Low
	Overburden stockpiling	C, O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Low	Low
	Containment of rainwater in trench	O	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Surface water quantity	Low	Low
	Heavy machinery equipment on site	C, O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	Low	Low
	Chemical toilets and sewage waste management	C, O	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	Surface water quality	Low	Low
	General waste generation	C, O	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Surface water quality	Low	Low
Resource drilling: drill pad and sump	Heavy machinery equipment on site	C, O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	Low	Low
	Drilling sludge	O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Low	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Risk Rating	Risk after management
	Vegetation removal & General activities	C, O	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	Low	Low
	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Low	Low
	Operation of drill pad sump	O	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Surface water quantity	Low	Low
	Chemical toilets and sewage waste management	C, O	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	Surface water quality	Low	Low
	Capping of Borehole	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Low	Low
	Rip impacted area	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Low	Low
	Rip impacted area	R	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	Low	Low
	General waste generation	C, O	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Surface water quality	Low	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Risk Rating	Risk after management
Access road	Vegetation removal (all access roads combined)	C	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	Low	Low
	Daily travelling to prospecting site	C, O	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	Low	Low
	Daily travelling to prospecting site	C, O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	Low	Low
	Rip road area	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Low	Low
Contractor camp	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Medium	Low
	Diesel storage	O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	Medium	Low
	Chemical toilets and sewage waste management	O	Contamination from spills from chemical toilets / emptying of septic tank (if applicable) could impact on water quality which in turn could impact on the biota and habitat as well.	Surface water quality	Medium	Low
	Storage of material	O	Contaminated water from material storage area could detrimentally impact on watercourses quality, biota and habitat.	Surface water quality	Medium	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Risk Rating	Risk after management
	Storage of general and hazardous waste	O	Contaminated water from waste storage area could detrimentally impact on watercourses quality, biota and habitat.	Surface water quality	Medium	Low
	Topsoil stockpiling/Vegetation removal & General activities	C, O	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	Medium	Low
	Vehicle maintenance	C, O	Hydrocarbon spills from vehicles and other equipment could negative impact water quality, habitat and biota.	Surface water quality	Medium	Low
	Removal of all infrastructures	R	Potential for spills from e.g. hydrocarbon tanks, septic tank, chemical toilets could impact on the surface water resource quality, habitat and biota if not managed.	Surface water quality	Medium	Low
	Rip impacted area	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	Medium	Low
	Camp area (whole off)	C, O	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Surface water quantity	Medium	Low
Prospecting activities (all)	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	C, O	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	Surface water quality	Medium	Low
	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	O	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	Surface water quantity	Medium	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Risk Rating	Risk after management
	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	R	During the rehabilitation phase water quality could be impacted as a result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.	Surface water quality	Medium	Low
Prospecting activities (all)	Cumulative impact: Schaffhausen	C, O	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	Surface water quality	Medium	Low
	Cumulative impact: Schaffhausen	O	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	Surface water quantity	Medium	Low
	Cumulative impact: Schaffhausen	R	During the rehabilitation phase water quality could be impacted as a result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.	Surface water quality	Medium	Low

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Abbreviations

%	Percentage
ºC	Degrees Celsius
ADI	Area of direct influence
AII	Area of indirect influence
DWAF	Department of Water and Forestry
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
km^2	Square kilometres
MAR	Mean annual runoff
mm	Millimetre
NEMA	National Environmental Management Act, 1998 (act 108 of 1998)
NEMWA	National Environmental Management Waste Act, 2008 (Act No. 59 of 2008)
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act, 1998 (Act 36 of 1998)
PES	Present Ecological Status
PFS	Pre-Feasibility Study
SACNASP`	South African Councill for Natural Applied Science Professionals
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
TDS	Total dissolved solids
WISA	Water Institute of South Africa
WMA	Water Management Area

1 CONTACT PERSON AND CORRESPONDING ADDRESS

Sylvania Northern Mining (Pty) Ltd Investments (Sylvania Northern) contracted Prescali Environmental Consultants (Pty) Ltd (Prescali) to manage the environmental authorisation process for the proposed prospecting activities on the Farms Altona 696 LR, Gillemberg 861 LR, Non Plus Ultra 683 LR, Teneriffe 682 LR, Aurora 397 LR, Nonnenwerth 421 LR and Portion 2 of Schaffhausen 689 LR.

Prescali was also appointed as an independent Environmental Assessment Practitioner (EAP) to undertake the necessary scope of work for a Desktop Surface Water Assessment to assist with the application for an Environmental Authorisation for the proposed prospecting activities on the Farms Altona 696 LR, Gillemberg 861 LR, Non Plus Ultra 683 LR, Teneriffe 682 LR, Aurora 397 LR, Nonnenwerth 421 LR and Portion 2 of Schaffhausen 689 LR within the Magisterial District of Blouberg, in the Limpopo Province.

1.1 DETAILS OF SPECIALIST

Specialist:	Dr Petro Erasmus	Ms Elaine van der Linde
Tel No:	012 543 3808	012 543 3808
Fax No:	086 621 0294	086 621 0294
E-mail address:	petro@prescali.co.za	elaine@prescali.co.za
Postal Address	P.O. Box 2544 Montana Park 0159	P.O. Box 2544 Montana Park 0159
Aspect	Assessment and document compilation	Document review

1.2 EXPERTISE OF THE SPECIALIST

- Dr. P. Erasmus has qualifications in Zoology and Biochemistry and further studied in Zoology and Marine pollution. She is registered as a Pr. Sci.Nat. (SACNASP), Natural Professional Scientist, for Ecological and Environmental Sciences (Registration number 116207) and with the Water Institute of South Africa (WISA). Dr. Erasmus is also registered with EAPASA as an Environmental Assessment Practitioner (2019/1473). Her qualifications are provided in Appendix 1.
- Ms. E. van der Linde has qualifications in Geology, Engineering Geology and Environmental Management and experience in Water and Environmental Management. She is registered as a Pr. Sci. Nat. (SACNASP), Natural Professional Scientist, Registration number 400219/05. Ms van der Linde is also registered with EAPASA. Her qualifications are provided in Appendix 1.

1.3 DECLARATION OF INDEPENDENCE

The Declarations of Independence is provided in Appendix 2.

1.4 SCOPE AND PURPOSE OF THIS REPORT

The scope and purpose of the surface water assessment is:

- To provide a description of the surface water environment (and its sensitivity) in and around the Sylvania Northern Mining (Pty) Ltd prospecting right application area; and
- To evaluate the potential impacts of the proposed prospecting sections and supporting infrastructure areas and activities on the nearby surface water resources.

2 PROJECT DESCRIPTION

2.1 NEED AND DESIRABILITY OF THE PROJECT

The "need and desirability" of a project "is the consideration of the strategic context of a development proposal within the broader societal needs and the public interest"[1] and should be determined by considering the broader community's needs and interests as reflected in a credible Integrated Development Plan (IDP), Spatial Development Framework (SDF) and Environmental Management Framework (EMF) for the area where the project will be taking place (DEA, 2017).

The minerals included in the prospecting rights application are: Platinum Group Minerals and Gold; Nickel and Copper; Cobalt and Chrome. Purely on the minerals itself the exploitation of these are desirable due to the uses of these minerals and the potential employment opportunities that could be generated should future mining be identified as a viable option.

Metal	Potential uses
Chrome (Cr)	Chromium is used in the Electroplating industry, in and in paints and dyes[2].
Cobalt (Co)	Cobalt is a component of various alloys that are used in the manufacture of aircraft engines, gas turbines, high speed steels. It is also used in magnets and magnetic recording devises, a catalyst in the petroleum and chemical industries and as a drying agent in paints and ink. The radioactive isotope Co-60 is used in medical treatment and to irradiate food for preservation and consumer protection[3].
Copper (Cu)	Used in the creation of various alloys such as bronze. Other uses are: agricultural poison, algicide in water purification and in a number of goods such as coins, cans, cooking foil, saucepans, electricity cables, planes, and space vehicles[4].
Gold (Au)	Mainly used to manufacture jewellery, glass it is also used in different parts in electronics items, as reflecting material in windows, embroidery thread and in medicine[5].
Nickel (Ni)	Nickel has the capacity to resist erosion and thus is used in the production of coins (money), wires, gas turbines, rocket engines, and alloys used for armour plating, nails and pipes. In combination with copper (Monel alloys) it is resistant to sweater corrosion and thus is used in propeller shafts of boats and desalination plants.[6]
Platinum Group Metals (PGM)	Platinum Group Metals[7] are known for their purity, high melting points, catalytic / oxidation and reduction properties and corrosion resistance, PGMs are utilized in various industrial processes, technologies and commercial applications. Consumer and industrial products include flat panel monitors, glass fibre, medical tools, computer hard drives, nylon and razors. Platinum, palladium and rhodium are also used as autocatalysis and pollution control in the automotive sector.

One of the main targets identified in the Mogalakwena IDP[8] is a "Reduction of official unemployment rate from 15.9% in 2014 to 14% by 2020. (Expanded unemployment rate from 30.9% in 2014 to less than 33% by 2020)" on a provincial level. For the Mogalakwena LM, according to Census 2011, of the 78 647 economically active (employed or unemployed but looking for work) people in the district, 40,2% are unemployed. The unemployment rate of Mogalakwena is almost double that of the other municipalities in the district. This could be attributed to a reduction in mining activities in recent years.

[1] https://cdn.slrconsulting.com/uploads/2020-06/TEPSA_11B12B_DSR_Chap5.pdf 23 June 2022
[2] https://byjus.com/chemistry/chromium/#uses-of-chromium 15 September 2022
[3] https://byjus.com/chemistry/cobalt/ 4 November 2021
[4] https://byjus.com/chemistry/copper/ 4 November 2021
[5] https://byjus.com/chemistry/gold/ 15 September 2022
[6] https://byjus.com/chemistry/nickel/ 4 November 2021
[7] https://www.platinumgroupmetals.net/pgm-markets/default.aspx 4 November 2021
[8] https://www.cogta.gov.za/cgta_2016/wp-content/uploads/2020/12/Mogalakwena-Final_IDP_2020-21-1.pdf 9 September 2022

Of the 39 515 economically active youth (15–35 years) in the area, 51,7% are unemployed, which is also the highest in the district.

From the Blouberg IDP[9] "Employment rate of Blouberg declined by 1% from 9178 to 9130 between 2000 and 2010 before recovering by 6.7% to 13 655 in 2016".

The potential for employment should the prospecting indicate that mining is viable would be good for the Local Municipalities employment rate.

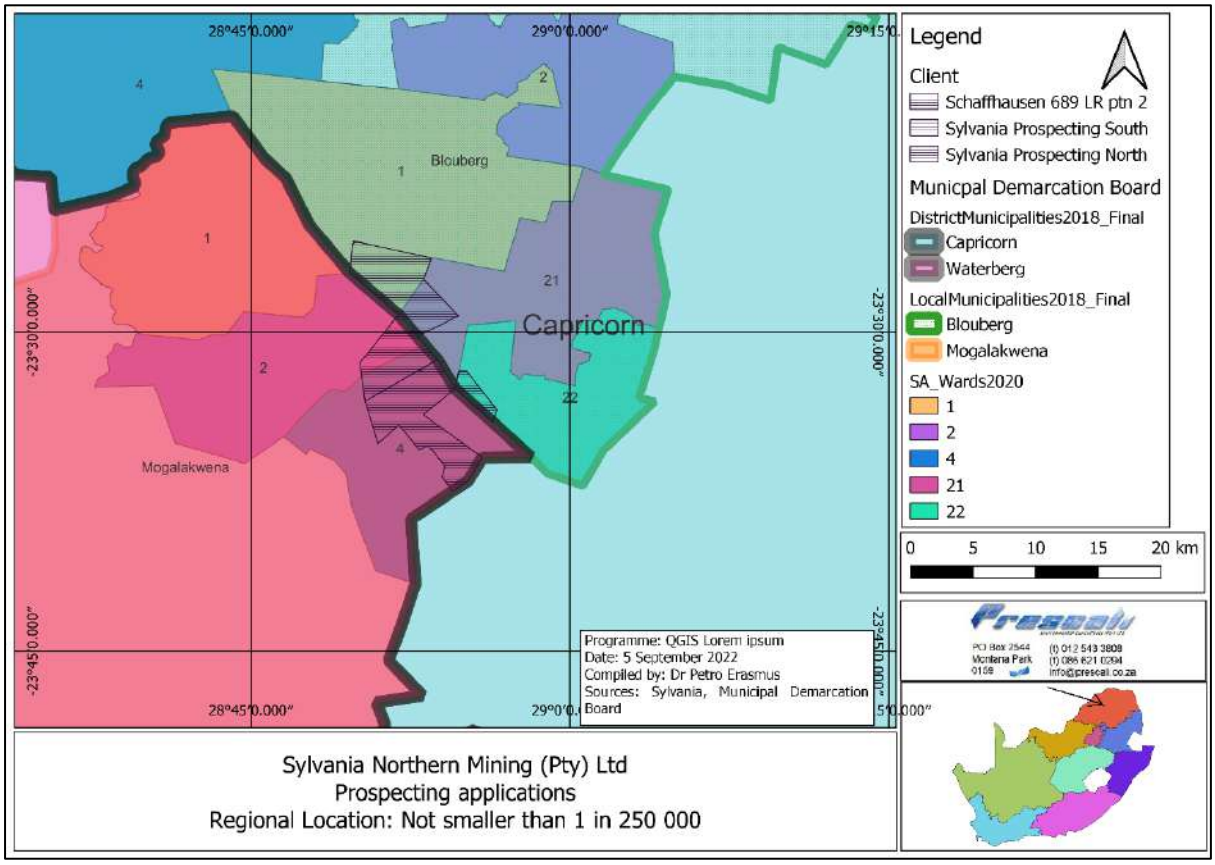


Figure 2-1: Location of the surface water assessment area

2.2 DESCRIPTION OF THE EXISTING AND PROPOSED ACTIVITIES

From Google Earth™ it can be seen that the area is undeveloped though agricultural fields are visible as well as residential (village) areas.

The following sections outline the proposed prospecting activities and the phases and timelines in which they will occur.

2.2.1 Non-Invasive Activities:

2.2.1.1 Phase 1

- **1.1 – 1.3 Investigate academic data and liaise with communities:** [Year 1; Duration: 6 Months]: Historical mining data and academic literature references will be acquired and reviewed. The data includes historical borehole information and any available geological maps.

[9] http://www.blouberg.gov.za/sstaff/pages/sites/blouberg/documents/idp/SUMMARY%20OF%20THE%20IDP.pdf 9 September 2022

Additional relevant information will also be acquired. This newly acquired information will be scrutinised, inventoried and verified (QA/QC procedure). Relevant academic studies about the area will also be examined for details on controls of mineralisation. Remote sensing data including satellite imagery, regional airborne geophysical data will also be acquired.

- **1.4 Desktop study: [Year 1; Duration: 1 month]:** A desktop study will be undertaken with a focus on the controls of mineralisation in the project area. The study aims to better understand the mineralisation features to define detailed exploration target areas more accurately.
- **1.5 Inventories, capture and QA/QC and database creation: [Year 1; Duration: 5 months]:** The above data will be compiled into a geological database in GIS digital map format to perform target generation exercises as well as geological modelling during later stages of the project.
- **1.6 Preliminary site visit: [Year 1; Duration: 1 week]:** A field visit will be undertaken to familiarise the applicant with surface features (such as cultural features, infrastructure, water bodies and wetlands) in the project area and to meet the surface landowners. During this visit farm boundaries within the project area and farming activities will be verified. An effort will be made to identify any factors that may impact the exploration program. The information collected during the site visit will be used to derive and prioritise preliminary exploration targets.
- **1.7 – 1.8 Regional geochemistry and geophysical interpretation:** [Year 1; Duration: 4 months]: Existing regional soil geochemical data and geophysical data will be interpreted to derive exploration targets in the prospecting area.
- **1.9 Integrate information and define exploration targets:** [Year 1; Duration: 1 month]: Information collected will be analysed and interpreted. Preliminary exploration targets will be delineated and ranked according to appropriate prospect activity parameters including geological stratigraphy and structures, historic exploration results, etc. This will permit an exploration strategy to be devised for the project area.

2.2.1.2 Phase 2

- **2.1 – 2.2 Ground geophysics and soil geochemical sampling:** [Year 2; Duration: 10 months]: Please refer to the invasive exploration section.
- **2.3 Trenching:** [Year 2; Duration: 5 months]: Please refer to the invasive exploration section.

2.2.1.3 Phase 3

- **3.1 Drilling:** [Year 3; Duration: 8 months]: Please refer to the invasive exploration section.
- **3.2 Logging, sampling and analysis:** [Year 3; Duration: 12 Months]: Logging of the lithology, mineralization, structure and alteration will be undertaken on all the drill holes, followed by a sampling of the mineralized sections of the drill holes. Included in the number of samples produced per drill hole will be the QA/QC samples (approximately about 30%). Samples will be sent to a commercial laboratory for elemental analysis.
- **3.3 Geological modelling:** [Year 3; Duration: 6 Months]: Utilising all the detailed geological and grade information, a geological model for the deposit will be generated.

2.2.1.4 Phase 4

- **4.1 Resource drilling:** [Year 4; Duration: 4 Months]: Please refer to the invasive exploration section.
- **4.2 Estimation of resource:** [Year 4; Duration: 3 Months]: Utilising all the detailed geological and grade information, an estimation of the resource will be undertaken for the deposit.

- **4.3 Pre-feasibility study:** [Year 4; Duration: 12 Months]: A pre-feasibility study investigates whether a concept satisfies the objectives and the technical, economic, social and environmental constraints for a particular project. Preparation for the pre-feasibility study will include: -
    - Initial conceptual mine planning
    - Planning the infrastructure requirements
    - Environmental management planning
    - Financial modelling
    - Market analysis
    - Analysis of transport logistics to market
    - Assessment of personnel and training requirements
    - Assessment of socio-economic factors
    - Permitting requirements

2.2.1.5 Phase 5

- **5.1 Feasibility study:** [Year 5; Duration: 6 Months]: A feasibility study is multidisciplinary by nature requiring the highest levels of expertise available. Such studies are both costly and time-consuming.

2.2.2 Invasive Activities

It is of significance to note that the specific exploration methods to be employed will depend on the results generated from previous phases and this programme assumes that the results are positive in each stage. It should also be noted that the first step in any exploration programme is to attempt to acquire and compile any existing exploration data in the area. Should this be successful, certain items in the programme could be reduced or could even become redundant and the pace of the entire programme could be accelerated.

- **2.1 – 2.2 Ground geophysics and soil geochemical sampling:** [Year 2; Duration: 10 months]: Geochemical sampling campaigns with pre-designed sampling grids of 250 m x 250 m will be undertaken on the prospecting areas. The collected samples will be analysed for major elements with the use of a portable XRF to enable the creation of geochemical anomaly maps. Ground magnetic surveys will be carried out to delineate structural features which may control mineralisation in the prospect area.
    - The sample points will be 250 m apart from each other. Two soil samples will be taken at each sample point from the same source. The soil sample will usually entail the removal of the top 20-30 cm of soil using a hand shovel, and 2 samples of 3-5 kg each will be bagged. A GPS point will be taken. The hole from where the sample is taken does not exceed 1m in depth, and will be a maximum of 1 m^2. The hole will be filled once the sample is taken with the material that was initially removed. The location test holes will usually be shifted slightly as not to affect the vegetation in the immediate vicinity. The work is carried out on foot, with a hand shovel and does not entail the use of any machinery on the sample area. The soil test area will be photographed before, during, and after the sample collection is complete.
    - The 250 m grid will not be established over the entire area, but will be selected based on the findings from the year 1 desktop study.
- **Trenching:** [Year 2; Duration: 5 months]: Eight short (25 m x 2 m x 2 m) trenches will be excavated over the outcrop positions of the defined orebodies. The trenches will be geologically mapped and the sidewalls of the trenches will be sampled. Once this is complete, the trenches will be refilled. During the trenching and mapping, temporary barriers will be erected around the excavation to prevent people/animals from falling into the trenches.

- **3.1 and 4.1 Resource drilling:** [Year 3; Duration: 8 months]: Drilling (diamond or RC) of the prospective areas will commence establishing the presence of mineralisation in the prospect areas. Geological borehole logging, downhole geophysical logging, core magnetic susceptibility measurement and sampling will also be carried out. It is anticipated that initially approximately 4 drill holes will be drilled. Drill holes could vary in depth from 150 to 350 m, with an average depth of 250 meters. The total amount of drilling to be budgeted for at this stage is 750 meters depth. Depending on the results of this drilling further 1 drill hole totalling 250 meters depth may be required.
-

	Altona 696 LR, Gillemberg 861 LR, Non Plus Ultra 683 LR, Teneriffe 682 LR, Aurora 397 LR, Nonnenwerth 421 LR	**Schaffhausen 689 LR**
Drill Site	10 m x 10 m Drill Sites 1 Drill site= 100 m^2 Total Drill Site Areas (6) = 600 m^2	10 m x 10 m Drill Sites 1 Drill site= 100 m^2 Total Drill Site Areas: (4) = 400 m^2
Trenching	25 m x 2 m x 2 m Trench Sites 1 Trench = 50 m^2 Total Trench Areas (25) = 1 250 m^2	25 m x 2 m x 2 m Trench Sites 1 Trench = 50 m^2 Total Trench Areas: (8) = 400 m^2
Contractor's camp	N/A	400 m^2
Rehabilitation and Closure	1 850 m^2	1 200 m^2

Sample analysis of all the potential intersections will be carried out by a certified commercial laboratory. For budgeting purposes, it is estimated that about 50% of the drilled meters will be sampled.

The geological information generated will be used to model and estimate the resource. The resources will at least be expected to be in the Indicated Category according to the JORC code.

2.2.3 Description of Pre-/Feasibility Studies

It is envisaged that a Pre-Feasibility Study (PFS) will commence following Phase 3 exploration. A PFS will be done to investigate various options and to be able to choose the most appropriate option to conduct a full Feasibility Study on. The study will comprise of, inter alia, the following:

- Geological modelling and geological resource statement.
- Mine planning and preliminary design.
- Study of surface infrastructural requirements and general engineering.
- Metallurgical studies and preliminary plant design.
- Studies relating to water availability and usage.
- Studies relating to electricity requirements and availability.
- Environmental Impact Studies.

The results of the studies will form the basis of a financial model to test the viability of the various options and the proposed project.

All studies will be conducted by independent professionals.

2.3 PROPOSED ALTERNATIVES

No alternatives were evaluated for this assessment. It is anticipated that the final site layout plan implemented by the application will take into considerations the recommendation of this report before finalising the location of the site-specific prospecting activities such as contractors camp, drilling sites and trenches.

3 LEGISLATION AND GUIDELINES THAT HAVE BEEN CONSIDERED

3.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 108 OF 1998) AS AMENDED

The overarching principles of sound environmental responsibility are reflected in the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The principles of the Act include:

- Environmental management must place people and their needs at the forefront of its concern[10].
- Development must be socially, environmentally and economically sustainable[11].
- That biological diversity is maintained, that pollution and degradation of the environment is avoided or minimised, that disturbance of landscapes and cultural heritage is avoided or minimised, that waste is avoided or minimised and recycled or disposed of in a responsible manner, that the use of non-renewable resources is responsible and equitable, that a risk averse and cautious approach is applied (i.e. the Precautionary Principle is used) and that negative impacts on the environment are anticipated and prevented or minimised and remedied where they cannot be avoided[12].
- Environmental management should be integrated and consider the best practicable environmental option[13].
- Equitable access to resources, public participation, cradle to grave philosophies, transparency, application of global and international responsibilities, the Polluter Pays principle and the recognition of sensitive and stressed ecosystems[14].

NEMA states that before certain development activities can be undertaken, an environmental impact assessment must be followed. The environmental departments of the various provincial governments are responsible for evaluating applications that have been submitted in terms of the EIA regulations[15]. Based on the findings of the EIA process, a decision will be made by the Limpopo Department of Agriculture, Conservation and Environment on whether the development is authorised or refused.

The National Department of Environmental Affairs are responsible for evaluating projects of national importance (for instance projects that cross provincial or national boundaries).

The written decision called an Environmental Authorisation, is a legal document setting out the conditions of the authorisation and the actions required to protect human health and the environment. Any affected party may appeal against the decision contained in an environmental authorisation. Appeals must be lodged with the Minister who considers appeals in terms of the relevant provisions of NEMA and the environmental regulations.

[10] Section 2(2) of the NEMA.
[11] Section 2(3) of the NEMA.
[12] Section 4(a) of the NEMA.
[13] Section 4(b) of the NEMA.
[14] Section 4(d)(e)(f)(k)(n)(p)(r) of the NEMA.
[15] Government Gazette No. 40772 7 April 2017: R324/R324/R326/R327

3.1.1 Integrated Environmental Management

Integrated Environmental Management (IEM) is a philosophy and procedure for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development. The aim of the IEM guidelines is to ensure a pro-active approach to sourcing, collating and presenting information at a level that can be interpreted at all levels.

3.1.2 Content of Specialist Reports

Government Notice R982 as published in Government Gazette 38282 dated 4 December 2014 and as amended by Government Notice 326 in Government Gazette 40772 dated 7 April 2017, outlines in Appendix 6 the requirements for specialist reports. The table below provides an overview of the requirements and the applicable sections of this report.

Table 3-1: Legislative report requirements GNR982

GNR982 as amended by GN326	Report Section
(1) A specialist report prepared in terms of these Regulations must contain—	
(a) details of—	
(i) the specialist who prepared the report; and	1.1
(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	1.2
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	1.3
(c) an indication of the scope of, and the purpose for which, the report was prepared;	1.4
(cA) an indication of the quality and age of base data used for the specialist report;	4.1
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	7.1, 7.2, 7.3
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	4.2
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	4.4
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	2.3 0
(g) an identification of any areas to be avoided, including buffers;	5.4
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	5.4 Figure 5-15
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	9
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	7.1 7.2
(k) any mitigation measures for inclusion in the EMPr;	8
(l) any conditions for inclusion in the environmental authorisation;	9
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	8.1
(n) a reasoned opinion—	
(i) whether the proposed activity, activities or portions thereof should be authorised;	9
(iA) regarding the acceptability of the proposed activity or activities; and	9
(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	8, 9

GNR982 as amended by GN326	Report Section
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Not applicable
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not applicable
(q) any other information requested by the competent authority.	Not applicable
(2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Not applicable

On 20 March 2020 "Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the NEMA when applying for environmental authorization" was published in GN 320 (Government Gazette 43110). One of the themes identified and covered by this protocol are Aquatic biodiversity. It is important to note that the protocol replaces the requirements of Appendix 6 of the EIA Impact regulations as outlined above. The protocol as published are outlined below. Please refer to Section 5.4 for the compliance statement for sites that classified as Low sensitivity.

Table 3-2: GNR320 site verification requirements

GN 320	**Report Section**
1. The site sensitivity verification must be undertaken by an Environmental Assessment Practitioner or a specialist.	1.1 and 1.2
2. The sensitivity verification must be undertaken through the use of:	
a. A desktop analyses, using satellite imagery;	Section 5.4
b. A preliminary on-site inspection; and	Section 5.4
c. Any other available and relevant information.	Existing GIS information: Table 4-1
3. The outcome of the site sensitivity verification must be recorded in the form of a report that:	
a. Confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructures, the change in vegetation cover status etc.;	Section 5.4
b. Contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and	Section 5.4
c. Is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.	This report

The following baseline descriptions must be included in the report.

Table 3-3: Content of specialist report GN320

Requirement	Section
2.3.1. a description of the aquatic biodiversity and ecosystems on the site, including; (a) aquatic ecosystem types; and (b) presence of aquatic species, and composition of aquatic species communities, their habitat, distribution and movement patterns;	5.3
2.3.2. the threat status of the ecosystem and species as identified by the screening tool;	5.4
2.3.3. an indication of the national and provincial priority status of the aquatic ecosystem, including a description of the criteria for the given status (i.e. if the site includes a wetland or a river freshwater ecosystem priority area or sub catchment, a	5.2.4

Requirement	Section
strategic water source area, a priority estuary, whether or not they are free -flowing rivers, wetland clusters, a critical biodiversity or ecologically sensitivity area); and	
2.3.4. a description of the ecological importance and sensitivity of the aquatic ecosystem including:	5.2.3
(a) the description (spatially, if possible) of the ecosystem processes that operate in relation to the aquatic ecosystems on and immediately adjacent to the site (e.g. movement of surface and subsurface water, recharge, discharge, sediment transport, etc.); and	5.2.2 5.2.3 5.3
(b) the historic ecological condition (reference) as well as present ecological state of rivers (in- stream, riparian and floodplain habitat), wetlands and/or estuaries in terms of possible changes to the channel and flow regime (surface and groundwater).	5.2.3
2.4. The assessment must identify alternative development footprints within the preferred site which would be of a "low" sensitivity as identified by the screening tool and verified through the site sensitivity verification and which were not considered appropriate.	2.3
2.5. Related to impacts, a detailed assessment of the potential impacts of the proposed development on the following aspects must be undertaken to answer the following questions:	7.1 7.2 7.3
2.5.1. Is the proposed development consistent with maintaining the priority aquatic ecosystem in its current state and according to the stated goal?	
2.5.2. is the proposed development consistent with maintaining the resource quality objectives for the aquatic ecosystems present?	
2.5.3. how will the proposed development impact on fixed and dynamic ecological processes that operate within or across the site? This must include:	
(a) impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes);	
(b) will the proposed development change the sediment regime of the aquatic ecosystem and its sub -catchment (e.g. sand movement, meandering river mouth or estuary, flooding or sedimentation patterns);	
(c) what will the extent of the modification in relation to the overall aquatic ecosystem be (e.g. at the source, upstream or downstream portion, in the temporary I seasonal I permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.); and	
(d) to what extent will the risks associated with water uses and related activities change;	
2.5.4. how will the proposed development impact on the functioning of the aquatic feature? This must include:	
(a) base flows (e.g. too little or too much water in terms of characteristics and requirements of the system);	
(b) quantity of water including change in the hydrological regime or hydroperiod of the aquatic ecosystem (e.g. seasonal to temporary or permanent; impact of over -abstraction or instream or off stream impoundment of a wetland or river);	
(c) change in the hydrogeomorphic typing of the aquatic ecosystem (e.g. change from an unchanneled valley-bottom wetland to a channelled valley-bottom wetland);	
(d) quality of water (e.g. due to increased sediment load, contamination by chemical and/or organic effluent, and/or eutrophication);	
(e) fragmentation (e.g. road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal); and	
(f) the loss or degradation of all or part of any unique or important features associated with or within the aquatic ecosystem (e.g. waterfalls, springs, oxbow lakes, meandering or braided channels, peat soils, etc.);	

Requirement	Section
2.5.5. how will the proposed development impact on key ecosystems regulating and supporting services especially: (a) flood attenuation; (b) streamflow regulation; (c) sediment trapping; (d) phosphate assimilation; (e) nitrate assimilation; (f) toxicant assimilation; (g) erosion control; and (h) carbon storage?	
2.5.6. how will the proposed development impact community composition (numbers and density of species) and integrity (condition, viability, predator - prey ratios, dispersal rates, etc.) of the faunal and vegetation communities inhabiting the site?	
2.6. In addition to the above, where applicable, impacts to the frequency of estuary mouth closure should be considered, in relation to: (a) size of the estuary; (b) availability of sediment; (c) wave action in the mouth; (d) protection of the mouth; (e) beach slope; (f) volume of mean annual runoff; and (g) extent of saline intrusion (especially relevant to permanently open systems).	Not Applicable

Table 3-4: Content of compliance statement (Low Sensitivity) or specialist assessment (high sensitivity)

GN 320	**Specialist assessment**
The compliance statement / assessment must be prepared by a suitably qualified specialist registered with the SACNASP, with expertise in the field of aquatic sciences.	Dr Erasmus is registered with SACNASP in the field of environmental and ecological sciences. She is suitably qualified to conduct the assessment, please refer to Appendix 1 of the main Report
The compliance statement / assessment must: be applicable to the preferred site and the proposed development footprint;	This report evaluated the Prospecting Right application footprint area.
2.7 The findings of the specialist assessment must be written up in an Aquatic Biodiversity Specialist Assessment Report that contains, as a minimum, the following information:	
2.7.1. contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Section 1.1
2.7.2. a signed statement of independence by the specialist;	Appendix 2
2.7.3. a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 4
2.7.4. the methodology used to undertake the site inspection and the specialist assessment, including equipment and modelling used, where relevant;	Section 4
2.7.5. a description of the assumptions made, any uncertainties or gaps in knowledge or data;	Section 9
2.7.6. the location of areas not suitable for development, which are to be avoided during construction and operation, where relevant;	Section 5.4

GN 320	Specialist assessment
2.7.7. additional environmental impacts expected from the proposed development;	Section 7
2.7.8. any direct, indirect and cumulative impacts of the proposed development on site;	Section 7
2.7.9. the degree to which impacts and risks can be mitigated;	Section 7.2
2.7.10. the degree to which the impacts and risks can be reversed;	Section 7.3
2.7.11. the degree to which the impacts and risks can cause loss of irreplaceable resources;	Section 7
2.7.12. a suitable construction and operational buffer for the aquatic ecosystem, using the accepted methodologies;	Section 5.4
2.7.13. proposed impact management actions and impact management outcomes for inclusion in the Environmental Management Programme (EMPr);	Section 8
2.7.14, a motivation must be provided if there were development footprints identified as per paragraph 2.4 above that were identified as having a "low" aquatic biodiversity sensitivity and that were not considered appropriate;	Section 5.4
2.7.15. a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability or not of the proposed development and if the proposed development should receive approval or not; and	Section 10
2.7.16. any conditions to which this statement is subjected.	Section 10

3.2 NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008

The National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) (NEMWA) came into effect on 1 July 2009 and aims to:

- Reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.
- Provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government.
- Provide for specific waste management measures.
- Provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; and to
- Provide for compliance and enforcement; and to provide for matters connected therewith.

Important Regulations regarding residue deposits and stockpiles and associated infrastructures are the following:

- GN R632 of 24 July 2015 (as amended): National Environmental Management: Waste Act (59/2008): regulations regarding the planning and management of residue stockpiles and residue deposits, 2015.

The NEMWA was amended in 2014 in Act No. 26 of 2014: National Environmental Management: Waste Amendment Act, 2014. In June 2022 the NEMWA was amended again and residue deposits were removed from the definition of waste in the National Environmental Management Amendment Act IV.

3.3 NATIONAL WATER ACT, 1998

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to manage the national water resources[16] to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected and also requires integration of the management of water resources with the delegation of powers to institutions at the regional or catchment level.

The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways, which consider:

- Meeting the basic human needs of present and future generation;
- Promoting equitable access to water;
- Redressing the results of past racial discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Providing for the growing demand of water use;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations;
- Promoting dam safety; and
- Managing floods and droughts.

Water uses are authorised under the following sections of the National Water Act:

- Section 39: General Authorisation; and
- Section 40: License.

There are 11 water uses described in Section 21 of the National Water Act:

(a) taking water from a water resource;
(b) storing water;
(c) impeding or diverting the flow of water in a watercourse[17];
(d) engaging in a stream-flow reduction activity contemplated in Section 36;
(e) engaging in a controlled activity identified as such in section 37(1) or declared under Section 38(1);
(f) discharging waste or water containing waste into a water resource through a pipe, canal, Sewer, sea outfall or other conduit;
(g) disposing of waste in a manner which may detrimentally impact on a water resource;
(h) disposing in any manner of water which contains waste from, or which has been heated in any industrial or power generation process;
(i) altering the bed, banks. course or characteristics of a watercourse;
(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
(k) using water for recreational purposes.

The above is regulated by the following:

- Government Gazette No. 32805 of 18 December 2009: No. 1198: General Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) in terms of Section 21(c) and (i) for the purpose of rehabilitating a wetland for conservation purposes. Schedule: Impeding or

[16] Water resource includes a watercourse, surface water, estuary or aquifer

[17] Watercourse: (a) a river or spring, (b) a natural channel in which water flows regularly or intermittently; (c) a wetland, lake or dam into which, or from which, water flows; and (d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

diverting the flow of water in a water course (Section 21(c)) and Altering the bed, banks, course or characteristics of a watercourse (Section 21(i)).

- Government Gazette No. 40229 of 26 August 2016: No. 509: General Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for water uses defined in Section 21(c) and Section 21(i).
- Government Gazette No. 36920 of 6 September 2013: No. 665: Revision of General Authorisations in terms of Section 39 of the National Water Act 1998 (Act No. 36 of 1998) (The Act). *Applicable water uses described are: Section 21(e), (f), (g), (h), (j).*
- Revision of General Authorisation for the taking and storage of water was published in Government Gazette 40243 of 2 September 2016 and came into effect on 2 March 2017.

Of specific importance for mines are:

- GN704 of 4 July 1999: Regulations on use of water for mining and related activities aimed at the protection of water resources as published in Government Gazette 20119. Commencement date: 4 June 1999.

Of importance is also the guidelines published by the (then) Department of Water and Forestry:

- Best Practice Guidelines dealing with aspects of the DHSWS's water management:
    - H1. Integrated Mine Water Management;
    - H2. Pollution Prevention and Minimisation of Impacts;
    - H3. Water Reuse and Reclamation;
    - H4. Water Treatment;

- Best Practice Guidelines dealing with general water management strategies, techniques and tools, which could be applied cross-sectoral activities:
    - G1. Storm Water Management;
    - G2. Water and Salt Balances;
    - G3. Water Monitoring Systems;
    - G4. Impact Prediction;
    - G5. Water Management Aspects for Mine Closure;

    - Best Practice Guidelines dealing with specific Mining activities or aspects. These guidelines address the prevention and management of impacts from:
        - A1. Small-Scale Mining;
        - A2. Water Management for Mine Residue Deposits;
        - A3. Water Management in Hydrometallurgical Plants;
        - A4. Pollution Control Dams;
        - A5. Water Management for Surface Mines; and
        - A6. Water Management for Underground Mines.

3.4 OTHER RELEVANT LEGISLATION

In addition to the foregoing, the project must also comply with the provisions of other relevant international and national legislation and conventions, which includes the following:

- Constitution of South Africa, 1996 (Act No. 108 of 1996);
- Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965);
- Hazardous Substances Act and Regulations, 1983 (Act No. 85 of 1983);
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004);
- Carbon Tax Act, 2019 (Act No. 15 of 2019);

- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004);
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Nuclear Energy Regulator Act, 1999 (Act No. 47 of 1999);
- National Parks Act, 1976 (Act No. 57 of 1976);
- National Spatial Biodiversity Assessment, 2011 (as available from South African National Biodiversity Institute (SANBI));
- Nuclear Energy Act, 1999 (Act No. 46 of 1999);
- Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and Major Hazard Installation Regulations;
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003).

The requirements of these will be assessed and included in the specialist reports and the EIA/EMP.

3.5 Integrated Development Plans and Environmental Management Frameworks

3.5.1 Waterberg District Environmental Management Framework[18]

The purpose of this EMF is to develop a framework that will integrate policies and frameworks, and align different government mandates in a way that will streamline decision-making to improve cooperative governance and guide future development in an environmentally responsible manner. The key surface water issues identified in this District are:

- Water availability and utilisation
    - The relative scarcity of water in the Waterberg District is recognised by all sectors and groups in the district.
    - The protection of important water catchment areas from activities (dams, weirs, road/track/path crossings, removal indigenous vegetation, etc) that may have a negative impact on water production and runoff, and in particular the upper parts of river systems, is a major concern.
    - The need to determine and maintain ecological reserves for all the rivers in the area should be addressed as a matter of urgency.
    - The extensive occurrence of alien vegetation along certain waterways impacts negatively on water production and runoff.
    - Illegal dams and water extraction impact negatively on water production and runoff.
- Water quality and pollution
    - Water pollution was identified as one of the major issues in the district. Causes of water pollution include:
        - Failing of municipal sewage works (biggest concern);
        - Lack of proper sewage systems and management at lodges and tourism facilities on farms and game reserves in the area;
        - Other sources mentioned include agricultural pesticides and fertilisers as well as polluted water runoff from industries and mines.
    - The quality of water for human consumption is an issue in especially the rural settlements as well as some of the small towns.

[18] https://screening.environment.gov.za/ScreeningDownloads/EMF/WDEMF_Final_EMF_Report.pdf 02/08/2022

4 METHODOLOGY EMPLOYED DURING THE ASSESSMENT

4.1 DESKTOP ASSESSMENT

A desktop assessment was done using existing GIS database information and Google Earth™ imagery. Available documentation as available for other applications were used where relevant.

4.1.1 GIS Information sourced and used

This assessment was conducted to determine which water resources are available in and around the Prospecting Right area.

The desktop assessment looked at the Screening tool report generated for the area. In addition, the following Geographical Information Systems (GIS) data sets were used throughout this document.

Table 4-1: GIS data sets used in the desktop assessment

Data Set	Provider	Date
Sensitivity rating	Screening tool	August 2022
National Land cover	EGIS	2020
District and Local Municipalities Wards	Municipal Demarcation board	2018 2020
Location of Prospecting Right application	Sylvania	August 2022
2328 Hydrol Lines / Utilities, Educational, Public, Industrial, Elevation lines	Surveyor general	2013
2328 Land use	Surveyor general	2014
Water Resources of Southern Africa 2012 Study (WR2012 (Baily & Pitman, 2015)): Various .shp files	Water Research Commission	2015
NFEPA: River_FEPA.shp	SANBI/CSIR	July 2011
NFEPA: NFEPA_Rivers.shp	SANBI/CSIR	July 2011
NFEPA: Fishsanc.shp	SANBI/CSIR	July 2011
NFEPA: Fishsanc_All_Spp.shp	SANBI/CSIR	July 2011
NFEPA: ESA_FishSupportAreas.shp	SANBI	2011 & 2014
National Freshwater Ecosystem Priority Areas: FEPA_subWMA.shp	SANBI	July 2011
National Freshwater Ecosystem Priority Areas: FEPA_WMA.shp	SANBI	July 2011
NFEPA: NFEPA_Wetlands.shp	SANBI	July 2011
River Ecosystem threat status	(CSIR, 2018)	2018
National wetland 5 and Confidence map	(CSIR, 2018)	2018
Artificial wetland	(CSIR, 2018)	2018
DHSWS web site for information on Water quality data and rainfall data.	DHSWS	Refer to Tables where information is provided in this report
Various internet information sources as referenced in the document		

4.2 SITE VISIT

No site was conducted.

4.3 RIPARIAN VEGETATION ASSESSMENT

No riparian vegetation was conducted.

4.4 IMPACT ASSESSMENT METHODOLOGY

Appendix A of Regulation No. 509 of 26 August 2016 prescribed the Water Use Risk Assessment Protocol and this methodology was used. An outline of the methodology is indicated below.

Table 4-2: Risk Assessment Key

Severity: How severe does the aspects impact on the environment and resource quality characteristics (flow regime, water quality, geo-morphology, biota, habitat)?	
Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful and/or wetland(s) involved	5
Where "or wetland(s) are involved" it means the activity is located within the delineated boundary (the temporary, seasonal or permanent zone) of any wetland. The score of 5 is only compulsory for the significance rating.	
Spatial Scale: How big is the area that the aspect is impacting on?	
Area specific (at impact site)	1
Whole site (entire surface right)	2
Regional / neighbouring areas (downstream within quaternary catchment)	3
National (impacting beyond secondary catchment or provinces)	4
Global (Impacting beyond SA boundary)	5
Duration: How long does the aspect impact on the environment and resource quality?	
One day to one month, PES, EIS and/or REC not impacted	1
One month to one year, PES, EIS and/or REC impacted but no change in status	2
One year to 10 years, PES, EIS and/or REC impacted to a lower status but can be improved over this period through mitigation	3
Life of the activity, PES, EIS and/or REC permanently lowered	4
More than life of the organization/facility, PES and EIS scores, an E or F	5
PES and EIS (Sensitivity) must be considered.	
Frequency of the Activity: How often do you do the specific activity?	
Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5
Frequency of the incident/impact: How often does the activity impact on the environment?	
Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly / likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5
Legal Issues: How is the activity governed by legislation?	
No legislation	1
Fully covered by legislation (wetlands are legally governed)	5

Located within the regulated areas: Within the outer edge of the 1 in 100-year flood line or delineated riparian area as measured from the middle of the watercourse measured on both banks, or within a 500 m radius from the boundary of any wetland (The boundary of a wetland is the outer edge of the seasonal or temporary zone as delineated for the wetland)	
Detection	
Immediately	1
Without much effort	2
Need some effort	3
Remote and difficult to observe	4
Covered	5

Table 4-3: Rating Classes

Rating	Class	Management description
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated.
56 – 169	M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more andrequire specialist input. Licence required.
170 – 300	(H) High Risk	Always involves wetlands. Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve. Licence required.

A low-risk class must be obtained for all activities to be considered for a General Authorization.

Table 4-4: Calculations used to determine Rating Class

Consequence = Severity + Spatial Scale + Duration
Likelihood = Frequency of Activity + Frequency of Incident +Legal Issues + Detection
Risk = Consequence x Likelihood

5 DESCRIPTION OF THE SURFACE WATER ENVIRONMENT

5.1 CLIMATE DATA

The nearest town to the prospecting area is Baltimore (44 km north west) which has a Subtropical steppe climate (Classification: BSh). The district's yearly temperature is 23.26 ºC and receives about 57.75 millimetres of precipitation annually[19].

[19] https://tcktcktck.org/south-africa/limpopo/baltimore 02/08/2022

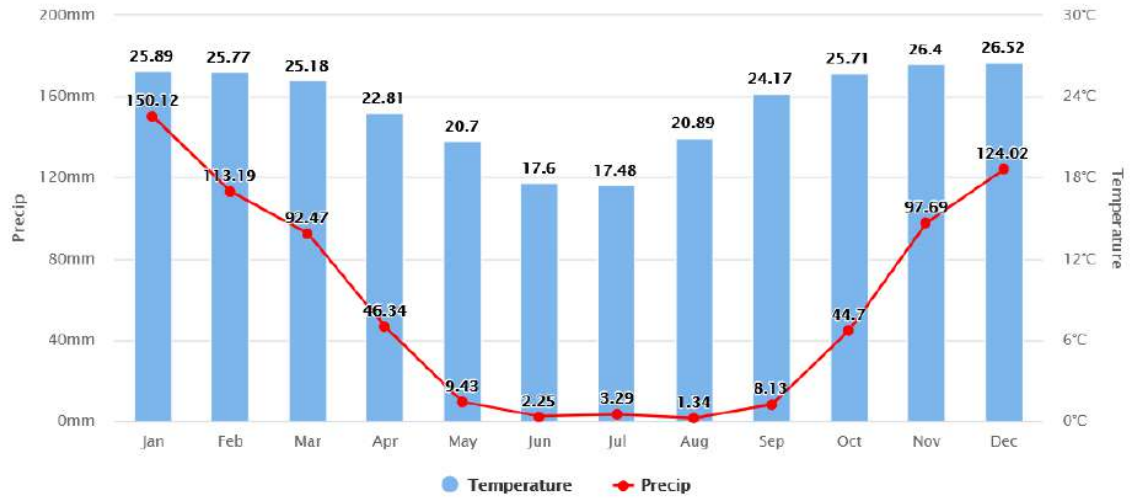


Figure 5-1: Baltimore monthly temperatures, precipitation and wind speed[19]

5.1.1.1 Precipitation and Evaporation

From the information from tcktcktck.org the average rainfall figures are provided in Table 5-1. Mean Annual Precipitation for the proposed Sylvania Northern prospecting area is indicated in Figure 5-2 and from WR2012 it ranges from 388 mm to 480 mm across the boundaries as indicated. With regards to evaporation, the proposed Sylvania Northern prospecting operations is located within the 2200 – 2600 mm A-pan evaporation zone, Figure 5-3.

Table 5-1: Mean climatic rainfall conditions for the project area [19]

Month	Average precipitation mm	Average precipitation days (≥ 1.0 mm)	Average relative humidity (%)
Jan	150.12	15.24	71.12
Feb	113.19	12.3	71.54
Mar	92.47	11.45	70.36
Apr	46.34	6.71	68.99
May	9.43	2.46	61.29
Jun	2.25	0.19	59.6
Jul	3.29	0.95	59.63
Aug	1.34	0.37	51.65
Sep	8.13	1.8	49.05
Nov	44.7	6.82	52.69
Oct	97.6	11.36	59.41
Dec	124.02	15.33	66.85
Year	57.75	7.08	61.85

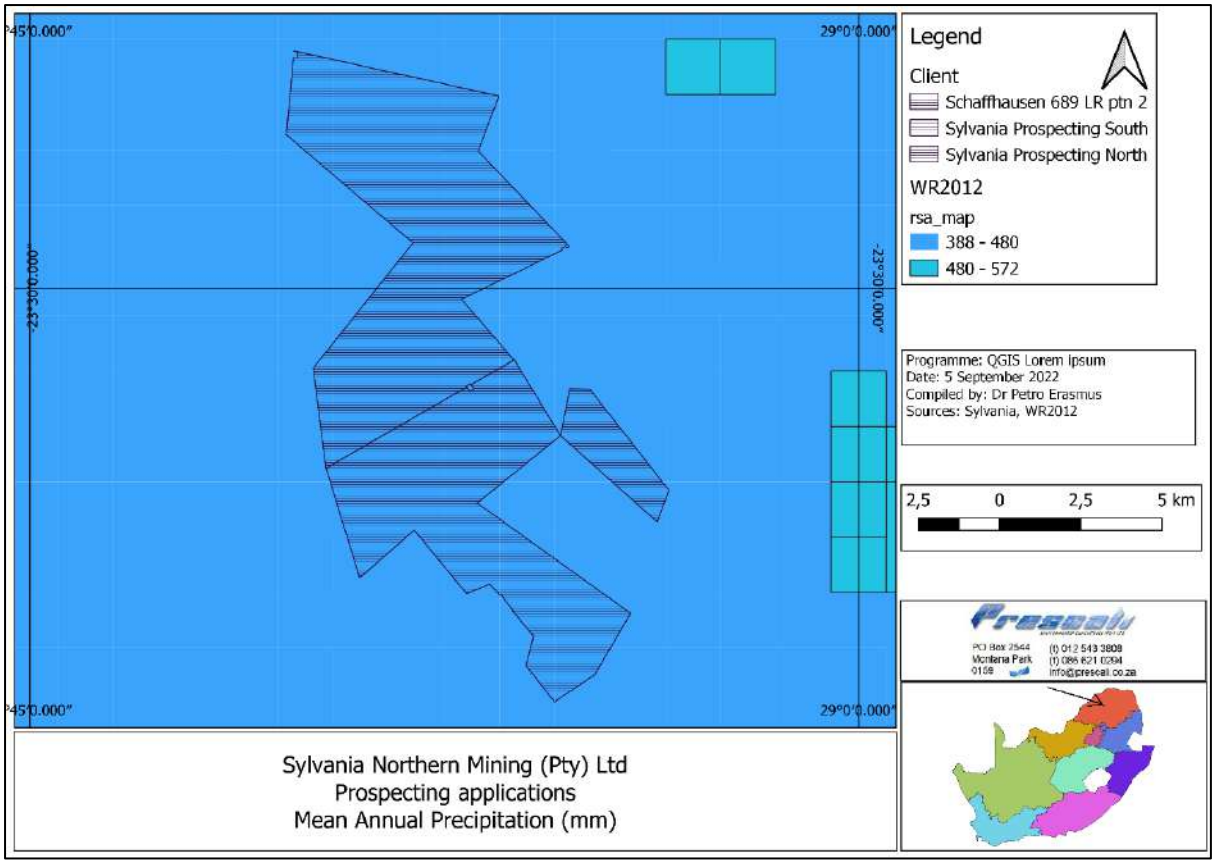


Figure 5-2: Mean annual precipitation (WR2012)

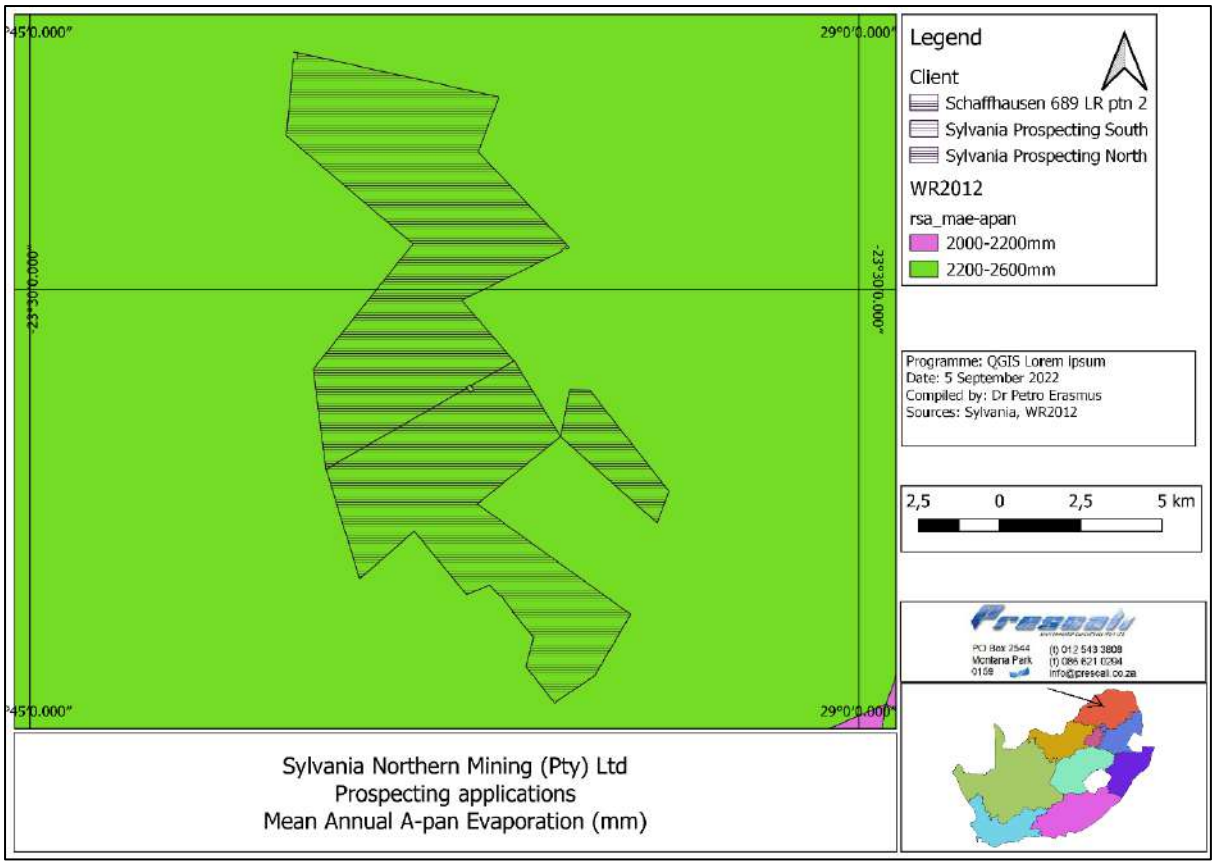


Figure 5-3: Mean annual A-Pan evaporation (WR2012)

5.2 DESCRIPTION OF THE REGIONAL AQUATIC ENVIRONMENT

5.2.1 Affected River Basin

The Sylvania Northern prospecting right application area is situated in the Limpopo Water Management Area (WMA) (A primary catchment), specifically quaternary catchment A62E, A62F, A62G and A62H of the Mogalakwena River catchment (Figure 5-4) (DWAF, 2004).

From the 2016 reconciliation strategy (Lombaard, J., 2016), the Mogalakwena River (A61 to A63) catchment has limited surface water resources but large groundwater resources, which have already been extensively exploited by the irrigation sector. The mining sector is expanding rapidly in this catchment and the water supply to these mines must be secured as a matter of priority. Additional water resources are groundwater and transfers from the Olifants River catchment.

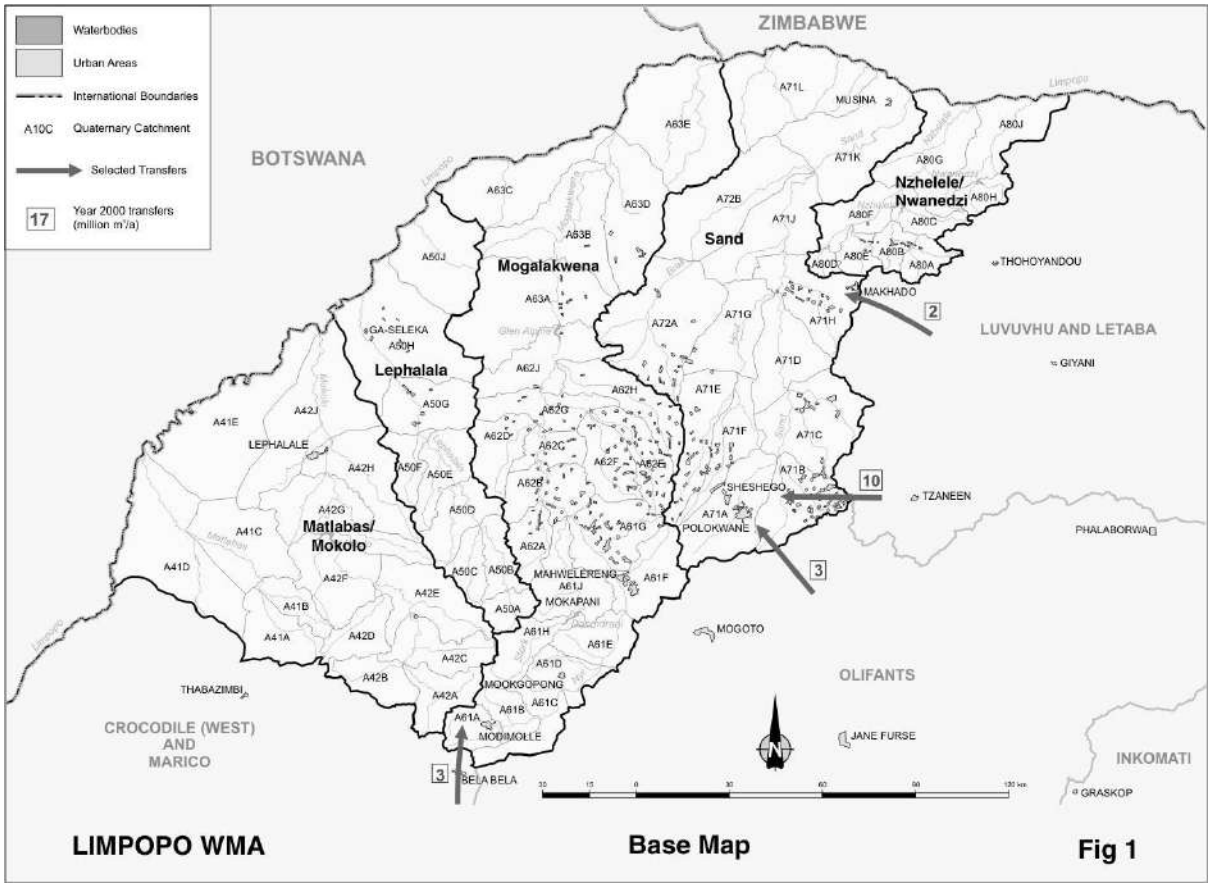


Figure 5-4: Base map of the Limpopo water management area and its sub-areas (DWAF, 2004))

5.2.2 Quaternary Catchments

The proposed Sylvania Northern prospecting area is located within the A62E, A62F, A62G and A62H quaternary catchments (Mogalakwena River catchment).

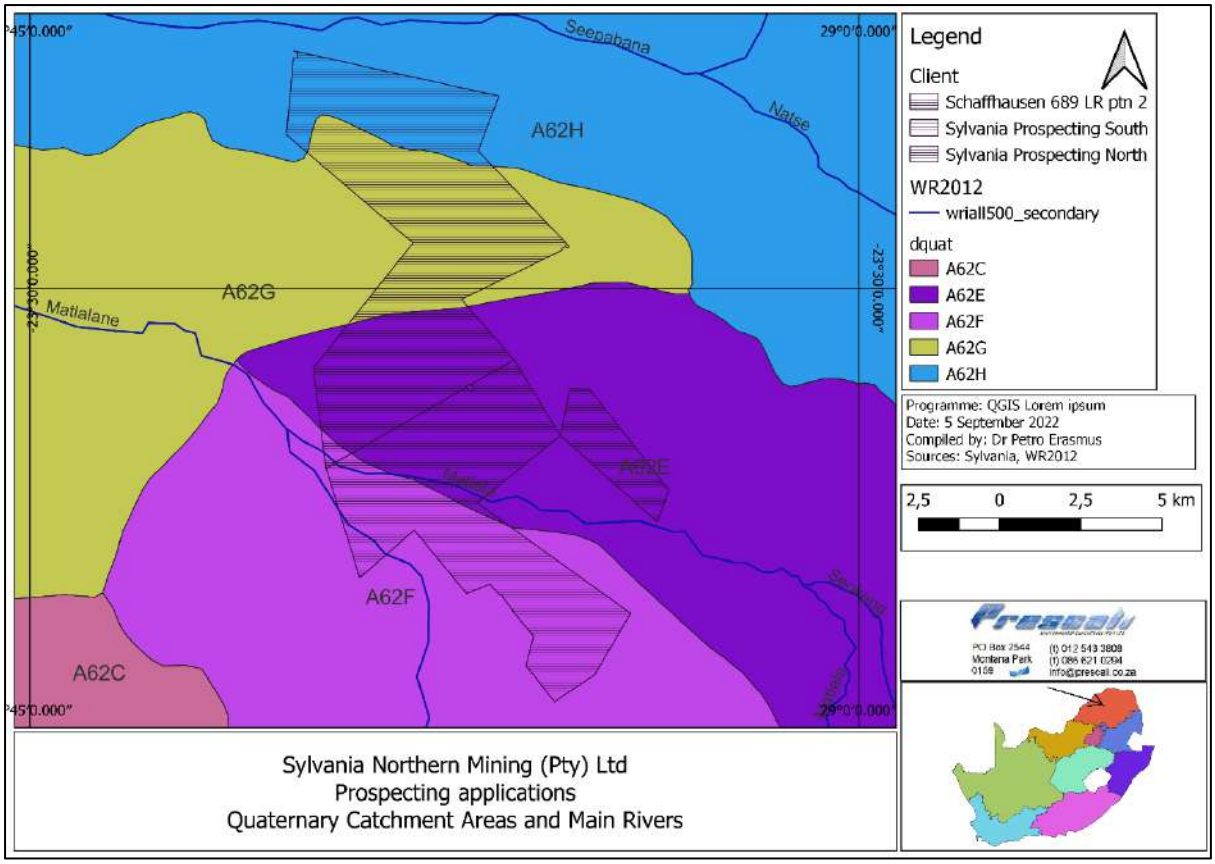


Figure 5-5: Quaternary catchments and primary and secondary Rivers (WR2012)

5.2.2.1 A60 Mogalakwena catchment (Lombaard, J., 2016)

Though the Mogalakwena catchment has a large potential for growth, it has insufficient water supply to meet current needs and the Doorndraai Dam is over-allocated, while all water resources in the Mogalakwena catchment have been fully developed.

The middle of this catchment is densely populated with informal settlements that are mainly supplied from groundwater, posing a risk to surface water quality, as well as groundwater quality due to the high concentration of pit latrines. This can lead to long-term contamination of underlying aquifers with *E.coli* and nitrate as well as unsafe concentrations of bacteria, viruses and chemicals.

Groundwater is also threatened by mine water decant and naturally occurring fluorides emanating from the underlining granite in some areas. With an increase of development within the mining sector the potential of more mine water decant is a high risk. Additional water quality determinants associated with the gold and base-metal mines as well as smelters are antimony, pH, TDS, total suspended solids and tin.

Large scale irrigation around the dams in this catchment can lead to deterioration of water quality due to runoff of potential agro-chemical pollutants into the water source.

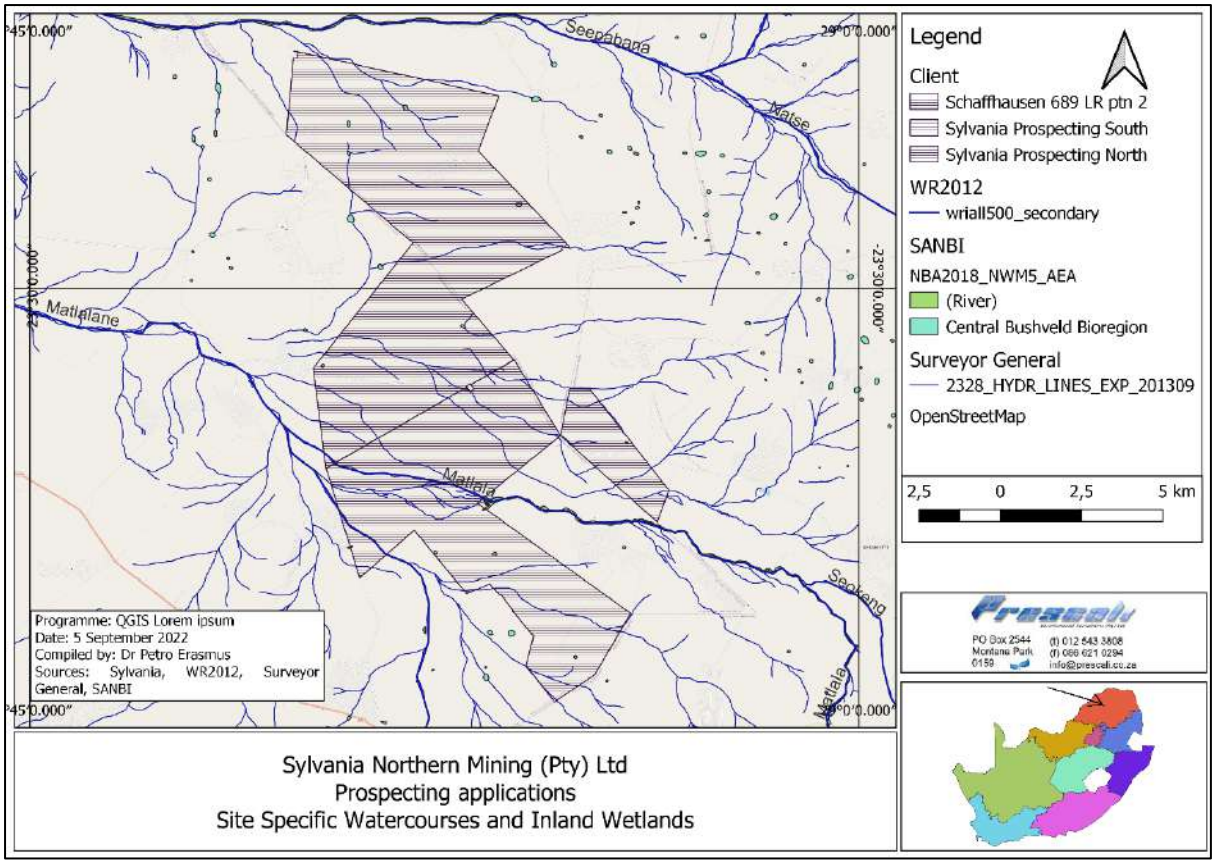


Figure 5-6: Location of proposed Sylvania Northern prospecting site, specific surface water resources and inland wetland areas

The Mean Annual Evaporation, Mean Annual Precipitation and MAR for the applicable quaternary catchments are indicated in Table 5-2.

Table 5-2: Applicable catchment areas MAR, MAP and MAE information (Baily & Pitman, 2015)

Area	Catchment area		MAE (mm) (S-pan)	MAP (mm)	MAR (million m^3/a)
	Gross (km^2)	Net (km^2)			
A62	5795	5584	1883	479	75,99
A62E	621	621	1850	460	5,51
A62F	620	620	1850	478	3,35
A62G	627	539	1900	437	6,22
A62H	871	871	1900	439	5,88
A62E PAA	39,9015				0,354
A62F PAA	25,9748				0,140
A62G PAA	25,9264				0,257
A62H PAA	14,4352				0,097

5.2.3 River Resource Classification

The ecological status (EcoStatus) of a river refers to its overall condition or health, i.e. the totality of the features and characteristics of the river and its riparian areas, which manifests in its ability to support a natural array of species. This ability relates directly to the capacity of the system to provide a variety of goods and services.

The Minister of Water and Sanitation is required to establish a classification system, and to determine the class and resource quality objectives for all or part of the resources considered to be significant.

From the desktop data assessment is can be seen that the Present Ecological Status (PES) for both the rivers closest to the prospecting right area decreased in classification from the 1999 assessment to the 2018 assessment. The Ecological Importance and Sensitivity Class (EI and ES) of the rivers in the applicable reaches are Moderate and Very Low respectively[20] (Figure 5-7).

Table 5-3: Classification of the River Reaches (CSIR, 2018) (CSIR, 2011)

	Matlala	**Seepabana**	**Mogalakwena**
Flow	Ephemeral	Perennial	Perennial
Order	2	2	3
Mainstem	1	1	1
PES1999	B: Large Natural	B: Largely Natural	D
Ecoregion	5	1	1
Geomorphic Zone	E	D	F
River Type	5_N_L	1_P_U	1_P_F
FFRID	0	0	0
FFRREGION	0	0	0
FFRFlagship	0	0	0
PES_2018	C	D	D
NBA2018ETS	CR	LT	CR
NBA2018PL	NP	WP	PP
FRID_2018	0	0	0
FRFAG_2018	0	0	0
FEPA Code	4	4	2

- FFRID: Free flowing river identification. Each system and its tributaries have the same identifier.
- FFRREGION: The lumped ecoregion into which free-flowing rivers fall, used to achieve representation of free-flowing rivers across the country.
- FFRFlagship: Flagship free-flowing rivers as identified through an expert review process.
- PES_2018: Data that became available between 2011 and 2017 from Reserve or Ecological Water Requirement (EWR) and Water Resource Classification System (WRCS) studies.
- NBA2018ETS: Ecosystem threat status (ETS) of river ecosystem types: this was based on the extent to which each river ecosystem type had been altered from its natural condition.
- NBA2018PL: Ecosystem protection level (EPL) of river ecosystem types: river ecosystem types in protected areas needed to be in good condition rivers (A or B ecological category) to be considered as protected. Well protected, moderately protected, poorly protected river ecosystem types have at least 100%, 50%, 5% of their biodiversity target in protected areas and in natural or near-natural ecological condition; not protected river ecosystem types have < 5%.
- FRID_2018: Free-flowing river ID. Each system and its tributaries have the same identifier.
- FRFAG_2018: In NBA 2018 where no river condition changes were recorded the free-flowing/flagship rivers remained unchanged.

Ecoregion 1 (39 383,5 km^2), Limpopo Plain, consists of plains and lowlands with a low to moderate relief. Vegetation consists mainly of Bushveld types and Mopane veld (Kleynhans, Thirion, & Moolman, 2005).

Ecoregion 5 (7 245.9 km^2), Northern Plataea have the following vegetation types: Mixed Bushveld (main); Clay Thorn Bushveld (limited) and North Eastern Mountain Grassland (Limited). The topography is dominated by plains with low to moderate relief (Kleynhans, Thirion, & Moolman, 2005).

[20] http://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.aspx 9 September 2020

No biomonitoring was conducted for this report; from the Freshwater Biodiversity Organisation website one sampling result date was available for the Matlala River (below Debengeni falls: A6N0KA-00001) and fish species were recorded[21]:

Taxon	Occurrences	Origin	Endemism	Cons. Status (Global)
Amphilius natalensis Boulenger, 1917	1	Native	Widespread	Least concern
Amphilius uranoscopus (Pfeffer, 1889)	1	Native	Subregional endemic	Least concern

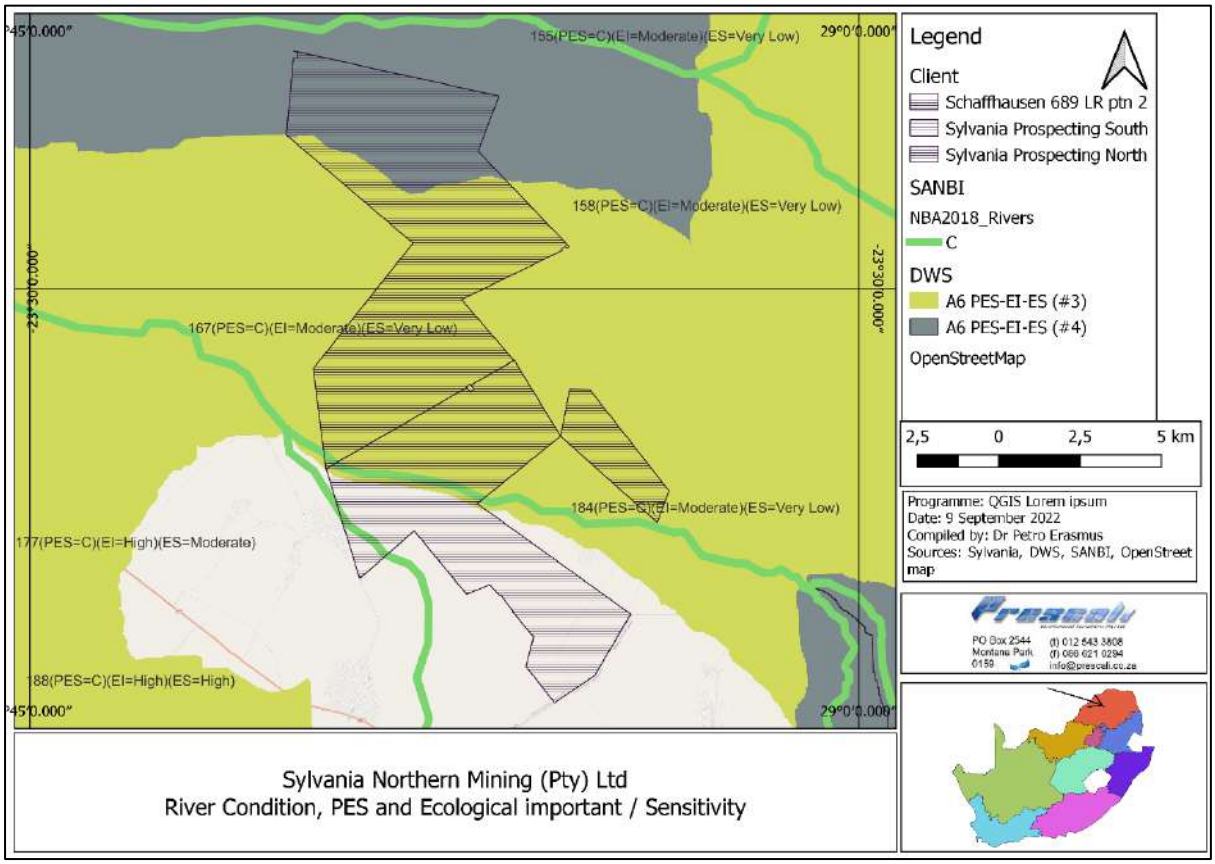


Figure 5-7: River condition, Present Ecological Status, Ecological Importance and Sensitivity

5.2.4 NFEPA and Fish Population Assessment

The quaternary catchments have a NFEPA code 0 classification: Not classified.

- It does not fall within a fish sanctuary area for threatened species;
- It does not fall within a fish relocation area for threatened species;
- It does not fall within a fish translocation area for threatened species;
- It does not fall within a fish rehabilitation area for threatened species; and
- It does not fall within a fish Corridor area for threatened species.

[21] https://freshwaterbiodiversity.org/map/#site-detail/taxon=&search=MATLALA&siteId=30447&collector=&category=&yearFrom=&yearTo=&months=&boundary=&userBoundary=&referenceCategory=&spatialFilter=&reference=&endemic=&conservationStatus=[]&modules=1&validated=&sourceCollection=[%22fbis%22,%22gbif%22,%22virtual_museum%22]&abioticData=&ecologicalCategory=&rank=&siteIdOpen=30447&orderBy=name&polygon=&thermalModule=&dst= 9 September 2022

5.2.5 Background Water Quality

The DHSWS has monitoring points in the Mogalakwena Rivers and the average concentrations are provided in Table 5-4:

- WMS A62_1000004250 (1-4250): Uitzicht Verstooteling 670 LR Bridge on Mogalakwena River 0.6 km Before Confluence with Matlalane (2009-01-22 to 2009-02-25); and
- WMS A62_90366: Glen Alpine Dam on Mogalakwena River: near Dam Wa (ncwq NEMP) (1975-11-12 to 2018-05-14) downstream of the confluence with the Seepabana River.

The water quality at the Glen Alpine Dam is of good quality complying with the Water Quality Guidelines except for aluminium and for phosphorus (inorganic). The upstream site indicates very poor water quality but only two samples' results were available, it may be that the samples were taken from stagnant water which could affect the quality thereof.

Table 5-4: Average background surface water quality (DWAF, 1996) (DWAF, 1996) (DWAF, 1996) (DWAF, 1996)

Parameter		A62-90366[22]	A62-1000004250[23]	Aquatic	Domestic	Agriculture	
						Livestock	Irrigation
Alkalinity	mg $CaCO_3$/l)	87,185	1221	N/A	N/A	N/A	N/A
Aluminium	mg/l	0,07	0,05	≤ 0.005	≤ 0.015	≤5	<5
Calcium	mg Ca/l	20,069	22	N/A	< 32	< 1000	N/A
Chlorine (free)	mg/l	48,79	ND	N/A	N/A	N/A	N/A
Electrical conductivity	mS/m	35,928	1059,5	15% from normal	< 70	156 (Dairy Pigs and Poultry), 313 Cattle & Horses, 469 (Sheep)	6,25
Fluoride	mg/l	0,328	1,1	< 0.75	< 1	< 2 All other livestock; < 6 ruminants	< 2
Magnesium	mg/l	9,674	90	N/A	< 30	< 500	N/A
pH	pH units	7,917	8,85	5% from normal	6 - 9	N/A	6.5 - 8.4
Phosphorus (inorganic)	mg/l	0,084	ND	0,005	N/A	N/A	N/A
Potassium	mg/l	3,578	53,5	N/A	< 50	N/A	N/A
Silica	mg/l	5,405		N/A	N/A	N/A	N/A
Sodium	mg/l	34,221	2140	N/A	< 100	< 2000	< 70
Sulphate	mg/l	8,299	510	N/A	< 200	< 1000	N/A

[22] www.dwa.gov.za/iwqs/wms/data/A62/A62_90366.zip 9 September 2022
[23] www.dwa.gov.za/iwqs/wms/data/A62/A62_1000004250.zip 9 September 2022

5.2.6 Surface Water Quantity

5.2.6.1 Mean Annual Runoff

The MAR is indicated in Table 5-2. Please refer to Section 5.3.2 for flow data recorded for the Mogalakwena River.

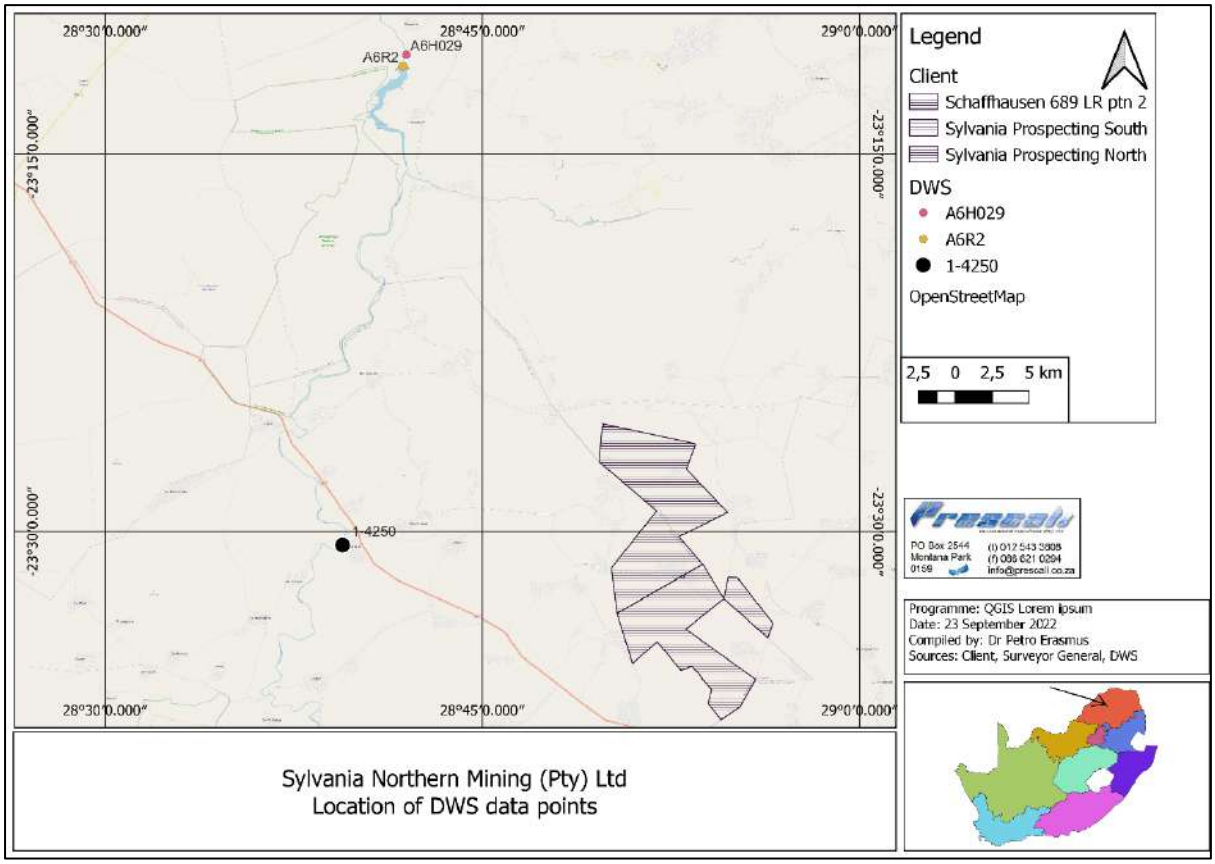


Figure 5-8: Location of DWS data sites in relation to the proposed Sylvania Northern prospecting right area

5.3 SITE SPECIFIC AQUATIC ECOSYSTEM DESCRIPTIONS

5.3.1 Aquatic ecosystem types

Aquatic ecosystems can be classified into two types namely[24]:

- Lentic Ecosystems: and
- Lotic Ecosystems.

5.3.1.1 Lentic Ecosystems – Wetlands, Impoundments, Lakes

Lentic ecosystems refer to standing or basin ecosystems and include lakes, impoundments and wetlands[24].

- Lakes: Generally, lakes are formed in basins created by geological activities e.g., warping and faulting of the earth's crust or as a result of glacial activities[24]. There are no lakes at the proposed Sylvania Northern prospecting right area.
- Impoundments: Impoundments, or dams are manmade infrastructures and can be onstem (i.e., the watercourse itself is dammed) or offstem (i.e., the dam is located a distance from the watercourse and water is pumped from the watercourse / underground reservoir to the dam) [24].

[24] http://www.egyankosh.ac.in/bitstream/123456789/16255/1/Unit-8.pdf 18 August 2020

There are no major dams in the Mogalakwena River catchment (DWS, 2004) and the Glen Alpine Dam that was constructed mainly for irrigation purposes are located on the Mogalakwena River.

- Wetlands: A wetland as defined by the NWA means "land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil". As described by (DWAF, 2005) the word "wetland" refers to ecosystems of which the primary driving force is water. Its prolonged presence in wetlands is a fundamental determinant of soil characteristics and plant and animal species composition. Any part of the landscape where water accumulates for long enough and often enough to influence the plants, animals and soils occurring in that area, is thus a wetland. The objective of the delineation procedure is to identify the outer edge of the temporary zone. This outer edge marks the boundary between the wetland and adjacent terrestrial areas.

Wetlands must have one or more of the following indicators:

- Wetland (hydromorphic) soils that display characteristics resulting from prolonged saturation;
- The presence, at least occasionally, of water loving plants (hydrophytes);
- A high-water table that results in saturation at or near the surface, leading to anaerobic conditions developing in the top 50 cm of the soil; and
- Terrain Unit indicator to identify the locality of the wetland within the landscape.

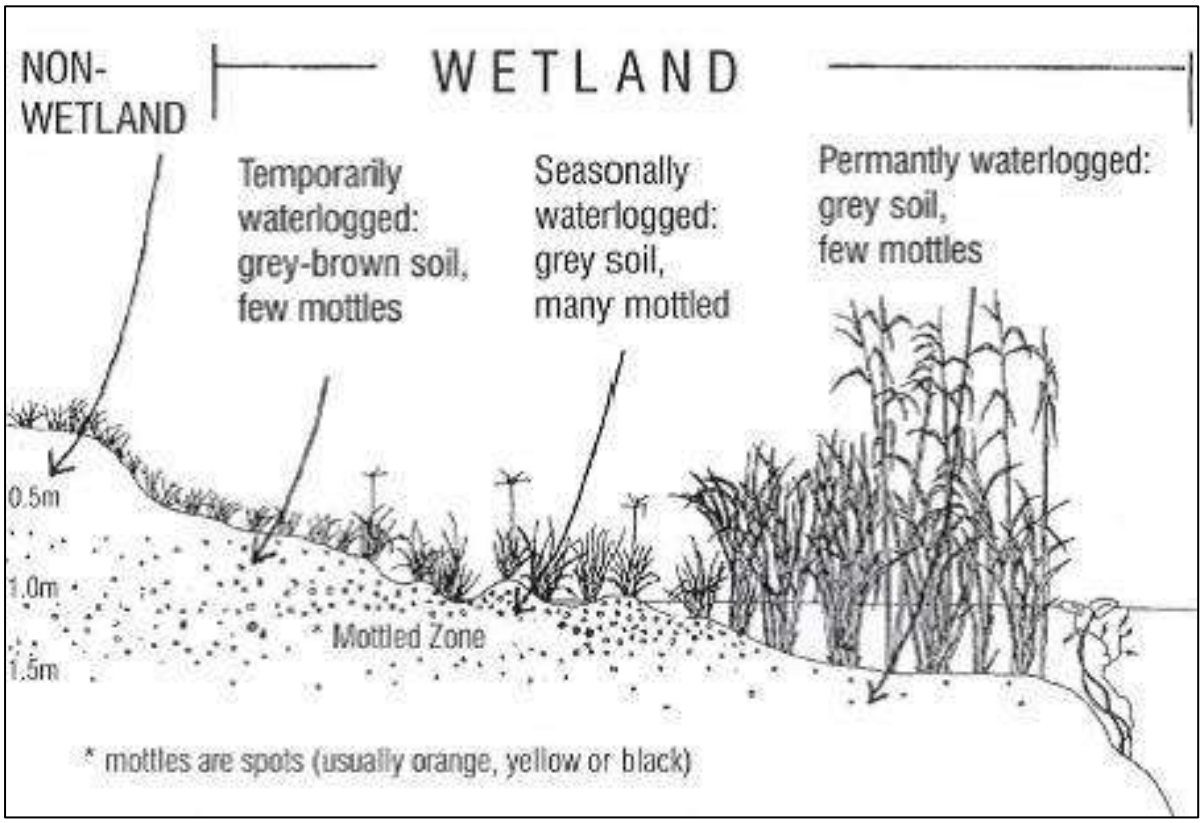


Figure 5-9: Cross section through a wetland (DWAF, 2005)

From the 2018 National Wetland Map 5: Ecosystem threat status and protection level data map (CSIR, 2018) several natural wetlands were identified at the proposed Sylvania Northern prospecting right area (not visually confirmed using Google Earth™), refer to Figure 5-6.

5.3.1.2 Lotic ecosystems – Rivers, streams etc.

Lotic systems include rivers and the most outstanding feature of such habitats are flowing water which moulds the characteristics of the water bed and influences the distribution of the organisms therein[24].

A water course is defined by the NWA as:

- River or spring;
- A natural channel in which water flows regularly, or intermittently;
- A wetland, lake or dam into which, or from which water flows (refer to Section 5.3.1.1); and
- Any collection of water that the Minister may, by notice in the Gazette, declare to be a water course, and a reference to a watercourse includes where relevant, its bed and banks.

For the purpose of this assessment, the applicable river / watercourse reaches were classified according to the guidelines by DWS in "*A practical field procedure for identification and delineation of wetlands and riparian areas*" as shown in Figure 5-10. Using this classification, three sections along the length of a watercourse are defined based on their position relative to the zone of saturation in the riparian area:

- Section "A" is defined as being above the zone of saturation and it therefore does not carry baseflow. They are mostly too steep to be associated with alluvial deposits and are not flooded with sufficient frequency to support riparian habitat or wetlands. This type does however carry storm runoff during fairly extreme rainfall events, but the flow is of short duration, in the absence of baseflow. The "A" watercourse sections are the least sensitive watercourses in terms of impacts on water yield from the catchment.
- Section B reaches are in the zone of the fluctuating water table, baseflow is intermittent and dependant on the current height of the water table and as the channel bed is in contact with or in close proximity to the water table residual pools are often observed when flow cease. The top end of the B Section is marked by the most headward extent of base flow in the channel during wet periods, when the water table is high, and the bottom end of the B Section is marked by the most downstream extent of zero flow during dry periods (when the water table is low). With regards to slope, the channel bed is flat enough to allow for the deposition of material and initial signs of flood plain development may be observed.
- Section C streams are perennial streams and thus always have contact with the zone of saturation (except during extreme drought conditions). These sections are very flat and a flood plain is usually present.

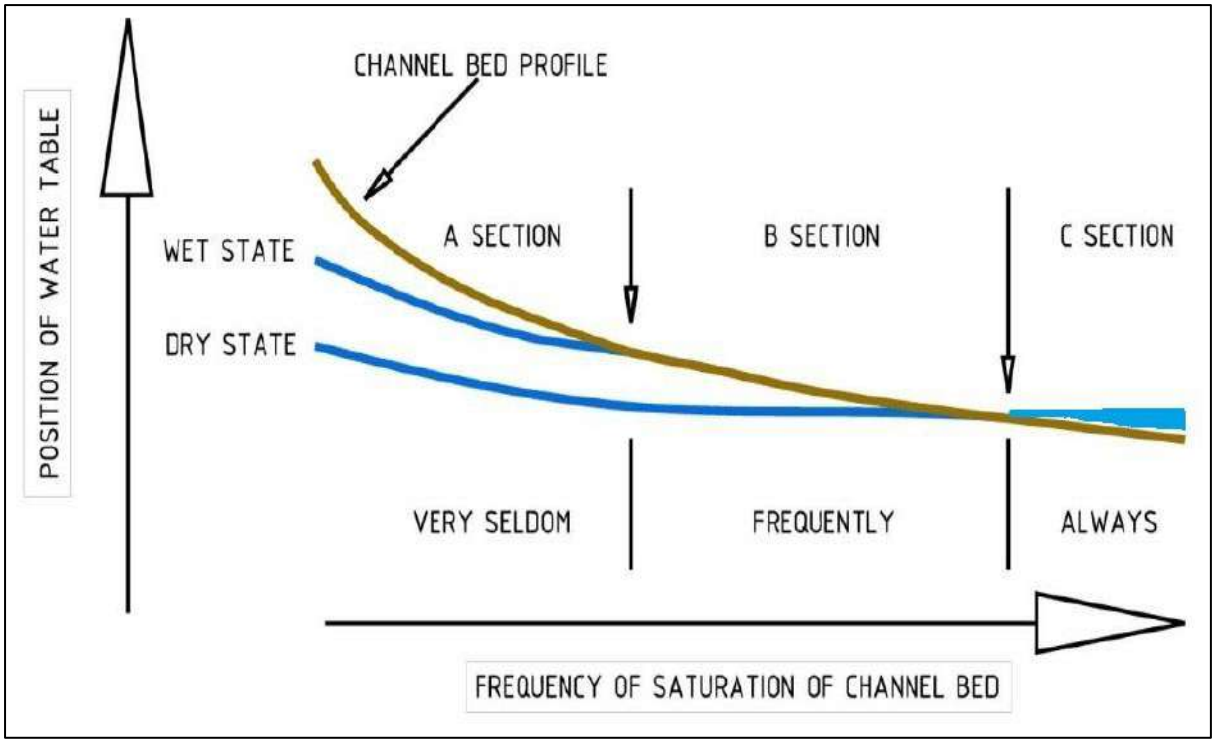


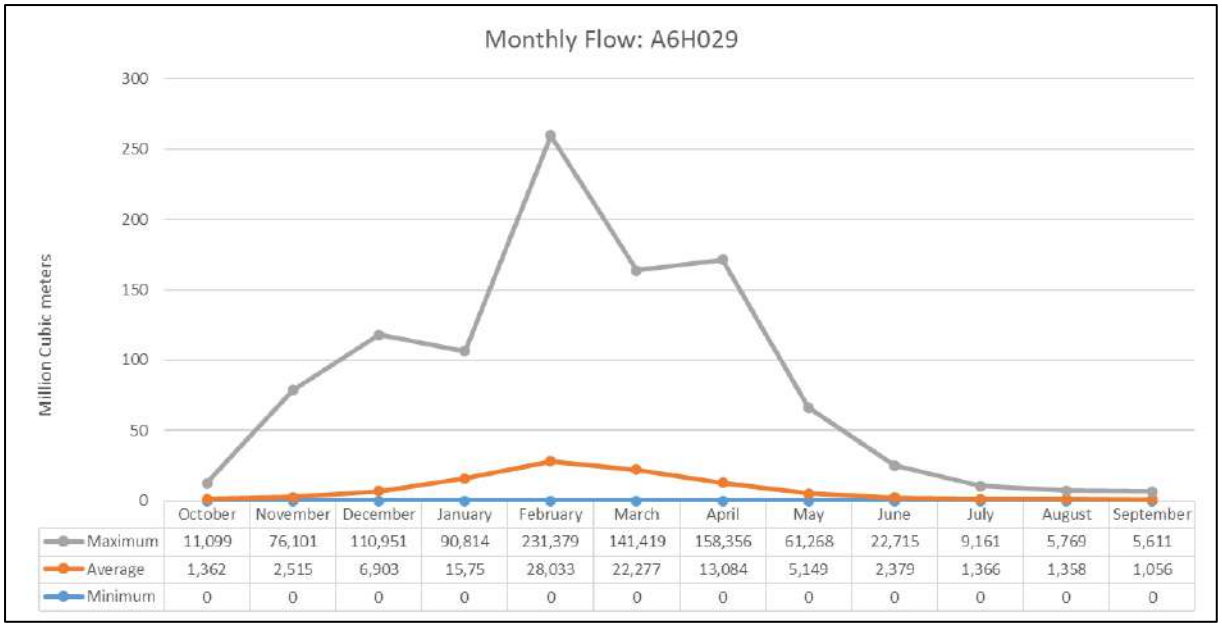
Figure 5-10: River classification (DWAF, 2005)

The Matlala River crosses the proposed Sylvania Northern prospecting right application area (Figure 5-6) and are preliminary classified as Section B watercourse, while the Seepabana directly to the north is classified as Section C due its classification as Perennial.

5.3.2 Normal Dry Weather Flow

No flow data is available for the Matlala and Seepabana Rivers. Monthly flow data in the Mogalakwene River was provided by DWS[25] for site A6H029 Glen Alpine Dam from 1 May 1975 till 28 February 2022 and is indicated in Figure 5-11 per month and in Figure 5-12 (Annual).

[25] Email correspondence dated 9 September 2022 from Nhlapo Elias



	October	November	December	January	February	March	April	May	June	July	August	September
Maximum	11,099	76,101	110,951	90,814	231,379	141,419	158,356	61,268	22,715	9,161	5,769	5,611
Average	1,362	2,515	6,903	15,75	28,033	22,277	13,084	5,149	2,379	1,366	1,358	1,056
Minimum	0	0	0	0	0	0	0	0	0	0	0	0

Figure 5-11: Mogalakwena River Monthly flow volume (million cubic meters)

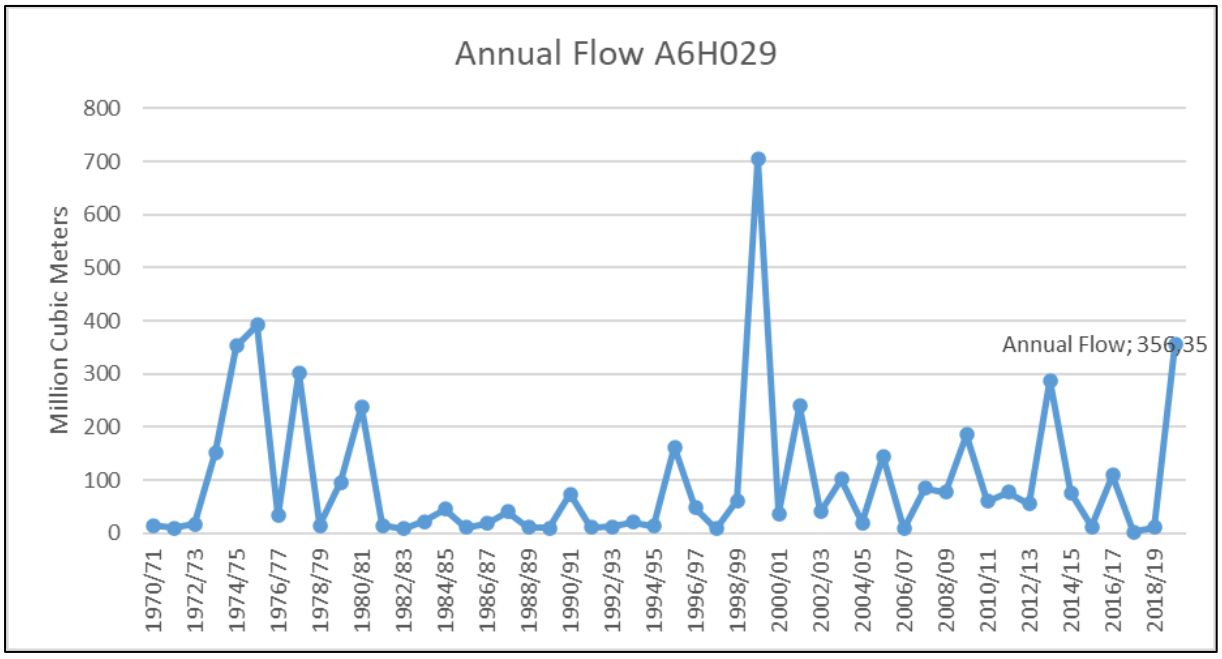


Figure 5-12: Total Annual flow in the Mogalakwena River (million cubic meters)

5.3.3 Drainage Density

The drainage density for the assessment area (106,2379 km^2) was calculated as 0,919 km/km^2. The total length of the drainage lines across the study area is 97,66 km.

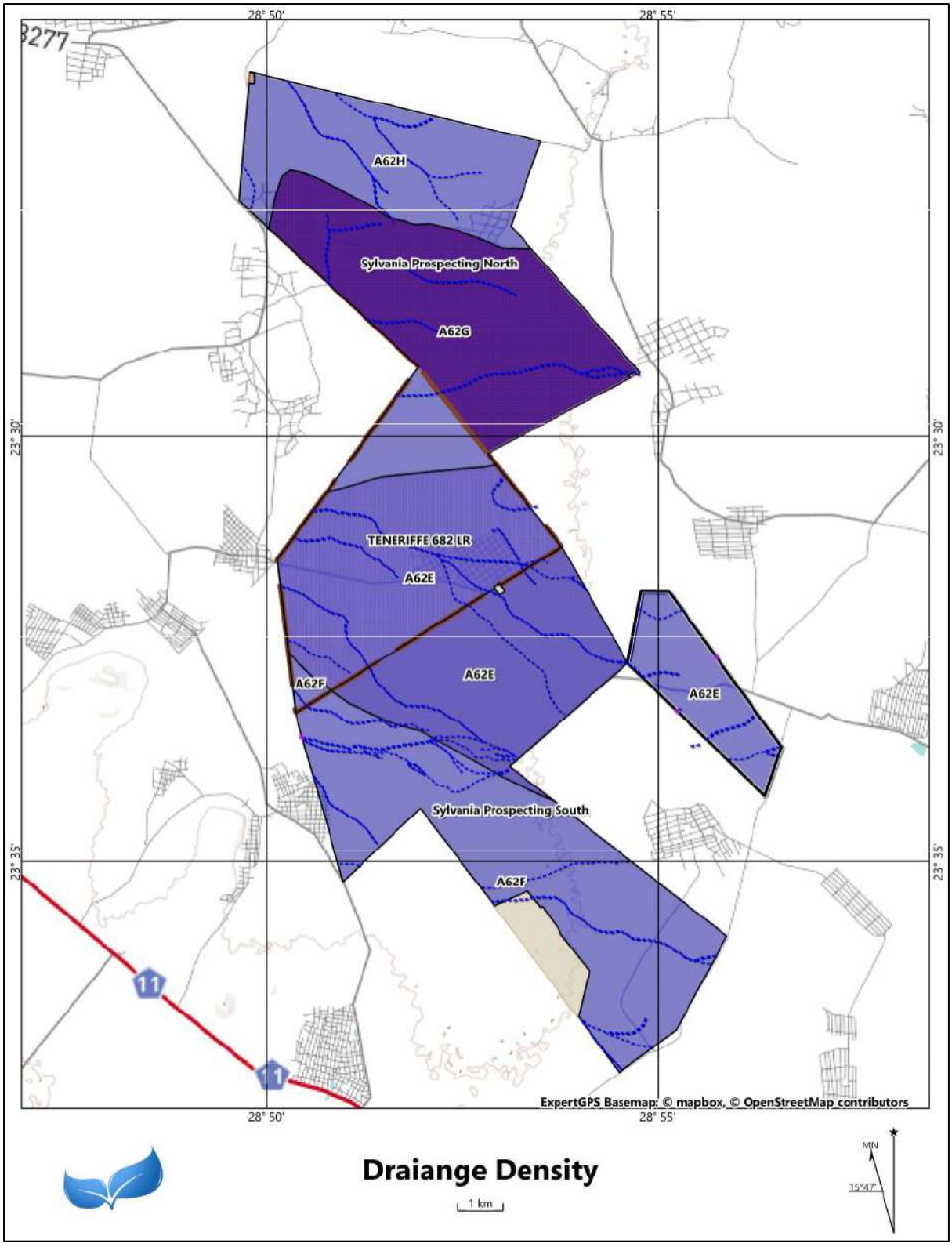


Figure 5-13: Location of surface drainage lines and surface water areas used to calculate the drainage density of the Prospecting Right application area

5.3.4 Flood Lines

Flood lines were sourced from assessment done for other prospecting right applications in the area, these include the Seepabana **(Element Consulting Engineers, 2014)** and Matlala Rivers **(Element Consulting Engineers, 2014)** and are indicated below.

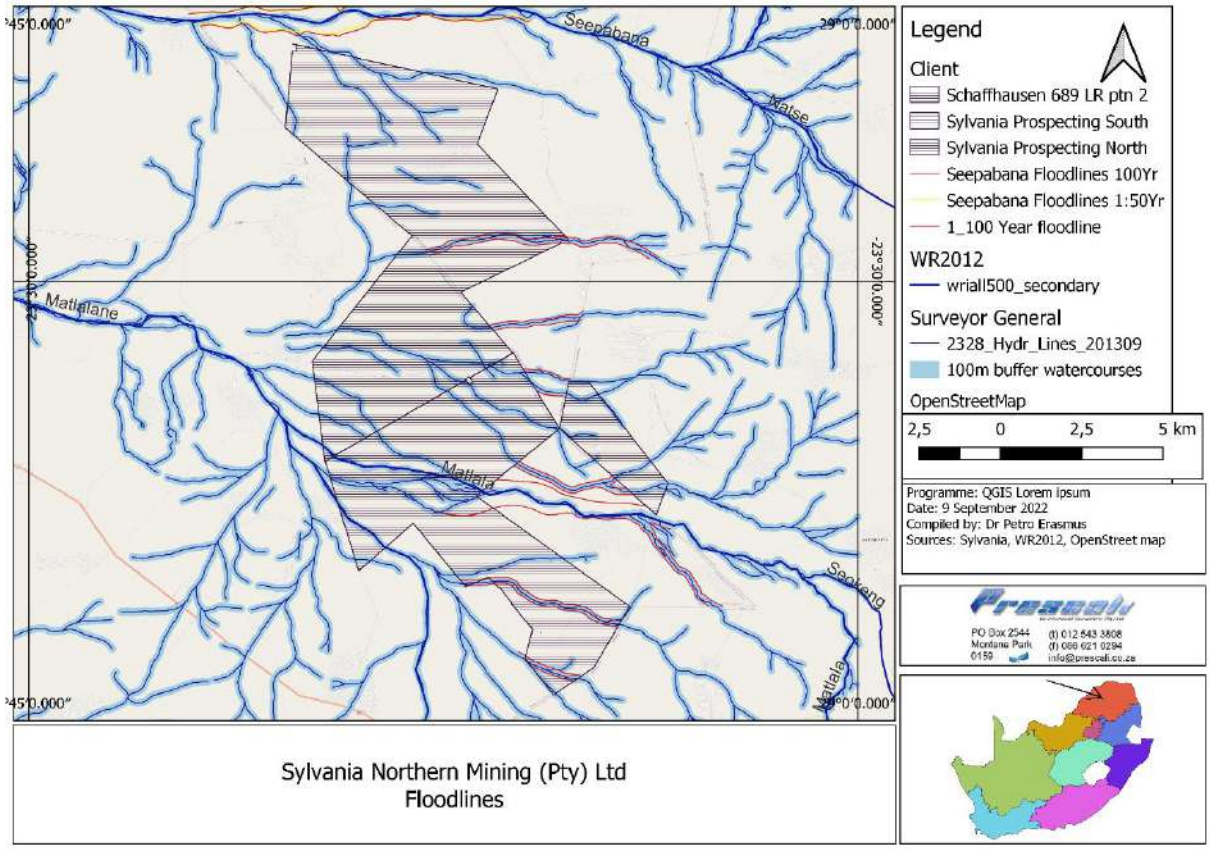


Figure 5-14: Flood lines

From the floodline report conducted for the Matlala River it is noted that in general the catchments of the tributaries are so small that the 100 m buffer is sufficient to encompass the 1 in 100-year flood line.

5.4 SENSITIVE AREAS AND SENSITIVITY OF SITES TO BE DEVELOPED

Environmentally sensitive (Forster, N., DeMeo, T., & Ditto, N.D., 1995) (Envirometrics and MetroGIS, 2009) areas defined as landscape elements or places which are vital to the long-term maintenance of biological diversity, soil, water or other natural resources both on the site and in a regional context, includes:

- Wildlife habitat areas inclusive of:
    - Focus areas for contributing to biodiversity thresholds that are likely to become future protected areas;
    - Private nature reserves, conservancies, core areas of biosphere reserves and other protected areas that are part of a stewardship programme or provincial protected area expansion strategy;
    - National and Provincial Parks and Reserves as defined in the National Environmental Management: Protected Areas Act, 2003 (Act NO. 57 of 2003), as amended;
    - National Parks view-shed protection areas that contain sensitive view areas around National Parks as identified by SANParks;
    - Priority areas in the vicinity of National Parks that have been identified for the long-term survival of biodiversity around the National Parks or upon which the long-term survival of the parks depend to a significant extent; and
    - Critically endangered and endangered ecosystems as identified by the South African National Biodiversity Institute;
- Steep slopes consisting of:
    - All areas with a slope of 8 degrees or steeper; and

  - Important topographical features topographical features that were delineated using the 20 m contour interval terrain model of South Africa and based on the inherent scenic value of these features;
- Rivers, wetlands and other water bodies consisting of rivers with a potential zone of influence buffer of 32 metres on each side from the banks of the rivers, wetlands with a potential zone of influence of 10 metres from the edge of the wetlands and dams with a potential zone of influence of 10 metres from their high-water lines, please refer to the sections below; and
- Prime agricultural lands.

Also included in the sensitive features are the regulated areas as per the NWA:

- 1 in 100-year flood – Sensitivity ranking: Very High;
- 100 m buffer for watercourses (Sensitivity ranking High) and 500 m buffer for wetlands (Sensitivity ranking High); and
- Riparian area (Sensitivity ranking Very High.

The interconnectivity of these sensitive areas creates greenway corridors that consists of networks of linked landscape elements that provide ecological, recreational, and cultural benefits to a community. (Forster, N., DeMeo, T., & Ditto, N.D., 1995).

Information from the Screening tool relating to the aquatic environment was the same as for the 2018 wetland information reported in this report.

Based on the above assessment, the Very High and High sensitivity areas are thus as indicated in Figure 5-15.

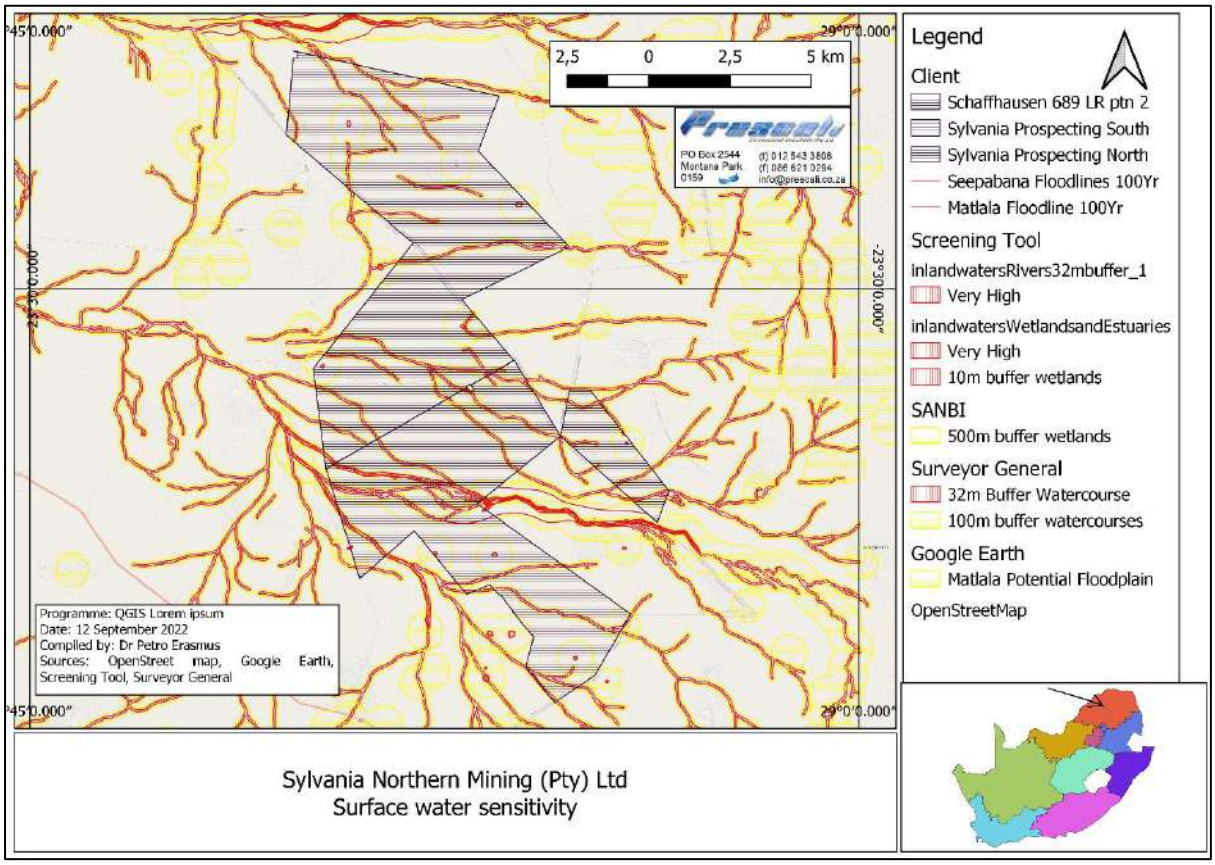


Figure 5-15: Sensitive features in the Prospecting Right application area

5.5 SURFACE WATER USES

The following potential surface water uses could take place: Ecological Reserve, agricultural activities (informal irrigation, livestock watering).

5.6 WATER AUTHORITY

The Department of Water and Sanitation (DWS) act as the Regional Water Authority through their office that is located in Polokwane.

5.7 WATER USE AUTHORISATION

No detail information is available however it is anticipated that a water use licence will be required provided that the prospecting activities are not located within the NWA regulated areas.

6 IMPACT ASSESSMENT METHODOLOGY

The main purpose of this assessment is to understand the significance of potential impacts and to develop strategies to ensure that impacts can be minimised or mitigated to an acceptable level. The identification of potential issues is broad and covers the construction, operational and decommissioning / closure phases of the proposed project.

The methodology used in the impact assessment is described in Section 4.4.

6.1 AREAS OF INFLUENCE

In order to assess the impact of the proposed activities and associated infrastructure on surface water resources as outlined in Section 2.2, various areas of potential impacts have been assessed. The first area is referred to as the "area of direct influence" (ADI) which is the area directly impacted upon by the proposed activities and associated infrastructure, i.e. the watercourses traversing the application area. The second area is referred to as the "area of indirect influence" (AII) which includes the broader catchment perspective, i.e. the Seepabana and Matlala Rivers and further downstream (Mogalakwena River).

6.1.1 Area of direct influence (ADI)

The ADI for water resources is determined by:

- Interception of watercourse and drainage areas due to the operational activities and associated infrastructure;
- Potential for pollution of surface water resources due to poor management of the activities and associated infrastructure e.g.
    - windblown waste,
    - incorrect design of pollution control infrastructure resulting in polluted water flowing to the unnamed tributary, and
    - incorrect liner design that will result in poor quality baseflow to the on-site watercourses.

In terms of the EIA methodology, the spatial extent of the ADI is referred to as "Local" and "Site Specific".

6.1.2 Area of indirect influence (AII)

The AII is determined by the boundaries of the identified Sub-WMAs, with the main emphasis on the downstream surface water resources, i.e. Mogalakwena River. In terms of the EIA methodology, the spatial extent of the AII is referred to as "Regional".

6.2 SIGNIFICANT ENVIRONMENTAL RATINGS

It is not the intention of this surface water environmental impact assessment to evaluate all potential environmental impacts associated with the project (e.g. fauna and flora, visual etc.). Environmental impacts are the change to the environment resulting from an environmental aspect or activity. The significant impacts are listed in Table 7-1.

6.3 RISK CLASSIFICATION

The risk associated with the processing activities was determined using the Golder guideline "Appendix A.3 - Identify Sector Activity Risk" of 2007. Based on this document the proposed prospecting activities is classified as Class C primary hazard class.

7 DESCRIPTION OF ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS INCLUDING CUMULATIVE IMPACTS

7.1 EXISTING IMPACTS AT THE PROPOSED DEVELOPMENT SITES

From Google Earth, a portion of the Prospecting Right application area has been impacted by agricultural activities in the form of fields (dry land) and villages.

7.2 POTENTIAL IMPACTS THAT COULD OCCUR

Potential activities and impacts that could occur as a result of the proposed activities and associated infrastructure development are indicated in Table 7-1.

Potential impacts that could occur was determined using the proposed activities as outlined in Section 2.2.

No impacts are foreseen for the non-invasive activities as these are all desktop based.

The invasive activities consist of the following:

Main Activity	**Secondary activity**
Ground geophysics and soil geochemical sampling	Vegetation removal Topsoil stockpiling General activities Replace topsoil
Trenching	Vegetation removal Topsoil stockpiling General activities Overburden stockpiling Containment of rainwater in trench Heavy machinery equipment on site Chemical toilets and sewage waste management General waste generation
Resource drilling	Heavy machinery equipment on site Drilling sludge General activities Vegetation removal Operation of drill pad sump Chemical toilets and sewage waste management Capping of Borehole Rip impacted area General waste generation

Access road	Vegetation removal Daily travelling to prospecting site Rip road area
Contractor camp	Vegetation removal Diesel storage Chemical toilets and sewage waste management Storage of material Storage of general and hazardous waste General activities Vehicle maintenance Removal of all infrastructures Rip impacted area Camp area (whole off)

Locations of prospecting activities and potential access roads (except contractor's camp) are indicated in Figure 7-1.

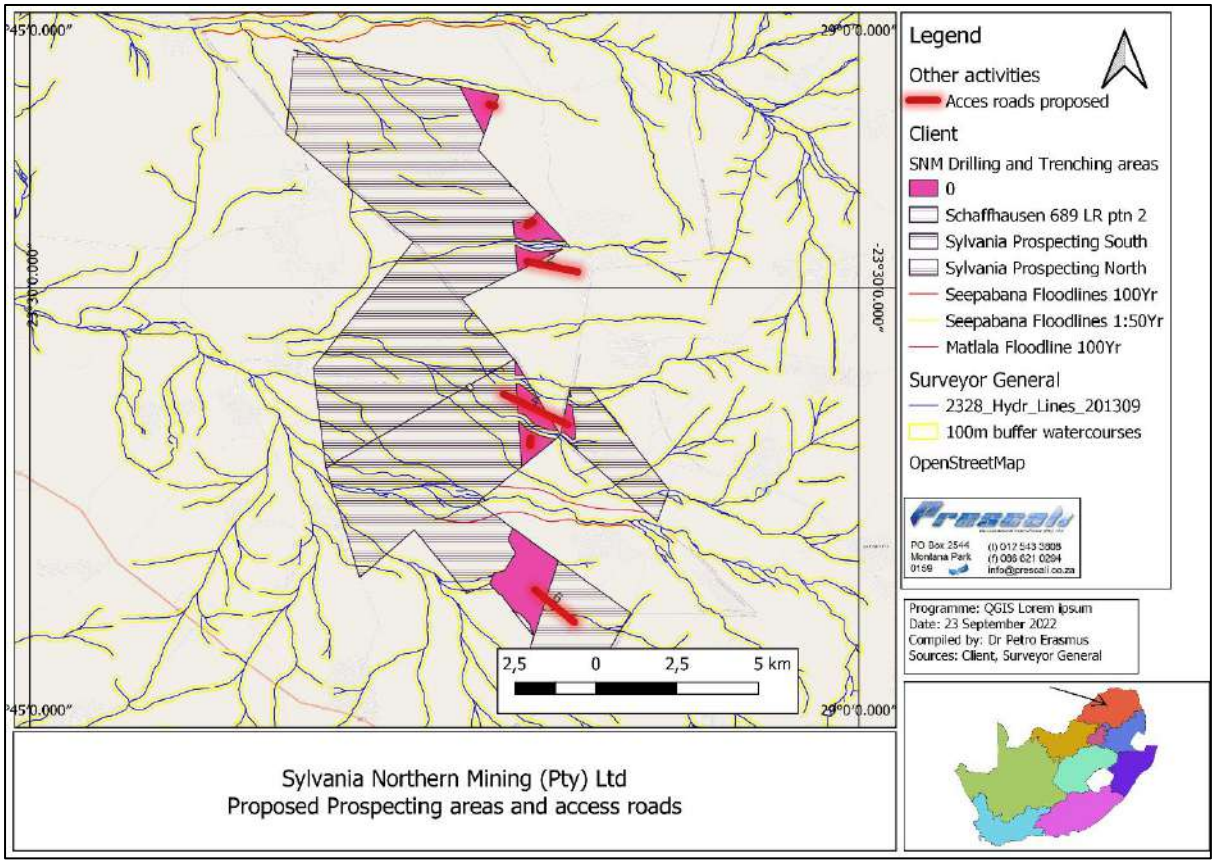


Figure 7-1: Assumed location of prospecting activities and access roads

From the impact assessment it can be seen that the proposed activities and infrastructures will have a low to medium impact before mitigation and a low impact following mitigation. The mitigation / management measures are outlined in Table 7-2 and the impact assessment following the implementation of the management measures are indicated in Table 7-3.

7.3 LEVELS OF ACCEPTABLE CHANGE

Due to the existing impacts that has already been noted in the present ecological status of the rivers, no change should occur in the PES.

Table 7-1: Impact assessment rating results without mitigation measures
(FR: Flow Regime; P&C: Physico[26]- and Chemical; H: Habitat; B: Biota; S: Severity, SS; Spatial Scale; D: Duration; C: Consequence, FA: Frequency of Activity; FI: frequency of Impact; LI: Legal Issue; Dt: Detection; L: Likelihood, Si: Significance, RR: Risk rating, M: Moderate)

Main Activity	Secondary activity	Phase	Impact	Aspect	Severity				S	SS
					FR	P&C	H	B		
Ground geophysics and soil geochemical sampling	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	1	1	1	1	1
	Topsoil stockpiling	C, O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	1	1	1	1	1
	Topsoil stockpiling/Vegetation removal & General activities	C, O	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	1	1	1	1	1
	Replace topsoil	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	1	1	1	1	1
	Replace topsoil	R	Dust generated from stockpile areas could impact on surface water quality,	Surface water quality	1	1	1	1	1	1

[26] pH, temperature, turbidity, conductivity, total dissolved solids, total suspended solids, total alkalinity, biological oxygen demand, chemical oxygen demand, dissolved oxygen, total organic carbon, sulphate, nitrate, and phosphate

Main Activity	Secondary activity	Phase	Impact	Aspect	Severity				S	SS
					FR	P&C	H	B		
			and biota should it reach watercourses and settle within this area.							
Trenching	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	3	3	2	2,25	1
	Topsoil stockpiling	C, O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	3	3	2	2,25	1
	Topsoil stockpiling/Vegetation removal & General activities	C, O	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	3	3	2	2,25	1
	Overburden stockpiling	C, O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	3	3	2	2,25	1
	Containment of rainwater in trench	O	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Surface water quantity	2	3	3	2	2,5	1
	Heavy machinery equipment on site	C, O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons	Surface water quality	1	3	3	2	2,25	1

Main Activity	Secondary activity	Phase	Impact	Aspect	Severity				S	SS
					FR	P&C	H	B		
			enter the watercourses, this could impact on the biota and habitat as well.							
	Chemical toilets and sewage waste management	C, O	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	Surface water quality	1	3	3	2	2,25	1
	General waste generation	C, O	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Surface water quality	1	3	3	2	2,25	1
Resource drilling: drill pad and sump	Heavy machinery equipment on site	C, O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	1	3	3	2	2,25	1
	Drilling sludge	O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	3	3	2	2,25	1
	Vegetation removal & General activities	C, O	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	3	3	2	2,25	1
	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	3	3	2	2,25	1

Main Activity	Secondary activity	Phase	Impact	Aspect	Severity				S	SS
					FR	P&C	H	B		
	Operation of drill pad sump	O	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Surface water quantity	2	3	3	2	2,5	1
	Chemical toilets and sewage waste management	C, O	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	Surface water quality	1	3	3	2	2,25	1
	Capping of Borehole	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	3	3	2	2,25	1
	Rip impacted area	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	3	3	2	2,25	1
	Rip impacted area	R	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	3	3	2	2,25	1
	General waste generation	C, O	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Surface water quality	1	3	3	2	2,25	1
Access road	Vegetation removal (all access roads combined)	C	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons	Surface water quality	1	2	2	2	1,75	1

Main Activity	Secondary activity	Phase	Impact	Aspect	Severity				S	SS
					FR	P&C	H	B		
			enter the watercourses, this could impact on the biota and habitat as well.							
	Daily travelling to prospecting site	C, O	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	2	2	2	1,75	1
	Daily travelling to prospecting site	C, O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	1	2	2	2	1,75	1
	Rip road area	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	2	2	2	1,75	1
Contractor camp	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	2	2	2	1,75	1
	Diesel storage	O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	1	2	2	2	1,75	1
	Chemical toilets and sewage waste management	O	Contamination from spills from chemical toilets / emptying of septic tank (if applicable) could impact on water quality which in turn could impact on the biota and habitat as well.	Surface water quality	1	2	2	2	1,75	1

Main Activity	Secondary activity	Phase	Impact	Aspect	Severity				S	SS
					FR	P&C	H	B		
	Storage of material	O	Contaminated water from material storage area could detrimentally impact on watercourses quality, biota and habitat.	Surface water quality	1	2	2	2	1,75	1
	Storage of general and hazardous waste	O	Contaminated water from waste storage area could detrimentally impact on watercourses quality, biota and habitat.	Surface water quality	1	2	2	2	1,75	1
	Topsoil stockpiling/Vegetation removal & General activities	C, O	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	2	2	2	1,75	1
	Vehicle maintenance	C, O	Hydrocarbon spills from vehicles and other equipment could negative impact water quality, habitat and biota.	Surface water quality	1	2	2	2	1,75	1
	Removal of all infrastructures	R	Potential for spills from e.g. hydrocarbon tanks, septic tank, chemical toilets could impact on the surface water resource quality, habitat and biota if not managed.	Surface water quality	1	2	2	2	1,75	1
	Rip impacted area	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	2	2	2	1,75	1
	Camp area (whole off)	C, O	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Surface water quantity	2	2	2	2	2	1
Prospecting activities (all)	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	C, O	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	Surface water quality	1	3	3	3	2,5	1

Main Activity	Secondary activity	Phase	Impact	Aspect	Severity				S	SS
					FR	P&C	H	B		
	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	O	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	Surface water quantity	2	2	2	2	2	1
	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	R	During the rehabilitation phase water quality could be impacted as a result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.	Surface water quality	1	3	3	3	2,5	1
Prospecting activities (all)	Cumulative impact: Schaffhausen	C, O	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	Surface water quality	1	3	3	3	2,5	2
	Cumulative impact: Schaffhausen	O	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	Surface water quantity	2	3	3	3	2,75	2
	Cumulative impact: Schaffhausen	R	During the rehabilitation phase water quality could be impacted as a result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.	Surface water quality	1	3	3	3	2,5	2

D: Duration; C: Consequence, FA: Frequency of Activity; FI: frequency of Impact; LI: Legal Issue; Dt: Detection; L: Likelihood, Si: Significance, RR: Risk rating, M: Moderate

Main Activity	Secondary activity	Phase	Impact	Aspect	D	C	FA	FI	LI	Dt	L	Si	RR
Ground geophysics and soil geochemical sampling	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	3	1	2	1	4	8	24	Low
	Topsoil stockpiling	C, O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	3	1	2	1	4	8	24	Low
	Topsoil stockpiling/Vegetation removal & General activities	C, O	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	3	1	2	1	4	8	24	Low
	Replace topsoil	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	3	1	2	1	4	8	24	Low
	Replace topsoil	R	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	3	1	2	1	4	8	24	Low
Trenching	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
	Topsoil stockpiling	C, O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact	Surface water quality	2	5,25	1	2	1	4	8	42	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	D	C	FA	FI	LI	Dt	L	Si	RR
			on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.										
	Topsoil stockpiling/Vegetation removal & General activities	C, O	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
	Overburden stockpiling	C, O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
	Containment of rainwater in trench	O	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Surface water quantity	2	5,5	1	2	1	4	8	44	Low
	Heavy machinery equipment on site	C, O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
	Chemical toilets and sewage waste management	C, O	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
	General waste generation	C, O	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
Resource drilling: drill pad and sump	Heavy machinery equipment on site	C, O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	2	5,25	1	2	1	4	8	42	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	D	C	FA	FI	LI	Dt	L	Si	RR
	Drilling sludge	O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
	Vegetation removal & General activities	C, O	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
	Operation of drill pad sump	O	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Surface water quantity	2	5,5	1	2	1	4	8	44	Low
	Chemical toilets and sewage waste management	C, O	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
	Capping of Borehole	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
	Rip impacted area	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	2	5,25	1	2	1	4	8	42	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	D	C	FA	FI	LI	Dt	L	Si	RR
	Rip impacted area	R	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
	General waste generation	C, O	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Surface water quality	2	5,25	1	2	1	4	8	42	Low
Access road	Vegetation removal (all access roads combined)	C	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	3	5,75	1	2	1	4	8	46	Low
	Daily travelling to prospecting site	C, O	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	3	5,75	1	2	1	4	8	46	Low
	Daily travelling to prospecting site	C, O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	3	5,75	1	2	1	4	8	46	Low
	Rip road area	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	3	5,75	1	2	1	4	8	46	Low
Contractor camp	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	3	5,75	5	2	1	4	12	69	Medium
	Diesel storage	O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses,	Surface water quality	3	5,75	5	2	1	4	12	69	Medium

Main Activity	Secondary activity	Phase	Impact	Aspect	D	C	FA	FI	LI	Dt	L	Si	RR
			this could impact on the biota and habitat as well.										
	Chemical toilets and sewage waste management	O	Contamination from spills from chemical toilets / emptying of septic tank (if applicable) could impact on water quality which in turn could impact on the biota and habitat as well.	Surface water quality	3	5,75	5	2	1	4	12	69	Medium
	Storage of material	O	Contaminated water from material storage area could detrimentally impact on watercourses quality, biota and habitat.	Surface water quality	3	5,75	5	2	1	4	12	69	Medium
	Storage of general and hazardous waste	O	Contaminated water from waste storage area could detrimentally impact on watercourses quality, biota and habitat.	Surface water quality	3	5,75	5	2	1	4	12	69	Medium
	Topsoil stockpiling/Vegetation removal & General activities	C, O	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	3	5,75	5	2	1	4	12	69	Medium
	Vehicle maintenance	C, O	Hydrocarbon spills from vehicles and other equipment could negative impact water quality, habitat and biota.	Surface water quality	3	5,75	5	2	1	4	12	69	Medium
	Removal of all infrastructures	R	Potential for spills from e.g. hydrocarbon tanks, septic tank, chemical toilets could impact on the surface water resource quality, habitat and biota if not managed.	Surface water quality	3	5,75	5	2	1	4	12	69	Medium
	Rip impacted area	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	3	5,75	5	2	1	4	12	69	Medium
	Camp area (whole off)	C, O	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Surface water quantity	3	6	5	2	1	4	12	72	Medium

Main Activity	Secondary activity	Phase	Impact	Aspect	D	C	FA	FI	LI	Dt	L	Si	RR
Prospecting activities (all)	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	C, O	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	Surface water quality	3	6,5	5	4	1	4	14	91	Medium
	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	O	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	Surface water quantity	3	6	5	3	1	4	13	78	Medium
	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	R	During the rehabilitation phase water quality could be impacted as a result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.	Surface water quality	3	6,5	5	4	1	4	14	91	Medium
Prospecting activities (all)	Cumulative impact: Schaffhausen	C, O	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	Surface water quality	3	7,5	5	4	1	4	14	105	Medium
	Cumulative impact: Schaffhausen	O	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	Surface water quantity	3	7,75	5	3	1	4	13	101	Medium
	Cumulative impact: Schaffhausen	R	During the rehabilitation phase water quality could be impacted as a result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.	Surface water quality	3	7,5	5	4	1	4	14	105	Medium

Table 7-2: Proposed Management Measures (PRH – Prospecting right holder; ECO- Environmental control officer)

Main Activity	Secondary activity	Phase	Control Measures	Frequency	Responsibility
Ground geophysics and	Vegetation removal	C	Clear vegetation only if needed and if no alternative site is available close by.	As needed	Contractor / ECO / PRH
	Topsoil stockpiling	C, O	Conduct sampling in dry season as far as possible.	As needed	Contractor / ECO / PRH

Main Activity	Secondary activity	Phase	Control Measures	Frequency	Responsibility
soil geochemical sampling	Topsoil stockpiling/Vegetation removal & General activities	C, O	Place a tarp over topsoil stockpile during windy conditions.	As needed	Contractor / ECO / PRH
	Replace topsoil	R	If possible wet topsoil once off to assist with vegetations establishment and to reduce dust generation.	As needed	Contractor / ECO / PRH
	Replace topsoil	R	If possible wet topsoil once off to assist with vegetations establishment and to reduce dust generation.	As needed	Contractor / ECO / PRH
Trenching	Vegetation removal	C	Conduct sampling in dry season as far as possible.	As needed	Contractor / ECO / PRH
	Topsoil stockpiling	C, O	Conduct sampling in dry season as far as possible.	As needed	Contractor / ECO / PRH
	Topsoil stockpiling/Vegetation removal & General activities	C, O	If stockpiles will be in use for more than 1 month, see if vegetation can be established. Implement dust suppression during high wind times.	As needed	Contractor / ECO / PRH
	Overburden stockpiling	C, O	Conduct sampling in dry season as far as possible.	As needed	Contractor / ECO / PRH
	Containment of rainwater in trench	O	Place overburden stockpiles on the upstream side of the trench to prevent storm water ingress into the trench. Conduct trenching in the dry season as far as possible.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH
	Heavy machinery equipment on site	C, O	Clean any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH
	Chemical toilets and sewage waste management	C, O	Maintain chemical toilets. Clean up any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file.	As needed As needed As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH
	General waste generation	C, O	Have a waste bag on site that can be kept in one of the vehicles and dispose all general waste therein.	As needed	Contractor / ECO / PRH

Main Activity	Secondary activity	Phase	Control Measures	Frequency	Responsibility
			Remove daily from site. Dispose at suitable landfill site / of the volume is little dispose in a local waste bin / skip.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH
Resource drilling: drill pad and sump	Heavy machinery equipment on site	C, O	Clean any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Sub-soil under drill rig to be protected by either spill kits under it / placement of PVD material topped with soil that can be removed if contaminated. Keep safe disposal certificates on file.	As needed As needed As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH
	Drilling sludge	O	Contain sludge in a suitably constructed area.	As needed	Contractor / ECO / PRH
	Vegetation removal & General activities	C, O	Only clear area that is needed. If dust is noted during high winds implement dust suppression.	As needed	Contractor / ECO / PRH
	Vegetation removal	C	Only clear area that is needed. Conduct activity in dry season.	As needed	Contractor / ECO / PRH
	Operation of drill pad sump	O	Ensure that sludge is contained.	As needed	Contractor / ECO / PRH
	Chemical toilets and sewage waste management	C, O	Maintain chemical toilets. Clean up any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file.	As needed As needed As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH
	Capping of Borehole	R	Conduct activity in dry season.	As needed	Contractor / ECO / PRH
	Rip impacted area	R	Conduct activity in dry season.	As needed	Contractor / ECO / PRH
	Rip impacted area	R	Wet affected area to assist with vegetation establishment and to reduce potential for dust generation in the short term.	As needed	Contractor / ECO / PRH
	General waste generation	C, O	Have a waste bag on site that can be kept in one of the vehicles and dispose all general waste therein. Remove daily from site.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH

Main Activity	Secondary activity	Phase	Control Measures	Frequency	Responsibility
			Dispose at suitable landfill site / of the volume is little dispose in a local waste bin / skip.	As needed	Contractor / ECO / PRH
Access road	Vegetation removal (all access roads combined)	C	Clean any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file.	As needed As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH
	Daily travelling to prospecting site	C, O	Implement dust suppression if complaints are received. Implement speed limit suitable to access road and as prescribed by existing provincial road notices.	As needed As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH
	Daily travelling to prospecting site	C, O	Clean any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file.	As needed As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH
	Rip road area	R	Wet affected area to assist with vegetation establishment and to reduce potential for dust generation in the short term.	As needed	Contractor / ECO / PRH
Contractor camp	Vegetation removal	C	Clear vegetation only if needed and if no alternative site is available close by. Implement sump to capture silt if needed.	As needed	Contractor / ECO / PRH
	Diesel storage	O	Comply with relevant legislation and SANS standards,	As needed	Contractor / ECO / PRH
	Chemical toilets and sewage waste management	O	Maintain chemical toilets. Clean up any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file.	As needed As needed As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH
	Storage of material	O	Comply with relevant legislation and SANS standards. Implement storm water sump if needed.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH

Main Activity	Secondary activity	Phase	Control Measures	Frequency	Responsibility
	Storage of general and hazardous waste	O	Comply with relevant legislation and SANS standards. Implement storm water sump if needed.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH
	Topsoil stockpiling/Vegetation removal & General activities	C, O	Implement dust suppression if complaints are received.	As needed	Contractor / ECO / PRH
	Vehicle maintenance	C, O	Clean any spills immediately and place in special marked bag for hazardous waste. Dispose hazardous waste at registered landfill site. Keep safe disposal certificates on file. Vehicle parking bays sub-soil to be protected by either spill kits under each vehicle / placement of PVD material topped with soil that can be removed if contaminated.	As needed As needed As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH Contractor / ECO / PRH
	Removal of all infrastructures	R	Follow the waste hierarchy: Re-Use, Reduce, recycle as far as possible. Comply with any relevant legislation and standards.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH
	Rip impacted area	R	Wet affected area to assist with vegetation establishment and to reduce potential for dust generation in the short term. Follow up 1 year after ripping to determine extend of vegetation establishment.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH
	Camp area (whole off)	C, O	Have upstream clean water diversion channel in place. Keep "dirty" footprint area as small as possible.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH
Prospecting activities (all)	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	C, O	Implement as above. Conduct prospecting activities consecutively and rehabilitate areas immediately after the prospecting activities have been finalised and is moved to the next area.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH
	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	O	Implement as above. Conduct prospecting activities consecutively and rehabilitate areas immediately after the	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH

Main Activity	Secondary activity	Phase	Control Measures	Frequency	Responsibility
			prospecting activities have been finalised and is moved to the next area.		
	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	R	Implement as above. Conduct prospecting activities consecutively and rehabilitate areas immediately after the prospecting activities have been finalised and is moved to the next area.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH
Prospecting activities (all)	Cumulative impact: Schaffhausen	C, O	Implement as above. Conduct prospecting activities consecutively and rehabilitate areas immediately after the prospecting activities have been finalised and is moved to the next area.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH
	Cumulative impact: Schaffhausen	O	Implement as above. Conduct prospecting activities consecutively and rehabilitate areas immediately after the prospecting activities have been finalised and is moved to the next area.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH
	Cumulative impact: Schaffhausen	R	Implement as above. Conduct prospecting activities consecutively and rehabilitate areas immediately after the prospecting activities have been finalised and is moved to the next area.	As needed As needed	Contractor / ECO / PRH Contractor / ECO / PRH

Table 7-3: Impact assessment following the implementation of management measures
(FR: Flow Regime; P&C: Physico- and Chemical; H: Habitat; B: Biota; S: Severity, SS; Spatial Scale; D: Duration; C: Consequence, FA: Frequency of Activity; FI: frequency of Impact; LI: Legal Issue; Dt: Detection; L: Likelihood, Si: Significance, RR: Risk rating, M: Moderate)

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
Ground geophysics and soil geochemical sampling	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which	Surface water quality	1	1	1	1	1	1	1	3	1	1	1	4	7	21	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
			could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.																
	Topsoil stockpiling	C, O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	1	1	1	1	1	1	3	1	1	1	4	7	21	Low
	Topsoil stockpiling/ Vegetation removal & General activities	C, O	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	1	1	1	1	1	1	3	1	1	1	4	7	21	Low
	Replace topsoil	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow	Surface water quality	1	1	1	1	1	1	1	3	1	1	1	4	7	21	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
			regime and the physico- and chemical quality of the water in the watercourse.																
	Replace topsoil	R	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	1	1	1	1	1	1	3	1	1	1	4	7	21	Low
Trenching	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low
	Topsoil stockpiling	C, O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
			chemical quality of the water in the watercourse.																
	Topsoil stockpiling/ Vegetation removal & General activities	C, O	Dust generated from stockpile areas could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low
	Overburden stockpiling	C, O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low
	Containment of rainwater in trench	O	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Surface water quantity	2	2	2	1	2	1	2	4,8	1	1	1	4	7	33	Low
	Heavy machinery	C, O	Soil contamination from hydrocarbon spills if not removed	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
	equipment on site		could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.																
	Chemical toilets and sewage waste management	C, O	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low
	General waste generation	C, O	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low
Resource drilling: drill pad and sump	Heavy machinery equipment on site	C, O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
	Drilling sludge	O	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low
	Vegetation removal & General activities	C, O	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low
	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low
	Operation of drill pad sump	O	Removal of run-off from the surface water resource could	Surface water quantity	2	2	2	1	2	1	2	4,8	1	1	1	4	7	33	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
			reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.																
	Chemical toilets and sewage waste management	C, O	Contamination from spills from chemical toilets could impact on water quality should the spilled material enter any watercourse and this could impact on the biota.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low
	Capping of Borehole	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low
	Rip impacted area	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
			biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.																
	Rip impacted area	R	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low
	General waste generation	C, O	General waste generation e.g. plastic bags, bottles etc. could impact on water quality and the habitat and biota in watercourses.	Surface water quality	1	2	2	1	2	1	2	4,5	1	1	1	4	7	32	Low
Access road	Vegetation removal (all access roads combined)	C	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	1	1	1	1	1	1	3	5	1	1	1	4	7	35	Low
	Daily travelling to prospecting site	C, O	Dust generated could impact on surface water quality, and biota should it reach	Surface water quality	1	1	1	1	1	1	3	5	1	1	1	4	7	35	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
			watercourses and settle within this area.																
	Daily travelling to prospecting site	C, O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	1	1	1	1	1	1	3	5	1	1	1	4	7	35	Low
	Rip road area	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and chemical quality of the water in the watercourse.	Surface water quality	1	1	1	1	1	1	3	5	1	1	1	4	7	35	Low
Contractor camp	Vegetation removal	C	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the	Surface water quality	1	1	1	1	1	1	3	5	5	1	1	4	11	55	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
			physico- and chemical quality of the water in the watercourse.																
	Diesel storage	O	Soil contamination from hydrocarbon spills if not removed could impact on water quality should the hydrocarbons enter the watercourses, this could impact on the biota and habitat as well.	Surface water quality	1	1	1	1	1	1	3	5	5	1	1	4	11	55	Low
	Chemical toilets and sewage waste management	O	Contamination from spills from chemical toilets / emptying of septic tank (if applicable) could impact on water quality which in turn could impact on the biota and habitat as well.	Surface water quality	1	1	1	1	1	1	3	5	5	1	1	4	11	55	Low
	Storage of material	O	Contaminated water from material storage area could detrimentally impact on watercourses quality, biota and habitat.	Surface water quality	1	1	1	1	1	1	3	5	5	1	1	4	11	55	Low
	Storage of general and	O	Contaminated water from waste storage area could	Surface water quality	1	1	1	1	1	1	3	5	5	1	1	4	11	55	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
	hazardous waste		detrimentally impact on watercourses quality, biota and habitat.																
	Topsoil stockpiling/ Vegetation removal & General activities	C, O	Dust generated could impact on surface water quality, and biota should it reach watercourses and settle within this area.	Surface water quality	1	1	1	1	1	1	3	5	5	1	1	4	11	55	Low
	Vehicle maintenance	C, O	Hydrocarbon spills from vehicles and other equipment could negative impact water quality, habitat and biota.	Surface water quality	1	1	1	1	1	1	3	5	5	1	1	4	11	55	Low
	Removal of all infrastructures	R	Potential for spills from e.g. hydrocarbon tanks, septic tank, chemical toilets could impact on the surface water resource quality, habitat and biota if not managed.	Surface water quality	1	1	1	1	1	1	2	4	5	1	1	4	11	44	Low
	Rip impacted area	R	Silt generation during rainfall events could reach surface water resources resulting in siltation of the watercourse which could impact on the biota, habitat, flow regime and the physico- and	Surface water quality	1	1	1	1	1	1	2	4	5	1	1	4	11	44	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
			chemical quality of the water in the watercourse.																
	Camp area (whole off)	C, O	Removal of run-off from the surface water resource could reduce surface flow in watercourses which in turn could impact on the habitat and biota within this area.	Surface water quantity	1	1	1	1	1	1	2	4	5	1	1	4	11	44	Low
Prospecting activities (all)	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	C, O	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	Surface water quality	1	2	2	2	2	1	2	4,8	5	1	1	3	10	48	Low
	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	O	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	Surface water quantity	2	2	2	2	2	1	2	5	5	1	1	3	10	50	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
	Cumulative impact: Big area (Areas 1, 2, 3 and 4)	R	During the rehabilitation phase water quality could be impacted as a result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.	Surface water quality	1	2	2	2	2	1	2	4,8	5	1	1	3	10	48	Low
Prospecting activities (all)	Cumulative impact: Schaffhausen	C, O	The proposed prospecting activities could impact on surface water quality as a result of hydrocarbon spills and siltation from run-off.	Surface water quality	1	2	2	2	2	1	2	4,8	5	1	1	3	10	48	Low
	Cumulative impact: Schaffhausen	O	The proposed prospecting activities could impact on surface water quantity; however, it is expected that the boreholes and trenching will be done consecutively thus the impact severity should not increase from that of the individual activities.	Surface water quantity	2	2	2	2	2	1	2	5	5	1	1	3	10	50	Low
	Cumulative impact: Schaffhausen	R	During the rehabilitation phase water quality could be impacted as a	Surface water quality	1	2	2	2	2	1	2	4,8	5	1	1	3	10	48	Low

Main Activity	Secondary activity	Phase	Impact	Aspect	Se					SS	D	Co	FA	FI	LI	De	Li	Si	RR
					FR	PC	Ha	Bi	S										
			result of hydrocarbon spills and from siltation from ripped areas that are not vegetated.																

8 ENVIRONMENTAL MANAGEMENT PROGRAMME

The applicant needs to develop an Environmental Management Programme / Plan which describe in detail how identified impacts will be managed on site to ensure that impacts are minimised.

The EMP must then be approved by the relevant government agencies. The management measures as indicated in Table 7-2 must be implemented where applicable.

8.1 MONITORING PROGRAMME

As the proposed activities will be located outside of the regulated areas and the watercourses nearest to the proposed activities are non-perennial no watercourse surface water quality or quantity monitoring is proposed.

9 LIMITATIONS AND ASSUMPTIONS

This report and assessment are based on available information as provided by Sylvania Northern Mining (Pty) Ltd Investments as outlined in Section 2.1 and throughout Section 5. No specific points for drilling / areas for trenching was provided thus assumptions with regards to access roads were made.

It is assumed that the information sourced from open source data is correct.

10 CONCLUSION AND RECOMMENDATIONS

The proposed prospecting activities should not impact on the surface water resource as the activities will be outside of the regulated area.

Recommendations are the following:

- The management measures as outlined in this report must be implemented.

If the management measures and recommendation as outlined in this report is implemented it is recommended that the proposed Prospecting Right be approved.

11 APPENDICES

Appendix 1: The expertise of the EAP to carry out the procedures
Appendix 2: Declaration of Independence

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Appendix 1
The expertise of the EAP to carry out the procedures

Christina Petronella Erasmus
(Petro)

1 Objectives

Objectives that I have set for myself and are constantly working towards are:

- Work in combinations of the following areas: auditing, research, environment and education.
- Continuously increase and update my knowledge with regards to environmental aspects and find ways of sharing the experience that I have with clients, interested parties and students.
- Obtain registrations with various environmental registration bodies that will serve as testimony to the fact that I am an expert in my field.

Furthermore, I would also like to be known as an environmental specialist that conducts her work with integrity and objectivity and that I speak truth to the impacts that any project that I work may have on the environment.

2 Contact details

- Email: petro@prescali.co.za
- Snail mail: P.O. Box 11, Mooinooi, 0325
- Phone (cell): +27 (072) 237 7305

3 Personal Information

I am a dedicated employee and will always give my best to my employer, clients and students. That being said a have be employed in the educational, government and consulting services as discussed below.

During my post graduate studies (1996 – 2003) I have worked as a laboratory assistant and in 2004 I lectured at the University of Port Elizabeth (now Nelson Mandela Metropolitan University). I have found the lecturing truly rewarding and enjoyed disseminating my knowledge to the young minds of our future work force. Subjects in which training was provided included the Bridging course for first year exchange students or students that did not have biology in high school and the physiology of the brain for nursing students.

My environmental background includes being involved in an Environmental field either as a student or in a working environment. From March 2006 – April 2008 I was involved in Water Management with the Department of Water Affairs and Forestry (DWAF, pre-2009). My duties included evaluation (evaluation, commenting and recommendation) of various regulatory required documents (such as Environmental Management Programs (EMPR's), Water Licence Applications and Environmental Impact Assessments), as well as the compilation of these documents. This work has been done for waste water management, mining and industrial sectors, as well as for private developers (e.g., residential) and business. In addition, as I have graduated in an Environmental Field (Zoology, specifically marine pollution) I have a great understanding of the water related environmental systems.

From May 2008 till January 2018, I have worked as an Environmental Consultant at the firm M2 Environmental Connections (MENCO). During this time, I was assisting Prescali Environmental Consultants with various projects focusing on auditing, environmental impact assessments, environmental management plans, water use licence applications and related aspects.

As of February 2018, I am full time employed by Prescali and have increased the number of training sessions that I have presented relating to Environmental Legal Awareness. A list of all projects that I have worked on since 2008 is provided in the attached at the end of the CV and detailed information on auditing and training is provided as well. During my time at Menco and Prescali I have gained experience in the mining, industrial, health and development sectors.

In addition to the above, I have experience in an agricultural (game) field, for work that I did for the Terrestrial Ecological Research Unit at the then University of Port Elizabeth. Another speciality area is waste management and I have drafted waste management reports, classification reports as well sewage management reports.

One of my favourite work fields are surface water assessment including the description of the surface water baseline environment due to the complex nature and interaction of these systems with the surrounding environment.

Since I passed the ISO14001:2015 Lead Auditor Exam through PECB in 2018, I have started to accumulate hours auditing this Management System and found it a very rewarding field as I can implement all the experience that I have gained throughout the years in determining conformance to the system. As a certified PECB Trainer for ISO14001:2015 I have also been approached to conduct training on the ISO14001:2015 standard and on Environmental Law (South Africa) providing me the way to share the experience that I have with other parties and thus fulfilling one of my goals.

I also take pride in the fact that I am registered with the South African Council for Natural Scientific Professions (SACNASP) in the Ecological and Environmental Scientific fields and that I am a Member of the Water Institute of South Africa (WISA). I have also been registered as an Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (EAPASA).

4 Personal Data

Identity Number	740502 0050 088
Date of Birth	2 May 1974
Sex	Female
Driver's license	Code 08 / EB
Nationality	South African
Home Language	Afrikaans (speak, read and write)
Other Languages:	English (speak, read and write)

5 Work Experience

A full list of projects is attached at the end of this CV.

2018 - Current **PRESCALI** **PRETORIA**

Duties include compiling technical documentation (EMPR / EMP, Water Balance, Surface Impact Report, WULA, IWRMP/IWWMP), Public Participation, Administrative duties (Invoicing; Quotations) & mentoring new employees, ISO14001 training, Legislative training, Auditing compliance with legislation, licences and management reports.

Client list include:

University of Mpumalanga
Pan Palladium South Africa (Pty) Ltd
Apollo Brick (Pty) Ltd
Grasvally Chrome Mine (Pty) Ltd
Gudani Consulting (Pty) Ltd
Sky Chrome Mining (Pty) Ltd
Corobrik (Pty) Ltd
Sail Group
Salene Manganese (Pty) Ltd
Reinhard Transportation Group (Pty) Ltd
Hacra Mining and Exploration Company (Pty) Ltd
Sylvania Metals (Pty) Ltd
Illita Mining (Pty) Ltd
Chromex Mining (Pty) Ltd
Red Kite Environmental Solutions (Pty) Ltd
International Ferro Metals (South Africa) (Pty) Ltd
Glenover Phosphate
Inlexo Innovative Solutions
Venetia Diamond Mine

Details on the Clients and their respective industries are provided in Section 15.

2008 - 2018 **MENCO / PRESCALI** **PRETORIA**

Duties include compiling technical documentation (EMPR / EMP, Water Balance, Surface Impact Report, WULA, IWRMP/IWWMP), Sampling (Harties Metsi A Me project), Public Participation, Administrative duties (Invoicing; Quotations), Auditing licences & Mentoring new employees.

Short client list includes:
Vesuvius South Africa (Pty) Ltd *Richmond Mining and Exploration*
Samancor (Eastern and Western Chrome Mines) *Virtual Consulting Engineers*
Andalusite Resources (Pty) Ltd *Samancor Ferrometals*
Coastal Fuels (Pty) Ltd
Details on the Clients and their respective industries are provided in Section 15.

2007- April 2008 **DWAF[1]** **HARTBEESPOORT**
Senior Water Pollution Control Officer
Knowledge of water policies and strategies relating to Integrated Water Resource Management was a requirement and I had to ensure that all water users complied with legal and technical principles. Other duties included Integrated Water Use Licenses and in providing specialist input into waste disposal facilities applications. In addition, I was involved in facilitating integrated monitoring programmes in terms of water quality, microbial, biology and other aspects of river health as well as general administrative duties. I was also the Health and Safety officer for our office.

2006(MARCH – DES) **DWAF** **EAST LONDON**
Water Pollution Control Officer
Duties included site inspections of waste water treatment plant, potable water treatment plants and other businesses and mines that could negative impact on water quality for compliance with the National Water Act, 1998 (Act 36 of 1998). Registration and licensing of water uses, taking of water samples and interpretation of analyses results, investigation of pollution incidents. I also assisted with SASS monitoring for the regional River Health Programme

Other duties included correspondence with clients, following up on complaints, attending committees and awareness creation among stakeholders.

2005 – 2006 **NICO ROUX GAME ENTERPRISES** **RUSTENBURG**
General Administration clerk.
Responsible for general administration which included obtaining permits for import and export of game (both internationally and provincially). Other duties included helping to organise game auctions, web site updating and payroll administration.

2004 **UPE[2]** **PORT ELIZABETH**
Laboratory Assistant UPE Advancement Program Biology laboratory
Semester 1 and 2: helping to set up a new biology laboratory. Duties included making microscope slides, and setting up practical equipment.

2004 (Feb – Jun)
Research Assistant, Terrestrial Ecology Research Unit, Zoology Department
Contacting game-farmers and game farm managers to update an existing database, as well as generating information on the information needs and sources of information utilised by game farmers and game farms managers. This formed part of the STEP (subtropical thicket ecosystem planning) project.

2004 (Jul – Des)
Contract Lecturer for the UPE Advancement Program & the Department of Biochemistry and Physiology
- UPE Advancement Programme: Lecturing the full second semester course on biology consisting of animal classification, human and animal physiology and ecology.
- Department of Biochemistry and Physiology: Lecturing the second part of BWV203 (The human nervous systems) and the whole of BWV204 (The human brain and spinal cord) for nursing students.

1 Department of Water Affairs and Forestry – Now Department of Water and Sanitation
2 University of Port Elizabeth: From January 2005 The following institutions amalgamated in January 2005 to for the Nelson Mandela Metropolitan University (NMMU): UPE, Vista PE and PE Technicon

For both of these I was responsible for setting up November exams papers and January Sick exam papers as well as grading the answer sheets.

2001 – 2003
Practical Assistant UPE Advancement Program

- Semester 1: preparation and presentation of practical experiments. Assistant lecturer.
- Semester 2: presentation of practical experiments and tutorials.
- Zoology 240 (Ecotoxicology) lecturer. Lectured the second-year course in ecotoxicology consisting of 10 lectures and 2 practical sessions. Duties also included setting up and marking examination papers as well as updating the lecture notes.

2001
Supplemental Instruction (SI)

- Assistant coordinator SI (Sciences) and Editor for The Ripple (SI UPE newsletter).
- Committee member Zoological Society South Africa Conference UPE. Portfolio: transport and accommodation

2000
Supplemental Instruction
SI leader: first year zoology students.

1998 – 2000
Zoology Practical Demonstrator

- 1998: Practical demonstrator for first year zoology students. Modules covered: general taxonomy (invertebrates) and an introduction to histology.
- 1999 – 2000: Practical demonstrator for second year zoology students. Modules covered: statistics, physiology, vertebrate anatomy, histology.

1996 **PU FOR CHE[3]** **POTCHEFSTROOM**
Zoology Practical Demonstrator
Practical demonstrator for first year zoology students. Some of the modules covered during the year included: general taxonomy (vertebrates and invertebrates), evolution.

6 Education

1993 – 1995 **PU FOR CHE** **POTCHEFSTROOM**
Baccalareus scientiae.
Graduated with third year subjects Zoology and Biochemistry.

1996 **PU FOR CHE** **POTCHEFSTROOM**
Baccalareus scientiae (honoris) in Zoology. Received cum laude.
During this year various disciplines within Zoology were covered, such as Parasitology, Genetics, Ecology, Histology, Computers, Biostatistics, Environmental Impact Studies and many more.
The project was histology based and increased my knowledge on how to make microscope slides and how to use immunocytochemistry to mark relevant tissue areas. The results from my study were published in the Onderstepoort Journal of Veterinary Science.

1998 - 1999 **UPE** **PORT ELIZABETH**
Magister Scientiae in Zoology, Received cum laude.
Supervisor: Dr. G. J. Rossouw.
The project was histology based and focused on the retinal cells of sharks. As a result, my knowledge in the field of histology increased as I learned how to use a transmission electron microscope and a scanning electron microscope. Computer statistical skills also improved due to the number of statistical tests that had to be completed.

2000 – 2003 **UPE** **PORT ELIZABETH**
Philosophiae Doctorae in Zoology.

[3] Potchefstoom University for Christian Higher Education, now the North-West University.

Promoter: Dr. G.J. Rossouw; Co-promoter: Prof. D. Baird.
This study focused on ecotoxicology. The concentration of 10 different metals in various tissue types of sharks that were caught along the south eastern coast of South Africa were investigated. During the course of this study, I became familiar with digestion of tissue samples using acid, and working with an ICP-MS. Part of the study focussed on the metallothioneins (a metal binding protein) in the liver of sharks. This part of the study taught me how to isolate different proteins (using a hydrophobic column), work with a spectrophotometer and I also become familiar with gel-electrophoreris (SDS-PAGE gels). Once again, I increased my statistical background due to the numerous comparisons and tests that had to be completed on the relevant data sets.

7 Short Courses / Workshops / Training Seminars Attended

Year	Course	Presented by and Location
1999	Practical Demonstrator Training Workshop	UPE: Department of Zoology
2000	Supplemental Instruction / Leader Training Workshop	UPE: National SI Centre
2000	Supplemental Instruction Supervisors / Leader Training Workshop	UPE: National SI Centre
2001	Ifaw Shark Conservation Workshop	IFAW: Cape Town
2006	Estuary Management	WRC, Buffalo City, U-KZN: East London
2006	Policy and Methods of Disposing Abattoir Waste, Hygiene in Abattoir Cutting Plants, Hygiene Management System, Animal Disease Reporting	Department of Agriculture: Amathole DM: East London
2006	Environmental Impact Assessment: The NEMA Regulations – A Practical Approach	CEM: Potchefstroom
2007	Water Quality Management Orientation Course	DWAF: Roodeplaat
2007	Improving Legal and Regulatory Efficiency for Water Resource Management in Southern Africa	IDLO: Pretoria
2007	Environmental Law for Environmental Managers	CEM: Potchefstroom
2010	Flood hydrology and urban Runoff modelling	University of Pretoria: Pretoria
2013	Applied Fluvial Geomorphology	Wildland Hydrology: Fayetteville, AR, USA
2014	IWRM, The NWA, and Water Use Authorisations, focussing on Water Use License Applications – Procedures, Guidelines, IWWMP's and Monitoring	Carin Bosman, Pretoria
2015	Environmental Impact Assessment (EIA) 2014 Legal Regime Workshop	Imbewu: Cape Town
2015	River Morphology and Applications	Wildland Hydrology, Bend, OR, USA
2015	WRSM2000(Pitman)/WR2012 Water Resources Two Day Course	Royal Haskoning DHV, Pretoria
2016	Financial Provision Regulations and mine closure requirements legal training workshop	IMBEWU, Johannesburg
2017	ISO 14001: 2015 Environmental Management Systems – Introductory 3-day course	EOH, Pretoria – No certificate provided
2017	Southern African Geomorphology Pure and Applied Conference	University of Swaziland
2017	ISO 14001: 2015 Lead Auditor course	PECB - EOH Pretoria (Self-study)
2018	Environmental Law Update Workshop	IMBEWU, Johannesburg
2019	WISA Workshop on water re-use (IFAT)	Gallagher Estate, Midrand
2019	Environmental Law Update Workshop	IMBEWU, Johannesburg
2020	OHS Legal Liability training	Inlexo – Online e-course
2020	Various Webinars as presented by WISA: Water meter performance (21/07/2020) River Health Restoration through community based monitoring and management (03/08/2020) Water re-use – concerns and guidelines (3/11/2020) Faecal sludge management toolbox (12/11/2020)	WISA – Online e-course – No certificates provided

Year	Course	Presented by and Location
2020	Various online certificated for CPD points using the SACNASP online portal: How to Manage your CPD activities: 0,1 CPD Category 3 Hydropedological Classification of South African Hillslopes: 0,2 CPD The science of hydropedology - linking soil morphology with hydrological processes: 0,1 CPD The contribution of hydropedological assessment to the availability and sustainable management of water, for all: 0,2 CPD Hydropedology in South Africa: Advances, applications and research oppertunities: 0,2 CPD Soil Indicators of Hillslope Hydrology: 0,2 CPD The Three commandments of Presenting: 0,1 CPD Hydropedological grouping of South African Soil forms: 0,1 CPD"	SACNASP
2021	WISA Webinar: Sustainable and resilient water management in South Africa – ongoing research Blue and Green Drop Keeping Hope Alive Integrated Biological System for Concurrent Wastewater Treatment, Solids Reduction and Resource Recovery from Tannery Wastewater	WISA
2021	Various online certificated for CPD points using the SACNASP online portal: ISO/IEC 17025-2017 Clause 4.1, 4.2 & 5 ISO/IEC 17025-2017 Clause 6 ISO/IEC 17025-2017 Clause 7.1, 7.2, 7.3 & 7.6 ISO/IEC 17025-2017 Clause 7.4, 7.5 & 7.7 ISO/IEC 17025-2017 Clause 8.1 & 8.2 ISO/IEC 17025-2017 Clayse 8.3 & 8.4 ISO/IEC 17025-2017 Clause 8.5 & 8.6 ISO/IEC 17025-2017 Clause 8.7 & 8.8 ISO/IEC 17025-2017 Clause 8.9 ISO/IEC 17025-2017 Clause 7.8, 7.9, 7.10 & 7,11 Update your portfolio of evidence (2020)	SACNASP

8 Professional Registrations

- Water Institute of South Africa (WISA): Member
- South African Council for Natural Scientific Professions (SACNASP): Ecological Science & Environmental Science
- EAPASA: Environmental Assessment Practitioner
- PECB: Lead Auditor ISO14001
- PECB: Certified Trainer

9 Peer Reviewed Publications

C.P. Erasmus & G. Van Aswegen. 1997. The endocrine pancreas of the cape fur seal, Arctocephalus pusillus (Schreber, 1776): an immunocytochemical study. Onderstepoort Journal of Veterinary Research, 64: 239 – 242.

10 Dissertations / Thesis / Reports

- C.P. Erasmus. 2000. The retinal cells of different elasmobranch species. M.Sc. Dissertation. University of Port Elizabeth, Port Elizabeth, South Africa.
- C.P. Erasmus. 2004. The concentration of ten metals in the tissues of shark species Squalus megalops and Mustelus mustelus (Chondrichthyes) occurring along the south-eastern coast of South Africa. Ph.D Thesis. University of Port Elizabeth, Port Elizabeth, South Africa. (Supervisors: Dr. G.J. Rossouw & Prof. D. Baird)

- P. Erasmus & G. Kerley. 2004. Ecological information needs of game farmers and land managers to sustainably manage subtropical thicket. TERU Report 49. 33pp.

11 Conference Proceedings

- C.P. Erasmus & G. Rossouw. 1998. The photoreceptors of different elasmobranch species in relation to their habitat. Electron microscopy – paper presented at IECM 14, symposium II, Volume IV, 1998: 81 – 82. (ICEM, Cancun, Mexico, 31 August – 4 September 1998).
- C.P. Erasmus & G.J. Rossouw. 1999. The rods and cones of some elasmobranchs. Microscopy Society Of South Africa - Proceedings, 29: 96 (Sams, Bloemfontein, December 1999).
- C.P. Erasmus, D. Baird & G.J. Rossouw. 2003. Metal concentration in the muscle of Mustelus mustelus (Linnaeus 1758) caught of St. Francis Bay. Joint conference of SASAQS & ZSSA, Cape Town 30 June – 4 July 2003.
- C.P. Erasmus, C.L. Frost & D. Baird. 2003. Metallothioneins in the liver of dogfish (Squalus megalops) caught off Algoa Bay, South Africa. SASBMB 18th Congress, Pretoria, 6 – 9 July 2003.

12 Popular Articles

- P. Erasmus. 2004. Changing land use trends in the subtropical thicket (valley bushveld) biome: feedback and the way forward. ECGMA Pelea news. March 2004: 35 – 36.
- P. Erasmus & G. Kerley. 2004. Spesifieke informasie behoeftes van wildplaas eienaars en –bestuurders in die Oos-Kaap. Game & Hunt (Wild en Jag). October/Oktober 2004 10: 47 – 49.

13 Interests

My interests are broad and can be categorised into the following:

- River morphology
- Game drives and Bird watching
- Reading
- Hand and Needlework

14 References

Riekie van den Berg

- Organization: Inlexo Innovative Legal Solutions
- Contact no: +27 82 552 3659
- Email: Riekie.vdBerg@inlexso.co.za
- Occupation/ Relationship: She is a client for which I do training and ISO14001 audits and have known her for at least ±4 years.

Setenane Nkopane

- Organization: Gudani Environmental Consulting
- Contact: +27 82 828 3412
- Email: setenane@gudaniconsulting.co.za
- Occupation/ Relationship: He is a client for which I have done various surface water impact assessment and I have known him for ±10 years.

Nicole Upton

- Organization: Red Kite Environmental Solutions (Pty) Ltd
- Contac no: +27 79 555 2433
- Email: nicole@redkiteconsulting.co.za
- Occupation/ Relationship: She is a client for which we do compliance audits and water balances. Before she started her own company she used to work with me at M2 Environmental. She is also a specialist I appoint occasionally for impact assessments and I have known her for ±9 year.

Morné de Jager

- Organization: M2 Environmental Connections / Environmental Acoustic Research
- Contact: +27 82 565 4059
- Email: morne@menco.co.za / morne@eares.co.za
- Occupation/ Relationship: He was a colleague at M2 Environmental connections and one of the company owners and I have known him for ±14 years.

15 General information on clients (not comprehensive)

Company	Background information
Andalusite Resources (Pty) Ltd	This is an opencast Andalusite mine with beneficiation occurring on site.
Apollo Brick (Pty) Ltd	Apollo brick is a clay mining and clay brick production operation.
Chromex Mining (Pty) Ltd	Chromes operates the opencast chrome mine on Vlakpoort. This was recently handed over to Destiny Springs.
Coastal Fuels (Pty) Ltd	This company owned and operated coal mines in Mpumalanga.
Corobrik (Pty) Ltd	Corobrik is a clay mining and clay brick production operation.
Glenover Phosphate	Glenover phosphate will be an opencast phosphate mine with processing on site.
Grasvally Chrome Mine (Pty) Ltd	Grasvally Chrome mine is a 100% owned subsidiary of Sylvania Platinum and currently is remining existing waste rock to produce chrome and platinum group metals. Approval has already been received for an opencast mine.
Gudani Consulting (Pty) Ltd	Gudani is an Environmental and Social impact assessment company. The work that I have done for them is surface water impact assessments.
Hacra Mining and Exploration Company (Pty) Ltd i.e. Ironveld Mining (Pty) Ltd	Hacra Mining is a new venture opencast iron mine that will be located in the Limpopo Province.
Illita Mining (Pty) Ltd	Illita operates the Stellite opencast chrome near Rustenburg.
Inlexo Innovative Legal Solutions / EOH	The work that I have done for this company consists of Environmental legal awareness training, ISO14001:2015 transitional training and Second party audits.
International Ferro Metals (South Africa) (Pty) Ltd	IFMSA was an underground chrome mine and Chrome Furnace that produced chrome ingots as the final product. The company has closed.
Pan Palladium South Africa (Pty) Ltd i.e. Lapon Mining (Pty) Ltd	Pan palladium is a new venture opencast iron mine that will be located in the Limpopo Province.
Phoenix Platinum (Pty) Ltd	Phoenix retreats current arising and tailings from tailings dams to produce chrome and platinum group metals. Phoenix Platinum is now a 100% owned subsidiary of Sylvania Metals.
Red Kite Environmental Solutions (Pty) Ltd	Red Kite is an Environmental impact assessment company. The work that I have done for them is audit and water / Salt balances.
Reinhard Transport (Pty) Ltd	This is an ISO14001:2015 certified company that transports chrome and coal for various companies.
Richmond Mining and Exploration	This is a mineral exploration mining company. The work that was done for them focussed on environmental authorisations and impact assessments.
Sail Group	The Sail group is a company that specialises in chrome mining and production and has various operational areas.
Salene Manganese	Salene started a new iron and manganese mine near Kathu in the Northern Cape. It is a small opencast operation and beneficiation of the Manganese and iron run of mine is proposed as a new expansion.
Samancor (Eastern and Western Chrome Mines)	Samancor is a Chrome mining company using opencast and underground operations. Beneficiation of the Run of mine also occurs on site.
Samancor Ferro Metals	This is a chrome furnace operation and the work conducted focussed on

Company	Background information
	external audits of the water use - and waste management licences.
Sky Chrome Mining (Pty) Ltd	Sky chrome was an opencast chrome mine and is currently under care and maintenance.
Sylvania Metals (Pty) Ltd	Sylvania owns and operates several facilities in Limpopo and the North West that retreats current arising and tailings from tailings dams to produce chrome and platinum group metals.
University of Mpumalanga	This is an educational establishment and I drafted a Waste Management Plan for the Mbombela campus
Venetia diamond mine	This is an opencast diamond mine located in the Limpopo Province
Vesuvius South Africa (Pty) Ltd	This international company's operation in South Africa produces refractory products and burnt dolomite (Doloma) for supply to various industries in South Africa. Vesuvius has four rotary kilns at their Olifantsfontein site.
Virtual Consulting Engineers	This is an engineering company, the work conducted for them focussed on environmental authorisations and impact assessments for various sewage treatment plants.

16 Client Industry outline

Company	Industry		Aspect	Documents compiled
Afarak	Mining	Chrome	Audits	WUL Audits
Altius 345 (Pty) Ltd: Imbabala Colliery	Mining	Coal	Water management	IWWMP, Surface Water Assessments, Legislation requirements
Andalusite Resources (Pty) Ltd	Mining	Andalusite	Water management	IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances
Apollo Brick (Pty) Ltd	Mining	Clay	Water management Audits Environmental Management	Integrated Water and Waste Management Plans, Monitoring, WUL Audits, EIA/EMP documentation
Assmang: Khumani Mine (subcontracted through GPT)	Mining	Iron	Water management	Water balance
Bauba (sub-contracted by Red Kite)	Mining	PGM	Water management Audits	Surface Water Assessments, Legislation requirements, WUL Audits
Chromex mining (Pty) Ltd (Mecklenburg Chrome Mine)	Mining	Chrome	Water management	IWWMP
Coastal Fuels (Pty) Ltd	Mining	Coal	Environmental Management Water Management	EIA/EMP d& IWWMP documentations
Corobrik (Pty) Ltd	Industry	Brick Making Kiln	Environmental Management Public Participation Waste Management	EIA/EMP documentations, Facilitating Public participation, Waste Classification
Corridor Mining Resources project: Fumani Gold Mine	Mining	Gold	Water management Waste Management	Surface water assessment, Water and Salt balance
Department of Public Works (Sub contracted through Shawshank constructions): Ncome Prison upgrade project	Sewage	Sewage	Environmental Management Sewage Management	EIA/EMP documentations, Environmental Control Officer, WQMR
Department of Public Works (Sub-contracted through MAGWA): Ekuseni Youth Centre Upgrade project	Sewage	Sewage	Environmental Management Sewage Management	EIA/EMP documentations, Environmental Control Officer, WQMR
Department of Public Works (Swartkopfontein border post)	Sewage	Sewage	Environmental Management Sewage Management	Section 24(g) application, WQMR
Department of Public Works (Zonderwater prison)	Sewage	Sewage	Environmental Management Sewage Management	EIA/EMP documentations, WQMR
Department of Public Works: Appointed through Virtual consulting: Nerston Port of entry	Sewage	Sewage	Environmental Management Sewage Management	EIA/EMP documentations, WQMR

Company	Industry		Aspect	Documents compiled
Department of Water Affairs and SRK: Rustenburg Local Municipality	Sewage	Sewage	Legislation	Water use licence application
Department of Water Affairs: Harties Metsi A Me project	Monitoring	Monitoring	Water management	Monitoring and Interpretation
Eco-elementum: Vunene Mining	Mining	Coal	Water management	Surface water assessment
EOH	Environmental	Training	Training	ISO14001:2015, Environmental law
EOH: Arengo Plastics	Industry	Packaging	Audit	ISO14001:2015
EOH: Clearline protection services	Industry	Electrical	Audit	ISO14001:2015
ERWAT (sub-contracted by Maziya)	Sewage	Sewage	Sewage management	WQMR
Glenover Phosphate	Mining	Phosphate	Environmental Management Public Participation Water management	EIA/EMP documentations, IWWMP
Grasvally Chrome Mine (Pty) Ltd	Mining	Chrome	Water management Audits	Integrated Water and Waste Management Plans, WUL Audit
Gudani Consulting (Pty) Ltd: 3 applications (Mokolo River)	Quarry	Sand	Water management	Surface Water Assessments, Legislation requirements
Gudani Consulting (Pty) Ltd: 7 Seas Capital	Quarry	Granite	Water management	Surface Water Assessments, Legislation requirements
Gudani Consulting (Pty) Ltd: Thaba Chue	Quarry	Quartz/Silica	Water management	Surface Water Assessments, Legislation requirements
Gudani Consulting (Pty) Ltd: Township Development (3 Applications: Ekurhuleni)	Residential / Holiday accommodation		Water management	Surface Water Assessments, Legislation requirements
Hacra Mining and Exploration Company (Pty) Ltd	Mining	Iron	Water management	IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances
Hacra Mining and Exploration Company (Pty) Ltd	Mining	PGE	Water management	IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances
Illita Mining (Pty) Ltd	Mining	Chrome	Audits	WUL Audits
Inlexo Innovative Solutions	Medical (6 sites)		Environmental Management	ISO14001:2015 audits
International Ferro Metals (South Africa) (Pty) Ltd	Mining	Chrome	Legislation Water management Waste management Audits	Section 24(g) application, IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances, Waste management documentation, WUL Audits

Company	Industry		Aspect	Documents compiled
International Ferro Metals (South Africa) (Pty) Ltd	Industry	Chrome Smelting	Water management Waste Management Audits	IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances, Waste management documentation, WUL Audits
Ironveld Smelting (Pty) Ltd	Smelter	Iron	Water management	IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances
Kingdom Development Company (Pty) Ltd (Appointed through M2 Environmental Connections)	Residential / Holiday accommodation		Water management Audits	IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances, WUL Audit
MTC Minerals	Mining	Chrome	Water management	IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances
Nouvall	Residential / Holiday accommodation		Water management	Rehabilitation strategy, Water use licence application
Palm Chrome	Mining	Chrome	Water management	Surface water assessment
Pan Palladium South Africa (Pty) Ltd	Mining	Iron	Water management	IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances
Pan Palladium South Africa (Pty) Ltd	Mining	PGE	Water management	IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances
Phoenix Platinum (Pty) Ltd	Mining	Chrome Tailings Retreatment	Waste Management Water Management	Tailings Storage Facility, IWWMP, Legal requirements, Monitoring and Interpretation
Piet Greyling	Quarry	Granite	Waste Management	Waste Management
Polmaise Colliery Middelburg	Mining	Coal	Water management	Water and salt balances
Richmond Mining & Exploration (Middelpunt)	Mining	Diamond	Water management	Emergency Rehabilitation, IWWMP
Ruighoek chrome mine	Mining	Chrome	Water management	Water and salt balances
Sail group	Mining	Chrome	Legislation	Environmental Due Diligence
Samancor Chrome Ltd: Eastern Chrome Mines	Mining	Chrome	Water management	IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances
Samancor Chrome Ltd: Eastern Chrome Mines	Mining	Chrome	Audit	WUL, Environmental Authorisations
Samancor Chrome Ltd: Eastern Chrome Mines	Mining	Chrome	Environmental Management	EIA/EMP documentations
Samancor Chrome Ltd: Eastern Chrome	Mining	Chrome	Waste Management	Waste Management Documentation

Company	Industry		Aspect	Documents compiled
Mines				
Samancor Chrome Ltd: Ferrometals	Industry	Chrome Smelting	Audit	WUL, Environmental Authorisations, Waste Licences
Samancor Chrome Ltd: Western Chrome Mines	Mining	Chrome	Water management	IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances
Samancor Chrome Ltd: Western Chrome Mines	Mining	Chrome	Audit	WUL, Environmental Authorisations
Samancor Chrome Ltd: Western Chrome Mines	Mining	Chrome	Environmental Management	EIA/EMP documentations
Samancor Chrome Ltd: Western Chrome Mines	Mining	Chrome	Waste Management	Waste Management Documentation
Sandberg / Mona Mona	Quarry	Sand	Water management	Surface water assessment
Sefateng Chrome Mine (sub-contracted by Red Kite)	Mining	Chrome	Water management	Water and salt balances
Sky Chrome Mining (Pty) Ltd	Mining	Chrome	Audits	EMP Performance assessments / WUL Audits
Sky Chrome Mining (Pty) Ltd	Mining	Chrome	Water management	IWWMP, Legal requirements, Monitoring and Interpretation
Sylvania (Pty) Ltd	Mining	Chrome Tailings Retreatment	Waste Management	Closure quantum
Umnotho we-Sizwe Resources	Mining	Chrome	Water management	IWWMP, Surface Water Assessments, Legislation requirements, Monitoring, water and salt balances
Vaalplan Regional and Town planners (Wilgeblare Beleggings)	Residential / Holiday accommodation		Water management	Surface water assessment
Venetia Mine	Mining	Diamond	Water management	WCDMP and Water Balance
Vesuvius South Africa (Pty) Ltd	Industry		Water management	Storm water plan, IWWMP

17 Detailed information on ISO14001:2015 Audits conducted

Project	Audit Outline	Organisation	Address	Contact person	Contact details	Type	Date	On site (day)	Off Site (day)	Role (L / A)
2018: ISO14001:2015	ISO14001:2015 2nd Party Audit log for Canon Sa	Arengo Plastics (Pty) Ltd	72 Regency Drive, Route 21 Corporate Park, Irene, 0157, South Africa	Riekie van den Bergh	+27 87 405 1818 Riekie.vdBerg@eoh.com	Audit	07-Aug-18	2	1	Auditor
2018: ISO14001:2015	ISO14001:2015 2nd Party Audit log for Canon Sa	Clearline Protection Systems	72 Regency Drive, Route 21 Corporate Park, Irene, 0157, South Africa	Riekie van den Bergh	+27 87 405 1818 Riekie.vdBerg@eoh.com	Audit	13-Aug-18	2	0,5	Auditor
2018: ISO14001:2015	ISO14001:2015 2nd Party Audit log for Canon Sa	Microtonixs	72 Regency Drive, Route 21 Corporate Park, Irene, 0157, South Africa	Riekie van den Bergh	+27 87 405 1818 Riekie.vdBerg@eoh.com	Audit	04-Oct-18	2	0,5	Auditor
2019: ISO14001:2015	Conducted a second party audit at Netcare Occupational Health and Travel Clinic in Boksburg.	Inlexo Innovative solutions	PO Box 76391, Lynnwoodridge, 0040	Riekie van den Bergh	+27 82 552 3659	Audit	25-Sep-19	1	0,5	Auditor
2019: ISO14001:2015	Conducted a second party audit at the Medicross Medical clinic in Benoni	Inlexo Innovative solutions	PO Box 76391, Lynnwoodridge, 0040	Riekie van den Bergh	+27 82 552 3659	Audit	30-Sep-19	1	0,5	Auditor
2019: ISO14001:2015	Conducted a second party audit at the Medicross Medical clinic in	Inlexo Innovative solutions	PO Box 76391, Lynnwoodridge, 0040	Riekie van den Bergh	+27 82 552 3659	Audit	02-Oct-19	1	0,5	Auditor

Project	Audit Outline	Organisation	Address	Contact person	Contact details	Type	Date	On site (day)	Off Site (day)	Role (L / A)
	Silverton (Pretoria)									
2019: ISO14001:2015	Conducted a gap audit at Reinhard transport an ISO14001:2015 certified company	Reinhardt Transport Group	29 Station Avenue, Pretoriusstad, Nigel, Gauteng	Johan Theron	+27 82 884 9402	Audit	11-Oct-19	1	0,5	Auditor
2019: ISO14001:2015	Conducted a second party audit at the Medicross Medical clinic in Randburg	Inlexo Innovative solutions	PO Box 76391, Lynnwoodridge, 0040	Riekie van den Bergh	+27 82 552 3659	Audit	22-Oct-19	1	0,5	Auditor
2019: ISO14001:2015	Conducted a second party audit at the Medicross Medical clinic in Kembirch (Ekurhuleni)	Inlexo Innovative solutions	PO Box 76391, Lynnwoodridge, 0040	Riekie van den Bergh	+27 82 552 3659	Audit	13-Nov-19	1	0,5	Auditor
2019: ISO14001:2015	Conducted a second party audit at the Medicross Medical clinic in Rustenburg	Inlexo Innovative solutions	PO Box 76391, Lynnwoodridge, 0040	Riekie van den Bergh	+27 82 552 3659	Audit	28-Nov-19	1	0,5	Auditor
2019: ISO14001:2015	Conducted a second party audit at Netcare Occupational Health and Travel Clinic in Boksburg.	Inlexo Innovative solutions	PO Box 76391, Lynnwoodridge, 0040	Riekie van den Bergh	+27 82 552 3659	Audit	06-Dec-19	1	0,5	Auditor
2020: ISO14001:2015	Conducted a second party audit at Omnia Fertilisers -	Inlexo Innovative solutions	PO Box 76391, Lynnwoodridge, 0040	Riekie van den Bergh	+27 82 552 3659	Audit	20-Feb-20	1	0,5	Auditor

Project	Audit Outline	Organisation	Address	Contact person	Contact details	Type	Date	On site (day)	Off Site (day)	Role (L / A)
	Sasolburg - Railway									
2020: ISO14001:2015	Conducted a second party audit at Omnia Fertilisers - Dryden	Inlexo Innovative solutions	PO Box 76391, Lynnwoodridge, 0040	Riekie van den Bergh	+27 82 552 3659	Audit	23-Feb-20	2	0,5	Auditor
2020: ISO14001:2015	Conducted a second party audit at Omnia Fertilisers - Sasolburg - Mechanical North	Inlexo Innovative solutions	PO Box 76391, Lynnwoodridge, 0040	Riekie van den Bergh	+27 82 552 3659	Audit	03-Mar-20	1	0,5	Auditor
2021: ISO14001: 2015	Conducted a Stage 1 Audit at Masmagnet	PECB		Riekie van den Bergh	+27 82 552 3659	Audit	19-Apr-21	1	1	Auditor
2021: ISO14001: 2015	Conducted a Stage 2 Audit at Masmagnet	PECB		Riekie van den Bergh	+27 82 552 3659	Audit	21-Apr-21	2	1	Auditor
2021: ISO14001: 2015	Conducted a Stage 1 Audit for FullServe	Prescali	746 Wiedrigh street, Moreleta Park	Elaine van der Linde	+27 12 543 3808	Audit	12-Oct-21	0	1	Auditor

18 Other Regulatory Audits (2008 to Current)

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
M2 Environmental Connections (Pty) Ltd: Mr Morne de Jager (c) 082 565 4059										
2011: Environmental Authorisation Audit	Audit on the Environmental Authorisation for the Samancor Lannex New Tailings storage facility	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@ samancorcr.com	20-Mar-12	1	0,5	A	Regulatory	Licence
2012: Legislation audit	Tweefontein Section: Conducted an audit on legislative compliance of the mine (NEMA, NWA, NEMWA)	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	11-Sep-12	2	2	L	Regulatory	Legal
2012: NEMA/NEMWA Audits	Conducted an internal legal audit on the Doornbosch/Steelpoort sections activities.	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	18-20 January 2012	1	1	L	Regulatory	Legal
2012: NEMA/NEMWA Audits	Conducted a legal audit on the sections activities for Lannex Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	18-20 January 2012	1	1	L	Regulatory	Legal
2012: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions for Lannex Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	18-20 January 2012	0,5	1	L	Regulatory	Licence
2012: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions for Doornbosch/Steelpoort	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	18-20 January 2012	0,5	1	L	Regulatory	Licence

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
2012: WUL Audit	Conducted a legal audit on the compliance with the WUL for Lannex Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	18-20 January 2012	0,5	1	L	Regulatory	Licence
2013: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions for Doornbosch/Steelpoort	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	9 - 11 December 2013	1,5	1	L	Regulatory	Licence
2013: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions for Lannex Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	10 - 11 December 2013	1,5	1	L	Regulatory	Licence
2015: Water use license audit	Conducted an external audit on the licensee's compliance with the water use licence conditions for Doornbosch/Steelpoort	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	7 - 9 April 2015	1,5	1	L	Regulatory	Licence
2015: Water use license audit	Conducted an external audit on the licensee's compliance with the water use licence conditions for Lannex Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	7 - 9 April 2015	1,5	1	L	Regulatory	Licence
2016: WUL Audit	Conducted the External Water Use Licence audit for Lannex Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	25 - 29 April 2016	1	1	L	Regulatory	Licence

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
2016: WUL Audit	Conducted the External Water Use Licence audit for Spitskop Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	25 - 29 April 2016	1	1	L	Regulatory	Licence
2016: WUL Audit	Conducted the External Water Use Licence audit for Tweefontein Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	07-Sep-16	2	1	L	Regulatory	Licence
2016: WUL Audit	Conducted the External Water Use Licence audit for Doornbosch/Steelpoort Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	24-Apr-17	1	1	L	Regulatory	Licence
2017: Environmental Authorisation audit	Conducted on audit on the compliance with the Environmental authorisation for the new tailings dam at Lannex	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	01-Mar-17	1	1	L	Regulatory	Licence
2017: Waste management Licence audit	Conducted a performance assessment on compliance with the Waste management licence for the new slimes dam	Samancor Chrome Ltd: Ferrometals	Ms Prenisha Chetty	+27 13 693 7438 / +27 72 575 2957 prenisha.chetty@samancorcr.com	23-May-17	1	2	L	Regulatory	Licence
2017: Waste management Licence audit	Conducted a performance assessment on compliance with the Waste management licence for the new slimes dam	Samancor Chrome Ltd: Ferrometals	Ms Prenisha Chetty	+27 13 693 7438 / +27 72 575 2957 prenisha.chetty@samancorcr.com	29-Nov-17	1	2	L	Regulatory	Licence

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
2017: Waste Management licence audit	Conducted a performance assessment on compliance with the Waste management licence for the Decommissioning of the Northern Slimes dam	Samancor Chrome Ltd: Ferrometals	Ms Prenisha Chetty	+27 13 693 7438 / +27 72 575 2957 prenisha.chetty@samancorcr.com	13-Sep-17	1	2	L	Regulatory	Licence
2017: Waste Management licence audit	Conducted a performance assessment on compliance with the Waste management licence for the Decommissioning of the Various Slimes dams	Samancor Chrome Ltd: Ferrometals	Ms Prenisha Chetty	+27 13 693 7438 / +27 72 575 2957 prenisha.chetty@samancorcr.com	13-Sep-17	1	1	L	Regulatory	Licence
2017: Waste Management licence audit	Conducted a performance assessment on compliance with the Waste management licence for the Slag dump	Samancor Chrome Ltd: Ferrometals	Ms Prenisha Chetty	+27 13 693 7438 / +27 72 575 2957 prenisha.chetty@samancorcr.com	29-Nov-17	1	2	L	Regulatory	Licence
2017: WUL Audit	Conducted a Water use licence audit.	Samancor Chrome Ltd: Ferrometals	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	30-Nov-17	1	1	L	Regulatory	Licence
2017: WUL Audit	Conducted the External Water Use Licence audit for Lannex Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	8 - 11 May 2017	1	1	L	Regulatory	Licence

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
2017: WUL Audit	Conducted the External Water Use Licence audit for Spitskop Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	14-16 March 2017	1	1	L	Regulatory	Licence
2017: WUL Audit	Conducted the External Water Use Licence audit for Tweefontein Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	9 - 10 May 2017	2	1	L	Regulatory	Licence
2017: WUL Audit	Conducted the External Water Use Licence audit for Doornbosch/Steelpoort Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	14-16 March 2017	1	1	L	Regulatory	Licence
2017: WUL Audit	Conducted the External Water Use Licence audit for Lwala Section	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	28-Feb-17	1	1	L	Regulatory	Licence
Prescali Environmental Consultants (Pty) Ltd: Ms Elaine van der Linde (c) 082 853 4170										
2010: Environmental Authorisation Audit	Conducted the audit on the Environmental Authorisation for the Samancor Lannex New Tailings storage facility	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	05-Oct-10	1	1	L	Regulatory	Licence
2011: Environmental Authorisation Audit	Conducted an audit on the compliance with the requirements of the EMPR	IFMSA	Sonja Lemmer	+27 82 334 0778	15-Dec-10	1	1	A	Regulatory	EMPR
2011: Environmental Authorisation Audit	Audit on the Environmental Authorisation for the Samancor Lannex New Tailings storage facility	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	02-May-11	1	0,5	A	Regulatory	Licence

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
2011: GN704 Audit	Conducted a GN704 audit on the existing activities at the mine	Andalusite Resources (Pty) Ltd	Tienie de Jager	+147860061 tienie@maroeloes.co.za	17-Jun-11	1	1	L	Regulatory	Legal
2011: GN704 Audit	Audit on the Environmental Authorisation for the Samancor Lannex New Tailings storage facility	Samancor Chrome Ltd: Eastern Chrome Mines:	Ms Elsie Mashishi	+27 13 230 7027 / +27 72 203 0990 elsie.mashishi@samancorcr.com	09-Sep-11	1	0,5	A	Regulatory	Licence
2011: WUL Audit	Conducted the External Water Use Licence audit for Apollo brick	Apollo Brick	Omphemetse Plaatjies	+11 848 2017 / +27 71 681 6363 she.abg@apollobrick.com	16-Sep-11	1	1	A	Regulatory	Licence
2011: WUL Audit	Conducted a GN704 audit on the existing activities at the mine	Andalusite Resources (Pty) Ltd	Tienie de Jager	+147860061 tienie@maroeloes.co.za	21-Sep-11	1	1	L	Regulatory	Legal
2011: Environmental Performance Assessment	Conducted the External Water Use Licence audit for Apollo brick	Apollo Brick	Omphemetse Plaatjies	+11 848 2017 / +27 71 681 6363 she.abg@apollobrick.com	20-Jul-12	1	1	A	Regulatory	Licence
2012: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions.	IFMSA	Sonja Lemmer	+27 82 334 0778	22-Aug-12	1	1	A	Regulatory	Licence
2013: WUL Audit	Conducted an external audit on the Mining right holders compliance with the EMPR.	Sky Chrome Mining	Sonja Lemmer	+27 82 334 0778	09-May-13	1	0,5	A	Regulatory	EMPR
2012: WUL Audit	Conducted the External Water Use Licence audit for Apollo brick	Apollo Brick	Omphemetse Plaatjies	+11 848 2017 / +27 71 681 6363 she.abg@apollobrick.com	05-Jul-13	1	1	A	Regulatory	Licence

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
2013: WUL audit	Conducted an external audit on the licensee's compliance with the water use licence conditions.	IFMSA	Sonja Lemmer	+27 82 334 0778	05-Sep-13	1	1	A	Regulatory	Licence
2014: EMPR audit	Conducted the External Water Use Licence audit	Andalusite Resources (Pty) Ltd	Tienie de Jager	+147860061 tienie@maroeloes.co.za	03-Dec-13	1	1	L	Regulatory	Licence
2014: EMPR audit	Conducted an external audit on the Mining right holders compliance with the EMPR.	Sky Chrome Mining	Sonja Lemmer	+27 82 334 0778	11-Jun-14	1	0,5	L	Regulatory	EMPR
2014: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions.	IFMSA	Sonja Lemmer	+27 82 334 0778	12-Sep-14	1	1	L	Regulatory	Licence
2014: EMPR audit	Conducted the External Water Use Licence audit for Apollo brick	Apollo Brick	Omphemetse Plaatjies	+11 848 2017 / +27 71 681 6363 she.abg@apollobrick.com	21-Oct-14	1	1	A	Regulatory	Licence
2014: WUL Audit	Conducted an external audit on the Mining right holders compliance with the EMPR.	IFMSA	Sonja Lemmer	+27 82 334 0778	18-Nov-14	1	0,5	A	Regulatory	EMPR
2014: WUL Audit	Conducted an external Water use licence audit	IFMSA	Sonja Lemmer	+27 82 334 0778	18-Nov-14	1	0,5	A	Regulatory	Licence
2015: EMPR audit	Conducted an external audit on the Mining right holders compliance with the EMPR.	Sky Chrome Mining	Sonja Lemmer	+27 82 334 0778	29-Apr-15	1	1	A	Regulatory	EMPR

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
2015: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions.	Phoenix Platinum	Carla Reinecke	+27 83 701 9328 phsco@sylvania.co.za	09-Oct-15	1	1	A	Regulatory	Licence
2015: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions.	Apollo Brick (Pty) Ltd	Omphemetse Plaatjies	+11 848 2017 / +27 71 681 6363 she.abg@apollobrick.com	19-Oct-15	1	1	A	Regulatory	Licence
2015: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions.	Illitha Mining	Jacques Prinsloo	+27 79 525 9255 jprinsloo@afarak.co.za	22-Oct-15	1	1	L	Regulatory	Licence
2016: WUL Audit	Conducted the External Water Use Licence audit for Mecklenburg	Afarak	Jacques Prinsloo	+27 79 525 9255 jprinsloo@afarak.co.za	26-May-16	1	0,5	L	Regulatory	Licence
2016: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions.	Apollo Brick (Pty) Ltd	Omphemetse Plaatjies	+11 848 2017 / +27 71 681 6363 she.abg@apollobrick.com	22-Sep-16	1	1	L	Regulatory	Licence
2016: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions.	Phoenix Platinum	Carla Reinecke	+27 83 701 9328 phsco@sylvania.co.za	20-Oct-16	1	1	L	Regulatory	Licence
2017: NEMA listed activities audit	Conducted an audit to determine if Diesel tanks installation required an Environmental Authorisation	Sylvania Lannex Section	Albert Jordaan	+27 82 307 7364 albert@sylvania.co.za	12-May-17	1	1	L	Regulatory	Legal
2017: Performance assessment	Conducted a Water use licence audit.	Phoenix Platinum	Carla Reinecke	+27 83 701 9328 phsco@sylvania.co.za	11-Sep-17	1	1	L	Regulatory	Licence

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
2017: WUL Audit	Conducted a performance assessment on the EMPR for the tailings dam.	Phoenix Platinum	Carla Reinecke	+27 83 701 9328 phsco@sylvania.co.za	10-Nov-17	1	1	L	Regulatory	EMPR
2018: WULA Audit	Water use licence audit for Moeijelijk Mine: Bauba	Red Kite Environmental Solutions (Pty) Ltd	Nicole Upton	+27 79 555 2433 nicole@redkiteconsulting.co.za	13-Apr-18	1	1	L	Regulatory	WUL
2018: WUL Audit	External Water Use Licence audit for the Kingdom Development Company	M2 Environmental Connections (Pty) Ltd	Hanjo Fourie	+27 012 004 0362 hanjo@menco.co.za	09-Aug-18	1	0,5	L	Regulatory	WUL
2018: WUL Audit	Internal audit on the WUL for Phoenix Platinum	Phoenix Platinum	Carla Reinecke	+27 83 701 9328 phsco@sylvania.co.za	20-Aug-18	1	0,5	A	Regulatory	WUL
2018: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions.	Brakkefontein Clay Pridcyts (PTY Ltd trading as Apollo Brick (Pty) Ltd	Omphemetse Plaatjies	+11 848 2017 / +27 71 681 6363 she.abg@apollobrick.com	11-Sep-18	1	0,5	A	Regulatory	WUL
2018: WUL Audit	Water use licence audit for Moeijelijk Mine: Bauba	Red Kite Environmental Solutions (Pty) Ltd	Nicole Upton	+27 79 555 2433 nicole@redkiteconsulting.co.za	12-Sep-18	1	1	L	Regulatory	WUL
2018: Performance assessment	Conducted an audit and a performance assessment on the approved EIA/EMP	Matutu Clay mine (Pty) Ltd	Dewald Haasbroek	+27769674280 dewald@matutu.co.za	13-Nov-18	0,5	1,5	L	Regulatory	EIA/EMP
2018: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions: Sefateng Chrome Mine (Pty) Ltd	Red Kite Environmental Solutions (Pty) Ltd	Nicole Upton	+27 79 555 2433 nicole@redkiteconsulting.co.za	29-Nov-18	0,5	1,5	L	Regulatory	WUL

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
2018: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions: Chevron SA - Millies	M2 Environmental Connections (Pty) Ltd	Hanjo Fourie	+27 012 004 0362 hanjo@menco.co.za	11-Dec-18	0,5	1,5	L	Regulatory	WUL
2018: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions: Omnia Fertilisers - Rustenburg	EOH	Riekie van den Bergh	+27 87 405 1818 Riekie.vdBerg@eoh.com	22-Jan-19	1	1	Lead	Regulatory	WUL
2018: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions: Omnia Fertilisers - Sasolburg	EOH	Riekie van den Bergh	+27 87 405 1818 Riekie.vdBerg@eoh.com	15-Jan-19	1	1	Lead	Regulatory	WUL
2018: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions: Grasvally Chrome Mine	Sylvania	Albert Jordaan	+27 82 307 7364 albert@sylvania.co.za	05 June 2019	1	1	Lead	Regulatory	WUL
2019: Performance Assessment	Conducted an audit and a performance assessment on the approved EIA/EMP: Bauba - Moeijelijk Chrome Mine	Bauba (sub-contracted by Red Kite)	Nicole Upton	+27 79 555 2433 nicole@redkiteconsulting.co.za	14-Aug-19	1	1	Lead	Regulatory	EMPR
2019: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions: Bauba - Moeijelijk Chrome Mine	Bauba (sub-contracted by Red Kite)	Nicole Upton	+27 79 555 2433 nicole@redkiteconsulting.co.za	01-Aug-19	1	1	Lead	Regulatory	WUL

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
2019: WUL Audit	Assisted in conducting the WUL audit for Apollo Brick	Apollo Brick	Omphemetse Plaatjies	+11 848 2017 / +27 71 681 6363 she.abg@apollobrick.com	02-Oct-19	1	1	Auditor	Regulatory	WUL
Assisted in conducting the WUL audit for Apollo Brick	Assisted in conducted an external audit on the licensee's compliance with the water use licence conditions: Omnia Fertilisers - Sasolburg	Inlexo Innovative solutions	Riekie van den Bergh	+27 82 552 3659	09-Dec-19	1	1	Auditor	Regulatory	WUL
2019: WUL Audit	Assisted in conducting the WUL audit for Phoenix Platinum	Phoenix Platinum	Oupa Chidi	phsco@sylvania.co.za	28 November 20109	1	1	Auditor	Regulatory	WUL
2020: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions: Bauba - Moeijelijk Chrome Mine	Bauba (sub-contracted by Red Kite)	Nicole Upton	+27 79 555 2433 nicole@redkiteconsulting.co.za	29-Jan-20	1	1	Lead	Regulatory	WUL
2020: WUL Audit	Conducted an external audit on the licensee's compliance with the water use licence conditions: Grasvally Chrome Mine	Sylvania	Albert Jordaan	+27 82 307 7364 albert@sylvania.co.za	27 January 2020	1	1	Lead	Regulatory	WUL
2020: Performance Assessment	Conducted an audit and a performance assessment on the approved EIA/EMP: Bauba - Moeijelijk Chrome Mine	Bauba (sub-contracted by Red Kite)	Nicole Upton	+27 79 555 2433 nicole@redkiteconsulting.co.za	27 January 2020	1	1	Auditor	Regulatory	EMPR
2020: WUL Audit	Conducted the Water use licence compliance audit for Moejelijk Chrome Mine	Bauba (sub-contracted by Red Kite)	Nicole Upton	+27 79 555 2433 nicole@redkiteconsulting.co.za	24 August 2020	1	1	Lead	Regulatory	WUL

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
2020: Performance Assessment	Assisted in the Performance assessment for Moejelijk Chrome Mine	Bauba (sub-contracted by Red Kite)	Nicole Upton	+27 79 555 2433 nicole@redkiteconsulting.co.za	24 August 2020	1	1	Auditor	Regulatory	EMPR
2020: Performance Assessment	Conducted the performance assessment on the approved EIA/EMP for the Vlakpoort Chrome mine	Destiny Springs Investments 11 (Pty) Ltd (subsidiary of Illitha Mining)	Moffet Mabelane	+27 82 294 2449 moffet@ilithamining.co.za	12 November 2020	0,5	1	Auditor	Regulatory	EMPR
2020: WUL Audit	Conducted the water use licence compliance audit for Omnia Sasolburg	Inlexo Innovative solutions	Riekie van den Bergh	+27 82 552 3659	09 December 2020	1,5	0,5	Auditor	Regulatory	WUL
2020: Performance Assessment	Conducted the performance assessment on the approved EIA/EMP for the Macarthy Manganese Mine	Salene Manganese	Jan Gerber	+27 83 795 1653 jgerber@salenemanganese.com	02 November 2020	1	1	Auditor	Regulatory	EMPR
2021: WUL Audit	Conducted the water use licence compliance audit for Omnia Sasolburg	Inlexo Innovative solutions	Riekie van den Bergh	+27 82 552 3659	08 December 2021	1,5	0,5	Auditor	Regulatory	WUL
2021: WUL Audit	Conducted the Water use licence compliance audit for Moejelijk Chrome Mine	Bauba (sub-contracted by Red Kite)	Nicole Upton	+27 79 555 2433 nicole@redkiteconsulting.co.za	14 September 2021	1	1	Lead	Regulatory	WUL
2021: EMPr performance	Conducted the EMPr performance assessment for the Thutsi Mine	Thutsi			04 August 2021	1	1	Auditor	Regulatory	EMPR
2022: WUL Audit	Conducted the Annual external water use licence audit for Grasvally Chrome Mine	Sylvania	Rob Steen	rob@sylvania.co.za	18 January 2022	1	1	Lead	Regulatory	WUL

Project	Outline	Organisation	Contact person	Contact details	Date	On site (day)	Off Site (day)	Role (L / A)	Type (Regulatory)	Details (WUL / EMPR/ Licence/ Legal)
2022: WUL Audit	Conducted the Annual External Water Use Licence Audit for Umgeni Waters: Howick	Umgeni Water Boarid	Lesailane Mphafudi	lesailane.mphafudi@umgeni.co.za	23 March 2022	1	1	Lead	Regulatory	WUL
2022: WUL Audit	Conducted the Annual External Water Use Licence Audit for Umgeni Waters: Darvill	Umgeni Water Boarid	Lesailane Mphafudi	lesailane.mphafudi@umgeni.co.za	22 March 2022	1	1	Lead	Regulatory	WUL
2022: WUL Audit	Conducted the Annual External Water Use Licence Audit for Umgeni Waters: Mtwalume	Umgeni Water Boarid	Lesailane Mphafudi	lesailane.mphafudi@umgeni.co.za	05 April 2022	1	1	Lead	Regulatory	WUL
2022: WUL Audit	Conducted the Annual External Water Use Licence Audit for Umgeni Waters: Amanzimtoti	Umgeni Water Boarid	Lesailane Mphafudi	lesailane.mphafudi@umgeni.co.za	06 April 2022	1	1	Lead	Regulatory	WUL

19 Detailed information on training provided

Project	Outline	Organisation	Contact	Date
2018: Environmental Legislation awareness	Environmental Law (NEMA) for Protechnic a division of ARMSCOR	EOH	Riekie van den Berg '+27 82 552 3659	24-May-18
2018: Environmental Legislation awareness	Environmental Law (NEMA) for Protechnic a division of ARMSCOR	EOH	Riekie van den Berg '+27 82 552 3659	29-May-18
2018: ISO14001:2015 Transition	Training Omnia Fertiliser on ISO14001: 2015 transitional requirements	EOH	Riekie van den Berg '+27 82 552 3659	22-May-18
2018: ISO14001:2015 Transition	Training Omnia Fertiliser on ISO14001: 2015 transitional requirements	EOH	Riekie van den Berg '+27 82 552 3659	30-May-18
2018: ISO14001:2015 Transition	Training Omnia Fertiliser on ISO14001: 2015 transitional requirements	EOH	Riekie van den Berg '+27 82 552 3659	20-Sep-18
2018: ISO14001:2015 Transition	2 Day ISO14001:2015 transition	PECB	Riekie van den Berg '+27 82 552 3659	08-Oct-18
2018: ISO14001:2015 Implementation	2 Day ISO14001:2015 implementation	EOH	Riekie van den Berg '+27 82 552 3659	20-Nov-18
2019: Environmental Legislation awareness	Environmental Law for Omnia Fertilisers (Delmas, Durban, Wesselsbron and Cape Town)	Inlexo Innovative Solutions	Riekie van den Berg '+27 82 552 3659	22 August 2019 29 August 2019 19 September 2019 6 November 2019
2020: Environmental Legislation awareness	Environmental Law for Omnia Fertilisers: Sasolburg	Inlexo Innovative Solutions	Riekie van den Berg '+27 82 552 3659	21-22 October 2020 18-19 November 2020
2021: Environmental Legislation awareness	Environmental Law for Omnia Fertilisers: Sasolburg	Inlexo Innovative Solutions	Riekie van den Berg '+27 82 552 3659	17-18 February 2021
2021: Environmental Legislation awareness	Environmental Law for BMW South Africa	Inlexo Innovative Solutions	Riekie van den Berg '+27 82 552 3659	28 May 2021 30 May 2021 19 June 2021 21 June 2021
2021: ISO14001	ISO14001: Lead Auditor	PECB	Riekie van den Berg	6 - September 2021

Project	Outline	Organisation	Contact	Date
			'+27 82 552 3659	22 - 23 September 2021
2021: Environmental Awareness in project planning	Compilation of training material and presentation for BMW Rosslyn	Inlexo Innovative Solutions	Riekie van den Berg '+27 82 552 3659	10-Dec-21
2022: Environmental Legislation awareness	Environmental Law for Omnia Fertilisers: Sasolburg	Inlexo Innovative Solutions	Riekie van den Berg '+27 82 552 3659	01-Feb-22

20 Other Projects outline (2008 to Current)

Outline	Company	Section	Type	Completion date
Determine the water requirements for the mine and detail the water balance as per the Department of Water Affairs requirements.	Ruighoek chrome mine	Ruighoek	Water balance	07 August 2008
Drafting a Storm water Management report that complies with Department of the Water Affairs requirements to outline management aspects and storm water catchment at the clients site.	Vesuvius SA	Clayville	Storm water	04 November 2008
Compiled the Integrated Water and Resource Management plan for the mine that was used as supporting information in the Water use licence application. Elandsfontein	Apollo Brick (Pty) Ltd	Elandsfontein	IWWMP	02 February 2009
Compiled the EIA and EMP for the mine as part of the Mining right conversion for the Buffelsfontein Sections	Samancor Western Chrome Mines	Buffelsfontein	EIA/EMP	05 May 2009
Compiled the EIA and EMP for the mine as part of the Mining right conversion for the Mooinooi Sections	Samancor Western Chrome Mines	Mooinooi	EIA/EMP	05 May 2009
Drafted the Scoping Report for the EIA/EMP for Jagdlust Section	Samancor Eastern Chrome Mines	Jagdlust	Scoping Report	19 May 2009
Compiled the EIA and EMP for the mine as part of the Mining right conversion, also compiled the EIA and EMP for new mining right on additional properties. Portion 7 and 10 of Elandsfontein	Apollo Brick (Pty) Ltd	Elandsfontein	EIA/EMP	20 May 2009
Compiled the Integrated Water and Resource Management plan for the mine that was used as supporting information in the Water use licence application for the Nerston Port of Entry	Virtual Consulting Engineers	Nerston port of entry	IWWMP	17 July 2009
Conducted the surface water assessment for the Twyfelaar Chrome Mine.	MTC Minerals / CMR	Twyfelaar	Surface water	30 July 2009
Conducted and compiled the Basic Assessment for the upgrade of the Waste water treatment works at the Nerston Port of Entry.	Virtual Consulting Engineers	Nerston port of entry	Basic Assessment	03 August 2009
Compiled the Emergency Rehabilitation Plan for the activities that occurred on the farm Middelpunt, Mpumalanga	Richmond Mining & Exploration	Middelpunt	Emergency Rehabilitation	18 September 2009
Drafted the Salt Balance for the Sefateng Chrome Mine.	MTC Minerals / CMR	Sefateng	Salt balance	13 October 2009
Drafted the water Balance for the Sefateng Chrome Mine.	MTC Minerals / CMR	Sefateng	Water balance	13 October 2009
Assisted with the finalisation of the application for a water use licence for the Rustenburg Waste Water Treatment works.	SRK	Rustenburg Local Municipality	WULA	15 October 2009
Compiled the Salt Balance report for the existing operations	Andalusite Resources (Pty) Ltd	Maroeloesfontein	Salt balance	19 November 2009

Outline	Company	Section	Type	Completion date
Compiled the EIA and EMP for the mine as part of the Mining right conversion for the Elandsdrift Section	Samancor Western Chrome Mines	Elandsfontein	EIA/EMP	26 November 2009
Drafted the Salt Balance for the Twyfelaar Chrome Mine.	MTC Minerals / CMR	Twyfelaar	Salt balance	01 December 2009
Drafted the water Balance for the Twyfelaar Chrome Mine.	MTC Minerals / CMR	Twyfelaar	Water balance	01 December 2009
Compiled the Integrated Water and Resource Management plan for the Twyfelaar Chrome mine	MTC Minerals / CMR	Twyfelaar	IWWMP	02 December 2009
Water use licence application process for the Twyfelaar Chrome Mine	MTC Minerals / CMR	Twyfelaar	WULA	02 December 2009
Compiled the Integrated Water and Resource Management plan for the Lannex Section's New Tailings dam	Samancor Eastern Chrome Mines	Lannex	IWWMP	14 January 2010
Compiled the Integrated Water and Resource Management plan for the Middelpunt mine (Mpumalanga) that was used as supporting information in the Water use licence application.	Ibhubesi Ore and Exploration (Pty) Ltd (Richmond Mining & Exploration)	Middelpunt	IWWMP	01 March 2010
Conducted the surface water assessment for the Fumani Mine.	Corridor Mining Resources	Fumani Gold Mine	Surface water	01 March 2010
Drafted the Salt Balance for the Fumani Mine.	Corridor Mining Resources	Fumani Gold Mine	Water and Salt Balance	01 March 2010
Water use licence application process for the Middelpunt activities.	Ibhubesi Ore and Exploration (Pty) Ltd (Richmond Mining & Exploration)	Middelpunt	WULA	01 March 2010
Compiled the Integrated Water and Resource Management plan small scale mining activities at Sefateng Chrome Mine	MTC Minerals / CMR	Sefateng	IWWMP	05 March 2010
Compiled the Integrated Water and Resource Management plan for Andalusite Resource Maroeloesfontein Mine	Andalusite Resources (Pty) Ltd	Maroeloesfontein	IWWMP	09 March 2010
Compiled the Integrated Water and Resource Management plan for Andalusite Resource Maroeloesfontein Mine	Andalusite Resources (Pty) Ltd	Maroeloesfontein	WULAR	09 March 2010
Conducted the surface water assessment for the Sefateng Chrome Mine.	MTC Minerals / CMR	Sefateng	Surface water	09 April 2010
Compilation of an IWWMP for the Water use licence process	Corridor Mining Resources	Fumani Gold Mine	IWWMP	06 May 2010
Compilation of a WULAR for the Water use licence process	Corridor Mining Resources	Fumani Gold Mine	WULAR	24 May 2010
Conducted a surface water assessment at Imbabala Colliery	Altius 345 (Pty) Ltd	Imbabala Colliery	Water and Salt Balance	05 June 2010
Facilitated the Water use licence application process for the Maroeloesfontein operation	Andalusite Resources (Pty) Ltd	Maroeloesfontein	Project Management	25 June 2010
Compiled the Integrated Water and Resource Management plan for the mine that was used as supporting information in the Water use licence application.	Sky Chrome Mining (Pty) Ltd	Bapong	IWWMP	14 July 2010

Outline	Company	Section	Type	Completion date
Compiled the Integrated Water and Resource Management plan for the Buffelsfontein Sections	Samancor Western Chrome Mines	Buffelsfontein	IWWMP	12 August 2010
Compiled the Integrated Water and Resource Management plan for the Mooinooi Sections	Samancor Western Chrome Mines	Mooinooi	IWWMP	12 August 2010
Water use licence application process for the Buffelsfontein Sections	Samancor Western Chrome Mines	Buffelsfontein	WULA	12 August 2010
Water use licence application process for the Mooinooi Section	Samancor Western Chrome Mines	Mooinooi	WULA	12 August 2010
Compiled the Integrated Water and Waste Management plan for the Buffelsfontein Section	Samancor Western Chrome Mines	Buffelsfontein	IWWMP	13 August 2010
Compiled the Integrated Water and Waste Management plan for the Mooinooi Section	Samancor Western Chrome Mines	Mooinooi	IWWMP	13 August 2010
Conducted a surface water assessment at Imbabala Colliery	Altius 345 (Pty) Ltd	Imbabala Colliery	Surface water assessment	13 August 2010
Compiled the Integrated Water and Resource Management plan for the Sefateng Chrome mine	MTC Minerals / CMR	Sefateng	IWWMP	30 August 2010
Water use licence application process for the Sefateng Chrome Mine	MTC Minerals / CMR	Sefateng	WULA	30 August 2010
Compiled the Integrated Water and Resource Management plan for the Imbabala Colliery	Altius 345 (Pty) Ltd	Imbabala Colliery	IWWMP	06 September 2010
Compiled a IWWMP for the operations	Hoyohoyo Mining (Pty) Ltd	Klipfontein Colliery	IWWMP	09 September 2010
Conducted a surface water assessment for the Klipfontein Colliery	Hoyohoyo Mining (Pty) Ltd	Klipfontein Colliery	Surface water	20 September 2010
Ad-hock assistance with conducting water monitoring for the project.	Department of Water Affairs	Harties Metsi A Me project	Monitoring	31 December 2010
Reviewed an audit on the compliance with the requirements of the EMPR	IFMSA	Buffelsfontein	Review	05 January 2011
Compiled a section 24(g) application under NEMA.	IFMSA	Buffelsfontein	Section 24(g)	10 February 2011
Compiled the Water Quality Management Report as per the DWS guideline as part of the Water use licence.	Virtual Consulting Engineers	Ekuseni Youth Centre (DPW) MAGWA	IWWMP	18 February 2011
Compiled the Water Quality Management Report as per the DWS guideline as part of the Water use licence.	Virtual Consulting Engineers	Ncome Prison (DPW: Shawshank)	IWWMP	18 February 2011
Compiled an EIA/EMP for the operations	Hoyohoyo Mining (Pty) Ltd	Klipfontein Colliery	EIA/EMP	22 February 2011
Review of the water use licence application report	City of Johannesburg	Zola	Review	24 February 2011
Compiled the Integrated Water and Waste Management plan for the Millsell and Waterkloof Sections	Samancor Western Chrome Mines	Millsell/Waterkloof	IWWMP	14 March 2011

Outline	Company	Section	Type	Completion date
Water use licence application process for Millsell and Waterkloof Sections	Samancor Western Chrome Mines	Millsell/Waterkloof	WULA	14 March 2011
Compiled the water and Salt Balance	Coastal Fuels (Pty) Ltd	Droogvallei & Paardeplaats	Water and Salt Balance	17 May 2011
Compiled the Scoping and EIA/EMP Documents for the waste act application to re-use slag.	IFMSA	Buffelsfontein	Waste Management	19 May 2011
Compiled the Scoping and EIA/EMP Documents for the waste act application to re-use slag.	IFMSA	Buffelsfontein	Waste Management	19 May 2011
Review of the Avifauna report for the WPB Colliery	William Patrick Bower	Groenvlei	Reviewed	22 July 2011
Conducted the surface water assessment for the proposed solar energy facility	ACED Renewables de Aar (Pty) Ltd	De Aar	Surface water assessment	22 July 2011
Compilation of an EIA/EMP for proposed coal mining activities	William Patrick Bower	Groenvlei	EIA/EMP	26 July 2011
Reviewed the WUL Audit report for the Maroeloesfontein Operations	Andalusite Resources (Pty) Ltd	Maroeloesfontein	Review	29 September 2011
Calculated the closure quantum for the Elandsdrift Section as per the DMR guideline.	Samancor Western Chrome Mines	Buffelsfontein	Closure quantum	16 November 2011
Calculated the closure quantum for the Millsell/Waterkloof Sections as per the DMR guideline.	Samancor Western Chrome Mines	Elansdrift	Closure quantum	16 November 2011
Calculated the closure quantum for the Mooinooi Sections as per the DMR guideline.	Samancor Western Chrome Mines	Millsell/Waterkloof	Closure quantum	16 November 2011
Calculated the closure quantum for the Mooinooi, Millsell/Waterkloof, Elandsdrift and Buffelsfontein Sections as per the DMR guideline.	Samancor Western Chrome Mines	Mooinooi	Closure quantum	16 November 2011
Compiled the EIA / EMP report for the NEMA applications.	Virtual Consulting Engineers	Ncome Prison (DPW: Shawshank)	EIA/EMP	24 November 2011
Compilation of a WULAR for Section 21(c) and (i) activities for township development	Nungu Trading 691 (Pty) Ltd	Orchards	WULAR	09 December 2011
Calculated the closure quantum as per the DMR guideline.	Porta Plant	Middelburg	Closure quantum	31 January 2012
Compilation of a closure plan for the Paardeplaats Section	Coastal Fuels (Pty) Ltd	Paardeplaats	Closure plan	01 March 2012
Compilation of a risk assessment for the closure of the Paardeplaats Section	Coastal Fuels (Pty) Ltd	Paardeplaats	Risk assessment	01 March 2012
Compilation of closure documentation for Paardeplaats	Coastal Fuels (Pty) Ltd	Paardeplaats	Closure application	09 March 2012
Drafted the EIA and EMP for the EMPR amendment as part of the Mining right conversion process.	Coastal Fuels (Pty) Ltd	Droogvallei	EIA/EMP	13 March 2012

Outline	Company	Section	Type	Completion date
Compiled a pollution incident report	Coastal Fuels (Pty) Ltd	Witrand	Pollution incident report	13 April 2012
Compiled the Integrated Water and Waste Management plan for the mine that was used as supporting information in the Water use licence application.	Vesuvius SA	Clayville	IWWMP	10 May 2012
Facilitated the Water use licence amendment process for the Maroeloesfontein operation	Andalusite Resources (Pty) Ltd	Maroeloesfontein	Project Management	23 May 2012
Compiled a water and salt balance as per the DWS requirements for the Colliery.	Polmaise Colliery Middelburg	Polmaise Colliery	Water balance	25 May 2012
Compiled the static water and salt balance for the proposed new mining activities	Samancor Eastern Chrome Mines	Spitskop	Water and Salt Balance	30 May 2012
Compiled the surface water assessment and related impact prediction for the new mining activities	Samancor Eastern Chrome Mines	Spitskop	Surface water assessment	01 June 2012
Compiled a static water and salt balance as per the DWS requirements for the new mining activities	Samancor Eastern Chrome Mines	Lwala	Salt balance	07 June 2012
Compiled the waste management plan with classification for the new mining activities.	Samancor Eastern Chrome Mines	Spitskop	Waste Management	07 June 2012
Conducted a surface water assessment to determine impacts and current status	Polmaise Colliery Middelburg	Polmaise Colliery	Surface water assessment	14 June 2012
Reviewed the Environmental Due Diligence and Liability report for portion 155 of the farm Elandskraal 469 JQ	Phoenix Platinum	Elandskraal / Minco	Review	27 August 2012
Reviewed the EIA/EMP used in the mining right application	Samancor Eastern Chrome Mines	Jagdlust	Review	15 September 2012
Conducted a surface water assessment and impact assessment for the proposed mine.	Samancor Eastern Chrome Mines	Jagdlust	Surface water	16 September 2012
Reviewed the addendum to the approved EMP for the opencast sections	Samancor Eastern Chrome Mines	Tweefontein	Review	21 September 2012
Compiled the Integrated Water and Waste Management plan for the mine that was used as supporting information in the Water use licence application	Samancor Eastern Chrome Mines	Tweefontein	IWWMP	01 November 2012
Compiled the static water and salt balance for the existing operations.	Samancor Eastern Chrome Mines	Tweefontein	Water and Salt Balance	02 November 2012
Compiled the Integrated water and waste management plan for the Water use licence application	Samancor Eastern Chrome Mines	Spitskop	IWWMP	06 December 2012
Reviewed the WUL Audit report for the Maroeloesfontein Operations	Andalusite Resources (Pty)	Maroeloesfontein	Review	20 January 2013

Outline	Company	Section	Type	Completion date
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Conducted a surface water assessment and impact assessment for the proposed mine.	Samancor Eastern Chrome Mines	Lwala	Surface water	2013/01/22
Compiled a static water and salt balance as per the DWS requirements for the new mining activities.	Samancor Eastern Chrome Mines	Lwala	Water balance	12 February 2013
Compiled the Integrated Water and Waste Management plan for the mine that was used as supporting information in the Water use licence application.	Samancor Eastern Chrome Mines	Lwala	IWWMP	2013/03/02
Drafted the Scoping Report for the EIA/EMP for Tweefontein Section	Samancor Eastern Chrome Mines	Tweefontein	Scoping Report	08 April 2013
Review of the Hydrological report for the proposed phot-voltaic solar power generation plan	Aurora Power Solutions (Pty) Ltd	Padrooi	Review	24 April 2013
Compiled the Integrated Water and Waste Management plan for the mine that was used as supporting information in the Water use licence application.	Phoenix Platinum	Buffelsfontein	IWWMP	03 May 2013
Conducted the surface water impact and resource assessment for the proposed activities.	Chromex mining / Afarak / Ruuki	Mecklenburg Chrome Mine	Surface water	06 May 2013
Review of the EIA report for the IPP waterberg power station	Savanna Environmental (Pty) Ltd	Waterberg Power Station	Review	14 May 2013
Compiled the Integrated Water and Waste Management plan for the mine that was used as supporting information in the Water use licence application.	Chromex mining / Afarak / Ruuki	Mecklenburg Chrome Mine	IWWMP	25 May 2013
Compiled the Water quality management report for the upgrade of the Waste Water Treatment works.	Virtual Consulting Engineers	Zonderwater prison (DPW)	Project Management	29 May 2013
Compiled the Water quality management report for the upgrade of the Waste Water Treatment works.	Virtual Consulting Engineers	Zonderwater prison (DPW)	WQMR	29 May 2013
Review of the EMP for the Knopjeslaagte Fuel station development	Alza Corporation	Knojeslaagte	Review	08 July 2013
Compiled the Water quality management report for the upgrade of the Waste Water Treatment works.	Virtual Consulting Engineers	Swartkopfontein Border Post (DPW)	Section 24(g)	10 July 2013
Review of the annually updated IWWMP for Andalusite Resources	Andalusite Resources (Pty) Ltd	Maroeloesfontein	Review	15 July 2013
Managed the Water Use Licence Application Process	Samancor Eastern Chrome Mines	Spitskop	Project Management	15 July 2013
Compiled the Salt Balance report for the existing operations	Andalusite Resources (Pty) Ltd	Maroeloesfontein	Salt balance	30 July 2013
Review of the Noise assessment report	Aurecon	Enia	Review	01 September 2013

Outline	Company	Section	Type	Completion date
Compiled the EIA/EMP documentation for the upgrade of the Waste Water Treatment works.	Virtual Consulting Engineers	Zonderwater prison (DPW)	EIA/EMP	18 September 2013
Compiled the Section 24(g) application documentation for the upgrade of the Waste Water Treatment works.	Virtual Consulting Engineers	Swartkopfontein Border Post (DPW)	24G Application	25 October 2013
Lannex Section: Drafted the scoping and EIA/EMP documents for the amendment of the existing mining rights.	Samancor Eastern Chrome Mines	Lannex	EIA/EMP	14 December 2013
Facilitated and compiled additional documentation for the WUL submitted in 2008	Coastal Fuels (Pty) Ltd	Droogvallei	Project Management	01 January 2014
Reviewed the care and maintenance plan for Droogvallei	Coastal Fuels (Pty) Ltd	Droogvallei	Review	03 March 2014
Compiled a surface water assessment of the rivers that could be impacted by the proposed expansion activities.	Vunene Mining	Vunene (Eco Elementum)	Surface water	17 March 2014
Review of the Biomonitoring assessment for the coal expansion project	Vunene Mining	Vunene (Eco Elementum)	Review	01 April 2014
Reviewed the EIA/EMP for the amendment of the Tweefontein section	Samancor Eastern Chrome Mines	Tweefontein	Review	15 April 2014
Reviewed the EMPR performance assessment for the Stellite operations	Chromex mining / Afarak / Ruuki	Illitha / Stellite	Review	07 July 2014
Reviewed the WUL audit for the Stellite operations	Chromex mining / Afarak / Ruuki	Illitha / Stellite	Review	07 July 2014
Updated the 2013 IWWMP report and drafted a Water balance for the licensee.	IFMSA	Buffelsfontein	Water balance	09 July 2014
Updated the existing IWWMP and water use licence application, this included drafting water balances.	Samancor Western Chrome Mines	Mooinooi	Water balance	2014/07/18
Review of the amendment of the existing EMPr for the Coal siding	Coastal Fuels (Pty) Ltd	Coal siding	Review	22 July 2014
Drafted the IWWMP for the new Saldanha operations	AfriSam	Saldanha	IWWMP	25 July 2014
Compilation of the Water Use Licence Application Report	AfriSam	Saldanha	WULAR	25 July 2014
Review of the WULAR for the new Moeijelijk Chrome Mine	Bauba	Moeijelijk Chrome Mine	Review	11 August 2014
Compiled a surface water assessment of the rivers that could be impacted by the proposed Iron Smelting Activities	Pan Palladium South Africa (Pty) Ltd	Altona Smelter	Surface water assessment	13 August 2014
Updated the existing IWWMP and water use licence application, this included drafting water balances.	Samancor Western Chrome Mines	Millsell/Waterkloof	IWWMP	2014/08/18
Updated the existing IWWMP and water use licence application, this included drafting water balances.	Samancor Western Chrome Mines	Millsell/Waterkloof	Water balance	2014/09/02
Compiled a surface water assessment of the rivers that could be impacted by the proposed activities.	Pan Palladium South Africa (Pty) Ltd	Magnetite mine	Surface water	03 September 2014

Outline	Company	Section	Type	Completion date
Updated the 2013 IWWMP report and drafted a Water balance for the licensee.	IFMSA	Buffelsfontein	IWWMP	09 September 2014
Conducted the surface water assessment for the Fumani Mine.	Corridor Mining Resources	Fumani Gold Mine	Surface water	10 September 2014
Compilation of a static water balance report	Corridor Mining Resources	Fumani Gold Mine	Water balance	10 September 2014
Updated the existing IWWMP and water use licence application, this included drafting water balances.	Samancor Western Chrome Mines	Mooinooi	IWWMP	2014/09/26
Compiled the IWWMP for the Water use licence amendment	Andalusite Resources (Pty) Ltd	Maroeloesfontein	IWWMP	29 September 2014
Managed the WULA process	AfriSam	Saldanha	Project Management	07 October 2014
Review of the wetland delineation study	Savanna Environmental (Pty) Ltd	Transalloys power plant Witbank	Review	09 October 2014
Review of the Surface water assessment	Savanna Environmental (Pty) Ltd	Transalloys power plant Witbank	Review	11 October 2014
Review of the Integrated Mine Water Management Plan	AfriSam	Olifantsfontein	Review	07 November 2014
Short report on drainage channels at Mecklenburg	Chromex mining / Afarak / Ruuki	Mecklenburg Chrome Mine	Surface water	12 November 2014
Facilitated the Water use licence amendment process for the Maroeloesfontein operation	Andalusite Resources (Pty) Ltd	Maroeloesfontein	Project Management	25 November 2014
Opinion on impacts of re-use of treated sewage effluent from Waterval WWTW if not released to surface water resource	Gudani Consulting	Ekurhuleni Waterval	Surface water	28 November 2014
Review of the Water use registration report	Inkanyiso Trust	Vaalbank	Review	02 December 2014
Compiled documentation for the application to delist residue stockpiles	Andalusite Resources (Pty) Ltd	Maroeloesfontein	Waste Management	04 December 2014
Compiled a water and salt balance for the iron mine.	Assmang Khumani Mine (GPT)	Khumani mine	Salt balance	05 December 2014
Review of the WULAR for the residential development	Crimson King Properties	Mogale Ext 10	Review	17 December 2014
Reviewed the WUL Audit report for the Maroeloesfontein Operations	Andalusite Resources (Pty) Ltd	Maroeloesfontein	Review	07 January 2015
Reviewed and assessed reports on alien invasive plant species and management plans: Millsell/Waterkloof, Mooinooi, Elandsdrift, Buffelsfontein East and West	Samancor Western Chrome Mines	Buffelsfontein East	Review	2015/01/13
Reviewed and assessed reports on alien invasive plant species and management plans: Millsell/Waterkloof, Mooinooi, Elandsdrift, Buffelsfontein East and West	Samancor Western Chrome Mines	Buffelsfontein West	Review	2015/01/13

Outline	Company	Section	Type	Completion date
Compiled a rehabilitation plan for the Witkranz colliery area	Coastal Fuels (Pty) Ltd	Witkranz	Rehabilitation plan	13 January 2015
Compilation of the Work Method Statement for the Bok River	AfriSam	Saldanha	Work Method Statement	23 March 2015
Reviewed and assessed reports on alien invasive plant species and management plans: Millsell/Waterkloof, Mooinooi, Elandsdrift, Buffelsfontein East and West	Samancor Western Chrome Mines	Mooinooi	Review	2015/04/14
Compiled the Integrated Water and Waste Management plan for the Altona Smelter	Pan Palladium South Africa (Pty) Ltd	Altona Smelter	IWWMP	17 April 2015
Compiled a surface water assessment of the rivers that could be impacted by the existing activities of Lannex Section	Samancor Eastern Chrome Mines	Lannex	Surface water	2015/05/12
Review of the WULAR for the development	Avizon (Pty) Ltd	Alra Park	Review	13 May 2015
Reviewed and assessed reports on alien invasive plant species and management plans: Millsell/Waterkloof, Mooinooi, Elandsdrift, Buffelsfontein East and West	Samancor Western Chrome Mines	Millsell/Waterkloof	Review	2015/06/04
Reviewed and assessed the flora assessment report.	Sylvania	Grasvally Chrome mine	Review	2015/06/10
Assisted with the compilation of a surface water assessment of the rivers that could be impacted by the existing activities of Doornbosch/Steelpoort Section	Samancor Eastern Chrome Mines	Doornbosch/Steelpoort	Surface water	2015/06/22
Reviewed and assessed reports on alien invasive plant species and management plans: Millsell/Waterkloof, Mooinooi, Elandsdrift, Buffelsfontein East and West	Samancor Western Chrome Mines	Elandsdrift	Review	2015/06/29
Reviewed and assessed the fauna assessment report.	Sylvania	Grasvally Chrome mine	Review	2015/07/03
Updated the IWRMP into the IWWMP format and applied for an amendment to the existing Water use licence. Elandsfontein	Apollo Brick (Pty) Ltd	Elandsfontein	IWWMP	03 July 2015
Review of annual external water use licence audit	Coastal Fuels (Pty) Ltd	Various	Review	20 July 2015
Review of the IWWMP for the South Block Extension	AEMFC (Gudani)	Vlakfontein South	Review	20 September 2015
Compiled the water monitoring plan for the mine that was used as supporting information in the Water use licence application.	Pan Palladium South Africa (Pty) Ltd: PGE Project	Magnetite mine	Water monitoring programme	09 November 2015
Compiled the Wetland Rehabilitation and management Plan for the Hacra PGE mining project	Hacra Mining and Exploration Company (Pty) Ltd	PGE and PGM Mine	RSIP	2015/11/20
Reviewed the EIA/EMP for the proposed Commissie kraal colliery by Tholie Logistics.	Lonmin Water user association	Commissie Kraal Colliery (Tholie Logistics)	Review	25 November 2015

Outline	Company	Section	Type	Completion date
Reviewed the WUL Audit report for the Maroeloesfontein Operations	Andalusite Resources (Pty) Ltd	Maroeloesfontein	Review	05 December 2015
Compiled the water monitoring plan for the mine that was used as supporting information in the Water use licence application.	Pan Palladium South Africa (Pty) Ltd: PGE Project	PGE and PGM Mine	Water monitoring programme	17 December 2015
Compiled the water balance report for the mine that was used as supporting information in the Water use licence application.	Pan Palladium South Africa (Pty) Ltd: PGE Project	PGE and PGM Mine	Water balance	21 December 2015
Compiled the Work Method Statement for the Magnetite mining project	Hacra Mining and Exploration Company (Pty) Ltd	Magnetite mine	Work Method Statement	21 December 2015
Compiled the work method statement for the mine that was used as supporting information in the Water use licence application.	Pan Palladium South Africa (Pty) Ltd: PGE Project	Magnetite mine	Work Method Statement	21 December 2015
Compiled the work method statement for the mine that was used as supporting information in the Water use licence application.	Pan Palladium South Africa (Pty) Ltd: PGE Project	PGE and PGM Mine	Work Method Statement	21 December 2015
Compiled the Wetland Rehabilitation and management Plan for the Magnetite mining project	Hacra Mining and Exploration Company (Pty) Ltd	Magnetite mine	RSIP	08 January 2016
Compiled the Wetland Rehabilitation and management for the Magnetite mining project based on available studies and information to support a water use licence application	Pan Palladium South Africa (Pty) Ltd	Magnetite mine	RSIP	12 January 2016
Compiled the Integrated Water and Waste Management plan for the mine that was used as supporting information in the Water use licence application.	Pan Palladium South Africa (Pty) Ltd	PGE and PGM Mine	IWWMP	28 January 2016
Compiled the water balance report for the mine that was used as supporting information in the Water use licence application.	Pan Palladium South Africa (Pty) Ltd	Magnetite mine	Water balance	28 January 2016
Reviewed the Environmental Due Diligence and Liability report for portion 155 of the farm Elandskraal 469 JQ	Phoenix Platinum	Elandskraal / Minco	Review	29 January 2016
Compiled the Integrated Water and Waste Management plan for the mine that was used as supporting information in the Water use licence application.	Pan Palladium South Africa (Pty) Ltd	Magnetite mine	IWWMP	29 January 2016
Compiled the Water Monitoring Programme for the Magnetite mining project	Hacra Mining and Exploration Company (Pty) Ltd	Magnetite mine	Water monitoring programme	22 February 2016
Compiled the Water Monitoring Programme for the Hacra PGE mining project	Hacra Mining and Exploration Company (Pty) Ltd	PGE and PGM Mine	Water monitoring programme	25 February 2016
Compiled the Water Monitoring Programme for the Hacra PGE mining project	Hacra Mining and Exploration Company (Pty) Ltd	PGE and PGM Mine	Work Method Statement	25 February 2016

Outline	Company	Section	Type	Completion date
Compiled the IWWMP for the Magnetite mining project	Hacra Mining and Exploration Company (Pty) Ltd	Magnetite mine	IWWMP	01 March 2016
Compiled the IWWMP for the Hacra PGE mining project	Hacra Mining and Exploration Company (Pty) Ltd	PGE and PGM Mine	IWWMP	01 March 2016
Review of the wetland delineation study	AfriSam	Saldanha	Review	06 June 2016
Compiled the wetland rehabilitation plan	AfriSam	Saldanha	Wetland rehabilitation plan	06 June 2016
Review of the hydrological report for the proposed piggery	Number Two Piggeries (Pty) Ltd (REC Services)	Longside	Review	30 June 2016
Update of the IWWMP's for various sections into one document	AEMFC (Gudani)	Vlakfontein	IWWMP	02 September 2016
Updated the IWWMP.	Phoenix Platinum	Buffelsfontein	IWWMP	27 September 2016
Conducted a waste classification on waste generated by Joc Abrasives (sanding paper)	Joc Abrasives	Joc Abrasives	Waste Management	27 September 2016
Review of the Surface water assessment	Steynburg Pork and Abattoir (Pty) Ltd (REC Services)	Steynsburg	Review	12 October 2016
Compiled the WCDMP.	Phoenix Platinum	Buffelsfontein	WCDMP	20 October 2016
Reviewed the WUL Audit report for the Maroeloesfontein Operations	Andalusite Resources (Pty) Ltd	Maroeloesfontein	Review	06 January 2017
Management of the Water use licence application process	Kingdom Development Company	Kingdom	Project Management	26 January 2017
Review of the WULAR for the development	Kingdom Development Company	Kingdom	Review	26 January 2017
Review of the BAR for the implementation of WWTW	Chevron SA (Pty) Ltd	Millies	Review	15 February 2017
Review of the wetland delineation study	Roman Catholic Archdiocese of Johannesburg (REC Services)	Kruitfontein	Review	03 March 2017
Compiled the IWWMP report for the Jagdlust section	Samancor Eastern Chrome Mines	Jagdlust	IWWMP	24 March 2017
Compiled the Water use licence application report for the Jagdlust section	Samancor Eastern Chrome Mines	Jagdlust	WULAR	24 March 2017
Conducted a due diligence for the Sail group on Smokey Hills Platinum Mine	Sail group	Smokey Hill Platinum Mine	Due Diligence	13 April 2017
Conducted a due diligence for the Sail group on Black Chrome Mine	Sail group	Mooihoek (Black) Chrome Mine	Due Diligence	19 May 2017
Review of the aquatic delineation study	Walt Landgoed (Pty) Ltd (REC Services)	Biesjeskraal	Review	24 May 2017

Outline	Company	Section	Type	Completion date
Review of the Fauna Terrestrial biodiversity plan	Kwa-Madwala Private Game reserve	Nkomazi Safari Hotel	Review	31 May 2017
Review of the Rehabilitation plan for the proposed development	Kwa-Madwala Private Game reserve	Nkomazi Safari Hotel	Review	22 June 2017
Compiled the Integrated Water and Waste Management plan for the mine that was used as supporting information in the Water use licence application.	Sky Chrome Mining	Bapong	IWWMP	31 July 2017
Annual update of the WCDMP for Phoenix Platinum	Phoenix Platinum	Buffelsfontein	WCDMP	04 September 2017
Compiled the WQMR for the ERWAT Vlakplaats Water use licence amendment	Virtual Consulting Engineers	ERWAT Vlakplaats (DWP = Maziya)	IWWMP	2017/09/15
Water Availability and impact of re-use of Treated Waste When not released into the water resource: Olifantsfontein and Waterval	Gudani Consulting	Ekurhuleni	Surface water	18 September 2017
Review of the external audit on the licensee's compliance with the water use licence conditions.	Apollo Brick (Pty) Ltd	Elandsfontein	Review	02 October 2017
Compiled a rehabilitation plan for Meadowhurst	Nouvall	Meadowhurst	Rehabilitation strategy	12 October 2017
Opinion on impacts of re-use of treated sewage effluent from Olifantsfontein WWTW if not released to surface water resource	Gudani Consulting	Ekurhuleni Olifantsfontein	Surface water	10 November 2017
Drafted the annual water balance for Moeijelijk Mine.	Bauba (sub-contracted by Red Kite)	Moeijelijk Chrome Mine (Red Kite)	Water balance	15 November 2017
Updated the IWWMP.	Phoenix Platinum	Buffelsfontein	IWWMP	21 November 2017
Review of annual external water use licence audit	Coastal Fuels (Pty) Ltd	Various	Review	30 November 2017
Drafted the Surface water component for the Environmental Management Frameworks for the Vhembe District Municipality	Gudani Consulting	EMF Surface water (Capricorn and Vhembe DM)	Surface water	01 December 2017
Drafted the Surface water component for the Environmental Management Frameworks for the Capricorn District Municipality	Gudani Consulting	EMF Surface water (Capricorn and Vhembe DM)	Surface water	01 December 2017
Conducted a surface water impact assessment for the proposed Bauba operations (central, northern, southern and Waterkop clusters)	Bauba (sub-contracted by Red Kite)	Central, Northern, southern and waterkop	Surface water	15 December 2017
Drafted the supporting documentation for the Mooihoek Chrome Mine Water use licence application: Monitoring programme, Work Method Statement, Rehabilitation strategy and Landscape Maintenance Plan	Umnotho we-Sizwe Resources (Sail group)	Mooihoek (Black) Chrome Mine	RSIP	01 January 2018

Outline	Company	Section	Type	Completion date
Drafted the rehabilitation plan for the impacts on watercourses as a result of mining activities	Umnotho we-Sizwe Resources (Sail group)	Mooihoek (Black) Chrome Mine	Rehabilitation strategy and Landscape Maintenance plan	01 January 2018
Compiled a Surface and Groundwater monitoring plan for the Mooihoek Chrome Mine (BCM)	Umnotho we-Sizwe Resources (Sail group)	Mooihoek (Black) Chrome Mine	Water monitoring programme	01 January 2018
Drafted the Work method statement for the impacts on water courses as a result of mining activities	Umnotho we-Sizwe Resources (Sail group)	Mooihoek (Black) Chrome Mine	Work Method Statement	01 January 2018
Reviewed the WUL audit report for the Grasvally Chrome mine.	Sylvania	Grasvally Chrome mine	Review	01 January 2018
Drafted the 2016/2017 water balance for Samancor Buffelsfontein East Section	Samancor Western Chrome Mines	Buffelsfontein East	Water balance	2018/01/08
Drafted the RSIP for Samancor Buffelsfontein East Section	Samancor Western Chrome Mines	Buffelsfontein East	RSIP	2018/01/09
General Authorisation report for the Hacra (HW Iron) Magnetite project	Hacra Mining and Exploration Company (Pty) Ltd	Magnetite mine	IWWMP	11 January 2018
Management of the BA Process for the proposed new kilns	Corobrik	Driefontein	Project Management	01 February 2018
Review of documentation required for the Environmental Authorisation for the Corobrik Driefontein New Kiln Expansion project	Corobrik	Driefontein	Review	01 February 2018
Reviewed the Financial quantum assessment for the Mooihoek Chrome Mine (BCM)	Sail group	Mooihoek (Black) Chrome Mine	Review	01 February 2018
Reviewed the Financial quantum assessment for the Rooderand Chrome Mine	Sail group	Rooderand	Review	01 February 2018
Compiled the IWWMP for the Mooihoek Chrome Mine (BCM)	Umnotho we-Sizwe Resources (Sail group)	Mooihoek (Black) Chrome Mine	IWWMP	01 February 2018
Facilitated the Public participation process for the Corobrik New Kilns expansion project	Corobrik	Driefontein	Public Participation Process	01 February 2018
Compiled the 2107 Salt Balance and Mass balance report for the Buffelsfontein East Section	Samancor Western Chrome Mines	Buffelsfontein East	Salt balance	01 February 2018
Compiled the 2017 Water balance report for the Buffelsfontein East Section	Samancor Western Chrome Mines	Buffelsfontein East	Water balance	01 February 2018
Compiled the WCDMP for Buffelsfontein East	Samancor Western Chrome Mines	Buffelsfontein East	WCDMP	01 February 2018

Outline	Company	Section	Type	Completion date
Review of the surface waer assessment report	Red Kite	Rondevly	Surface water	03 February 2018
Drafted the 2016/2017 salt balance for Samancor Buffelsfontein East Section	Samancor Western Chrome Mines	Buffelsfontein East	Water balance	2018/02/05
Drafted theWCDMP for Samancor Buffelsfontein East Section	Samancor Western Chrome Mines	Buffelsfontein East	Water balance	2018/02/05
Compiled the waste classification report	Glenover Phosphate	Glenover	Waste Management	19 February 2018
Conducted an Aquatic Assessment for the proposed sand winning activities in the Mokolo River	Gudani Consulting	Mokolo River	Surface water assessment	22 February 2018
Conducted an Environmental Due diligence and Liability at portion 155 of the farm Elandskraal 469 JQ	Phoenix Platinum	Elandskraal / Minco	Due Diligence	01 March 2018
Reviewed the EIA/EMP compiled for the amendment at the Mooihoek Chrome Mine (BCM)	Umnotho we-Sizwe Resources (Sail group)	Mooihoek (Black) Chrome Mine	Review	01 March 2018
Compiled a static water balance for existing and proposed new activities	Umnotho we-Sizwe Resources (Sail group)	Mooihoek (Black) Chrome Mine	Water balance	01 March 2018
Drafted the WULAR documentation for the Mooihoek Chrome Mine Water use licence application for water from the Lebalelo water scheme	Umnotho we-Sizwe Resources (Sail group)	Mooihoek (Black) Chrome Mine	WULA	23 March 2018
Reviewed the EIA/EMP compiled for the amendment at the Glenover Phosphate mine	Glenover Phosphate	Glenover	Review	01 April 2018
Conducted Basic Public Participation for the Glenover Phosphate mine (Municipal Meetings)	Glenover Phosphate	Glenover	Public Participation Process	01 April 2018
Compiled an aquatic assessment for the Northdene plot 3 development	Vaalplan Regional and Town planners (Wilgeblare Beleggings)	Northdene	Surface water assessment	01 April 2018
Compiled the static water balance for Venetia mine (20162017)	Gudani Consulting	Venetia mine	Water balance	19 April 2018
Conducted the Desktop surface water assessment for the Tedstoneville development: Erf 853, Extension 1 (Ekurhuleni Municipality)	Gudani Consulting	Tedstoneville	Surface water assessment	27 April 2018
Annual update of the financial liabilities for all the Sylvania sites	Sylvania	Various	Closure quantum	01 May 2018
Conducted the surface water and wetland assessment for the Zwartkopjies and Rietspruit Development (Edenpark) (Ekurhuleni Municipality)	Gudani Consulting	Edenpark) (Ekurhuleni	Surface water and wetland assessment	16 May 2018

Outline	Company	Section	Type	Completion date
Reviewed the Fauna Terrestrial Assessment for the Zwartkopjies and Rietspruit Development (Edenpark) (Ekurhuleni Municipality)	Gudani Consulting	Edenpark	Review	18 May 2018
Conducted baseline waste classification for Mr Piet Greyling	Piet Greyling	DNCC Granite	Waste Management	01 June 2018
Annual update of the Rehabilitation Strategy and Landscape Maintenance Plan for Phoenix Platinum	Phoenix Platinum	Buffelsfontein	Rehabilitation strategy and Landscape Maintenance plan	06 June 2018
Conducted the desktop surface water assessment for the Thaba Chueu mining right application	Gudani Consulting	Thaba Chueue	Surface water assessment	15 June 2018
Annual update of the financial liabilities for Phoenix Platinum	Phoenix Platinum	Buffelsfontein	Closure quantum	01 July 2018
Risk assessment report for the proposed pipeline at Mooihoek Chrome Mine (BCM)	Umnotho we-Sizwe Resources	Mooihoek (Black) Chrome Mine	Risk Assessment (surface water)	01 July 2018
Annual update of the WCDMP for Phoenix Platinum	Phoenix Platinum	Buffelsfontein	WCDMP	01 July 2018
Motivation and request for administrative changes to the Grasvally Chrome Mine WUL	Sylvania	Grasvally Chrome mine	WUL Amendment	01 July 2018
Conducted the Aquatic Assessment for the Small Scale mining activities in the Klein Letaba River	Gudani Consulting	Sandberg / Mona mona: Klein Letaba	Surface water assessment	05 July 2018
Conducted the water and Salt Balance report for Phoenix Platinum	Phoenix Platinum	Buffelsfontein	Salt balance	05 July 2018
Drafted the wet season water and Salt balance for Moeijelijk Mine.	Bauba (sub-contracted by Red Kite)	Moeijelijk Chrome Mine (Red Kite)	Water balance	14 July 2018
Compiled and submitted the WULAR documentation that was submitted for the Mooihoek Chrome Mine Water integrated water use licence	Umnotho we-Sizwe Resources (Sail group)	Mooihoek (Black) Chrome Mine	WULAR	23 July 2018
Annual update of the IWWMP for Phoenix Platinum	Phoenix Platinum	Buffelsfontein	IWWMP	01 August 2018
Review of the EMP Performance assessment for the prospecting permit on Palmietfontein	Palm Chrome	Palmietfontein	Review	01 August 2018
Review of the Fauna terrestrial assessment for Palm Chrome on the farm Palmietfontein	Palm Chrome	Palmietfontein	Review	01 August 2018
Review of the Fauna terrestrial assessment for Sefateng Chrome Mine	Red Kite	Sefateng Chrome Mine	Review	01 August 2018
Compiled the 2018-2019 water and salt balance report	Phoenix Platinum	Lesedi/Phoenix	Water and Salt Balance	14 August 2018

Outline	Company	Section	Type	Completion date
Desktop Surface water assessment for Palm Chrome on the farm Palmietfontein	Palm Chrome	Palmietfontein	Surface water assessment	17 August 2018
Conducted the desktop Surface water assessment for 7 Seas Capital Ventures (Granite mining) in the Western Cape	Gudani Consulting	7Seas Capital ventures	Surface water assessment	22 August 2018
Reviewed the Surface water assessment report for the Rooderand Chrome Mine	Sail group	Rooderand	Review	04 September 2018
Review of the Flora Assessment	Red Kite	Memorial Park	Review	28 September 2018
Reviewed the actual rehabilitation cost as applicable to the TNT shaft at Mooihoek	Umnotho we-Sizwe Resources (Sail group)	Mooihoek (Black) Chrome Mine	Review	16 October 2018
Conducted the desktop Surface water assessment for Highly Blue (Granite mining) in the North West	Gudani Consulting	Highly Blue	Surface water assessment	16 October 2018
Compiled the ROD application submitted to the DWS for the Waste management activities	Glenover Phosphate	Glenover	Waste Management	16 November 2018
Compiled the IWWMP for the water use licence application	Glenover Phosphate	Glenover	Review	22 November 2018
Conducted a waste classification on waste generated by Langpan Chrome mine	Langpan Chrome Mine	Langpan	Waste Management	22 November 2018
Compiled the WULAR for the water use licence application	Glenover Phosphate	Glenover	Review	22 November 2018
Conducted a Surface water assessment for the proposed sand dredging in the Crocodile River	Gudani Consulting	Sanmar sands cc	Surface water	13 December 2018
Compiled documentaton for the WUL amendment of Phoenix (Borehole location change)	Sylvania	Lesedi/Phoenix	WUL Amendment	31 December 2018
Conducted a waste classification on waste generated by the Vlakpoort Chrome Mine	Afarak	Vlakpoort	Waste Management	21 January 2019
Conducted a waste classification on waste generated by the Odendaalsrust operations	Corobrik	Odendaalsrus	Waste Management	08 February 2019
Reviewed the Scoping report for the proposed UG1 opencast mine	Phokataba	SHPM	Scoping Report	01 May 2019
Review of the surface waer assessment report	Red Kite	SHPM	Surface water	15 May 2019
Review of the surface water assessment report	Red Kite	Silverton	Surface water	23 May 2019
Reviewed the waste classification Reports	Corobrik	Eastbrick	Waste Management	25 May 2019
Reviewed the waste classification Reports	Corobrik	Middlewit	Waste Management	25 May 2019

Outline	Company	Section	Type	Completion date
Review of the Fauna and Terrestrial assessment for the SHPM	Red Kite	SHPM	Review	27 May 2019
Reviewed the waste classification Reports	Corobrik	Glencoe	Waste Management	27 May 2019
Conducted a Surface water assessment for the proposed weir and pond	Gudani Consulting	Cottondale	Surface water	31 May 2019
Compiled the dry season and annual water balance for the mine	Red Kite	Bauba	Water Balance	03 June 2019
Managed the eWULA process for the proposed smelter	Altona Smelting	Altona Smelter	WULA	03 June 2019
Conducted a Surface water assessment for the proposed cemetary	Gudani Consulting	Mashishing	Surface water	04 June 2019
Conducted a Surface water assessment for the granite quarry	Gudani Consulting	Highly Blue: Concorida site	Surface water	04 June 2019
Conducted the Section 21© and (i) Risk assessment for the proposed development	Nouvalle	Meadowhurst	Surface water	18 June 2019
Conducted a waste classification on waste generated by the Driefontein operations	Corobrik	Driefontein	Waste Management	18 June 2019
Compiled the 2018-2019 water and salt balance report	Red Kite	Sefateng Chrome Mine	Water and Salt Balance	26 June 2019
Conducted a Surface water assessment for the clay mine	Gudani Consulting	Kumbelo	Surface water	27 June 2019
Amended the rehabilitation strategy	Phoenix Platinum	Lesedi/Phoenix	RSIP	12 July 2019
Reviewed the performance assessment and environmental compliance audit report	Phokataba	SHPM	Audit	24 July 2019
Compiled the 20180-2019 WCDMP report	Phoenix Platinum	Lesedi/Phoenix	WCDMP	26 July 2019
Conducted a waste classification and risk assessment	Corobrik	Middlewit	Waste Management	14 August 2019
Conducted a waste classification and risk assessment	Corobrik	Eastbrick	Waste Management	14 August 2019
Conducted a waste classification and risk assessment	Corobrik	Driefontein	Waste Management	14 August 2019
Conducted a waste classification and risk assessment	Corobrik	Phesantekraal	Waste Management	15 August 2019
Conducted a waste classification and risk assessment	Corobrik	Glencoe	Waste Management	15 August 2019
Conducted a waste classification and risk assessment on Jumbo Clay	Corobrik	Middlewit and Eastbrick	Waste Management	15 August 2019

Outline	Company	Section	Type	Completion date
Compiled the presentation used for the Environmental training for Omnia Fertilsers Liquid and Blenders	Inlexo	Omnia	Training	16 August 2019
Conducted a waste classification and risk assessment	Corobrik	Midrand	Waste Management	16 August 2019
Reviewed the EIA/EMP for the proposed SHPM UG1 project area	Sail group	SHPM	EIA/EMP	27 August 2019
Conducted a waste classification and risk assessment	Corobrik	Boekenhoutskloof	Waste Management	04 September 2019
Compiled the static water balance for Venetia mine (2017_2018)	Gudani Consulting	Venetia mine	Water balance	04 September 2019
Conducted a waste classification and risk assessment	Corobrik	Springs	Waste Management	16 September 2019
Conducted a waste classification and risk assessment	Corobrik	Rietvlei	Waste Management	23 September 2019
Compiled the environmental site selection report for the ECM Tweefontein section Tailings storage facility project	Sylvania	ECM: Tweefontein	Site selection report	07 October 2019
Compiled the environmental site selection report for the ECM Lannex section Tailings storage facility project	Sylvania	ECM: Lannex	Site selection report	14 October 2019
Reviewed the Closure and rehabilitation plan for the proposed SHPM UG1 project area	Sail group	SHPM	Closure and rehabilitation plan	24 October 2019
Reviewed the BAR and EMPr for the proposed link road between Estate D' Afrique and Meerhof	Estate D'Afrique	Estate D'Afrique	BAR	13 November 2019
Determined the static water balance for the proposed Lefa Colliery	ElementumS	Lefa Coal	Water Balance	13 November 2019
Compiled the Annual Water balance for Moeijelijk Chrome Mine	Bauba (sub-contracted by Red Kite)	Moeijelijk Chrome Mine (Red Kite)	Water balance	25 November 2019
Conducted a waste classification and risk assessment	Corobrik	Rayton	Waste Management	10 December 2019

Outline	Company	Section	Type	Completion date
Compilation of Water Quality Report	Andalusite Resources (Pty) Ltd	Maroeloesfontein	Monitoring	1) 2010/05/10 2) 2010/08/11 3) 2010/12/02 4) 2011/04/11 5) 2011/07/28 6) 2011/10/11 7) 2012/01/06 8) 20120322 9) 20120605 10) 20121001
Compiled the water monitoring reports	Phoenix Platinum	Buffelsfontein	Monitoring report	1) 2018/05/01 (MR) 2) 2018/06/01(MR)&(QR) 3) 2018/06/21(QR) 4) 2018/07/01(MR) 5) 2018/08/01(MR) 6) 2018/09/25(QR) 7) 2018/10/11(MR) 8) 2018/1022(QR) 9) 2018/11/12(MR) 10) 2018/12/04(QR) 11) 2018/12/12(MR) 12) 2019/02/01 (QR) 13) 2019/04/01(AR) 14) 2019/04/01(MR) 15) 2019/06/03(MR)&(QR) 16) 2019/07/19 (MR) 17) 2019/07/22 (MR) 18) 2019/08/19 (MR) 19) 2019/09/23 (AR) 20) 2019/10/24 (MR) 21) 2020/01/23 (Mr) 22) 2020/03/24 (AR) 23) 2020/07/31 (MR) 24) 2020/09/24 (MR) 25) 2020/10/12 (MR) 26) 2020/12/17 (MR)

Outline	Company	Section	Type	Completion date
Reviewed the water monitoring reports	Phoenix Platinum	Buffelsfontein	Monitoring report	1) 2019/03 (MR) 2) 2019/05 (MR) 3) 2019/11 (MR) 4) 2019/12 (MR) 5) 2020/02 (MR) 6) 2020/05 (QR) 7) 2020/08 (QR)
Compiled the water monitoring reports	Umnotho we-Sizwe Resources (Sail group)	Mooihoek (Black) Chrome Mine	Monitoring report	1) 2018/11/07(MR) 2) 2018/11/25(MR) 3) 2019/01/28(MR) 4) 2019/02/04(MR)
Review of ECO reports for storm water implementation construction activities	Ndodana Consulting Engineers	Oriel	Review	2013/06/11 2013/07/31 2013/08/31
Compiled the WCDMP for Venetia Mine	Gudani Consulting	Venetia Mine	WCDMP	2018/04/25 2019/12/30
Reviewed and updated the IWWMP updated for Venetia mine	Gudani Consulting	Venetia mine	Review	2018/05/31 2019/12/30
Conducted a Surface water assessment for the proposed Lodge	Gudani Consulting	Nkanyi Lodge	Surface water	2019/06/20 2019/09/23
Compiled the Public Particapation report for the propsoed link road to Meerhof	Estate D'Afrique	Estate D'Afrique	Public Participation Process	17 February 2020
Reviewed the completeness and suitability of the TMT Shaft 2008 approved EMPr for Sail group	Sail group	TNT Shaft	Review	27 February 2020
Conducted a surface water assessment for the proposed new Sabie Landfill site: Sabie	Gudani Consulting	Sabie Landfill site	Surface water	01 March 2020
Compiled an Environmental impact statement of the TNT shaft activities for the Sail Group	Sail group	TNT Shaft	Review	01 April 2020
Conducted a surface water assessment for the proposed filling and Depo station near Musina	Gudani Consulting	2SP Investment trust	Surface water	25 May 2020
Compiled the wet and dry water balance for AEMFC - Vlakfontein Mine	AEMFC	Vlakfontein	Water balance	22 May 2020
Compiled a Surface water description report for the Janniek mine near Polokwane	Gudani Consulting	Janniek Mining and Roodepoort crushers	Surface water	25 May 2020

Outline	Company	Section	Type	Completion date
Reviewed the Estate D'Afrique Shore line rehabilitation report	Estate D'Afrique	Estate D'Afrique	Surface water	01 March 2020
Reviewed the IWWMP for East Block	AEMFC	East Block	IWWMP	22 May 2020
Reviewed the IWWMP for Central and North Blocks	AEMFC	Central, Northern Blocks	IWWMP	23 May 2020
Compiled the Scoping report for the Eastern Chrome Mines TSF and WRD expansion project	Samancor Chrome Ltd	Tweefontein	Scoping Report	07 July 2020
Conducted a Surface water assessment for the proposed TSF and WRD expansion for Eastern Chrome Mines	Samancor Chrome Ltd	Tweefontein	Surface water assessment	04 August 2020
Conducted a desktop surface water assessment for a proposed Limestone, Clay, Shale and Quartsite mine	Gudani Consulting	Gilmoe Mining	Surface water assessment	23 July 2020
Compiled a Waste Management for the University of Mpumalanga, Mbombela campus.	Afroteq	University of Mpumalanga	Waste Management	04 August 2020
Review of the Scoping report for Lannex Section EMPR consolidation and Expansion project	Samancor Chrome Ltd	Lannex	Review	17 July 2020
Project manger for the Samancor Tweefontein EMPR amendment project. - Drafting Public Participation Documentation - newspaper advertisements . Background information document. Application forms.	Samancor Chrome Ltd	Tweefontein	Project Management	on-going
Project manger for the Samancor Tweefontein EMPR amendment project. Drafting Public Participation Documentation - newspaper advertisements . Background information document. Application forms.	Samancor Chrome Ltd	Lannex	Project Management	on-going
Compiled the annual Salt balance for Sylvania Lesedi	Sylvania	Lesedi/Phoenix	Salt balance	28/09/2020
Conducted a Surface water assessment for Mofenyi Mining (Pty) Ltd Vermiculite mine	Gudani Consulting	Mofenyi mining	Surface water assessment	
Conducted a surface water assessment report for the Lannex Section expansion	Samancor Chrome Ltd	Lannex	Surface water Assessment	25 August 2020
Conducted a surface water assessment for the propsoed TSF expansion at Mooinooi section	Samancor Chrome Ltd	Mooinooi	Surface water assessment	17 August 2020
Drafted the Section 27 Motivation report for the Lannex Section Water use licence application	Samancor Chrome Ltd	Lannex	Section 27 Motivation	27 August 2020
Conducted a basic Waste classification for the Mooinooi Tailings	Sylvania	Mooinooi	Waste classification	23 September 2020

Outline	Company	Section	Type	Completion date
Conducted a surface water assessment for the propsed Macarhy Mine EMPr amendment project	Salene Manganeese	Macarthy Mine	Surface water Assessment	10 November 2020
Compiled the Section 27 for the Water use licence application	Samancor Chrome Ltd	Lannex	Section 27 Motivation	01 December 2020
Compiled the Rehabilitation stratfy and implementation for a new water use licence application	Samancor Chrome Ltd	Lannex	RSIP	09 December 2020
Compiled the Application form and the Basic Assessment Report (inclusive of EMPr) for the proposed pipeline between Lesedi and Mooinooi Sections	Samancor Chrome Ltd	Sylvania	BAR	15 December 2020
Updated the existing IWWMP and water use licence application, this included drafting water balances.	Samancor Chrome Ltd	Mooinooi	IWWMP	31 December 2020
Compiled the section 27 for the new TSF water use licence application at Mooinooi	Samancor Chrome Ltd	Mooinooi	Section 27 Motivation	31 January 2020
Compiled a Water use licence application report for a stand alone section 21(c) and (i) water use for a water and slurry pipeline	Samancor Chrome Ltd	Sylvania	WULAR	28 December 2020
Compiled a Section 27 motivation for a stand alone section 21(c) and (i) water use for a water and slurry pipeline	Samancor Chrome Ltd	Mooinooi	Section 27 Motivation	28 December 2020
Compiled a closure and rehabilitaton plan for proposed prospecting activities	Salene Manganeese	Salene	Closure and rehabilitation plan	29 December 2020
Compiled the Record of Decision report submitted to the DWS in support of a Waste Management Licence	Samancor Chrome Ltd	Mooinooi	ROD	04 January 2021
Compiled the Rehabilitation stratfy and implementation for a new water use licence application	Samancor Chrome Ltd	Tweefontein	RSIP	02 April 2021
Compiled the Rehabilitation stratfy and implementation for a new water use licence application	Samancor Chrome Ltd	Lannex	RSIP	01 April 2021
Compiled the Basic Assessment Report and Environmental Management Programme for the proposed pipeline between Lesedi and Mooinooi Sections	Samancor Chrome Ltd	Mooinooi	BAR/EMPr	03 May 2021
Compiled the Rehabilitation stratfy and implementation for a new water use licence application	Samancor Chrome Ltd	Lesedi/Phoenix	RSIP	18 March 2021
Compiled the Method statement as supporting documentation for a Water use licence application	Samancor Chrome Ltd	Lannex	Method Statement	04 May 2021
Compiled the Method statement as supporting documentation for a Water use licence application	Samancor Chrome Ltd	Tweefontein	Method Statement	04 May 2021
Compiled the Record of Decision report submitted to the DWS in support of a Waste Management Licence	Samancor Chrome Ltd	Lannex	ROD	25 May 2021

Outline	Company	Section	Type	Completion date
Managed the Public participation process and compiled the Public Participation report for the Mooinooi-lEsedi pipeline	Samancor Chrome Ltd	Mooinooi	Public Participation Process	03 May 2021
Conducted monitoring and compiled the water monitoring reports	Sylvania	Lesedi Phoenix TSF	Monitoring report	1) 2021/01 2) 2021/03 (+AR) 3) 2021/04 4) 2021/06
Compiled the water monitoring reports	Phoenix Platinum	Buffelsfontein	Monitoring report	January 2021 March 2021 April 2021 June 2021 July 2021 September 2021 October 2021 December 2021
Reviewed the water monitoring reports	Phoenix Platinum	Buffelsfontein	Monitoring report	February 2021 May 2021 August 2021 November 2021
Compiled the Basic Assessment Report and Environmental Management Programme for the proposed pipeline between Lesedi and Mooinooi Sections	Samancor Chrome Ltd	Mooinooi	BAR/EMPr	03 May 2021
Compiled the Method statement as supporting documentation for a Water use licence application	Samancor Chrome Ltd	Lannex	Method Statement	04 May 2021
Compiled the Method statement as supporting documentation for a Water use licence application	Samancor Chrome Ltd	Tweefontein	Method Statement	04 May 2021
Conducted monitoring and compiled the water monitoring reports	Sylvania	Lesedi Phoenix TSF	Monitoring report	1) 2021/01 2) 2021/03 (+AR) 3) 2021/04 4) 2021/06
Managed the Public participation process and compiled the Public Participation report for the Mooinooi-lEsedi pipeline	Samancor Chrome Ltd	Mooinooi	Public Participation Process	03 May 2021
Compiled the Record of Decision report submitted to the DWS in support of a Waste Management Licence	Samancor Chrome Ltd	Mooinooi	ROD	04 January 2021
Compiled the Record of Decision report submitted to the DWS in support of a Waste Management Licence	Samancor Chrome Ltd	Lannex	ROD	25 May 2021

Outline	Company	Section	Type	Completion date
Compiled the Section 27 motivation for the new Section 21(a) water use licence application	Sylvania	Lesedi Phoenix TSF	Section 27 Motivation	29 September 2021
Updated the Mooinooi IWWMP for the new TSF WULA	Samancor Chrome Ltd	Mooinooi	IWWMP	30 March 2021
Sylvania Lesedi (Phoenix) annual water and salt balance report	Sylvania	Lesedi Phoenix TSF	Water and Salt Balance	27 July 2021
Sylvania Lesedi (Phoenix) annual WCDMP update	Sylvania	Lesedi Phoenix TSF	WCDMP	27 July 2021
Updated the Monitoring programme as part of the WULA	Sylvania	Lesedi Phoenix TSF	Monitoring programme	09 September 2021
Updated the RSIP for the Lesedi section	Sylvania	Lesedi Phoenix TSF	RSIP	29 September 2021
Drafted the WULAR for the Mooinooi - Lesedi Pipeline WUL	Samancor Chrome Ltd	Mooinooi	WULAR	14 October 2021
Compiled the Work method statement for the Mooinooi - Lesedi pipeline	Samancor Chrome Ltd	Mooinooi	Method Statement	20 October 2021
Compiled the Monitoring and Audit plan as supporting documentation for a WULA	Sylvania	Mooinooi	Monitoring and Audit plan	20 October 2021
Compiled the Water balance for the Macarthy WULA	Salene Manganese	Macarthy Mine	Water balance	19 October 2021
Compiled the Annual 2020-2021 Water balance fro Bauba Moeijelijk Chrome Mine	Bauba (sub-contracted by Red Kite)	Moeijelijk	Water balance	12 January 2022
Compiled the Annual 2020-2021 Water balance for Sefateng Chrome Mine	Sefateng (sub-contracted by Red Kite)	Sefateng	Water balance	17 January 2022
Assisted in compiling the EMZ and SEMP for the Capricorn District Municipality	Gudani Consulting	Capricorn EMF	EMZ and SEMP	18 February 2022
Compiling the final EMF for the Capricorn District Municipality	Gudani Consulting	Capricorn EMF	EMF	18 February 2022
Compiling the EMZ and SEMP for the Vhembe District Municipality	Gudani Consulting	Vhembe EMF	EMZ and SEMP	23 February 2022
Compiling the final EMF for the Vhenmbe District Municipality	Gudani Consulting	Vhembe EMF	EMF	11 March 2022

Outline	Company	Section	Type	Completion date
Compiled the Rehabilitation stratfy and implementation for a new water use licence application	Samancor Chrome Ltd	Tweefontein	RSIP	02 April 2021
Compiled the Rehabilitation stratfy and implementation for a new water use licence application	Samancor Chrome Ltd	Lannex	RSIP	01 April 2021
Compiled the Rehabilitation stratfy and implementation for a new water use licence application	Samancor Chrome Ltd	Lesedi/Phoenix	RSIP	18 March 2021
Compiled the Record of Decision report submitted to the DWS in support of a Waste Management Licence	Samancor Chrome Ltd	Tweefontein	ROD	29 September 2021
Compiled the updated water balance for TC Smelters	Samancor Chrome Ltd	TC Smelters	Water Balance	29 October 2021
Conducted a Desktop surface water assessment for a proposed granite mine	Gudani Consulting	Sable Granite	Surface water assessment	04 October 2021
Conducted a Desktop surface water assessment for a proposed cemetary expansion	Gudani Consulting	Vaalwater cemetary	Surface water assessment	25 August 2021
Facilitating the registeration of Waste Water Treatment works	Gudani Consulting	Venetia Mine	WULA	30 November 2021
Compiled the IWWMP for the Macarthy Mine	Salene Manganese	Macarthy Mine	IWWMP	20 December 2021
Compiled the Section 27 motivation for the Macarthy Mine WULA	Salene Manganese	Macarthy Mine	Section 27 Motivation	21 September 2021
Compiled the updated IWWMP for Lannex Section as part of the WULA	Samancor Chrome Ltd	Lannex Section	IWWMP	31 May 2021
Compiled the Method statement as supporting documentation for a Water use licence application	Samancor Chrome Ltd	Lannex Section	Method Statement	09 June 2021
Compiled the Monitoring and Audit plan as supporting documentation for a WULA	Samancor Chrome Ltd	Lannex Section	Monitoring and Audit plan	15 June 2021
Compiled the Water use licence application report for the Lannex section	Samancor Chrome Ltd	Lannex Section	WULAR	24 September 2021
Compiled the EIA/EMP document for the Tweefontein Expansion project	Samancor Chrome Ltd	Tweefontein	EIA/EMP	25 October 2021
Compiled the Section 27 motivation for the Tweefontein WULA	Samancor Chrome Ltd	Tweefontein	Section 27 Motivation	14 June 2021
Compiled the work method statement for Tweefontein Section	Samancor Chrome Ltd	Tweefontein	Work Method Statement	20 May 2021
Compiled the Monitoring and Audit plan as supporting documentation for a WULA	Samancor Chrome Ltd	Tweefontein	Monitoring and Audit plan	20 December 2021
Updated the IWWMP for Lesedi (Phoenix) to be used in new WULA	Sylvania	Lesedi Phoenix TSF	IWWMP	20 October 2021

Appendix 2
Declaration of Independence

Details of Specialist and Declaration of Interest

Specialist:	Prescali Environmental Consultants (Pty) Ltd		
Contact person:	Petro Erasmus		
Postal address:	PO Box 2544, Montana Park		
Postal code:	0159	Cell:	072 237 7305
Telephone:	012 513 3808	Fax:	086 621 0296
E-mail:	petro@prescali.co.za		
Professional affiliation(s) (if any)	SACNASP / EAPASA		
Project Consultant:	Prescali Environmental Consultants (Pty) Ltd		
Contact person:	Elaine van der Linde		
Postal address:	PO Box 2544, Montana Park		
Postal code:	0159	Cell:	082 853 4170
Telephone:	012 513 3808	Fax:	086 621 0294
E-mail:	info@prescali.co.za		

General declaration:
I, Christina Petronella Erasmus, declare that --

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist: _____
Name of company (if applicable): Prescali Environmental Consultants (Pty) Ltd
Date: _____28/09/2022_____

Desktop Terrestrial Ecology Assessment

DESKTOP TERRESTRIAL ECOLOGY ASSESSMENT FOR SYLVANIA NORTHERN MINING (PTY) LTD: PROSPECTING PROJECT

ON VARIOUS FARMS IN THE MOGALAKWENA AND BLOUBERG LOCAL MUNICIPALITIES,

LIMPOPO PROVINCE

SEPTEMBER 2022

Red Kite

Environmental Solutions

Red Kite Environmental Solutions (Pty) Ltd

Tel: 079 555 2433 | Email: nicole@redkiteconsulting.co.za | PostNet Suite 0111, Private Bag X37, Lynnwood Ridge, 0040

Client:

CLIENT:	Prescali Environmental Consultants (Pty) Ltd
Contact:	Elaine van der Linde
Address:	P.O. Box 2544, Montana Park, 0159
Contact number:	012 543 3808
Email:	info@prescali.co.za

Prepared By:

CONSULTANT:	Red Kite Environmental Solutions (Pty) Ltd
Contact:	Nicole Upton
Qualification:	B. Sc. (Hons) Animal, Plant and Environmental Sciences
Address:	PostNet Suite 0111, Private Bag X37, Lynnwood Ridge, 0040
Contact Number:	079 555 2433
Email:	nicole@redkiteconsulting.co.za

Authors:

Nicole Upton	B.Sc. (Hons) Animal, Plant and Environmental Sciences Pri.Sci.Nat (Registration number: 121030)
Corlien Lambrechts	B.Sc. (Hons) Environmental Management, Zoology Pr.Sci.Nat (Registration number: 009135)

Project Reference: RK/2022/SNMTEA/V1

CONFIDENTIALITY:

Executive Summary

Red Kite Environmental Solutions (Pty) Ltd ("Red Kite") was appointed by Prescali Environmental Consultants (Pty) Ltd to conduct a desktop Terrestrial Ecology Assessment for the Sylvania Northern Mining (Pty) Ltd: Prospecting project in the Mogalakwena and Blouberg Local Municipalities of the Limpopo Province.

Sylvania Northern Mining is applying for two Prospecting Rights (LP 14710PR & LP 14728PR) with a combined area of 10 661.07 ha. The preliminary area of disturbance has been estimated as a total of 3 050 m^2 (0.3 ha).

No site survey was conducted to verify or dispute any findings related to the desktop assessment.

Information on plant species previously recorded for the project area was extracted from the POSA online database hosted by SANBI. The results indicate that 78 plant species have been recorded in the area queried:

- None of the species previously recorded for the area are Species of Conservation Concern (SCC) in terms of their Red List status. Furthermore, the Environmental Screening Tool Report for the project area does not list any SCC. The aforementioned is supported by the findings of previous ecology assessments undertaken on the project area.
- None of the flora species recorded on POSA for the area are listed as protected in the LEMA.
- Four protected species, in terms of the NFA, may occur on the project area, namely:
  - *Boscia albitrunca* (Shepherd's tree)
  - *Combretum imberbe* (Leadwood)
  - *Sclerocarya birrea* (Marula)
  - *Vachellia erioloba* (Camel thorn)

A desktop study was conducted to establish whether any potentially sensitive faunal species or species of conservation concern may possibly occur on site. The following summary of findings are relevant to the development:

- Mammals: one (1) mammal species was found to possibly occur, which is a provincial SCC and listed nationally within TOPS 2007, while two (2) additional SCC were listed by the Screening Tool Report for the project.
- Avifaunal: 168 bird species were found to possibly occur, with eight (8) avifaunal species indicated as SCC.
- Butterflies: Thirteen (13) butterfly species were found to occur, all of which were categorized as LC.
- Other Invertebrates: Three (3) Dungbeetle species were shown to occur for the QDS, all noted as LC.
- Reptiles: 36 reptile species were recorded for the QDS, of which three are SCC.
- Amphibians: Nine (9) amphibian species were reported, of which one (1) is listed within TOPS 2007.

The majority of the project footprint lies within the Makhado Sweet Bushveld and a small section on the north-western most border of the PR area is located in the Roodeberg Bushveld. The Makhado Sweet Bushveld and Roodeberg Bushveld are not listed in the "National List of Ecosystems that are Threatened and need of protection", and as Least Concern by the 2018 National Biodiversity Assessment.

The Prospecting Right areas contains the following classes from the LCP and District Bioregional Plans: CBA1, CBA2, ESA1, ESA2, NNR and ONA. However, the majority of the proposed target areas are located in areas categorised as ONA and NNR. Limited sections of the target area on the farm Altona 696 is located on areas categorised as CBA2 and ESA2.

The north-eastern section of the Prospecting Right area is located in the transition zone of the Vhembe Biosphere Reserve.

From satellite imagery of the Prospecting Right areas the following impacts are apparent:

- Numerous dirt roads. Impacts from human and vehicle movement on these roads are expected.
- Extensive dryland crop farming has taken place on the Prospecting Right area.
- A number of villages and residences are located on and adjacent to the Prospecting Right area.

- Heavy livestock grazing and wood harvesting is expected, as reported in previous ecological studies conducted on the study area.
- Exotic and Alien Invasive Plant species proliferation is expected, as reported in previous ecological studies conducted on the study area.

Various non-perennial tributaries of the Matlalane River and Seepabana River are located on the Prospecting Right areas. However, the layout of the prospecting target areas appear to have been designed to avoid most of these non-perennial tributaries.

The southern section of the Prospecting Right area is located in an area designated as a Phase 2 and the northern section is located in an area designated as an Upstream FEPA.

Based on the desktop assessment findings, the Terrestrial Ecology sensitivity is considered as follows:

- All untransformed areas indicated as Critical Biodiversity Areas are considered high sensitivity.
- All watercourses and their associated riparian zones are considered high sensitivity.
- The remainder of the Prospecting Right area is considered low sensitivity.

Sensitive watercourse and their associated riparian vegetation habitat constitute the most important features which make up the area identified as increased sensitivity.

It is the reasoned opinion of the specialist that the development may continue if all recommended mitigation measures are implemented from the onset of the development.

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Abbreviations

AIP	Alien Invasive Plant
ADU	Animal Demographic Unit
CBA	Critical Biodiversity Area
CITES	Convention on International Trade in Endangered Species
DFFE	Department of Forestry, Fisheries and the Environment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESA	Ecological Support Area
FEPA	Freshwater Ecosystem Priority Area
IBA	Important Birding and Biodiversity Area
IDP	Integrated Development Plan
IUCN	International Union for Conservation of Nature and Natural Resources
LC	Least Concern
LCP	Limpopo Conservation Plan
LEMA	Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003)
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
NFA	National Forests Act, 1998 (Act No. 84 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NPAES	National Protected Area Expansion Strategy
POSA	Plants of Southern Africa
QDS	Quarter Degree Squares
SABAP2	South African Bird Atlas Project 2
SABCA	South African Butterfly Conservation Assessment
SACAD	South African Conservation Areas Database
SANBI	South African National Biodiversity Institute
SAPAD	South African Protected Areas Database
SARCA	South African Reptile Conservation Assessment
SCC	Species of Conservation Concern
ToPS	Threatened and Protected Species List (2007) as part of the National Environmental Management: Biodiversity Act (Act 10 of 2004)
VU	Vegetation Unit

Declaration of Independence

I, Nicole Upton, declare that -

- I act as the independent specialist;
- I will perform the work relating to the project in an objective manner, even if this results in views and findings that are not favourable to the project proponent;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this project, including knowledge of the National Environmental Management Act, 1998 (Act No. 107 of 1998; the Act), regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in Regulation 8;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the project proponent and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the project; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority or project proponent;
- All the particulars furnished by me in this document are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Signature of Specialist	
Name of Company	Red Kite Environmental Solutions (Pty) Ltd (“Red Kite”)
Date	29/09/2022

I, Corlien Lambrechts, declare that -

- I act as the independent specialist;
- I will perform the work relating to the project in an objective manner, even if this results in views and findings that are not favourable to the project proponent;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this project, including knowledge of the National Environmental Management Act, 1998 (Act No. 107 of 1998; the Act), regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
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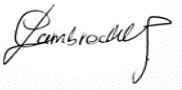
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the project proponent and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the project; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority or project proponent;
- All the particulars furnished by me in this document are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Signature of Specialist	
Name of Company	External for Red Kite Environmental Solutions (Pty) Ltd (“Red Kite”)
Date	29/09/2022

1. INTRODUCTION

Red Kite Environmental Solutions (Pty) Ltd ("Red Kite") was appointed by Prescali Environmental Consultants (Pty) Ltd to conduct a desktop Terrestrial Ecology Assessment for the Sylvania Northern Mining (Pty) Ltd: Prospecting project in the Mogalakwena and Blouberg Local Municipalities of the Limpopo Province.

Sylvania Northern Mining is applying for two Prospecting Rights over the following farm portions:

Prospecting Right LP30/5/1/1 /2/14710PR	Prospecting Right LP30/5/1/1/2/14728PR
Aurora 397 LR Nonnenworth 421 LR remaining extent Non Plus Ultra 683 LR Altona 696 LR Teneriffe 682 LR	Schaffhausen 689 LR portion 2

The combined Prospecting Right areas are 10 661.07 Ha in extent.

The following invasive activities are proposed as part of the prospecting project:

- **Ground geophysics and soil geochemical sampling:**
- **Trenching:** Eight short (25x2x2m) trenches will be excavated over the outcrop positions of the defined orebodies. Upon completion trenches will be refilled. During the trenching and mapping, temporary barriers will be erected around the excavation to prevent people/animals from falling into the trenches.
- **Resource drilling:** Drilling (diamond or RC) of the prospective areas. It is anticipated that initially approximately 4 drill holes will be drilled. Drill holes could vary in depth from 150 to 350m, with an average depth of 250 meters. Depending on the results of this drilling further 1 drill hole may be required.

Activities	Prospecting Right: LP30/5/1/1 /2/14710PR	Prospecting Right: LP30/5/1/1/2/14728PR
Drill Site	10m x 10m Drill Sites 1 Drill site= 100 m^2 Total Drill Site Areas: (6) = 600 m^2	10 m x 10 m drill sites 1 drill site= 100 m^2 Total Drill Site Areas: (4) = 400 m^2
Trenching	25m x 2m x 2m Trench Sites 1 Trench = 50 m^2 Total Trench Areas (25) = 1 250 m^2	25m x 2m x 2m Trench Sites 1 Trench = 50 m^2 Total Trench Areas: (8) = 400 m^2
Contractor's camp	N/A	400 m^2
Rehabilitation and Closure	1 850 m^2	1 200 m^2

As per the table above, the preliminary area of disturbance has been estimated as a total of 3 050 m^2 (0.3 ha).

The objectives of the fauna and flora assessment include:

- Identify sensitive areas and species that should be avoided during the proposed development.
- Make use of the South African Biodiversity Institute Database to obtain specialised information and previous surveys within the area.
- Summarise legislation pertaining to the project with regard to biodiversity.
- Highlight major concern or fatal flaws of the project with regard to biodiversity.
- Provide relevant mitigations and recommendations to the developer to help limit and minimise the impacts they may have on the fauna and flora of the area.

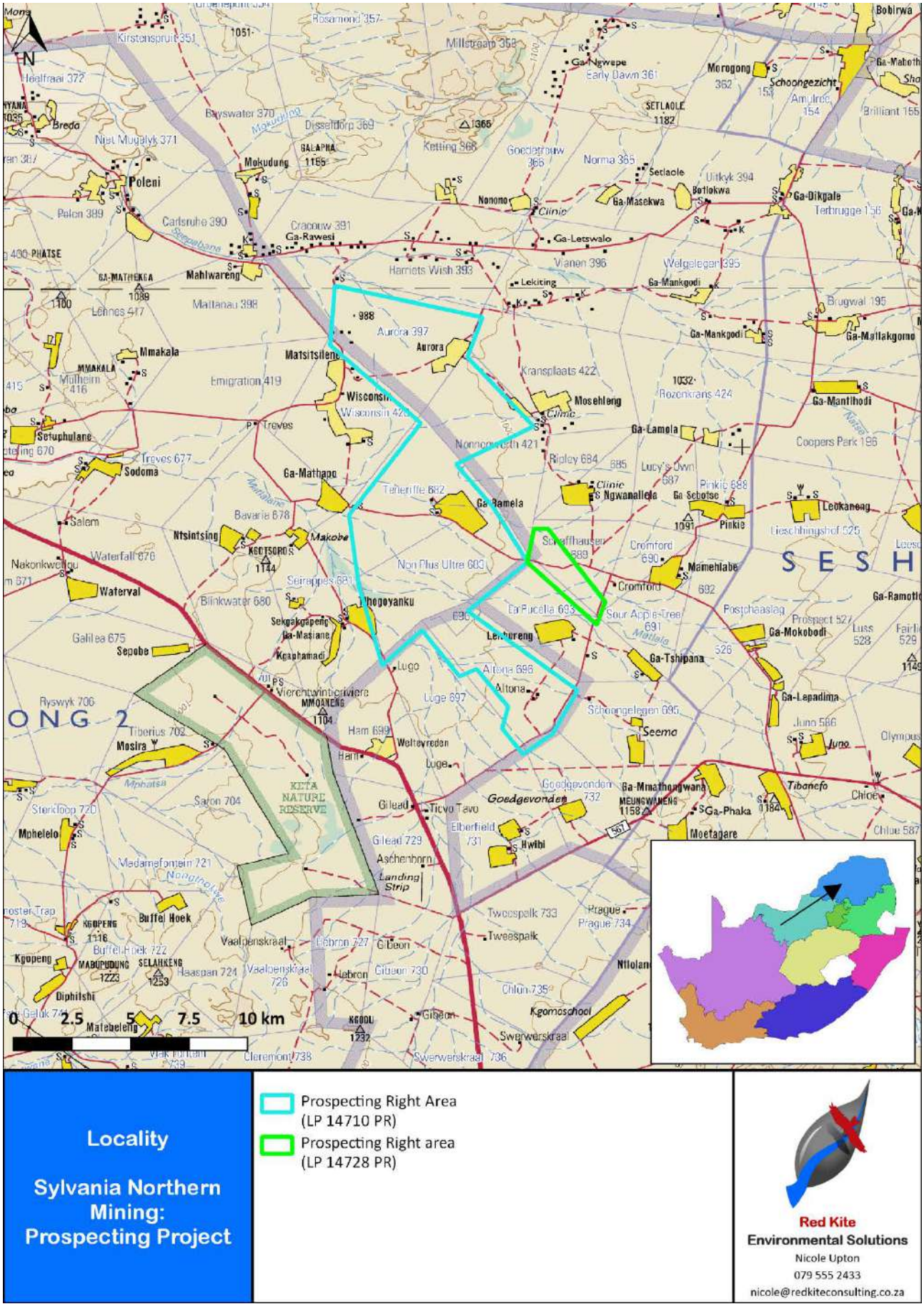


Figure 1: Locality of the proposed Prospecting Right areas

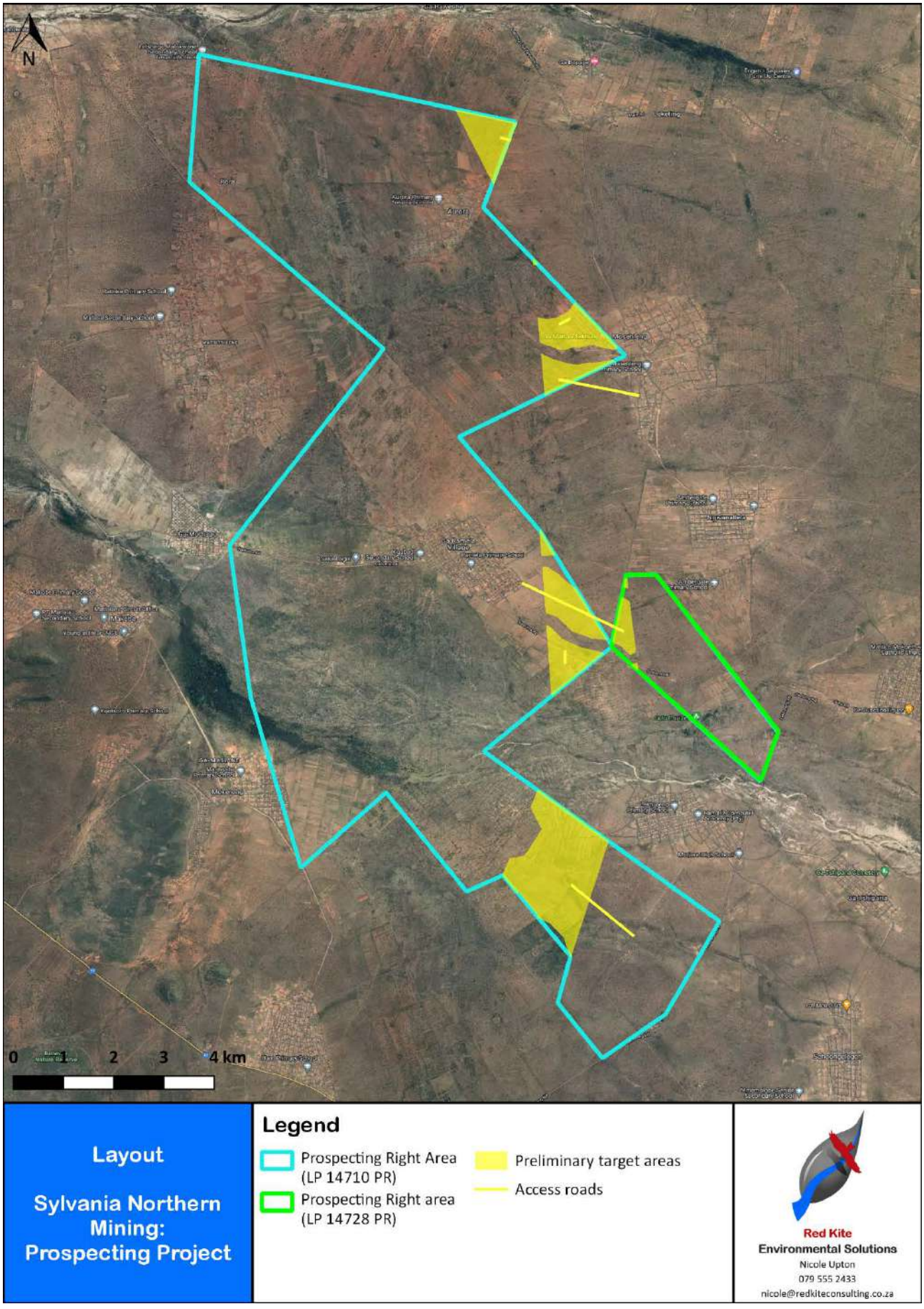


Figure 2: Proposed preliminary prospecting target areas

2. SCOPE OF THE STUDY

Red Kite Environmental Solutions was appointed to conduct a Desktop Terrestrial Ecology Assessment as one of the specialist studies for the Environmental Authorisation process for the project. This Terrestrial Ecology Assessment consist of a desktop study, which includes the following:

- A desktop vegetation study, which included:
    - Classification of the main biome and description of the dominant vegetation type;
    - Investigation of the dominant indigenous species within this region;
    - Listing the endemic species;
    - Listing species of conservation concern; and
    - Determining the medicinal species.

- A desktop invertebrate and mammal study, which included determining the:
    - Endemic species;
    - Baseline occurrences of species within the area;
    - Virtual Museum and Animal Demographic Unit consultation; and
    - Listing species of conservation concern.

No field assessment was conducted to verify or dispute the findings as obtained during the desktop assessment.

The information from the desktop study was used to report on the following:

- General description of the biodiversity components in the study area;
- Description and mapping of the broad vegetation types identified in the study area
- Identify sensitive areas and species that should be avoided by the proposed development.
- Make use of the South African Biodiversity Institute Database to obtain specialised information and previous surveys within the area.
- Summarise legislation pertaining to the project with regard to biodiversity.
- Highlight major concern or fatal flaws of the project with regard to biodiversity.
- Identify potential impacts to terrestrial ecology aspects and determine the potential significance of these impacts.
- Provide relevant mitigations and recommendations to limit and minimise the impacts the activities may have on the fauna and flora of the area.

3. LEGISLATION

The aim of this component of the report is to provide a brief overview of the pertinent policies, as well as legal and administrative requirements applicable to biodiversity aspects of the proposed development.

3.1. The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)

The NEMA is the statutory framework to enforce Section 24 of the Constitution of the Republic of South Africa. The Act aids in providing for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for co-ordinating environmental functions exercised by organs of state. The Act also provides for certain aspects of the administration and enforcement of other environmental management laws and matters connected therewith.

This Act embraces all three fields of environmental concern namely:

i) resource conservation and exploitation;
ii) pollution control and waste management; and
iii) land use planning and development.

3.1.1. National Environmental Management Biodiversity Act (Act No. 10 0f 2004) (NEMBA)

The following aspects of the NEMBA are important to consider in the compilation of an ecological report:

- Lists of ecosystems that are threatened or in need of national protection;
- Links to Integrated Environmental Management processes;
- Must be taken into account in Environmental Management Plans (EMP) and Integrated Development Plans (IDPs);
- The Minister may make regulations to reduce the threats to listed ecosystems.

- ***Threatened or Protected Species List (ToPS List) – Government Gazette Notice No. 151 of 2007***
  "National Environmental Management: Biodiversity Act, 2004 (Act No. 10 Of 2004): Publication of Lists of Critically Endangered, Endangered, Vulnerable and Protected Species"

  The status provided by the Government Gazette in terms of Notice 151 implies:
  - Critically endangered: Section 56(1)(a) applies to the species awarded this status in terms of NEMBA, meaning: *"Critically endangered species, being any indigenous species facing an extremely high risk of extinction in the wild in the immediate future"*
  - Endangered species: Section 56(1)(b) applies to the species awarded this status in terms of NEMBA, meaning: *"Endangered species, being any indigenous species facing a high risk of extinction in the wild in the near future, although they are not a critically endangered species"*
  - Vulnerable species: Section 56(1)(c) applies to the species awarded this status in terms of NEMBA, meaning: *"Vulnerable species, being any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future, although they are not a critically endangered species or an endangered species"*
  - Protected species: Section 56(1)(d) applies to the species awarded this status in terms of NEMBA, meaning: *"Protected species, being any species, which are of such high conservation value or national importance that they require national protection, although they are not listed in terms of paragraph (a), (b) or (c)"*

- ***Alien and Invasive Species List - Government Gazette Notice No. 598 of 2014 [as amended]***
  The Department of Forestry, Fisheries and Environment (DFFE) manages Invasive Alien Species (IAS) under the NEMBA.

  The four different categories that NEMBA classify AIPs under are:
  - Category 1a: A person in control of a Category 1a Listed Invasive Species must immediately take steps to combat or eradicate listed invasive species and officials from the DEFF must be allowed access to monitor or assist with control. If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.
  - Category 1b: A person in control of a Category 1b Listed Invasive Species must control the listed invasive species. If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme. The Minister may require any person to develop a Category 1b Control Plan for one or more Category 1b species. Officials from the DFFE must be allowed access to monitor or assist with control.
  - Category 2: These are invasive species that can remain in your garden, but only with a permit. A person in control of a Category 2 Listed Invasive Species, or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit. Any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area (permit) must, for purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed accordingly.
  - Category 3: These are invasive species that can remain on your property. However, you cannot propagate or sell these species and must control them in your garden. In riparian zones or wetlands all category 3 plants become category 1b plants.

- ***National List of Ecosystems that are threatened and in need of protection - Government Gazette Notice No. 1002 of 2011***
  The National Environmental Management Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing of threatened or protected ecosystems, in one of four categories:
  - Critically Endangered: these have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;
  - Endangered: these have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;
  - Vulnerable: these have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; or
  - Protected: these have a high conservation value or of high national or provincial importance, although they are not listed as critically endangered, endangered or vulnerable.

Threatened ecosystems are listed in order to reduce the rate of ecosystem and species extinction by preventing further degradation and loss of structure, function and composition of threatened ecosystems. The purpose of listing protected ecosystems is primarily to conserve sites of exceptionally high conservation value (SANBI, BGIS).

3.2. The National Forest Act, 1998 (Act No. 84 of 1998) (NFA)

The National Forests Act:

- Promotes the sustainable management and development of forests for the benefit of all;
- Creates the conditions necessary to restructure forestry in State Forests;
- Provide special measures for the protection of certain forests and protected trees;
- Promotes the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes; and
- Promotes community forestry.

In terms of the NFA, forest trees or protected tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold – except under license granted by the Department of Forestry, Fisheries and Environment (DFFE).

The list of protected trees has been published in terms of Section 12 (1) (d) of the NFA, in Government Gazette No. 536 of 2018.

3.3. Focus Areas for Protected Area Expansion – NPAES (2008)

The goal of the National Protected Area Expansion Strategy (NPAES) is to achieve cost effective protected area expansion for ecological sustainability and adaptation to climate change. The NPAES sets targets for protected area expansion, provides maps of the most important areas for protected area expansion, and makes recommendations on mechanisms for protected area expansion. It deals with land-based and marine protected areas across all of South Africa's territory (SANBI, BGIS).

3.4. National Biodiversity Assessment (NBA; 2018)

The National Biodiversity Assessment (NBA) is the primary tool for monitoring and reporting on the state of biodiversity in South Africa and is prepared as part of the SANBI mandate under the National Environmental Management: Biodiversity Act (Act 10 of 2004). It is used to inform policies, strategies and actions in a range of sectors for managing and conserving biodiversity more effectively.

The NBA focusses primarily on assessing biodiversity at the ecosystem and species level, and the two headline indicators of threat status and protection level are applied to both ecosystems and species in the four realms (terrestrial, inland aquatic, estuarine and marine) and in two cross-realm areas (the coast and South Africa's sub-Antarctic territory). These established headline indicators provide a way of comparing results meaningfully across the realms, and a standardised framework that links with policy and legislation in South Africa to facilitate an effective interface between science and policy. Underlying the headline indicators is a wealth of geographically detailed information that can be applied at the provincial and local level.

The latest NBA (NBA 2018) was released in October 2019 and builds on the National Spatial Biodiversity Assessment 2004 and the NBA 2011.

3.5. Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003) (LEMA)

The objectives of this Act are:

- to manage and protect the environment in the Province;
- to secure ecologically sustainable development and responsible use of natural resources in the Province;
- generally, to contribute to the progressive realisation of the fundamental rights contained in section 24 of the Constitution of the Republic of South Africa Act, 1996 (Act No. 108 of 1996), and
- to give effect to international agreements effecting environmental management which are binding on the Province.

The LEMA deals with the conservation of wild animals, fresh water fish and the conservation and protection of flora in the Limpopo Province. Animals and plants are both listed in the schedules with different degrees of protection afforded to each. The LEMA (2003) contains schedules of specially protected Wild animals (Schedule 2), Protected Wild Animals (Schedule 3), specially protected plants (Schedule 11) and protected plants (Schedule 12).

This Act must be interpreted and applied in accordance with the national environmental management principles set out in Section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

4. METHODS AND APPROACH

This report is based on a literature review and GIS analysis of the proposed development. The literature review included scientific and popular publications on related aspects for the area. Internet searches for ecological issues in the area and Red Data plant and animal species were performed. The Google search engine was used for information pertaining to Red Data flora and fauna and their habitat preferences.

A baseline assessment was conducted to establish whether any potentially sensitive species/receptors might occur on site. The South African National Biodiversity Institute's (SANBI) online biodiversity tool and the Virtual Museum and Animal Demography Unit (ADU) was used to query species lists for the project area.

The National Web Based Environmental Screening Tool, hosted by the Department of Forestry, Fisheries and Environment, was also used to determine geographically based sensitivity information in terms of terrestrial ecology, and animal and plant species themes, including potential sensitive species associated with the region.

Aerial photographs and satellite imagery were used to delineate potential sensitive habitat types and these were used as suitable method to identify sensitive areas at a desktop level.

No field survey was conducted for the assessment and all results given within this document is based on desktop findings and assessments. A field assessment is recommended to assess the habitat conditions and to ascertain whether any SCC occur on the project footprint before construction begins.

4.1. Data Sourcing

The data sources consulted and used where necessary in the study includes the following:

- Vegetation types and their conservation status were extracted from the South African National Vegetation Map (Mucina and Rutherford 2006) (updated 2018).
- Information on plant species recorded for the project area was extracted from the Plants of Southern Africa (POSA) database hosted by SANBI. The area queried is a much larger extent than the study area to account for the fact that the area has probably not been well sampled in the past.
- The IUCN conservation status of the species recorded for the area queries on POSA was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants.
- Threatened Ecosystem data was extracted from the NEM:BA listed ecosystems layer (2011 and 2018).
- Information on Critical Biodiversity Areas (CBA) was extracted from the Limpopo Conservation Plan (2018) and the Waterberg Bioregional Plan (2019).
- Protected areas expansion areas were extracted from the National Protected Areas Expansion Strategy 2008 (NPAES).
- Protected Areas, in terms of the NEMPAA, was extracted from the DFFE Protected Areas Register (2022).
- South African Conservation Areas were sourced from the DFFE database (2022).
- Important Bird and Biodiversity Areas (2015) were sourced from SANBI.
- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and various spatial databases (SANBI's SIBIS and BGIS databases).
- Bird species lists for the area were extracted from the SABAP 1 and SABAP 2 databases and Birdlife South Africa's Important Bird Areas was also consulted to ascertain if the site falls within the range of any range-restricted or globally threatened species.
- The faunal species lists provided are based on species which are known to occur in the broad geographical area.
- The conservation status of each species is also listed, based on the latest IUCN Red List Categories and Criteria and where species have not been assessed under these criteria, the CITES status is reported where possible.

4.2. Limitations and Assumptions

The desktop study was conducted with up to date resources. It might however be possible that additional information become available in time, because environmental impact assessments deal with dynamic natural ecosystems. It is therefore important that the report be viewed and acted upon with these limitations in mind.

No field survey was conducted for the assessment and all results given within this document are based on desktop findings and assessments. Therefore, the results, typical flora, herpetofauna, avifauna and mammalian communities found within the study should/can therefore only be used as a general guideline.

The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

5. FLORA

5.1. Biomes

The project area is located in the Savanna biome.

The Savanna Biome is the largest biome in South Africa, covering 46% of the country (Low & Rebelo, 1996). Savanna stretches from the Kalahari in the north-west across to the lowveld in the north-east and southwards to the lowlands of KwaZulu Natal and the Eastern Cape.

The Savanna biome is characterised by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground the vegetation may be referred to as Shrubveld, where it is dense as Woodland, and the intermediate stages are locally known as Bushveld (Low & Rebelo, 1996).

The environmental factors delimiting the biome are complex: altitude ranges from sea level to 2 000 m; rainfall varies from 235 to 1 000 mm per year; frost may occur from 0 to 120 days per year; and almost every major geological and soil type occurs within the biome. A major factor delimiting the biome is the lack of sufficient rainfall which prevents the upper layer from dominating, coupled with fires and grazing, which keep the grass layer dominant. Summer rainfall is essential for the grass dominance, which, with its fine material, fuels near-annual fires. In fact, almost all species are adapted to survive fires, usually with less than 10% of plants, both in the grass and tree layer, killed by fire. Even with severe burning, most species can resprout from the stem bases (Low & Rebelo, 1996).

5.2. Vegetation Types

According to SANBI (2006 – 2018), the majority of the project footprint lies within the Makhado Sweet Bushveld (SVcb20) and a small section on the north-western most border of the PR area is located in the Roodeberg Bushveld (SVcb18). A description of the vegetation types, extracted from the CD accompanying Mucina & Rutherford (2006), is presented below.

5.2.1. Makhado Sweet Bushveld

The Makhado Sweet Bushveld vegetation type is found in the Limpopo Province and occurs on the plains south of the Soutpansberg, east of the Waterberg and on the apron surrounding the Blouberg and Lerataupje Mountains, and north of the Polokwane Plateau and west of the escarpment, with extensions to Mokopane to the south and to the north near Vivo. The vegetation type is found on slightly to moderately undulating plains sloping generally down to the north, with some hills in the southwest. Makhado Sweet Bushveld is characterised by short and shrubby bushveld with a poorly developed grass layer.

A list of expected common and dominant species in undisturbed vegetation includes the following (those with a "d" are considered to be dominant) (Mucina and Rutherford, 2006):

- **Trees:** *Senegalia erubescens* (d), *Vachellia gerrardii* (d), *Senegalia mellifera* subsp. *detinens* (d), *Vachellia rehmanniana* (d), *Boscia albitrunca* (d), *Combretum apiculatum* (d), *Vachellia tortilis* subsp. *heteracantha*, *Terminalia sericea*.
- **Shrubs:** *Commiphora pyracanthoides*, *Dichrostachys cinerea*, *Grewia flava*, *Hibiscus calyphyllus*, *Lycium shawii*, *Rhigozum obovatum*, *Barleria lancifolia*, *Hirpicium bechuanense*, *Indigofera poliotes*, *Melhania rehmannii*, *Pechuel-Loeschea leubnitziae*.
- **Graminoids:** *Anthephora pubescens* (d), *Aristida stipitata* subsp. *graciliflora* (d), *Cenchrus ciliaris* (d), *Enneapogon scoparius* (d), *Brachiaria nigropedata*, *Eragrostis trichophora*, *Panicum coloratum*, *P. maximum*, *Schmidtia pappophoroides*, *Urochloa mosambicensis*.

- **Herbs:** *Chamaecrista absus*, *Corbichonia decumbens*, *Geigeria acaulis*, *Harpagophytum procumbens* subsp. *transvaalense*, *Heliotropium steudneri*, *Hemizygia elliottii*, *Hermbstaedtia odorata*, *Leucas sexdentata*, *Osteospermum muricatum*, *Tephrosia purpurea* subsp. *leptostachya*.

5.2.2. Roodeberg Bushveld

The Roodeberg Bushveld vegetation type is located in the Limpopo Province, straddling the Tropic of Capricorn. The vegetation type occurs from Marken and Villa Nora in the south through Baltimore to near Swartwater in the north and to the plains around the base of the Blouberg and Lerataupje Mountains in the northeast. The vegetation type is characterised by plains and slightly undulating plains, including some low hills, with short, closed woodland to tall open woodland and poorly developed grass layer.

A list of expected common and dominant species in undisturbed vegetation includes the following (those with a "d" are considered to be dominant) (Mucina and Rutherford, 2006):

- **Trees**: *Senegalia burkei* (d), *S. nigrescens* (d), *Vachellia robusta* (d), *V. erioloba*, *Sclerocarya birrea* subsp. *caffra, Senegalia erubescens* (d), *S. mellifera* subsp. *detinens* (d), *Vachellia nilotica* (d), *V. tortilis* subsp. *heteracantha* (d), *Combretum apiculatum* (d), *Kirkia acuminata* (d), *Vachellia grandicornuta*, *V. luederitzii* var. *retinens*, *Senegalia senegal* var. *leiorhachis*, *Albizia harveyi*, *Combretum imberbe*, *Commiphora mollis*, *Searsia lancea*, *Terminalia sericea*, *Ziziphus mucronata*.
- **Shrubs**: *Dichrostachys cinerea* (d), *Grewia flava* (d), *Euclea crispa* subsp. *crispa*, *E. undulata*, *Grewia monticola*, *Hibiscus micranthus, Commiphora africana*, *Melhania acuminata*, *Sida cordifolia*, *Solanum delagoense*.
- **Graminoids**: *Aristida canescens* (d), *Chloris virgata* (d), *Digitaria eriantha* subsp. *eriantha* (d), *Enneapogon cenchroides* (d), *Eragrostis rigidior* (d), *Panicum maximum* (d), *Urochloa mosambicensis* (d), *Aristida congesta*, *Brachiaria deflexa*, *Cymbopogon pospischilii*, *Cynodon dactylon*, *Eragrostis rotifer*.
- **Herbs**: *Achyranthes aspera*, *Corbichonia decumbens*, *Hemizygia elliottii*, *Kyphocarpa angustifolia*, *Seddera capensis*, *Tephrosia purpurea* subsp. *leptostachya*, *Waltheria indica*.

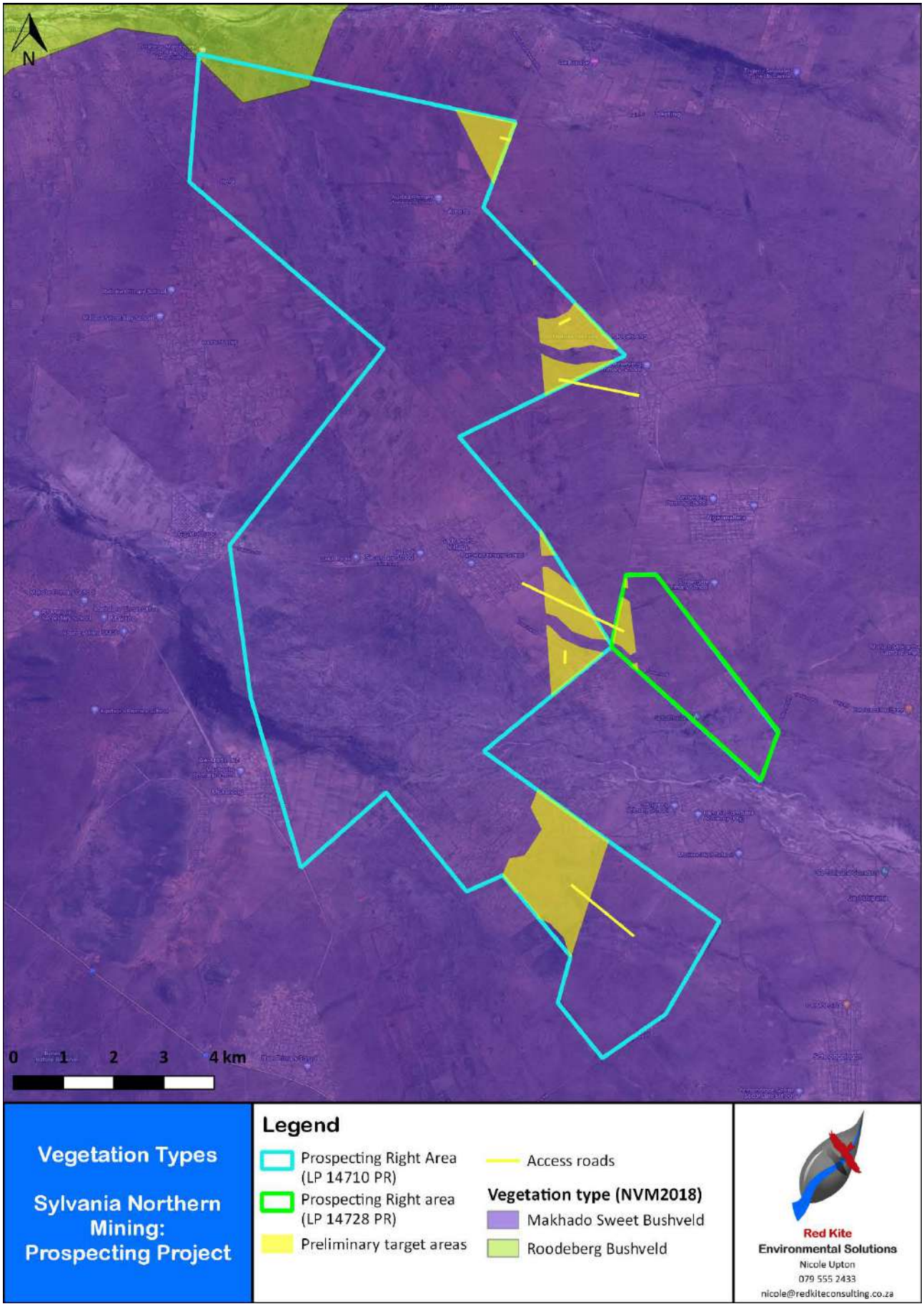


Figure 3: Vegetation types of the study site

5.3. Conservation Status

The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under NEMBA (Section 3.1.1), lists national vegetation types that are afforded protection on the basis of rates of transformation. The Makhado Sweet Bushveld and Roodeberg Bushveld are not listed in the "National List of Ecosystems that are Threatened and need of protection", and as Least Concern by the 2018 National Biodiversity Assessment.

There is one main conservation management plan for the province, namely the Limpopo Conservation Plan (LCP) (LCPv2, 2013). The LCP comprises two spatial components: maps of terrestrial and freshwater critical biodiversity areas (CBAs); and a set of land-use guidelines that are important for maintaining and supporting the inherent biodiversity values of these critical biodiversity areas. The LCP has been updated consecutively and individually for the Waterberg (2015), Mopani (2016), Vhembe (2017), Sekhukhune (2018) and Capricorn (2018) district municipalities as part the compilation of bioregional plans for these municipalities. Each bioregional plan produced an updated CBA map for the district.

Protection of the priority areas identified in the LCP and bioregional plans would contribute to meeting national biodiversity targets for the South African vegetation types.

- **Critical Biodiversity Areas (1) (CBA1):** Irreplaceable Sites. Areas required to meet biodiversity pattern and/or ecological processes targets. No alternative Sites are Available to Meet targets. Maintain In a natural state with limited or no biodiversity loss. Rehabilitate degraded areas to a natural or near natural state, and manage for no further degradation.
- **Critical Biodiversity Area (2) (CBA2):** Best Design Selected Sites. Areas selected to meet biodiversity pattern and/or ecological process targets. Alternative sites may be available to meet targets. Maintain in a natural state with limited or no biodiversity loss. Maintain current agricultural activities. Ensure that land use is not intensified and that activities are managed to minimize impact on threatened species.
- **Ecological Support Areas (1) (ESA1):** Natural, Near natural and degraded areas supporting CBAs by maintaining Ecological processes. Maintain ecosystem functionality and connectivity allowing for limited loss of biodiversity pattern.
- **Ecological Support Areas (2) (ESA2):** Areas with no natural habitat that is important for supporting ecological processes. Avoid additional / new impacts on ecological processes.
- **Other Natural Areas (ONA):** Natural and intact but not required to meet targets, or identified as CBA or ESA. No management objectives, land management recommendations or land-use guidelines are prescribed.
- **No natural habitat remaining:** Areas with no significant direct biodiversity value. Not Natural or degraded natural areas that are not required as ESA, including intensive agriculture, urban, industry; and human infrastructure. No management objectives, land management recommendations or land-use guidelines are prescribed.

The Prospecting Right areas contains the following classes from the LCP and District Bioregional Plans: CBA1, CBA2, ESA1, ESA2, NNR and ONA. However, the majority of the proposed target areas are located in area categorised as ONA & NNR. Limited sections of the target area on the farm Altona 696 is located on areas categorised as CBA2 and ESA2.

No Protected Areas, in terms of NEMPAA, are located within 10 km of the project area.

The Limpopo Central Bushveld NPAES is located approximately 7.4 km south-west of the project area.

The north-eastern section of the Prospecting Right area is located in the transition zone of the Vhembe Biosphere Reserve.

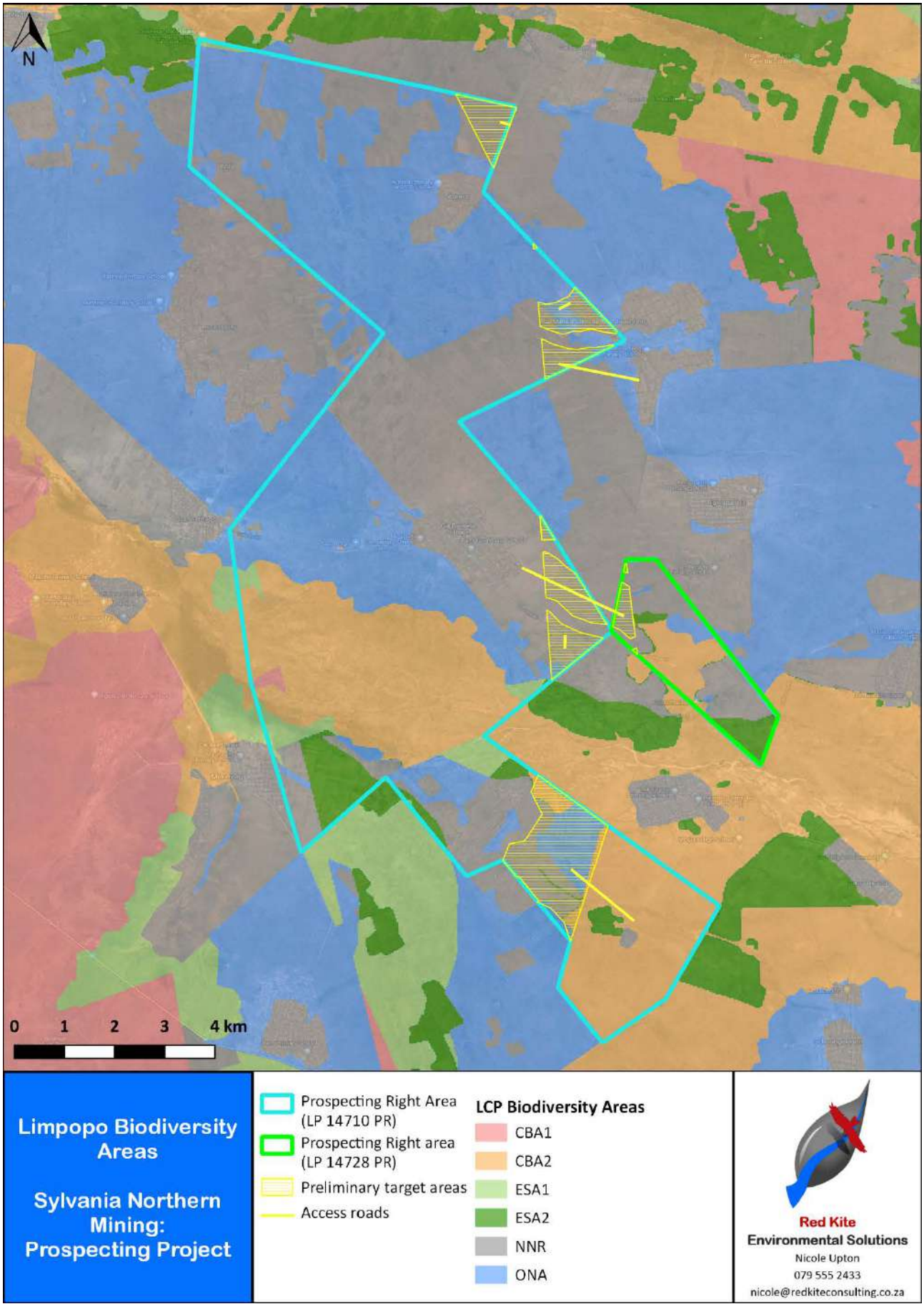


Figure 4: Limpopo Conservation Plan (V2) Biodiversity areas on the project area

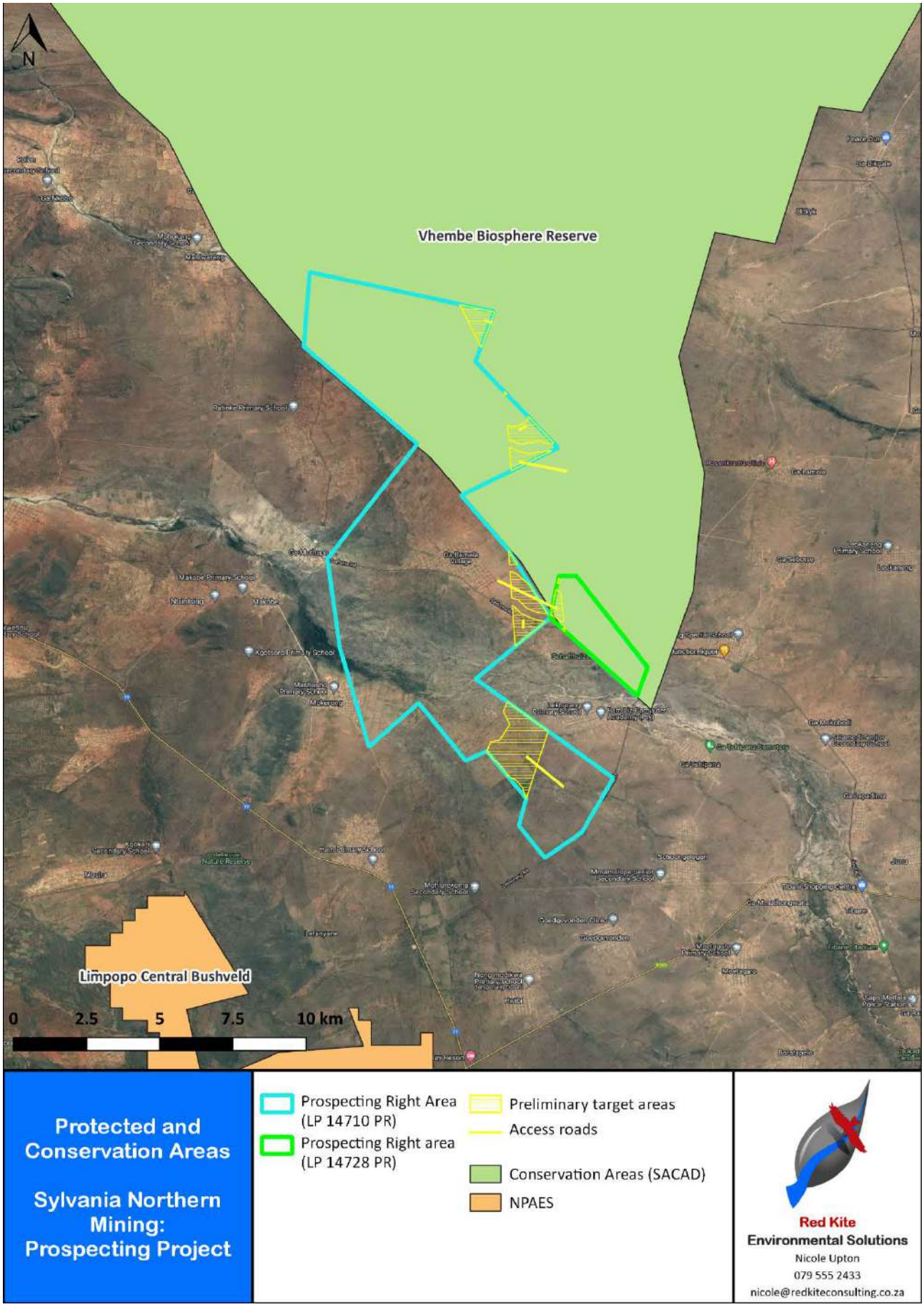


Figure 5: Protected and conservation areas

The southern section of the Prospecting Right area is located in an area designated as a Phase 2 and the northern section is located in an area designated as an Upstream FEPA.

The project area is not located in a Strategic Water Source Area (SWSA).

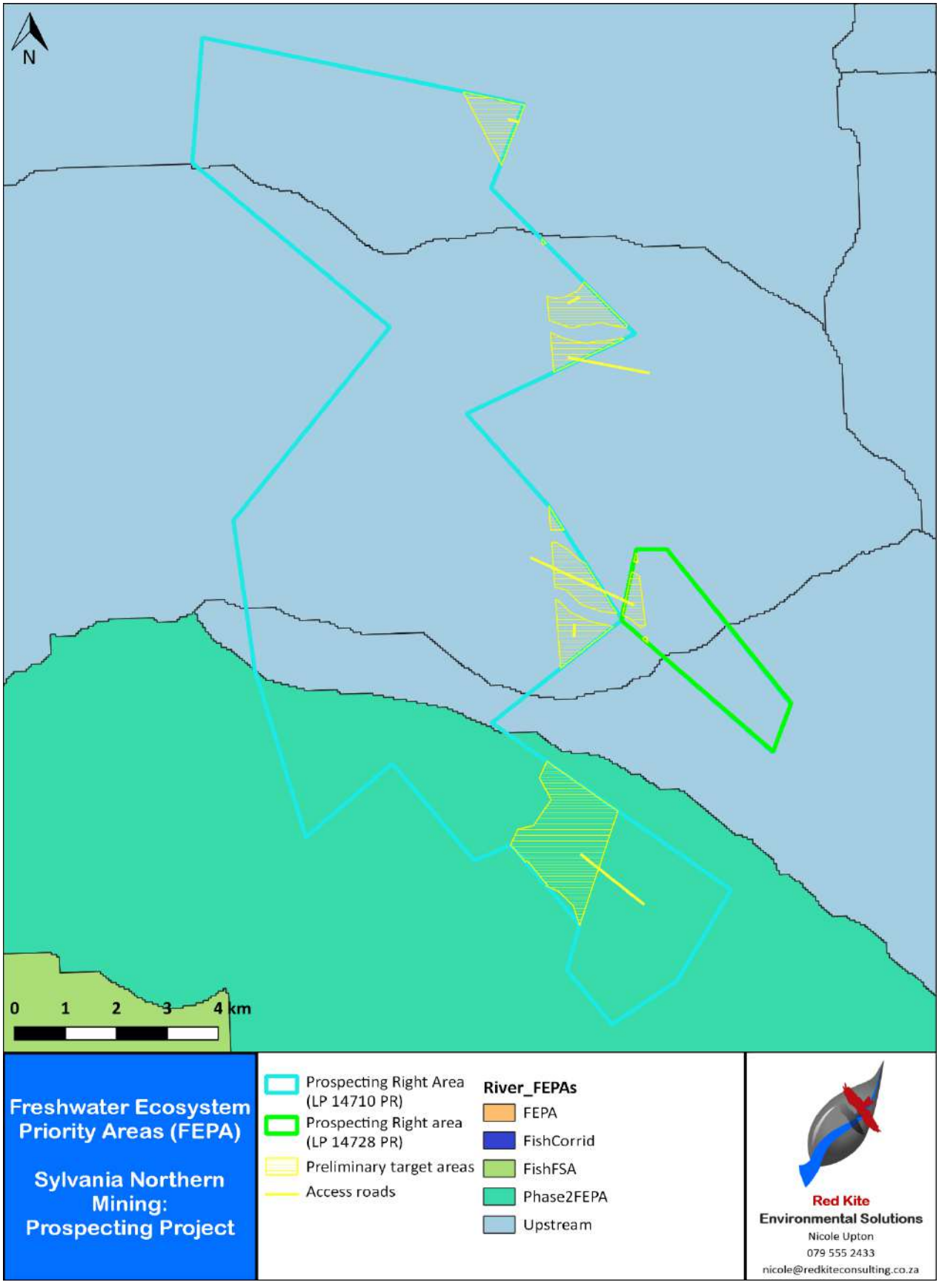


Figure 6: FEPA located on project area

5.4. POSA Plant Species

Information on plant species previously recorded for the project area was extracted from the POSA online database hosted by SANBI. A list of plant species that have previously been recorded in the project area is provided in Appendix C. The results indicate that 78 plant species have been recorded in the area queried, consisting of 13 families. The most prominent family is Poaceae, with 60 species.

Of the 78 species previously recorded for the area, none are Species of Conservation Concern (SCC) in terms of their Red List status. Furthermore, the Environmental Screening Tool Report for the project area does not list any SCC. The aforementioned is supported by the findings of previous ecology assessments undertaken on the project area (M2 Environmental Connections, 2014 & Scientific Aquatic Services, 2013).

None of the flora species recorded on POSA for the area are listed as protected in the LEMA.

Three protected species, in terms of the NFA, has been recorded on POSA for the area queried, namely:

- *Boscia albitrunca* (Shepherd's tree)
- *Combretum imberbe* (Leadwood)
- *Sclerocarya birrea* (Marula)

The above protected tree species as well as *Vachellia erioloba* (Camel thorn) were identified to occur on the project footprint during previous studies carried out on the project footprint (M2 Environmental Connections, 2014 & Scientific Aquatic Services, 2013).

Four of the flora species recorded on POSA for the area are known to have medicinal uses:

- *Ehretia rigida*
- *Sclerocarya birrea*
- *Senna italica*
- *Terminalia sericea*

Various additional flora species that have medicinal or cultural uses were identified to occur on the project footprint during previous studies carried out on the project footprint (M2 Environmental Connections, 2014 & Scientific Aquatic Services, 2013).

None of the flora species listed on POSA for the project area are endemic to South Africa.

6. FAUNA

A desktop study was conducted to establish whether any potentially sensitive faunal species or species of conservation concern (SCC) may possibly occur on site. The Virtual Museum and Animal Demography Unit (ADU) were used to compile species lists based on the sightings and data gathering from the South African Biodiversity Institute for the 2328BD and 2328DB QDS. The avifaunal species list was obtained from SABAP2 for the pentads.

It is important to note that a QDS covers a large area: ±27 X 25 km (±693 km²) and a pentad (SABAP2 Protocol) and area of ±8 X 7.6 km (±60.8 km²) and it is possible that suitable habitat will exist for a certain Red Data avifaunal species within this wider area surrounding the study site. However, the specific habitat(s) found on site may not suit Red Data species, even though it has been recorded for the QDS or pentad.

Species and habitat were identified as possibly sensitive within the framework of this study. Sensitive species were determined according to their close relationship and dependence on the vegetation type and habitat found to occur from aerial footage of the area.

Appendix D list the faunal species for the 2328BD and 2328DB QDS and Table 1 lists all fauna species that are of conservation concern which were found during the desktop study. Mammalian, avifaunal, reptilian and amphibian SCC are known to occur in the regional area where the Prospecting Right is proposed.

Table 1: Fauna SCC previously recorded for QDS

Scientific Name	Common Name	Red Data List Category
Mammalia		
Mellivora capensis	Honey Badger	LC, LEMA Schedule 3 Protected, TOPS 2007
Crocidura maquassiensis	Makwassie musk shrew	VU (2016) - As per Screening Tool Report
Dasymys robertsii	Robert's Marsh Rat	NT (2016)- As per Screening Tool Report
Avifauna		
Oxyura maccoa	Duck, Maccoa	NT (Regional), VU (Global)
Falco biarmicus	Falcon, Lanner	VU (Regional), LC (Global)
Certhilauda chuana	Lark, Short-clawed	NT (Regional), LC (Global)
Ciconia nigra	Stork, Black	VU (Regional), LC (Global)
Gyps coprotheres	Vulture, Cape	EN (Regional), EN (Global), TOPS EN
Torgos tracheliotos	Vulture, Lappet-faced	EN (Regional), EN (Global), TOPS EN
Gyps africanus	Vulture, White-backed	CR (Regional), CR (Global), TOPS EN
Aquila rapax	Eagle, Tawny	EN (Regional), LC (Global), Flagged by STR
Reptiles		
Platysaurus monotropis	Orange-throated Flat Lizard	EN (SARCA 2014), LEMA Schedule 3
Homopholis mulleri	Muller's Velvet Gecko	VU (SARCA 2014), LEMA Schedule 3
Lygodactylus soutpansbergensis	Soutpansberg Dwarf Gecko	NT (SARCA 2014), LEMA Schedule 3
Amphibian		
Pyxicephalus edulis	African/Lesser Bull Frog	LC (SARCA 2014), LEMA Schedule 3, TOPS 2007

6.1. Mammals

According to the SANBI Animal Demographic Unit (ADU), one (1) mammal species was found to possibly occur in the area queried, which is a provincial SCC (LEMA) and listed Nationally under TOPS 2007:

- *Mellivora capensis* (Honey Badger) - LC, LEMA Schedule 3 Protected, TOPS

Two (2) additional mammalian SCC were listed in the Environmental Screening Tool Report for the project:

- *Crocidura maquassiensis* (Makwassie musk shrew) - VU (2016)

- *Dasymys robertsii* (Robert's Marsh Rat) - NT (2016)

6.2. Avifaunal

According to data collected during the Southern African Bird Atlas Project 2 (SABAP2), the site is located within pentads 2325_2845, 2325_2850, 2330_2850 and 2335_2850 and hundred and sixty-eight (168) bird species have been recorded to occur within this area.

Eight (8) avifaunal SCC were listed for the area queried:

- Duck, Maccoa - *Oxyura maccoa* - NT (Regional), VU (Global)
- Falcon, Lanner - *Falco biarmicus* - VU (Regional), LC (Global)
- Lark, Short-clawed - *Certhilauda chuana* - NT (Regional), LC (Global)
- Stork, Black - *Ciconia nigra* - VU (Regional), LC (Global)
- Vulture, Cape - *Gyps coprotheres* - EN (Regional), EN (Global)
- Vulture, Lappet-faced - *Torgos tracheliotos* - EN (Regional), EN (Global)
- Vulture, White-backed - *Gyps africanus* - CR (Regional), CR (Global)
- Eagle, Tawny - *Aquila rapax* - EN (Regional), LC (Global)

The site is located a significant distance away from Important Birding and Biodiversity Areas (IBAs). The Waterberg IBA is located 45 km south-west of the project area and the Blouberg IBA is located 30 km north of the project area.

6.3. Butterflies

Thirteen (13) butterfly species were recorded in for the 2328BD and 2328DB QDS, all of which were categorized as LC by SANBI.

6.4. Other Invertebrates

Three (3) Dungbeetle species were recorded for the QDS, all of which were categorized as LC by SANBI.

6.5. Reptiles

Thirty-six (36) reptile species were recorded for the QDS. Three (3) of the species have are SCC:

- *Platysaurus monotropis* (Orange-throated Flat Lizard) - Endangered (SARCA 2014)
- *Homopholis mulleri* (Muller's Velvet Gecko) - Vulnerable (SARCA 2014)
- *Lygodactylus soutpansbergensis* (Soutpansberg Dwarf Gecko) - Near Threatened (SARCA 2014)
- Almost all species of Reptiles are protected in terms of LEMA: Schedule 3, excluding the water monitor, rock monitor, and all indigenous snakes not listed in the Act otherwise.

6.6. Amphibians

Nine (9) amphibian species were reported within the QDS, of which one is listed as an SCC in terms of TOPS 2007:

- *Pyxicephalus edulis* (African/Lesser Bull Frog) - Least Concern (SARCA 2014), LEMA Schedule 3, TOPS 2007

7. SENSITIVITY

The majority of the project footprint lies within the Makhado Sweet Bushveld (SVcb20) and a small section on the north-western most border of the PR area is located in the Roodeberg Bushveld (SVcb18). The Makhado Sweet Bushveld and Roodeberg Bushveld are not listed in the "National List of Ecosystems that are Threatened and need of protection", and as Least Concern by the 2018 National Biodiversity Assessment.

The Prospecting Right areas contains the following classes from the LCP and District Bioregional Plans: CBA1, CBA2, ESA1, ESA2, NNR and ONA. However, the majority of the proposed target areas are located in area categorised as ONA and NNR. Limited sections of the target area on the farm Altona 696 is located on areas categorised as CBA2 and ESA2.

The north-eastern section of the Prospecting Right area is located in the transition zone of the Vhembe Biosphere Reserve.

None of the flora species previously recorded for the area on POSA are Species of Conservation Concern (SCC) in terms of their Red List status. However, fifteen (15) faunal species previously recorded in the area queried are categorised as SCC.

From satellite imagery of the Prospecting Right areas the following impacts are apparent:

- Numerous dirt roads. Impacts from human and vehicle movement on these roads are expected.
- Extensive dryland crop farming has taken place on the Prospecting Right area.
- A number of villages and residences are located on and adjacent to the Prospecting Right area.
- Heavy livestock grazing and wood harvesting is expected, as reported in previous ecological studies conducted on the study area (M2 Environmental Connections, 2014 and Scientific Aquatic Services, 2013).
- Exotic and Alien Invasive Plant species proliferation is expected, as reported in previous ecological studies conducted on the study area (M2 Environmental Connections, 2014 and Scientific Aquatic Services, 2013).

Various non-perennial tributaries of the Matlalane River and Seepabana River are located on the Prospecting Right areas. However, the layout of the prospecting target areas appear to have been designed to avoid most of these non-perennial tributaries.

The southern section of the Prospecting Right area is located in an area designated as a Phase 2 and the northern section is located in an area designated as an Upstream FEPA.

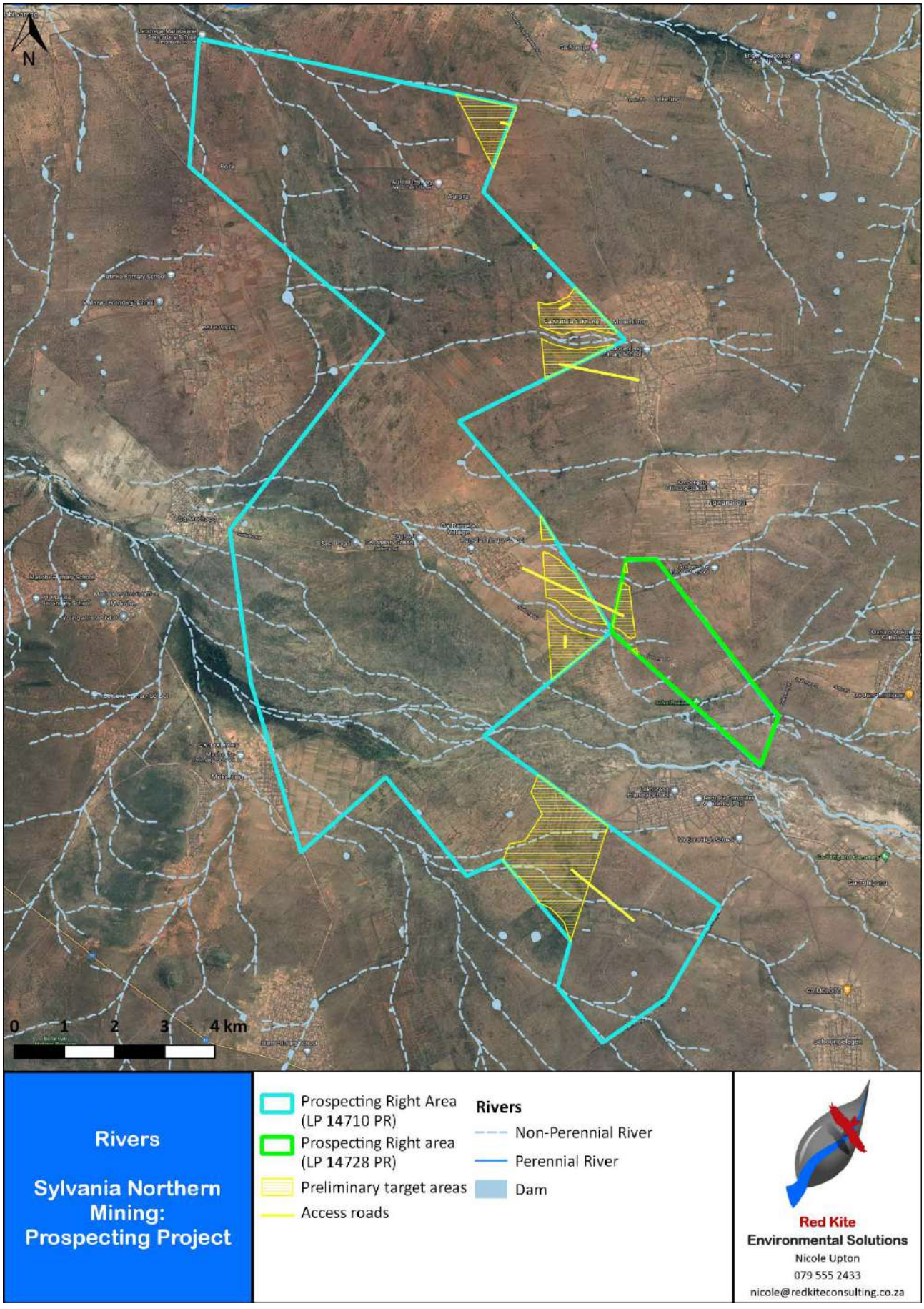


Figure 7: Rivers and stream in relation to the project site

The National Web Based Environmental Screening Tool indicated that the project footprint is of low, moderate and high sensitivity in terms of animal species and low sensitivity in terms of plant species sensitivity. The terrestrial biodiversity theme for the project area is indicated as low and very high (refer to figures below).

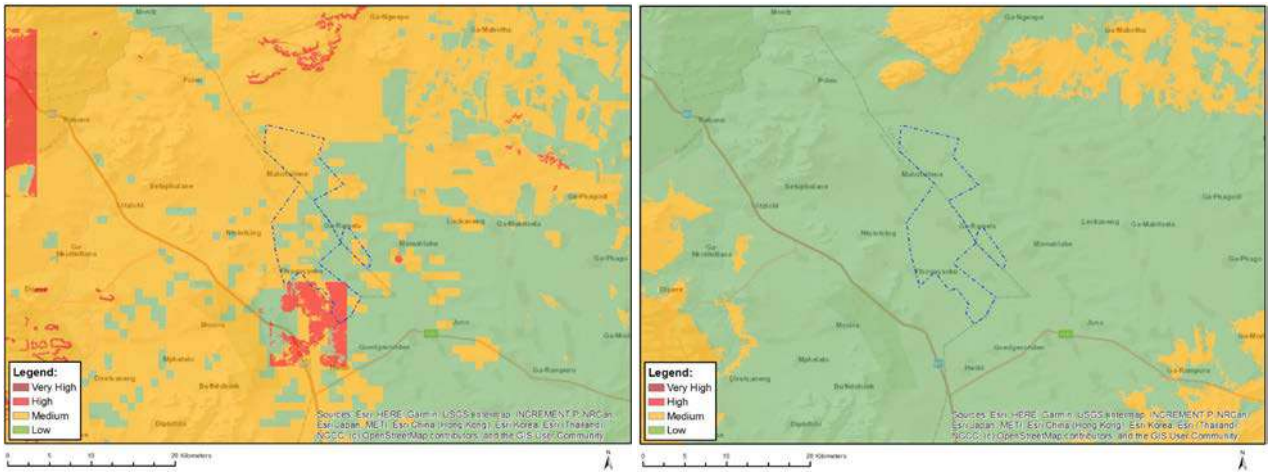


Figure 8: Map of animal species (left) and plant species (right) theme sensitivity as per the Environmental Screening Tool Report

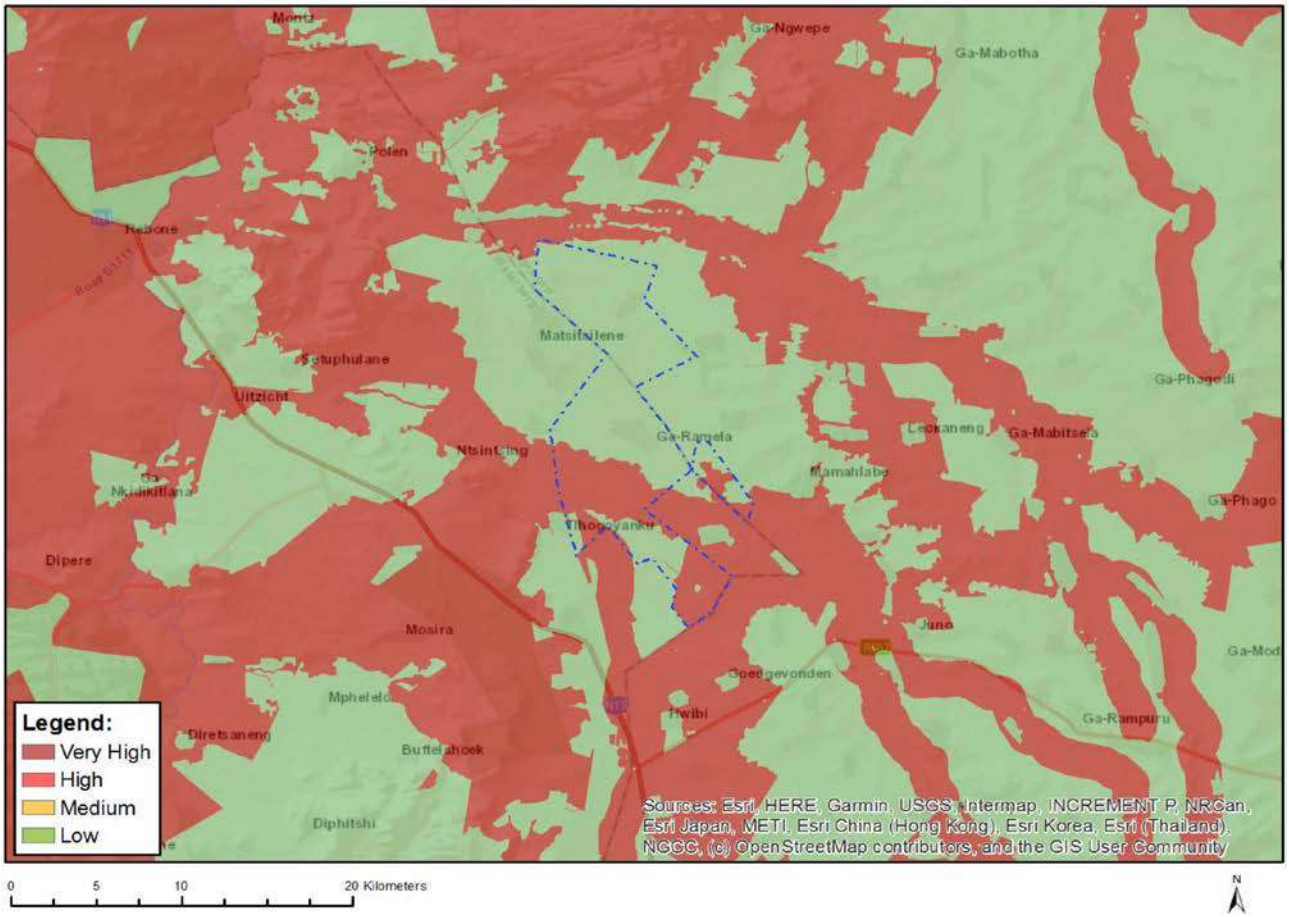


Figure 9: Environmental Screening Tool maps of terrestrial ecology themes sensitivity

Based on the desktop assessment findings, the Terrestrial Ecology sensitivity is considered as follows:

- All untransformed areas indicated as Critical Biodiversity Areas are considered high sensitivity
- All watercourses and their associated riparian zones are considered high sensitivity
- The remainder of the Prospecting Right area is considered low sensitivity

8. IMPACT ASSESSMENT

All forms of development, albeit for mining, industrial, urban or residential purposes, will have an immediate effect on the natural environment. It is therefore of utmost importance to provide information on the environmental consequences these activities will have and to inform the decision-makers thereof.

8.1. Methodology

8.1.1. Assessment Criteria

The criteria for the description and assessment of environmental impacts were drawn from the EIA Guidelines, National Environmental Management Act (Act No. 107 of 1998): EIA Regulations (2014) and as amended from time to time.

The level of detail as depicted in the EIA Guidelines was fine-tuned by assigning specific values to each impact. In order to establish a coherent framework within which all impacts could be objectively assessed, it was necessary to establish a rating system, which was applied consistently to all the criteria. For such purposes each aspect was assigned a value, ranging from one (1) to five (5), depending on its definition. This assessment is a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

An explanation of the impact assessment criteria is defined below.

Table 2: Impact Assessment Criteria

EXTENT	
Classification of the physical and spatial scale of the impact	
Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
Site	The impact could affect the whole, or a significant portion of the site.
Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
National	The impact could have an effect that expands throughout the country (South Africa).
International	Where the impact has international ramifications that extend beyond the boundaries of South Africa.
DURATION	
The lifetime of the impact that is measured in relation to the lifetime of the proposed development.	
Short term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.
Short to Medium term	The impact will be relevant through to the end of a construction phase (1.5 years).
Medium term	The impact will last up to the end of the development phases, where after it will be entirely negated.
Long term	The impact will continue or last for the entire operational lifetime i.e. exceed 30 years of the development, but will be mitigated by direct human action or by natural processes thereafter.
Permanent	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
INTENSITY	
The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself. The intensity is rated as	

Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.
High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
PROBABILITY	
This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:	
Improbable	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0 %).
Possible	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25 %.
Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50 %.
Highly Likely	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.
Definite	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.

The status of the impacts and degree of confidence with respect to the assessment of the significance must be stated as follows:

- **Status of the impact:** A description as to whether the impact would be positive (a benefit), negative (a cost), or neutral.
- **Degree of confidence in predictions:** The degree of confidence in the predictions, based on the availability of information and specialist knowledge.

Other aspects to take into consideration in the specialist studies are:

- Impacts should be described both before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for the full-lifecycle of the proposed development, including construction, operation and decommissioning.
- The impact evaluation should take into consideration the cumulative effects associated with this and other facilities which are either developed or in the process of being developed in the region.
- The specialist studies must attempt to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

8.1.2. Mitigation

The impacts that are generated by the development can be minimised if measures are implemented in order to reduce the impacts. The mitigation measures ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.

8.1.2.1. Determination of Significance-Without Mitigation

Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as “positive”. Significance is rated on the following scale:

Table 3: Significance-Without Mitigation

NO SIGNIFICANCE	The impact is not substantial and does not require any mitigation action.
LOW	The impact is of little importance, but may require limited mitigation.
MEDIUM	The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
HIGH	The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

8.1.2.2. Determination of Significance- With Mitigation

Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation is rated on the following scale:

Table 4: Significance- With Mitigation

NO SIGNIFICANCE	The impact will be mitigated to the point where it is regarded as insubstantial.
LOW	The impact will be mitigated to the point where it is of limited importance.
LOW TO MEDIUM	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels.
MEDIUM	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
MEDIUM TO HIGH	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.
HIGH	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

8.1.3. Assessment Weighting

Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it was necessary to weigh and rank all the criteria.

8.1.3.1. Ranking, Weighting and Scaling

For each impact under scrutiny, a scaled weighting factor is attached to each respective impact (refer Table 7). The purpose of assigning weights serves to highlight those aspects considered the most critical to the various stakeholders and ensure that each specialist's element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance.

Table 5: Description of assessment parameters with its respective weighting

EXTENT		DURATION		INTENSITY		PROBABILITY		WEIGHTING FACTOR (WF)		SIGNIFICANCE RATING (SR)	
Footprint	1	Short term	1	Low	1	Probable	1	Low	1	Low	0-19
Site	2	Short to Medium	2			Possible	2	Low to Medium	2	Low to Medium	20-39
Regional	3	Medium term	3	Medium	3	Likely	3	Medium	3	Medium	40-59
National	4	Long term	4			Highly Likely	4	Medium to High	4	Medium to High	60-79
International	5	Permanent	5	High	5	Definite	5	High	5	High	80-100

MITIGATION EFFICIENCY (ME)		SIGNIFICANCE FOLLOWING MITIGATION (SFM)	
High	0.2	Low	0 - 19
Medium to High	0.4	Low to Medium	20 - 39
Medium	0.6	Medium	40 - 59
Low to Medium	0.8	Medium to High	60 - 79
Low	1.0	High	80 - 100

8.1.3.2. Identifying the Potential Impacts Without Mitigation Measures (WOM)

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1:

Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x Weighting Factor

8.1.3.3. Identifying the Potential Impacts with Mitigation Measures (WM)

In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it was necessary to re-evaluate the impact.

8.1.3.4. Mitigation Efficiency (ME)

The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation efficiency (ME) rating (refer to Table 7). The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2:

Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency

or WM = WOM x ME

8.1.3.5. Significance Following Mitigation (SFM)

The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact is therefore seen in its entirety with all considerations taken into account.

8.2. Nature of Impacts Identified

The following section focuses on the potential impacts that the proposed activity and associated activities may have on the terrestrial ecology of the area. Potential impacts, as a result of the proposed activities, will be investigated for two phases of the project: operational phase and closure / decommissioning phase. As the project only proposes to undertake trenching and drilling as part of the invasive activities, no dedicated construction phase is expected.

The impacts and significance rating for the proposed invasive prospecting activities on both Prospecting Right areas are expected to be similar. Thus, the impacts assessment below is applicable to both Prospecting Right applications (LP 14710PR & LP 14728PR).

- Most of the impacts on plant species will occur during the operational phase when removal of plant communities will take place on site, which will also impact on the animals that use the area.
- The operational activities may result in impacts to the natural environment due to increased traffic and personnel to the area. Heavy machinery and vehicles will result in compaction of the soil and removal of vegetation and topsoil.
- Impacts to sensitive areas and specialised niche habitats, such as rivers and streams may occur as a result of the proposed project.
- Vegetation clearance will likely destroy habitats and lead to possible invasive and / or exotic species establishing in the area and edge-effects occurring surrounding the prospecting activities. Bare areas may become vulnerable to Alien and Invasive Plant species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat.
- Endemic and/or SCC species could possibly occur within the operational footprint area and would then be damaged or destroyed without proper knowledge and/or mitigation measures.
- Anthropogenic influence stemming from staff and contractors that infiltrate the natural veld areas may damage and impact on species communities within these areas.
- Human activity may impact on the faunal communities within the area. Associated noise, waste, the smell of humans, physical infiltration into natural areas are problematic and may lead to declining populations (where the disturbance of habitat has caused habitat remaining to become unfavorable).
- Once the invasive prospecting activities have been concluded, final steps in the rehabilitation process will take place. It is, however, possible that the rehabilitation actions are not effective or only implemented and planned at a late stage, hindering successful rehabilitation.

8.3. Impact Assessment and Risk Evaluation

8.3.1. Impact on overall biodiversity due to development activities

Phase of development: operation

Impact • Invasive prospecting and associated activities will lead to destruction and damage of habitats and vegetation communities and overall loss of biodiversity and ecosystem function within the clearance and operational area. • Destruction of habitat may lead to faunal species migrating to other more favourable areas.		
	No Mitigation	**With Mitigation**
Extent	Site (2)	0.8 (Low to medium) ME
Duration	Short to medium term (2)	
Magnitude	Low to medium (2)	
Probability	Definite (5)	
Weighting factor	Low to medium (2)	
Significance Rating (SR)	Low to Medium (22)	Low (18)

Recommended mitigation measures:

- The vegetation removal should be controlled, very specific and the clearance area kept as small as possible.
- A control of access should be implemented for all remaining natural areas to prevent unnecessary destruction of habitats or disturbance of species. It is also vital that no unnecessary fragmentation occurs and that all roads are clearly demarcated and kept to without any exceptions. No vehicles or personnel are permitted outside of these demarcated roads.
- To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled.
- Continuous rehabilitation of the area should occur, where infilling of trenches and replacement of topsoil should be prioritised.

Phase of development: operation

Impact The continuous human activity over a longer-term period may further impact on the faunal communities within the area. Associated noise, waste, the smell of humans and physical infiltration into remaining natural areas are problematic and may lead to declining populations (where the disturbance of habitat has caused habitat remaining to become unfavourable).		
	No Mitigation	**With Mitigation**
Extent	Regional (3)	0.8 ME (Low to Medium)
Duration	Short to medium term (2)	
Magnitude	Low to medium (2)	
Probability	Probable (4)	
Weighting factor	Medium (3)	
Significance Rating (SR)	Low to Medium (33)	Low to Medium (26)

Recommended mitigation measures:

- Animals may get used to movement by people in designated areas if the it is predictable. A control of access should be implemented for all remaining natural areas to prevent infiltration of remaining natural habitats or disturbance of species.
- To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled, removed, killed or interfered with.
- Prevent impacts and waste from reaching the surface water systems and areas outside the footprint areas.
- Hazardous wastes should be stored in impermeable and bunded areas. Domestic waste and other waste should be managed in the appropriate manner and apply good housekeeping practices will aid this issue.

8.3.2. Impact on biodiversity due to exotic and invasive plant species

Phase of development: operation

Impact Vegetation clearance will destroy indigenous vegetation and lead to possible invasive and/or exotic species establishing in the area and edge-effects occurring surrounding the prospecting activities. Bare areas may become vulnerable to Alien and Invasive Plant species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat.		
	No Mitigation	**With Mitigation**
Extent	Regional (3)	0.6 (Medium) ME
Duration	Long term (4)	
Magnitude	Medium (3)	
Probability	Possible (3)	
Weighting factor	Medium (3)	
Significance Rating (SR)	Low to medium (39)	Low to medium (23)

Recommended mitigation measures:

- Alien Invasive Plant (AIP) control measures should be implemented for the control of invasive and exotic plant species.

8.3.3. Impact on species of conservation concern and sensitive habitats

Phase of development: operation

Impact

Invasive prospecting and associated activities may impact on areas designated as high sensitivity, including critical biodiversity areas and watercourses situated in and around the Prospecting Right area. The majority of the proposed target areas are located in area categorised as ONA and NNR. Limited sections of the target area on the farm Altona 696 are located on areas categorised as CBA. The layout of the prospecting target areas appear to have been designed to avoid most of the non-perennial tributaries.

The activity may lead to the loss of species of conservation concern. Based on the desktop study findings, no flora SCC are considered to be likely to occur on the project area. However, fifteen (15) faunal species previously recorded in the area queried are categorised as SCC.

	No Mitigation	**With Mitigation**
Extent	Regional (3)	0.4 (Medium to high) ME
Duration	Long term (4)	
Magnitude	Medium (3)	
Probability	Possible (2)	
Weighting factor	Medium (3)	
Significance Rating (SR)	Low to Medium (36)	Low (14)

Recommended mitigation measures:

- The vegetation removal should be controlled, very specific and the clearance area kept as small as possible.
- If any SCC are encountered within the subject property in the future, the following should be ensured:
  - If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas or within designated open space on the subject property.
  - All rescue and relocation plans should be overseen by a suitably qualified specialist.
  - Obtain relevant permits/consent, if applicable, for each protected or endangered floral species identified within the proposed development area that will be destroyed.
- Placement of the infrastructure and activities should be planned to avoid sensitive areas such as CBAs and rivers and streams.

8.3.4. Impact on ecology due to Closure / Post-closure Phase

Phase of development: closure / post-closure

Impact

Rehabilitation could be ineffective if rehabilitation actions are not effectively implemented. Without the necessary mitigation measures, rehabilitation will be less successful and the ecology of the impacted areas may not recover to a pre-prospecting state.

Without mitigation the alien invasive species may increase and result in a degraded veld condition making the property less viable for post-closure land use activities such as wilderness, grazing and agriculture.

	No Mitigation	**With Mitigation**
Extent	Site (2)	0.6 ME
Duration	Medium term (3)	
Magnitude	Medium (3)	
Probability	Likely (3)	

Weighting factor	Medium (3)	
Significance Rating (SR)	Low to Medium (33)	Low to Medium (20)

Recommended mitigation measures:

- Alien Invasive Plant (AIP) control measures should be implemented for the control of invasive and exotic plant species.
- Prior to finalisation of the activities and closure, an AIP survey must be undertaken to determine whether AIP are present in and around the project footprint.
- Rehabilitation plans should be planned long before the closure phase is due. Continuous rehabilitation should also take place during the operational phase, with infilling of trenches and replacement of topsoil being the priority.

9. ECOLOGICAL MANAGEMENT PLAN

9.1. Pre-Construction Phase

- Sensitive watercourses and associated riparian zone habitats constitute the most important features which make up the area identified as increased sensitivity. Invasive prospecting activities should be planned to keep clear of these zones.
- Four protected tree species, in terms of the NFA, may occur on the project footprint. A survey for protected tree species on the clearance footprint should be undertaken by a suitably qualified specialist prior to the start of construction / clearance. Based on the findings of the survey, the relevant permits, if applicable, for each protected tree species identified within the proposed clearance footprint, which may be damaged or destroyed, should be applied for.

9.2. Construction and Operational Phases

9.2.1. Aim and Objectives

- Prevent the needless loss of or damage to fauna and flora, particularly with regard to SCC.
- Prevent the needless death, injury or hindrance to fauna, particularly with regard to protected species.
- Prevent or limit significant alteration to the ecosystems in the area.

9.2.2. Mitigation and Management measures

- Adhere to mitigation measures as prescribed in this report as well as the EMPr to prevent and mitigate impacts associated with the proposed project.
- The river systems should be avoided by the proposed invasive prospecting and associated activities.
- Responsible persons from the staff members/workers should be identified to ensure that the necessary mitigation measures are implemented and established. These personnel should also enforce the collaboration of other staff members, contractors and visitors to comply with these mitigation measures.
- Alien Invasive Plant (AIP) control measures should be implemented for the control of invasive and exotic plant species.
- Adequate waste storage and disposal must be implemented at the development. Littering must be prevented and regularly cleaned up and form part of good housekeeping practices to be implemented around site.
- Ensure awareness amongst all staff, contractors and visitors to site to not needlessly harm or hinder animals or damage flora.
- No additional fragmentation should occur and all roads should be clearly demarcated and kept to without any exceptions and within the proposed footprints where possible.
- All footprint areas should remain as small as possible.
- The vegetation removal should be controlled and should be very specific.
- It is vital that if any SCC occurs on the proposed site that these species should be protected and/or left undisturbed as far as possible. Only as an exception can these species be relocated to favourable sites with the use of a specialist prior to vegetation and habitat removal. If at any point any SCC is encountered, a specialist should be consulted as to determine the best way forward and a permit should be obtained if any intervention is required.

9.3. Decommissioning and Closure

- Prior to finalisation of the activities and closure, an AIP survey must be undertaken to determine whether AIP are present in and around the project footprint.
- Rehabilitation plans should be planned long before the closure phase is due. Continuous rehabilitation should also take place during the operational phase, with infilling of trenches and replacement of topsoil being the priority.
- Ensure that an acceptable aesthetic scenario is created post closure.
- When closure is considered successful and rehabilitation complete, unnecessary fences/barriers should be lifted to restore larger foraging areas.
- Re-vegetation of all degraded areas and bare patches is advised to speed recovery to natural, self-sustaining state as soon as possible.

9.4. Monitoring

An ECO or appropriately appointed person must ensure that all impacts remain within the approved footprint and remains in compliance with the approved EMPr.

Monitoring should start as soon as the operational phase of the development activities commences. The monitoring should include the following:

- Annual visual assessment of surrounding areas to determine if vegetation in undisturbed areas is being impacted. The visual assessment can be undertaken by the ECO. Photographic record of monitoring sites should be kept for comparison between monitoring events.
- Annual alien invasive plant monitoring, eradication and control programme.
- Implement an Observe and Report approach which will enable employees/locals to report any disturbance of fauna or degradation that they encounter during the operational phase.
- Prior to finalisation of the activities and closure, an AIP survey must be undertaken to determine that AIP are present in and around the project footprint.

10. CONCLUSION

No site survey was conducted to verify or dispute any findings related to the desktop assessment.

Information on plant species previously recorded for the project area was extracted from the POSA online database hosted by SANBI. The results indicate that 78 plant species have been recorded in the area queried:

- None of the species previously recorded for the area are Species of Conservation Concern (SCC) in terms of their Red List status. Furthermore, the Environmental Screening Tool Report for the project area does not list any SCC. The aforementioned is supported by the findings of previous ecology assessments undertaken on the project area.
- None of the flora species recorded on POSA for the area are listed as protected in the LEMA.
- Four protected species, in terms of the NFA, may occur on the project area, namely:
  - *Boscia albitrunca* (Shepherd's tree)
  - *Combretum imberbe* (Leadwood)
  - *Sclerocarya birrea* (Marula)
  - *Vachellia erioloba* (Camel thorn)

A desktop study was conducted to establish whether any potentially sensitive faunal species or species of conservation concern may possibly occur on site. The following summary of findings are relevant to the development:

- Mammals: one (1) mammal species was found to possibly occur, which is a provincial SCC and listed nationally within TOPS 2007, while two (2) additional SCC were listed by the Screening Tool Report for the project.
- Avifaunal: 168 bird species were found to possibly occur, with eight (8) avifaunal species indicated as SCC.
- Butterflies: Thirteen (13) butterfly species were found to occur, all of which were categorized as LC.
- Other Invertebrates: Three (3) Dungbeetle species were shown to occur for the QDS, all noted as LC.
- Reptiles: 36 reptile species were recorded for the QDS, of which three are SCC.
- Amphibians: Nine (9) amphibian species were reported, of which one (1) is listed within TOPS 2007.

The majority of the project footprint lies within the Makhado Sweet Bushveld and a small section on the north-western most border of the PR area is located in the Roodeberg Bushveld. The Makhado Sweet Bushveld and Roodeberg Bushveld are not listed in the "National List of Ecosystems that are Threatened and need of protection", and as Least Concern by the 2018 National Biodiversity Assessment.

The Prospecting Right areas contains the following classes from the LCP and District Bioregional Plans: CBA1, CBA2, ESA1, ESA2, NNR and ONA. However, the majority of the proposed target areas are located in area categorised as ONA and NNR. Limited sections of the target area on the farm Altona 696 is located on areas categorised as CBA2 and ESA2.

The north-eastern section of the Prospecting Right area is located in the transition zone of the Vhembe Biosphere Reserve.

From satellite imagery of the Prospecting Right areas the following impacts are apparent:

- Numerous dirt roads. Impacts from human and vehicle movement on these roads are expected.
- Extensive dryland crop farming has taken place on the Prospecting Right area.
- A number of villages and residences are located on and adjacent to the Prospecting Right area.
- Heavy livestock grazing and wood harvesting is expected, as reported in previous ecological studies conducted on the study area (M2 Environmental Connections, 2014 and Scientific Aquatic Services, 2013).
- Exotic and Alien Invasive Plant species proliferation is expected, as reported in previous ecological studies conducted on the study area (M2 Environmental Connections, 2014 and Scientific Aquatic Services, 2013).

Various non-perennial tributaries of the Matlalane River and Seepabana River are located on the Prospecting Right areas. However, the layout of the prospecting target areas appear to have been designed to avoid most of these non-perennial tributaries.

The southern section of the Prospecting Right area is located in an area designated as a Phase 2 and the northern section is located in an area designated as an Upstream FEPA.

Based on the desktop assessment findings, the Terrestrial Ecology sensitivity is considered as follows:

- All untransformed areas indicated as Critical Biodiversity Areas are considered high sensitivity
- All watercourses and their associated riparian zones are considered high sensitivity
- The remainder of the Prospecting Right area is considered low sensitivity

Sensitive watercourse and their associated riparian vegetation habitat constitute the most important features which make up the area identified as increased sensitivity.

It is the reasoned opinion of the specialist that the development may continue if all recommended mitigation measures are implemented from the onset of the development.

11. REFERENCES

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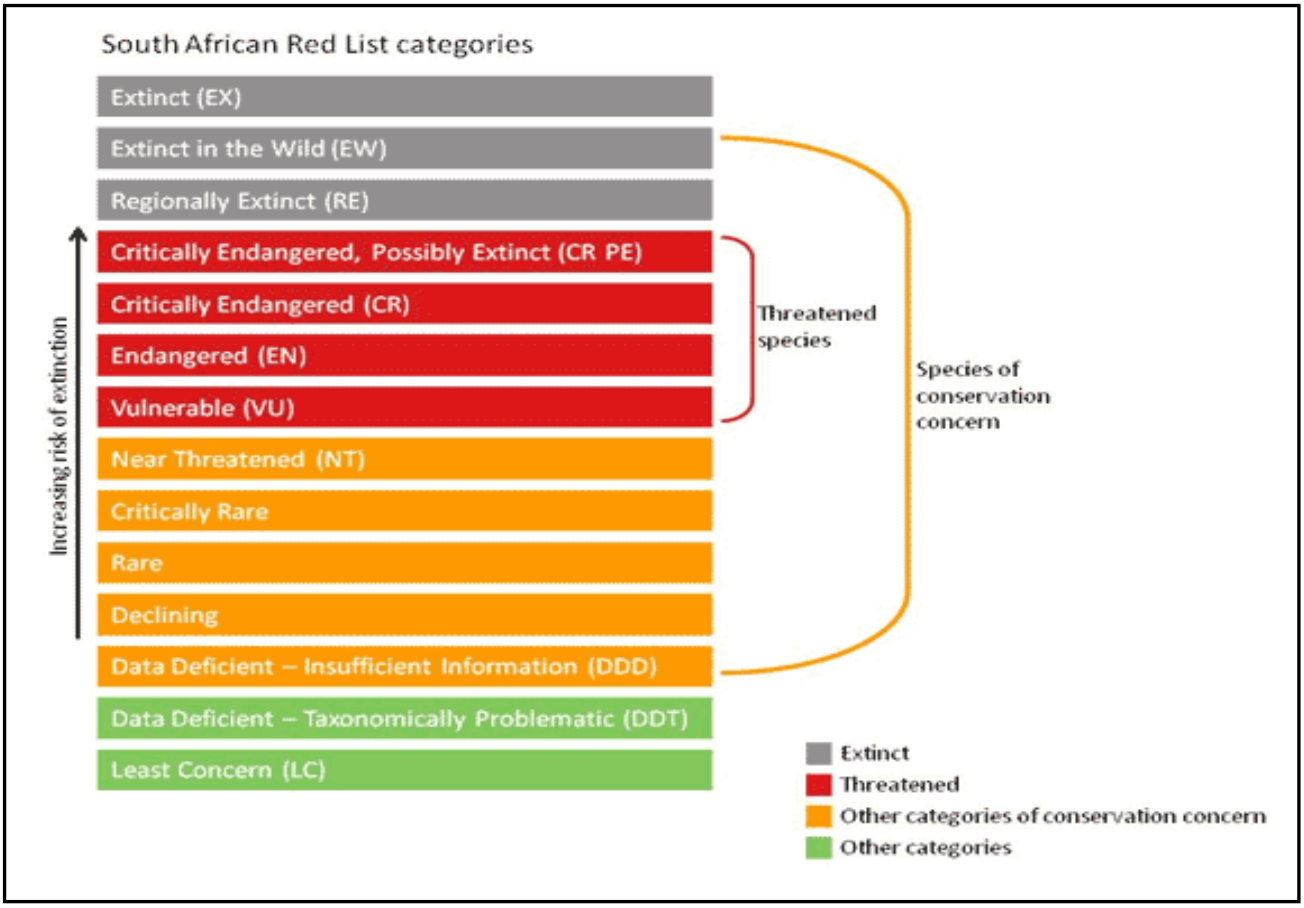
APPENDIX A: SPECIALISTS' CURRICULUM VITAE

APPENDIX B: IUCN RED LIST DEFINITIONS

Categories marked with [N] are non-IUCN, national Red List categories for species not in danger of extinction but considered of conservation concern. The IUCN equivalent of these categories is Least Concern (LC).

Categories	Definition
Extinct (EX)	A species is Extinct when there is no reasonable doubt that the last individual has died. Species should be classified as Extinct only once exhaustive surveys throughout the species' known range have failed to record an individual.
Extinct in the Wild (EW)	A species is Extinct in the Wild when it is known to survive only in cultivation or as a naturalized population (or populations) well outside the past range.
Regionally Extinct (RE)	A species is Regionally Extinct when it is extinct within the region assessed (in this case South Africa), but wild populations can still be found in areas outside the region.
Critically Endangered, Possibly Extinct (CR PE)	Possibly Extinct is a special tag associated with the category Critically Endangered, indicating species that are highly likely to be extinct, but the exhaustive surveys required for classifying the species as Extinct has not yet been completed. A small chance remains that such species may still be rediscovered.
Critically Endangered (CR)	A species is Critically Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Critically Endangered, indicating that the species is facing an extremely high risk of extinction.
Endangered (EN)	A species is Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Endangered, indicating that the species is facing a very high risk of extinction.
Vulnerable (VU)	A species is Vulnerable when the best available evidence indicates that it meets at least one of the five IUCN criteria for Vulnerable, indicating that the species is facing a high risk of extinction.
Near Threatened (NT)	A species is Near Threatened when available evidence indicates that it nearly meets any of the IUCN criteria for Vulnerable and is therefore likely to become at risk of extinction in the near future.
[N]Critically Rare	A species is Critically Rare when it is known to occur at a single site but is not exposed to any direct or plausible potential threat and does not otherwise qualify for a category of threat according to one of the five IUCN criteria.
[N]Rare	A species is Rare when it meets at least one of four South African criteria for rarity but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to one of the five IUCN criteria. The four criteria are as follows: • Restricted range: Extent of Occurrence <500 km^2, OR • Habitat specialist: Species is restricted to a specialized microhabitat so that it has a very small Area of Occupancy, typically smaller than 20 km^2, OR • Low densities of individuals: Species always occurs as single individuals or very small subpopulations (typically fewer than 50 mature individuals) scattered over a wide area, OR • Small global population: Less than 10 000 mature individuals.
[N]Declining	A species is Declining when it does not meet or nearly meet any of the five IUCN criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened, but there are threatening processes causing a continuing decline of the species.
Least Concern (LC)	A species is Least Concern when it has been evaluated against the IUCN criteria and does not qualify for any of the above categories. Species classified as Least Concern

Categories	Definition
	are considered at low risk of extinction. Widespread and abundant species are typically classified in this category.
Data Deficient - Insufficient Information (DDD)	A species is DDD when there is inadequate information to make an assessment of its risk of extinction, but the species is well defined. Listing of species in this category indicates that more information is required, and that future research could show that a threatened classification is appropriate.
Data Deficient - Taxonomically Problematic (DDT)	A species is DDT when taxonomic problems hinder the distribution range and habitat from being well defined, so that an assessment of risk of extinction is not possible.
Not Evaluated (NE)	A species is Not Evaluated when it has not been evaluated against the criteria. The national Red List of South African plants is a comprehensive assessment of all South African indigenous plants, and therefore all species are assessed and given a national Red List status. However, some species included in Plants of southern Africa: an online checklist are species that do not qualify for national listing because they are naturalized exotics, hybrids (natural or cultivated), or synonyms. These species are given the status Not Evaluated and the reasons why they have not been assessed are included in the assessment justification.



APPENDIX C: POSA FLORA SPECIES LIST

Protected or Species of Conservation Concern (SCC) are highlighted green
Exotic species are highlighted orange

Family	Species	Red List Status	Diagnostic	Conservation
Amaranthaceae	*Aerva leucura*	LC	herb;	
Loranthaceae	*Agelanthus natalitius*	LC	succulent; parasite; shrub;	
Poaceae	*Andropogon chinensis*	LC	graminoid;	
Scrophulariaceae	*Antherothamnus pearsonii*	LC	shrub;	
Poaceae	*Aristida congesta*	LC	graminoid;	
Poaceae	*Aristida mollissima*	LC	graminoid;	
Poaceae	*Aristida rhiniochloa*	LC	graminoid;	
Poaceae	*Aristida stipitata*	LC	graminoid;	
Brassicaceae	*Boscia albitrunca*	LC	tree;	NFA: Protected
Poaceae	*Bothriochloa radicans*	LC	graminoid;	
Poaceae	*Brachiaria eruciformis*	LC	graminoid;	
Poaceae	*Brachiaria nigropedata*	LC	graminoid;	
Poaceae	*Brachiaria serrata*	LC	graminoid;	
Poaceae	*Cenchrus ciliaris*	LC	graminoid;	
Poaceae	*Chloris virgata*	LC	graminoid;	
Poaceae	*Chrysopogon serrulatus*	LC	graminoid;	
Combretaceae	*Combretum apiculatum*	LC	shrub; tree;	
Combretaceae	*Combretum hereroense*	LC	shrub; tree;	
Combretaceae	*Combretum imberbe*	LC	shrub; tree;	NFA: Protected
Poaceae	*Cymbopogon pospischilii*	NE	graminoid;	
Poaceae	*Cynodon dactylon*	LC	graminoid;	
Poaceae	*Dactyloctenium aegyptium*	LC	graminoid;	
Poaceae	*Dichanthium annulatum*	LC	graminoid;	
Poaceae	*Digitaria eriantha*	LC	graminoid;	
Poaceae	*Echinochloa holubii*	LC	graminoid;	
Boraginaceae	*Ehretia rigida*	LC	shrub;	Medicinal
Poaceae	*Elionurus muticus*	LC	graminoid;	
Poaceae	*Enneapogon cenchroides*	LC	graminoid;	
Poaceae	*Enneapogon scoparius*	LC	graminoid;	
Poaceae	*Eragrostis aspera*	LC	graminoid;	
Poaceae	*Eragrostis barbinodis*	LC	graminoid;	
Poaceae	*Eragrostis biflora*	LC	graminoid;	
Poaceae	*Eragrostis chloromelas*	LC	graminoid;	
Poaceae	*Eragrostis cilianensis*	LC	graminoid;	
Poaceae	*Eragrostis lehmanniana*	LC	graminoid;	
Poaceae	*Eragrostis nindensis*	LC	graminoid;	
Poaceae	*Eragrostis pallens*	LC	graminoid;	
Poaceae	*Eragrostis rigidior*	LC	graminoid;	
Poaceae	*Eragrostis trichophora*	LC	graminoid;	
Poaceae	*Eustachys paspaloides*	LC	graminoid;	
Poaceae	*Fingerhuthia africana*	LC	graminoid;	
Malvaceae	*Grewia olukondae*	LC	shrub;	

Family	Species	Red List Status	Diagnostic	Conservation
Boraginaceae	*Heliotropium ciliatum*	LC	herb;	
Poaceae	*Heteropogon contortus*	LC	graminoid;	
Poaceae	*Hyparrhenia anamesa*	LC	graminoid;	
Poaceae	*Hyperthelia dissoluta*	LC	graminoid;	
Poaceae	*Ischaemum afrum*	LC	graminoid;	
Poaceae	*Leptochloa eleusine*	LC	graminoid;	
Poaceae	*Lintonia nutans*	LC	graminoid;	
Poaceae	*Loudetia flavida*	LC	graminoid;	
Poaceae	*Melinis repens*	LC	graminoid;	
Fabaceae	*Ormocarpum trichocarpum*	LC	shrub; tree;	
Poaceae	*Panicum coloratum*	LC	graminoid;	
Poaceae	*Panicum deustum*	LC	graminoid;	
Poaceae	*Panicum maximum*	LC	graminoid;	
Poaceae	*Perotis patens*	LC	graminoid;	
Poaceae	*Pogonarthria squarrosa*	LC	graminoid;	
Vitaceae	*Rhoicissus revoilii*	LC	tree; climber; shrub	
Poaceae	*Schizachyrium jeffreysii*	LC	graminoid;	
Poaceae	*Schmidtia pappophoroides*	LC	graminoid;	
Anacardiaceae	*Sclerocarya birrea*	LC	tree'	NFA: Protected; Medicinal
Asteraceae	*Senecio latifolius*	LC	herb;	
Fabaceae	*Senna italica*	LC	herb;	Medicinal
Poaceae	*Setaria incrassata*	LC	graminoid;	
Poaceae	*Setaria sphacelata*	LC	graminoid;	
Poaceae	*Setaria verticillata*	LC	graminoid;	
Solanaceae	*Solanum lichtensteinii*	LC	dwarf shrub; shrub;	
Poaceae	*Sporobolus stapfianus*	LC	graminoid;	
Combretaceae	*Terminalia sericea*	LC	tree;	Medicinal
Poaceae	*Themeda triandra*	LC	graminoid;	
Poaceae	*Tragus berteronianus*	LC	graminoid;	
Poaceae	*Tricholaena monachne*	LC	graminoid;	
Poaceae	*Trichoneura grandiglumis*	LC	graminoid;	
Poaceae	*Triraphis schinzii*	LC	graminoid;	
Poaceae	*Urochloa mosambicensis*	LC	graminoid;	
Poaceae	*Urochloa oligotricha*	LC	graminoid;	
Poaceae	*Urochloa panicoides*	LC	graminoid;	
Fabaceae	*Vachellia gerrardii*	LC	tree;	

APPENDIX D: FAUNA SPECIES LIST FOR QDS

Mammal species found in QDS 2328BD and 2328DB (MammalMAP)

Family	Scientific name	Common name	Red list category
Mustelidae	*Mellivora capensis*	Honey Badger	Least Concern (2016), LEMA Schedule 3 Protected

Avifaunal species found within the relevant pentads

Common Name	Scientific Name	Regional	Global
Brubru	*Nilaus afer*	LC	LC
Shikra	*Accipiter badius*	LC	LC
Babbler, Arrow-marked	*Turdoides jardineii*	LC	LC
Babbler, Southern Pied	*Turdoides bicolor*	LC	LC
Barbet, Acacia Pied	*Tricholaema leucomelas*	LC	LC
Barbet, Black-collared	*Lybius torquatus*	LC	LC
Barbet, Crested	*Trachyphonus vaillantii*	LC	LC
Batis, Chinspot	*Batis molitor*	LC	LC
Bee-eater, European	*Merops apiaster*	LC	LC
Bee-eater, Little	*Merops pusillus*	LC	LC
Bee-eater, White-fronted	*Merops bullockoides*	LC	LC
Bishop, Southern Red	*Euplectes orix*	LC	LC
Boubou, Southern	*Laniarius ferrugineus*	LC	LC
Bulbul, African Red-eyed	*Pycnonotus nigricans*	LC	LC
Bulbul, Dark-capped	*Pycnonotus tricolor*	LC	LC
Bunting, Golden-breasted	*Emberiza flaviventris*	LC	LC
Bunting, Lark-like	*Emberiza impetuani*	LC	LC
Bushshrike, Grey-headed	*Malaconotus blanchoti*	LC	LC
Buzzard, Common	*Buteo buteo*	LC	LC
Canary, Black-throated	*Crithagra atrogularis*	LC	LC
Canary, Yellow	*Crithagra flaviventris*	LC	LC
Canary, Yellow-fronted	*Crithagra mozambica*	LC	LC
Chat, Familiar	*Oenanthe familiaris*	LC	LC
Cisticola, Desert	*Cisticola aridulus*	LC	LC
Cisticola, Rattling	*Cisticola chiniana*	LC	LC
Cisticola, Zitting	*Cisticola juncidis*	LC	LC
Cormorant, Reed	*Microcarbo africanus*	LC	LC
Coucal, Burchell's	*Centropus burchellii*	LC	LC
Courser, Temminck's	*Cursorius temminckii*	LC	LC
Crake, Black	*Zapornia flavirostra*	LC	LC
Crombec, Long-billed	*Sylvietta rufescens*	LC	LC
Crow, Cape	*Corvus capensis*	LC	LC
Crow, Pied	*Corvus albus*	LC	LC
Cuckoo, Black	*Cuculus clamosus*	LC	LC
Cuckoo, Diederik	*Chrysococcyx caprius*	LC	LC
Cuckoo, Jacobin	*Clamator jacobinus*	LC	LC
Cuckoo, Klaas's	*Chrysococcyx klaas*	LC	LC
Cuckoo, Levaillant's	*Clamator levaillantii*	LC	LC
Dove, Cape Turtle	*Streptopelia capicola*	LC	LC
Dove, Emerald-spotted Wood	*Turtur chalcospilos*	LC	LC
Dove, Laughing	*Spilopelia senegalensis*	LC	LC

Common Name	Scientific Name	Regional	Global
Dove, Namaqua	*Oena capensis*	LC	LC
Dove, Red-eyed	*Streptopelia semitorquata*	LC	LC
Dove, Rock	*Columba livia*	LC	LC
Drongo, Fork-tailed	*Dicrurus adsimilis*	LC	LC
Duck, Maccoa	*Oxyura maccoa*	NT	VU
Duck, White-faced Whistling	*Dendrocygna viduata*	LC	LC
Duck, Yellow-billed	*Anas undulata*	LC	LC
Eremomela, Burnt-necked	*Eremomela usticollis*	LC	LC
Eremomela, Yellow-bellied	*Eremomela icteropygialis*	LC	LC
Falcon, Lanner	*Falco biarmicus*	VU	LC
Finch, Red-headed	*Amadina erythrocephala*	LC	LC
Firefinch, Jameson's	*Lagonosticta rhodopareia*	LC	LC
Fiscal, Southern	*Lanius collaris*	LC	LC
Flycatcher, Marico	*Melaenornis mariquensis*	LC	LC
Flycatcher, Spotted	*Muscicapa striata*	LC	LC
Francolin, Crested	*Dendroperdix sephaena*	LC	LC
Go-away-bird, Grey	*Crinifer concolor*	LC	LC
Goose, Egyptian	*Alopochen aegyptiaca*	LC	LC
Goshawk, Gabar	*Micronisus gabar*	LC	LC
Grebe, Little	*Tachybaptus ruficollis*	LC	LC
Greenbul, Yellow-bellied	*Chlorocichla flaviventris*	LC	LC
Guineafowl, Helmeted	*Numida meleagris*	LC	LC
Harrier-Hawk, African	*Polyboroides typus*	LC	LC
Heron, Black-headed	*Ardea melanocephala*	LC	LC
Heron, Grey	*Ardea cinerea*	LC	LC
Honeyguide, Lesser	*Indicator minor*	LC	LC
Hoopoe, African	*Upupa africana*	LC	LC
Hornbill, Southern Red-billed	*Tockus rufirostris*	LC	LC
Hornbill, Southern Yellow-billed	*Tockus leucomelas*	LC	LC
Ibis, Hadada	*Bostrychia hagedash*	LC	LC
Kestrel, Greater	*Falco rupicoloides*	LC	LC
Kingfisher, Brown-hooded	*Halcyon albiventris*	LC	LC
Kingfisher, Pied	*Ceryle rudis*	LC	LC
Kingfisher, Woodland	*Halcyon senegalensis*	LC	LC
Kite, Yellow-billed	*Milvus aegyptius*	LC	LC
Korhaan, Red-crested	*Lophotis ruficrista*	LC	LC
Lapwing, Blacksmith	*Vanellus armatus*	LC	LC
Lapwing, Crowned	*Vanellus coronatus*	LC	LC
Lark, Fawn-colored	*Calendulauda africanoides*	LC	LC
Lark, Monotonous	*Mirafra passerina*	LC	LC
Lark, Sabota	*Calendulauda sabota*	LC	LC
Lark, Short-clawed	*Certhilauda chuana*	NT	LC
Martin, Common House	*Delichon urbicum*	LC	LC
Martin, Rock	*Ptyonoprogne fuligula*	LC	LC
Moorhen, Common	*Gallinula chloropus*	LC	LC
Mousebird, Red-faced	*Urocolius indicus*	LC	LC
Mousebird, Speckled	*Colius striatus*	LC	LC
Myna, Common	*Acridotheres tristis*	LC	LC
Owlet, Pearl-spotted	*Glaucidium perlatum*	LC	LC

Common Name	Scientific Name	Regional	Global
Oxpecker, Red-billed	*Buphagus erythrorynchus*	LC	LC
Peafowl, Indian	*Pavo cristatus*	LC	LC
Pigeon, Speckled	*Columba guinea*	LC	LC
Pipit, African	*Anthus cinnamomeus*	LC	LC
Plover, Three-banded	*Charadrius tricollaris*	LC	LC
Prinia, Black-chested	*Prinia flavicans*	LC	LC
Prinia, Tawny-flanked	*Prinia subflava*	LC	LC
Puffback, Black-backed	*Dryoscopus cubla*	LC	LC
Pytilia, Green-winged	*Pytilia melba*	LC	LC
Quelea, Red-billed	*Quelea quelea*	LC	LC
Robin-Chat, White-throated	*Cossypha humeralis*	LC	LC
Roller, Lilac-breasted	*Coracias caudatus*	LC	LC
Roller, Purple	*Coracias naevius*	LC	LC
Sandgrouse, Burchell's	*Pterocles burchelli*	LC	LC
Scimitarbill, Common	*Rhinopomastus cyanomelas*	LC	LC
Scrub Robin, Kalahari	*Cercotrichas paena*	LC	LC
Scrub Robin, White-browed	*Cercotrichas leucophrys*	LC	LC
Shrike, Crimson-breasted	*Laniarius atrococcineus*	LC	LC
Shrike, Lesser Grey	*Lanius minor*	LC	LC
Shrike, Magpie	*Urolestes melanoleucus*	LC	LC
Shrike, Red-backed	*Lanius collurio*	LC	LC
Shrike, Southern White-crowned	*Eurocephalus anguitimens*	LC	LC
Sparrow, Cape	*Passer melanurus*	LC	LC
Sparrow, Great	*Passer motitensis*	LC	LC
Sparrow, House	*Passer domesticus*	LC	LC
Sparrow, Southern Grey-headed	*Passer diffusus*	LC	LC
Sparrow, Yellow-throated Bush	*Gymnoris superciliaris*	LC	LC
Sparrow-Weaver, White-browed	*Plocepasser mahali*	LC	LC
Sparrowhawk, Little	*Accipiter minullus*	LC	LC
Spoonbill, African	*Platalea alba*	LC	LC
Spurfowl, Swainson's	*Pternistis swainsonii*	LC	LC
Starling, Cape	*Lamprotornis nitens*	LC	LC
Starling, Red-winged	*Onychognathus morio*	LC	LC
Starling, Wattled	*Creatophora cinerea*	LC	LC
Stilt, Black-winged	*Himantopus himantopus*	LC	LC
Stork, Black	*Ciconia nigra*	VU	LC
Sunbird, Amethyst	*Chalcomitra amethystina*	LC	LC
Sunbird, Marico	*Cinnyris mariquensis*	LC	LC
Sunbird, White-bellied	*Cinnyris talatala*	LC	LC
Swallow, Barn	*Hirundo rustica*	LC	LC
Swallow, Greater Striped	*Cecropis cucullata*	LC	LC
Swallow, Lesser Striped	*Cecropis abyssinica*	LC	LC
Swallow, Red-breasted	*Cecropis semirufa*	LC	LC
Swift, African Palm	*Cypsiurus parvus*	LC	LC
Swift, Alpine	*Tachymarptis melba*	LC	LC
Swift, Little	*Apus affinis*	LC	LC
Tchagra, Black-crowned	*Tchagra senegalus*	LC	LC
Tchagra, Brown-crowned	*Tchagra australis*	LC	LC
Teal, Red-billed	*Anas erythrorhyncha*	LC	LC

Common Name	Scientific Name	Regional	Global
Tern, Whiskered	*Chlidonias hybrida*	LC	LC
Thick-knee, Spotted	*Burhinus capensis*	LC	LC
Thrush, Groundscraper	*Turdus litsitsirupa*	LC	LC
Thrush, Kurrichane	*Turdus libonyana*	LC	LC
Tinkerbird, Yellow-fronted	*Pogoniulus chrysoconus*	LC	LC
Tit, Ashy	*Melaniparus cinerascens*	LC	LC
Tit, Cape Penduline	*Anthoscopus minutus*	LC	LC
Tit, Southern Black	*Melaniparus niger*	LC	LC
Vulture, Cape	*Gyps coprotheres*	EN	EN
Vulture, Lappet-faced	*Torgos tracheliotos*	EN	EN
Vulture, White-backed	*Gyps africanus*	CR	CR
Wagtail, Cape	*Motacilla capensis*	LC	LC
Warbler, Chestnut-vented	*Curruca subcoerulea*	LC	LC
Warbler, Olive-tree	*Hippolais olivetorum*	LC	LC
Warbler, Willow	*Phylloscopus trochilus*	LC	LC
Waxbill, Black-faced	*Brunhilda erythronotos*	LC	LC
Waxbill, Blue	*Uraeginthus angolensis*	LC	LC
Waxbill, Common	*Estrilda astrild*	LC	LC
Waxbill, Violet-eared	*Granatina granatina*	LC	LC
Weaver, Red-billed Buffalo	*Bubalornis niger*	LC	LC
Weaver, Scaly-feathered	*Sporopipes squamifrons*	LC	LC
Weaver, Southern Masked	*Ploceus velatus*	LC	LC
Weaver, Spectacled	*Ploceus ocularis*	LC	LC
Whitethroat, Common	*Curruca communis*	LC	LC
Whydah, Long-tailed Paradise	*Vidua paradisaea*	LC	LC
Widowbird, White-winged	*Euplectes albonotatus*	LC	LC
Wood Hoopoe, Green	*Phoeniculus purpureus*	LC	LC
Woodpecker, Cardinal	*Dendropicos fuscescens*	LC	LC
Wren-Warbler, Barred	*Calamonastes fasciolatus*	LC	LC

Butterfly species occurring in QDS

Family	Scientific name	Common name	Red list category
Geometridae	*Chiasmia furcata*		LC
Geometridae	*Isturgia catalaunaria*		
Hesperiidae	*Coeliades pisistratus*	Two-pip policeman	LC (SABCA 2013)
Hesperiidae	*Spialia colotes transvaaliae*	Bushveld sandman	LC (SABCA 2013)
Lycaenidae	*Anthene dulcis dulcis*	Mashuna ciliate blue	LC (SABCA 2013)
Lycaenidae	*Tarucus bowkeri transvaalensis*	Chequered pierrot	LC (SABCA 2013)
Nymphalidae	*Byblia anvatara acheloia*	African joker	LC (SABCA 2013)
Nymphalidae	*Byblia ilithyia*	Spotted joker	LC (SABCA 2013)
Nymphalidae	*Coenyropsis natalii natalii*	Orange lined ringlet	LC (SABCA 2013)
Nymphalidae	*Junonia hierta cebrene*	Yellow pansy	LC (SABCA 2013)
Pieridae	*Eurema brigitta brigitta*	Broad-bordered grass yellow	LC (SABCA 2013)
Pieridae	*Pinacopteryx eriphia eriphia*	Zebra white	LC (SABCA 2013)
Pieridae	*Teracolus agoye agoye*	Speckled sulphur tip	LC (SABCA 2013)

Reptile species possibly occurring in QDS

Family	Scientific name	Common name	Red list category
Agamidae	*Acanthocercus atricollis*	Southern Tree Agama	LC (SARCA 2014), LEMA Schedule 3
Agamidae	*Agama aculeata distanti*	Distant's Ground Agama	LC (SARCA 2014), LEMA Schedule 3
Amphisbaenidae	*Monopeltis infuscata*	Dusky Worm Lizard	LC (SARCA 2014), LEMA Schedule 3
Chamaeleonidae	*Chamaeleo dilepis*	Common Flap-neck Chameleon	LC (SARCA 2014), LEMA Schedule 3
Colubridae	*Dasypeltis scabra*	Rhombic Egg-eater	Least Concern (SARCA 2014)
Colubridae	*Philothamnus semivariegatus*	Spotted Bush Snake	Least Concern (SARCA 2014)
Colubridae	*Thelotornis capensis capensis*	Southern Twig Snake	Least Concern (SARCA 2014)
Cordylidae	*Platysaurus guttatus*	Dwarf Flat Lizard	LC (SARCA 2014), LEMA Schedule 3
Cordylidae	*Platysaurus monotropis*	Orange-throated Flat Lizard	EN (SARCA 2014), LEMA Schedule 3
Cordylidae	*Smaug breyeri*	Waterberg Girdled Lizard	LC (SARCA 2014), LEMA Schedule 3
Gekkonidae	*Homopholis mulleri*	Muller's Velvet Gecko	VU (SARCA 2014), LEMA Schedule 3
Gekkonidae	*Homopholis wahlbergii*	Wahlberg's Velvet Gecko	LC (SARCA 2014), LEMA Schedule 3
Gekkonidae	*Lygodactylus bradfieldi*	Bradfield's Dwarf Gecko	LC (SARCA 2014), LEMA Schedule 3
Gekkonidae	*Lygodactylus capensis*	Common Dwarf Gecko	LC (SARCA 2014), LEMA Schedule 3
Gekkonidae	*Lygodactylus montiscaeruli*	Makgabeng Dwarf Gecko	DD (SARCA 2014), LEMA Schedule 3
Gekkonidae	*Lygodactylus soutpansbergensis*	Soutpansberg Dwarf Gecko	NT (SARCA 2014), LEMA Schedule 3
Gekkonidae	*Pachydactylus affinis*	Transvaal Gecko	LC (SARCA 2014), LEMA Schedule 3
Gekkonidae	*Pachydactylus capensis*	Cape Gecko	LC (SARCA 2014), LEMA Schedule 3
Gerrhosauridae	*Gerrhosaurus flavigularis*	Yellow-throated Plated Lizard	LC (SARCA 2014), LEMA Schedule 3
Gerrhosauridae	*Matobosaurus validus*	Common Giant Plated Lizard	LC (SARCA 2014), LEMA Schedule 3
Lacertidae	*Heliobolus lugubris*	Bushveld Lizard	LC (SARCA 2014), LEMA Schedule 3
Lacertidae	*Ichnotropis capensis*	Ornate Rough-scaled Lizard	LC (SARCA 2014), LEMA Schedule 3
Lacertidae	*Meroles squamulosus*	Common Rough-scaled Lizard	LC (SARCA 2014), LEMA Schedule 3
Lacertidae	*Nucras holubi*	Holub's Sandveld Lizard	LC (SARCA 2014), LEMA Schedule 3
Lacertidae	*Nucras intertexta*	Spotted Sandveld Lizard	LC (SARCA 2014), LEMA Schedule 3
Lacertidae	*Pedioplanis lineoocellata lineoocellata*	Spotted Sand Lizard	LC (SARCA 2014), LEMA Schedule 3
Lamprophiidae	*Lamprophis guttatus*	Spotted House Snake	LC (SARCA 2014)
Leptotyphlopidae	*Leptotyphlops incognitus*	Incognito Thread Snake	Least Concern (SARCA 2014)
Leptotyphlopidae	*Leptotyphlops scutifrons scutifrons*	Peters' Thread Snake	
Scincidae	*Mochlus sundevallii*	Sundevall's Writhing Skink	LC (SARCA 2014), LEMA Schedule 3
Scincidae	*Panaspis wahlbergii*	Wahlberg's Snake-eyed Skink	LC (SARCA 2014), LEMA Schedule 3
Scincidae	*Trachylepis punctatissima*	Speckled Rock Skink	LC (SARCA 2014), LEMA Schedule 3
Scincidae	*Trachylepis punctulata*	Speckled Sand Skink	LC (SARCA 2014), LEMA Schedule 3
Scincidae	*Trachylepis sp. (Transvaal varia)*	Skink sp. 1	LC (SARCA 2014), LEMA Schedule 3

Family	Scientific name	Common name	Red list category
Scincidae	*Trachylepis varia sensu lato*	Common Variable Skink Complex	LC (SARCA 2014), LEMA Schedule 3
Typhlopidae	*Afrotyphlops schlegelii*	Schlegel's Beaked Blind Snake	LC (SARCA 2014)

Amphibian species found in2328BD and 2328DB QDS (FrogMAP)

Family	Scientific name	Common name	Red list category
Brevicepitidae	*Breviceps adspersus*	Bushveld Rain Frog	LC (SARCA 2014), LEMA Schedule 3
Bufonidae	*Sclerophrys garmani*	Olive Toad	LC (SARCA 2014), LEMA Schedule 3
Hyperoliidae	*Kassina senegalensis*	Bubbling Kassina	LC (SARCA 2014), LEMA Schedule 3
Microhylidae	*Phrynomantis bifasciatus*	Banded Rubber Frog	LC (SARCA 2014), LEMA Schedule 3
Ptychadenidae	*Ptychadena anchietae*	Plain Grass Frog	LC (SARCA 2014), LEMA Schedule 3
Pyxicephalidae	*Cacosternum boettgeri*	Common Caco	LC (SARCA 2014), LEMA Schedule 3
Pyxicephalidae	*Pyxicephalus edulis*	African/Lesser Bull Frog	LC (SARCA 2014), LEMA Schedule 3, TOPS 2007
Pyxicephalidae	*Tomopterna cryptotis*	Tremelo Sand Frog	LC (SARCA 2014), LEMA Schedule 3
Pyxicephalidae	*Tomopterna natalensis*	Natal Sand Frog	LC (SARCA 2014), LEMA Schedule 3

Other invertebrate species occurring in QDS

Family	Scientific name	Common name	Red list category
Dungbeetle species			
Scarabaeidae	*Gymnopleurus humeralis*	-	DD
Scarabaeidae	*Onitis alexis*	-	DD
Scarabaeidae	*Proagoderus aureiceps*	-	DD

Desktop Heritage Impact Assessment

APAC
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A DESKTOP HERITAGE IMPACT ASSESSMENT REPORT FOR THE SYLVANIA NORTHERN MINING PROSPECTING RIGHTS APPLICATION ON VARIOUS FARMS IN THE MOKOPANE MAGISTERIAL DISTRICT OF THE LIMPOPO PROVINCE

For:

PRESCALI ENVIRONMENTAL CONSULTANTS (PTY) LTD
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REPORT: **APAC022/93**

by:

A.J. Pelser
Accredited member of ASAPA

October 2022

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DISCLAIMER:

Although all efforts are made to identify all sites of cultural heritage (archaeological and historical) significance during an assessment of study areas, the nature of archaeological and historical sites are as such that it is always possible that hidden or subterranean sites, features or objects could be overlooked during the study. APELSER Archaeological Consulting can't be held liable for such oversights or for costs incurred as a result thereof.

Clients & Developers should not continue with any development actions until SAHRA or one of its subsidiary bodies has provided final comments on this report. Submitting the report to SAHRA is the responsibility of the Client unless required of the Heritage Specialist as part of their appointment and Terms of Reference

SUMMARY

APelser Archaeological Consulting (APAC cc) was appointed by Prescali Environmental Consultants (Pty) Ltd, on behalf of Sylvania North Mining (Pty) Ltd, to conduct a Desktop-based Heritage Impact Assessment for the their Prospecting/Mining Rights Application on various farms in the Mokopane Magisterial District of the Limpopo Province. The study and project area is situated approximately 67km north-west of Mokopane & 61km north-west of Polokwane.

Background research indicates that there are several cultural heritage (archaeological & historical) sites and features in the larger geographical area within which the study area falls, and some in the study area and on a number of the farms that form part of the Application Area. These sites and heritage resources were identified during previous assessments conducted by APAC cc in the area. This report discusses the results of the background research and provides recommendations on the way forward at the end.

From a Cultural Heritage point of view it is recommended that the proposed Prospecting Rights Application be allowed to continue, taking into consideration the recommendations put forward at the end.

CONTENTS

1. INTRODUCTION

APelser Archaeological Consulting (APAC cc) was appointed by Prescali Environmental Consultants (Pty) Ltd, on behalf of Sylvania North Mining (Pty) Ltd, to conduct a Desktop-based Heritage Impact Assessment for the their Prospecting/Mining Rights Application on various farms in the Mokopane Magisterial District of the Limpopo Province. The study and project area is situated approximately 67km north-west of Mokopane & 61km north-west of Polokwane.

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The client indicated the location and boundaries of the study area and the assessment concentrated on this portion.

2. TERMS OF REFERENCE

The Terms of Reference for the study was to:

1. Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the portion of land that will be impacted upon by the proposed development;

2. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;

3. Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;

4. Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources;

5. Review applicable legislative requirements;

It should be noted that No Field-Based Assessment was conducted as part of this Appointment and that the results and recommendations made in this report are based on the scrutiny of previous research and assessments in the area, as well as archival research and aerial images of the study area.

3. LEGISLATIVE REQUIREMENTS

Aspects concerning the conservation of cultural resources are dealt with mainly in two Acts. These are the National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998).

3.1. The National Heritage Resources Act

According to the Act the following is protected as cultural heritage resources:

a. Archaeological artifacts, structures and sites older than 100 years
b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
c. Objects of decorative and visual arts
d. Military objects, structures and sites older than 75 years
e. Historical objects, structures and sites older than 60 years
f. Proclaimed heritage sites
g. Grave yards and graves older than 60 years
h. Meteorites and fossils
i. Objects, structures and sites of scientific or technological value.

The National Estate includes the following:

a. Places, buildings, structures and equipment of cultural significance
b. Places to which oral traditions are attached or which are associated with living heritage
c. Historical settlements and townscapes
d. Landscapes and features of cultural significance
e. Geological sites of scientific or cultural importance
f. Sites of Archaeological and paleontological importance
g. Graves and burial grounds
h. Sites of significance relating to the history of slavery
i. Movable objects (e.g. archaeological, paleontological, meteorites, geological specimens, military, ethnographic, books etc.)

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon. An Archaeological Impact Assessment (AIA) only looks at archaeological resources. An HIA must be done under the following circumstances:

a. The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length
b. The construction of a bridge or similar structure exceeding 50m in length
c. Any development or other activity that will change the character of a site and exceed 5 000m^2 or involve three or more existing erven or subdivisions thereof

d. Re-zoning of a site exceeding 10 000 m^2
e. Any other category provided for in the regulations of SAHRA or a Provincial Heritage Authority

Structures

Section 34 (1) of the Act states that no person may demolish any structure or part thereof which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

A structure means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

Alter means any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or the decoration or any other means.

Archaeology, palaeontology and meteorites

Section 35(4) of the Act deals with archaeology, palaeontology and meteorites and states that no person may, without a permit issued by the responsible heritage resources authority (National or Provincial):

a. destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite;

b. destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite;

c. trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or paleontological material or object, or any meteorite;

d. bring onto or use at an archaeological or paleontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and paleontological material or objects, or use such equipment for the recovery of meteorites;

e. alter or demolish any structure or part of a structure which is older than 60 years as protected.

The above mentioned may only be disturbed or moved by an archaeologist, after receiving a permit from the South African Heritage Resources Agency (SAHRA). In order to demolish such a site or structure, a destruction permit from SAHRA will also be needed.

Human remains

Graves and burial grounds are divided into the following:

a. ancestral graves
b. royal graves and graves of traditional leaders
c. graves of victims of conflict
d. graves designated by the Minister
e. historical graves and cemeteries
f. human remains

In terms of Section 36(3) of the National Heritage Resources Act, no person may, without a permit issued by the relevant heritage resources authority:

a. destroy, damage, alter, exhume or remove from its original position of otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

b. destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

c. bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

Human remains that are less than 60 years old are subject to provisions of the Human Tissue Act (Act 65 of 1983) and to local regulations. Exhumation of graves must conform to the standards set out in the **Ordinance on Excavations** (**Ordinance no. 12 of 1980**) (replacing the old Transvaal Ordinance no. 7 of 1925).

Permission must also be gained from the descendants (where known), the National Department of Health, Provincial Department of Health, Premier of the Province and local police. Furthermore, permission must also be gained from the various landowners (i.e. where the graves are located and where they are to be relocated to) before exhumation can take place.

Human remains can only be handled by a registered undertaker or an institution declared under the **Human Tissues Act** (**Act 65 of 1983 as amended**).

3.2. The National Environmental Management Act

This Act states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made.

Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

4. METHODOLOGY

4.1. Survey of literature

A survey of available literature was undertaken in order to place the development area in an archaeological and historical context. The sources utilized in this regard are indicated in the bibliography.

4.2. Field survey

The field assessment section of the study is normally conducted according to generally accepted HIA practices and aimed at locating all possible objects, sites and features of heritage significance in the area of the proposed development. The location/position of all sites, features and objects is determined by means of a Global Positioning System (GPS) where possible, while detail photographs are also taken where needed.

No field work was undertaken as part of this assessment.

4.3. Oral histories

People from local communities are sometimes interviewed in order to obtain information relating to the surveyed area. It needs to be stated that this is not applicable under all circumstances. When applicable, the information is included in the text and referred to in the bibliography.

4.4. Documentation

All sites, objects, features and structures identified are documented according to a general set of minimum standards. Co-ordinates of individual localities are determined by means of the Global Positioning System (GPS). The information is added to the description in order to facilitate the identification of each locality.

5. DESCRIPTION OF THE AREA & PROJECT

The study and Prospecting Rights Application Area is located on various farms in the Mokopane Magisterial District of the Limpopo Province, and approximately 67km north-west of the town of Mokopane & 61km north-west of Polokwane. The farms included in the Application Area are:

Aurora 397LR
Nonnenwerth 421LR

Teneriffe 682LR
Non Plus Ultra 683LR
Gillemberg 861LR
Altona 696LR
Schaffhausen 689LR

The topography and general landscape of the study & application area can't be described from a personal observation perspective as no physical fieldwork was undertaken for this specific assessment. However, based on aerial images (Google Earth) of the area, as well as physical assessments done in the area previously, it is clear that the area is relatively flat and open with little or no rocky ridges and outcrops present. Portions have been extensively ploughed and changed agriculturally, while a number of residential villages are also present and had changed the natural and historical landscape to some degree. Cattle grazing have also impacted on the area, while sections are also characterized by sandveld. A number of small streams and tributaries of rivers such as the Matlala & Seepabana is present in parts of the study & application area.

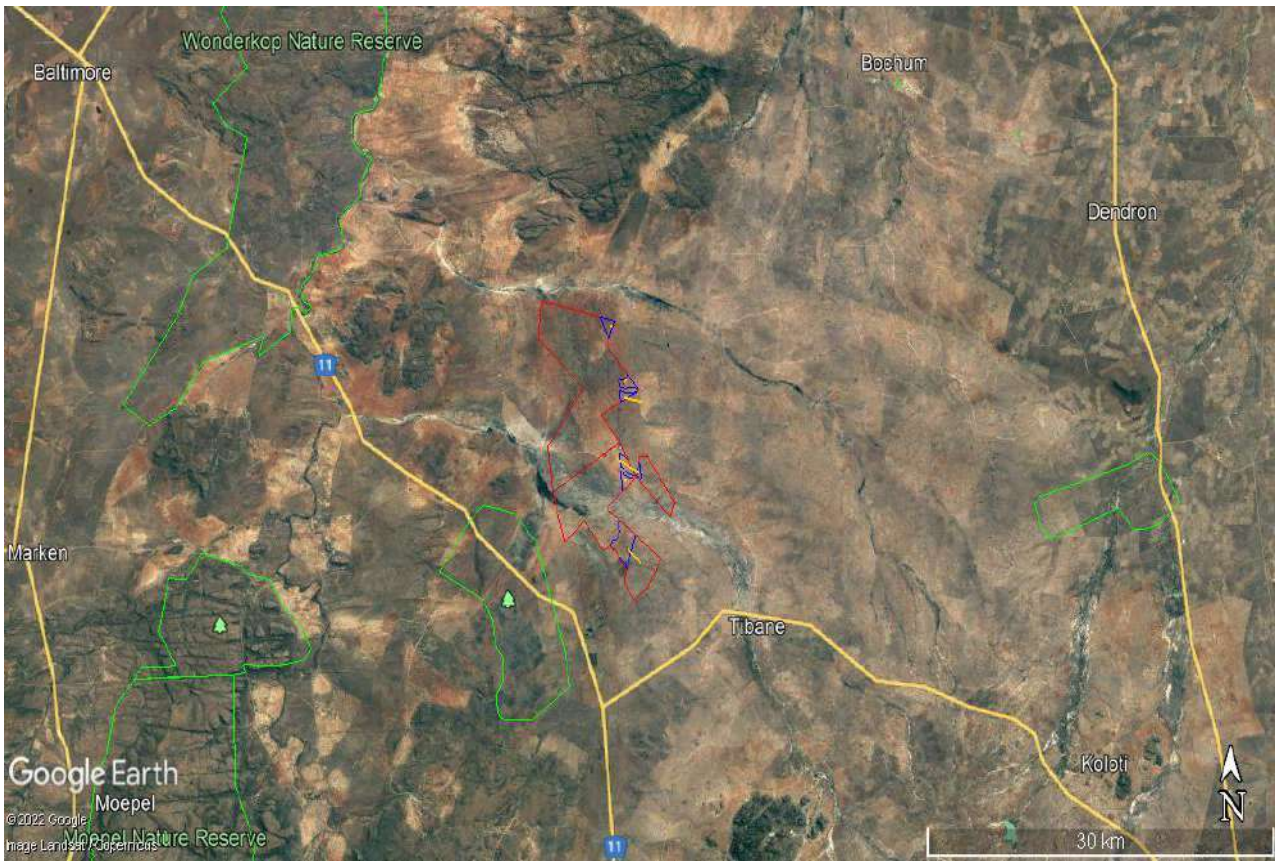

Figure 1: General location of the study & application area (Google Earth 2022).

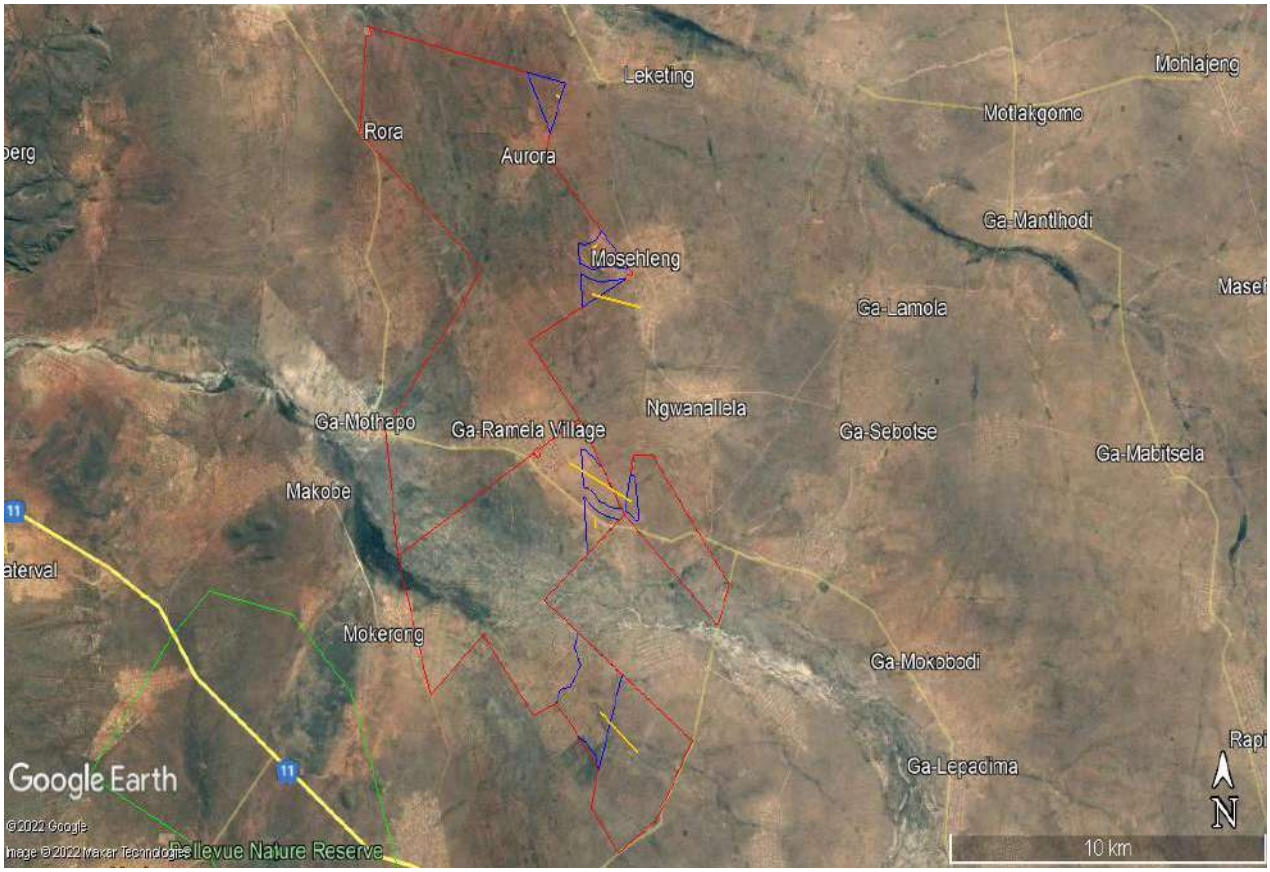

Figure 2: Closer view of the study & application area location (Google Earth 2022). The areas in blue indicate the proposed trenching and drilling areas, with the yellow lines the proposed access roads.

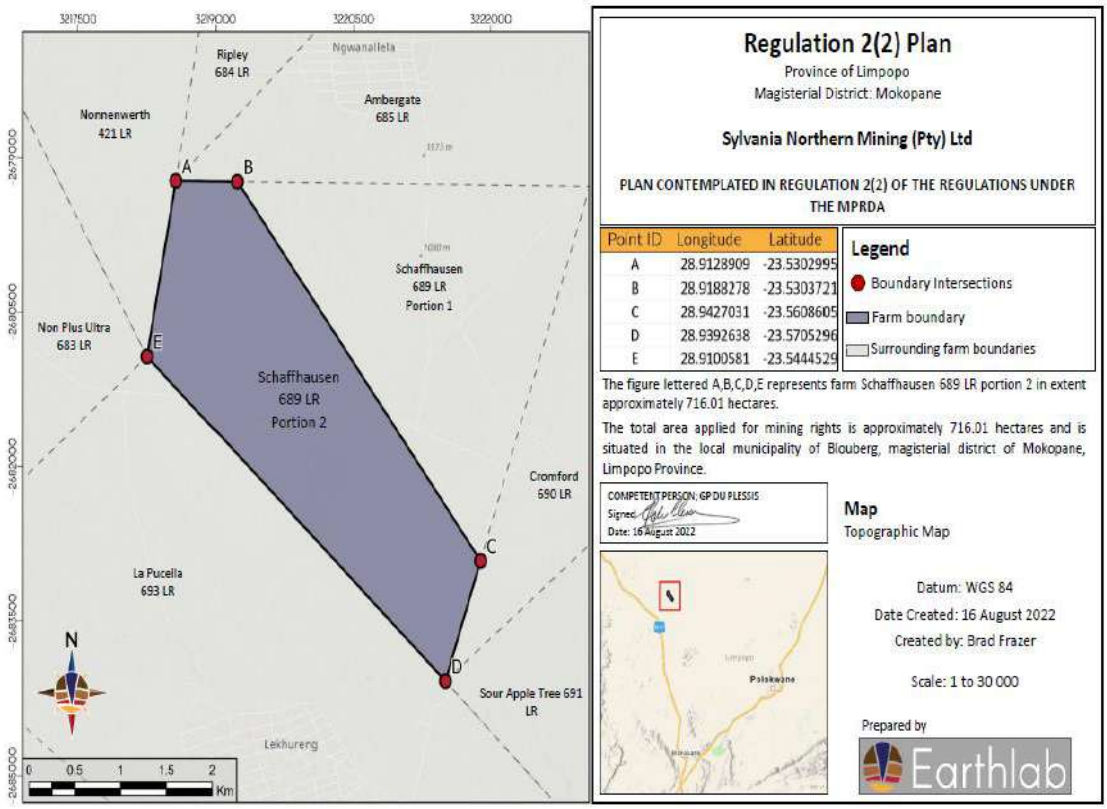

Figure 3: Regulation 2(2) Plan for the Schauffhausen 689LR Prospecting Rights Area (provided by Prescali Environmental Consultants)

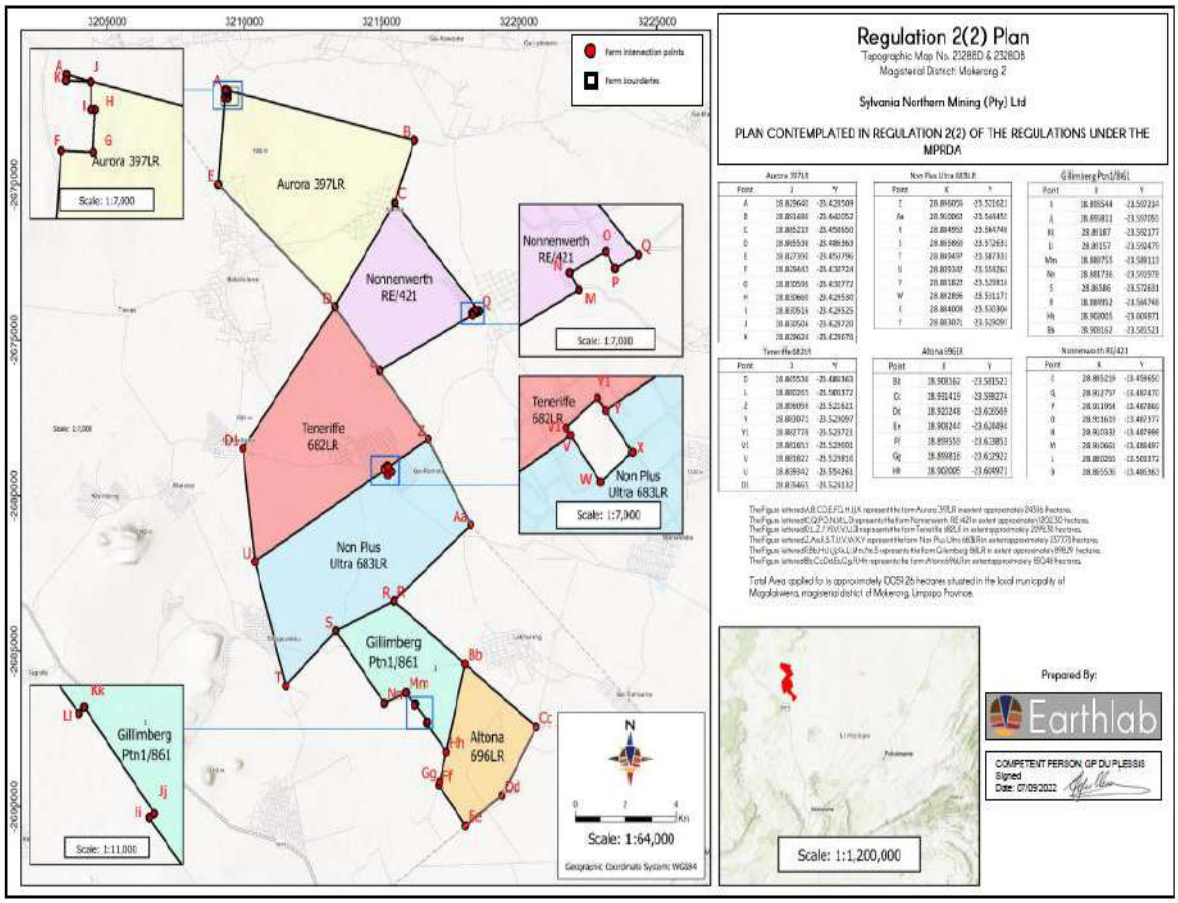

Figure 4: Regulation 2 (2) Plan for the other farms forming part of the Prospecting Rights Application (provided by Prescali Environmental Consultants)

6. DISCUSSION

The Stone Age is the period in human history when lithic (stone) material was mainly used to produce tools. In South Africa the Stone Age can be divided in basically into three periods. It is however important to note that dates are relative and only provide a broad framework for interpretation. A basic sequence for the South African Stone Age (Lombard et.al 2012) is as follows:

Earlier Stone Age (ESA) up to 2 million – more than 200 000 years ago
Middle Stone Age (MSA) less than 300 000 – 20 000 years ago
Later Stone Age (LSA) 40 000 years ago – 2000 years ago

It should also be noted that these dates are not a neat fit because of variability and overlapping ages between sites (Lombard et.al 2012: 125).

No Stone Age sites (including rock art) are known to occur in the immediate study area. The closest known Stone Age sites are located at near Blouberg on the Makgabeng Plateau dating to the Later Stone Age (Bergh 1999: 4). A very large number of significant rock art sites (numbering in their hundreds) are located on the Makgabeng Plateau and on farms directly north of the study area. These rock art sites are representative of San, Khoi and

Northern-Sotho rock art traditions (J.van Schalkwyk Pers.Comm 2012-12-11) and is located on farms such Disseldorp 369LR and Bayswater 370LR north of the farms that form part of the current study (Eastwood et.al 2004; 2005), as well as other farms including Groenepunt, Kirstenspruit and Rosamond.

The possibility of finding Stone Age material in the study areas is always a possibility. These would however more specifically be individual artifacts and small scatters of artifacts in open-air contexts if they are present.

The Iron Age is the name given to the period of human history when metal was mainly used to produce metal artifacts. In South Africa it can be divided in two separate phases (Bergh 1999: 96-98), namely:

Early Iron Age (EIA) 200 – 1000 A.D
Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:

Early Iron Age (EIA) 250 – 900 A.D.
Middle Iron Age (MIA) 900 – 1300 A.D.
Late Iron Age (LIA) 1300 – 1840 A.D.

There are no known Iron Age sites in the immediate study area. Once again a large number of EIA and LIA sites are known to exist to the north of the study area on the Makgabeng Plateau (J.van Schalkwyk Pers.Comm. 2013-10-15).

Tom Huffman's research work shows that EIA, MIA and LIA sites, features or material could possibly be found in the area. This could include the so-called Happy Rest facies of the Kalundu Tradition dating to between AD500 and AD750 (Huffman 2007: 219); Diamant facies of the same tradition dating to between AD750 and AD1000 (p.223); Eiland facies of Kalundu dating to between AD1000 and AD1300 (p.227); the Icon facies of the Urewe Tradition dating to between AD1300 & AD1500 (p.183) and finally the Letsibogo facies of the same tradition dating to between AD1500 and AD1700 (Huffman 2007: 187).

The historical age started with the first recorded oral histories in the area. It includes the moving into the area of people that were able to read and write. The first European group to pass close by the area was that of Coenraad de Buys in 1821 and again 1825, followed by the Voortrekkers after 1844 (Bergh 1999: 12; 14). By 1848 the area formed part of the Soutpansberg Magisterial District (Bergh 1999: 17).

Results of previous assessments in the area

During previous assessments in the area by the author of this report (**See APAC013/71 & APAC014/47**) some cultural heritage sites and features were identified. These included

mainly recent historical settlement remains as well as graveyards and graves. No Stone Age or Iron Age sites or remains were identified during these previous field assessments.

The following sites were identified and recorded in the area during the 2013 & 2014 assessments:

Site 1 – Ruins of recent historical settlement: S23.42191 E28.84669
Site 2 – Ruins of recent historical settlement: S23.41329 E28.85336

Both these sites are on the farm Cracouw and are located outside of the current study & Application Area.

Sites 3 & 4 – Sections of low, stone-packed walls dating to recent historical periods: (3) S23 36 18.50 E28 54 19.80 & (4) S23 36 17.30 E28 54 21.20.

***Their Cultural Heritage Significance was seen as Low and no Mitigation Measures were required*.**

Site 5 – Consists of 2 graveyards & the remains of a recent historical settlement: S23 34 20.70 E28 51 48.20

Sites 6 & 7 - Contains a single grave & 3 larger cemeteries respectively: (6) S23 34 14.20 E28 51 57.70 (grave); (7) S23 32 49.40 E28 54 35.10 (3 cemeteries).

Graves always carry a High Cultural Significance rating and should any of the recorded sites (and possible unmarked or unknown ones) be impacted by the proposed mining-related activities, mitigation measures will have to be implemented. This could either be the in situ preservation of the sites and graves, or the exhumation and relocation of the graves after social consultation and the requiring of the necessary permits. The older settlement remains should also be avoided if possible as they might contain unmarked burials (still-born or young infants/children) in close proximity, but if this is not possible these sites should also be recorded in more detail through social consultation and mapping.

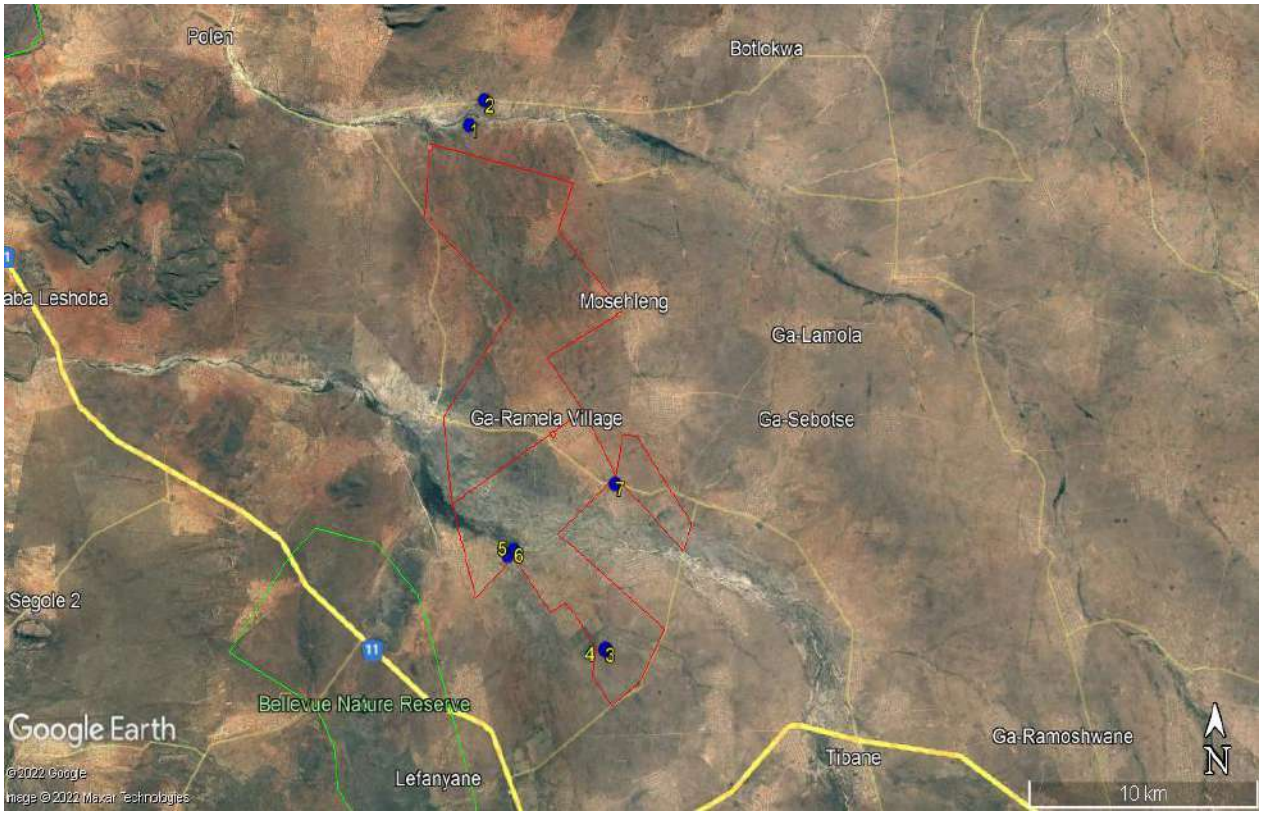

Figure 5: Location & distribution of sites identified during the 2013 & 2014 assessments (Google Earth 2022).

Figure 6: A view characteristic of the general area with a small rural village visible (picture taken in 2013).

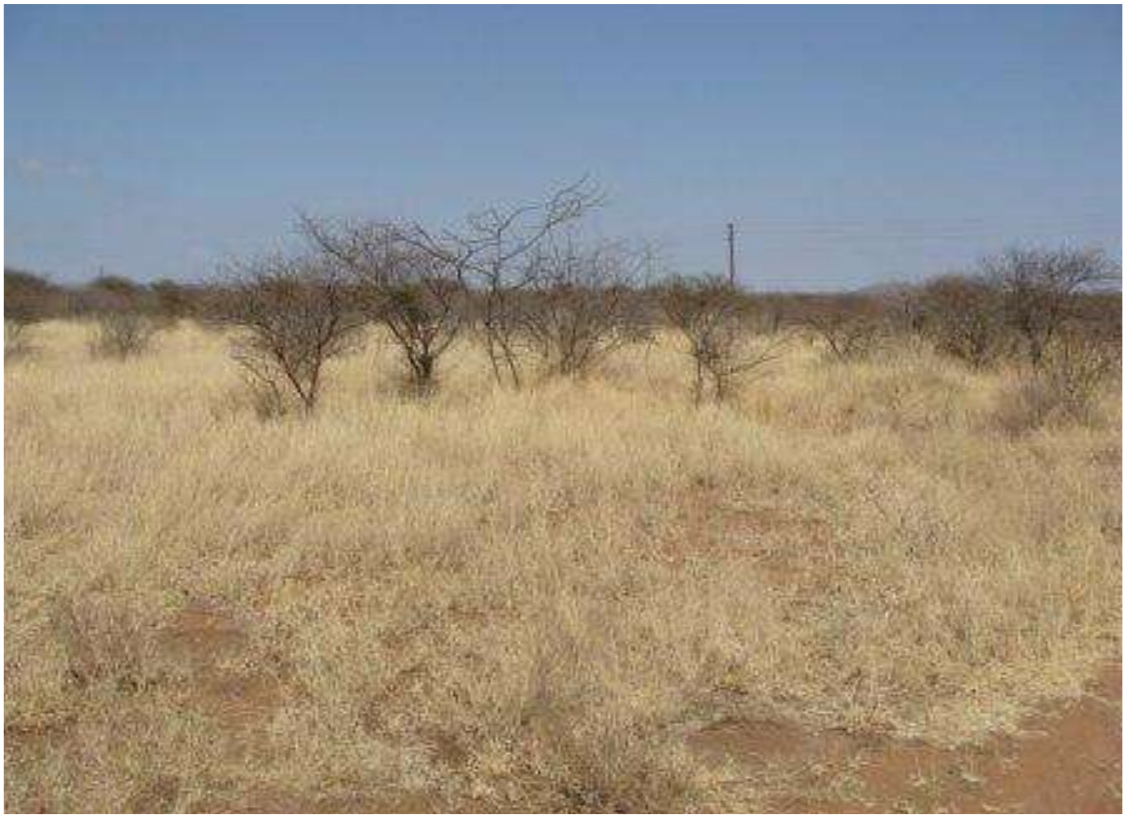

Figure 7: A typical view of the landscape and vegetation in the area (taken in 2014).

Figure 8: The topography of the area is relatively flat and open with some areas showing the effects of overgrazing (taken in 2013).

Figure 9: Large sections of the area have been altered through agriculture and will therefore have no impacts on any heritage sites (taken in 2014).

Figure 10: Another view of a section of the study area. Open, eroded and overgrazed areas and rural residential developments are the norm (taken in 2014).

Figure 11: A section of low stone walling found in the area during 2014 (Sites 3 & 4).

Figure 12: Recent historical settlement remains in the area found in 2014 (Site 5).

Figure 13: The Site 5 cemetery recorded in 2014.

Figure 14: The single grave (Site 6) recorded in 2014.

Figure 15: One of the three cemeteries found at Site 7 during 2014.

No physical field assessment was undertaken for the Sylvania North Mining Prospecting/Mining Rights Application on Schauffhausen and the other farms that form part of the Study & Application Area. It is therefore not possible to say if there are any cultural heritage (archaeological and/or historical) sites, features or material located here that could possibly be negatively impacted by the proposed prospecting and related future mining activities here. Although some sites were found in the area on some of the other farms that make up the application area, it is always possible that many were missed during the earlier assessments as a result of various factors. These would include dense vegetation and access issues during the 2013 & 2014 studies.

It is however evident from the desktop study that archaeological/historical sites and finds do occur in the geographical landscape within which the study area is located. Based on this it is possible that open-air Stone Age sites could be found in the area, most likely in the form of individual stone tools or small scatters. The possibility of Iron Age sites (especially stone-walled Late Iron Age sites) in the areas can also not be excluded, although this is less likely. The likelihood of recent historical sites and features being present in the area is High, and will most be represented by the remnants of individual homesteads, rural settlements and both formal & informal cemeteries, individual graves and even previously unknown & unmarked graves.

The following is recommended on the way forward:

That the proposed Sylvania Northern Mining (Pty) Ltd Prospecting/Mining Rights Application on various farms in the Mokopane Magisterial District, 67km north-west of

Mokopane and 61km north-west of Polokwane, be allowed to continue with the condition that once the final detailed locations of the Prospecting Boreholes and Trenches has been determined that detailed field-based assessments be carried out in these areas to determine the impacts of these activities on any possible cultural heritage (archaeological and/or historical) sites and remains. Any resultant proposed future mining activities and related developments and operations will have to then be assessed as well.

7. CONCLUSIONS AND RECOMMENDATIONS

APelser Archaeological Consulting (APAC cc) was appointed by Prescali Environmental Consultants (Pty) Ltd, on behalf of Sylvania North Mining (Pty) Ltd, to conduct a Desktop-based Heritage Impact Assessment for the their Prospecting/Mining Rights Application on various farms in the Mokopane Magisterial District of the Limpopo Province. The study and project area is situated approximately 67km north-west of Mokopane & 61km north-west of Polokwane.

Background research indicates that there are several cultural heritage (archaeological & historical) sites and features in the larger geographical area within which the study area falls, and some in the study area and on a number of the farms that form part of the Application Area. These sites and heritage resources were identified during previous assessments conducted by APAC cc in the area.

During previous assessments in the area some cultural heritage sites and features were identified. These included mainly recent historical settlement remains as well as graveyards and graves. No Stone Age or Iron Age sites or remains were identified during these previous field assessments. No physical field assessment was undertaken for the Sylvania North Mining Prospecting/Mining Rights Application on Schauffhausen and the other farms that form part of the Study & Application Area. It is therefore not possible to say if there are any cultural heritage (archaeological and/or historical) sites, features or material located here that could possibly be negatively impacted by the proposed prospecting and related future mining activities here.

It is also evident from the desktop study that archaeological/historical sites and finds do occur in the geographical landscape within which the study area is located. Based on this it is possible that open-air Stone Age sites could be found in the area, most likely in the form of individual stone tools or small scatters. The possibility of Iron Age sites (especially stone-walled Late Iron Age sites) in the areas can also not be excluded, although this is less likely. The likelihood of recent historical sites and features being present in the area is High, and will most be represented by the remnants of individual homesteads, rural settlements and both formal & informal cemeteries, individual graves and even previously unknown & unmarked graves.

It is important to note here that Graves always carry a High Cultural Significance rating and should any of the recorded sites (and possible unmarked or unknown ones) be impacted by the proposed mining-related activities, mitigation measures will have to be implemented. This could either be the in situ preservation of the sites and graves, or the exhumation and

relocation of the graves after social consultation and the requiring of the necessary permits. Any recent historical homestead/settlement remains should also be avoided if possible as they might contain unmarked burials (still-born or young infants/children) in close proximity, but if this is not possible these sites should also be recorded in more detail through social consultation and mapping.

Finally it can be concluded that the proposed Sylvania Northern Mining (Pty) Ltd Prospecting/Mining Rights Application on various farms in the Mokopane Magisterial District in the Limpopo Province should be allowed to continue with the condition that once the final detailed locations of the Prospecting Boreholes and Trenches has been determined that detailed field-based assessments be carried out in these areas to determine the impacts of these activities on any possible cultural heritage (archaeological and/or historical) sites and remains. Any resultant proposed future mining activities and related developments and operations will have to then be assessed as well.

8. REFERENCES

General &, Closer Views of Study Area location: Google Earth 2022.

Known sites location and distribution: Google Earth 2022.

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Republic of South Africa. 1998. **National Environmental Management Act** (no 107 of 1998). Pretoria: The Government Printer.

APPENDIX A: DEFINITION OF TERMS:

Site: A large place with extensive structures and related cultural objects. It can also be a large assemblage of cultural artifacts, found on a single location.

Structure: A permanent building found in isolation or which forms a site in conjunction with other structures.

Feature: A coincidental find of movable cultural objects.

Object: Artifact (cultural object).

(Also see Knudson 1978: 20).

APPENDIX B: DEFINITION/ STATEMENT OF HERITAGE SIGNIFICANCE

Historic value: Important in the community or pattern of history or has an association with the life or work of a person, group or organization of importance in history.

Aesthetic value: Important in exhibiting particular aesthetic characteristics valued by a community or cultural group.

Scientific value: Potential to yield information that will contribute to an understanding of natural or cultural history or is important in demonstrating a high degree of creative or technical achievement of a particular period

Social value: Have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.

Rarity: Does it possess uncommon, rare or endangered aspects of natural or cultural heritage.

Representivity: Important in demonstrating the principal characteristics of a particular class of natural or cultural places or object or a range of landscapes or environments characteristic of its class or of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province region or locality.

APPENDIX C: SIGNIFICANCE AND FIELD RATING:

Cultural significance:

- Low: A cultural object being found out of context, not being part of a site or without any related feature/structure in its surroundings.

- Medium: Any site, structure or feature being regarded less important due to a number of factors, such as date and frequency. Also any important object found out of context.

- High: Any site, structure or feature regarded as important because of its age or uniqueness. Graves are always categorized as of a high importance. Also any important object found within a specific context.

Heritage significance:

- Grade I: Heritage resources with exceptional qualities to the extent that they are of national significance

- Grade II: Heritage resources with qualities giving it provincial or regional importance although it may form part of the national estate

- Grade III: Other heritage resources of local importance and therefore worthy of conservation

Field ratings:

i. National Grade I significance: should be managed as part of the national estate

ii. Provincial Grade II significance: should be managed as part of the provincial estate

iii. Local Grade IIIA: should be included in the heritage register and not be mitigated (high significance)

iv. Local Grade IIIB: should be included in the heritage register and may be mitigated (high/ medium significance)

v. General protection A (IV A): site should be mitigated before destruction (high/medium significance)

vi. General protection B (IV B): site should be recorded before destruction (medium significance)

vii. General protection C (IV C): phase 1 is seen as sufficient recording and it may be demolished (low significance)

APPENDIX D: PROTECTION OF HERITAGE RESOURCES:

Formal protection:

National heritage sites and Provincial heritage sites – Grade I and II
Protected areas - An area surrounding a heritage site
Provisional protection – For a maximum period of two years
Heritage registers – Listing Grades II and III
Heritage areas – Areas with more than one heritage site included
Heritage objects – e.g. Archaeological, palaeontological, meteorites, geological specimens, visual art, military, numismatic, books, etc.

General protection:

Objects protected by the laws of foreign states
Structures – Older than 60 years
Archaeology, palaeontology and meteorites
Burial grounds and graves
Public monuments and memorials

APPENDIX E: HERITAGE IMPACT ASSESSMENT PHASES

1. Pre-assessment or Scoping Phase – Establishment of the scope of the project and terms of reference.

2. Baseline Assessment – Establishment of a broad framework of the potential heritage of an area.

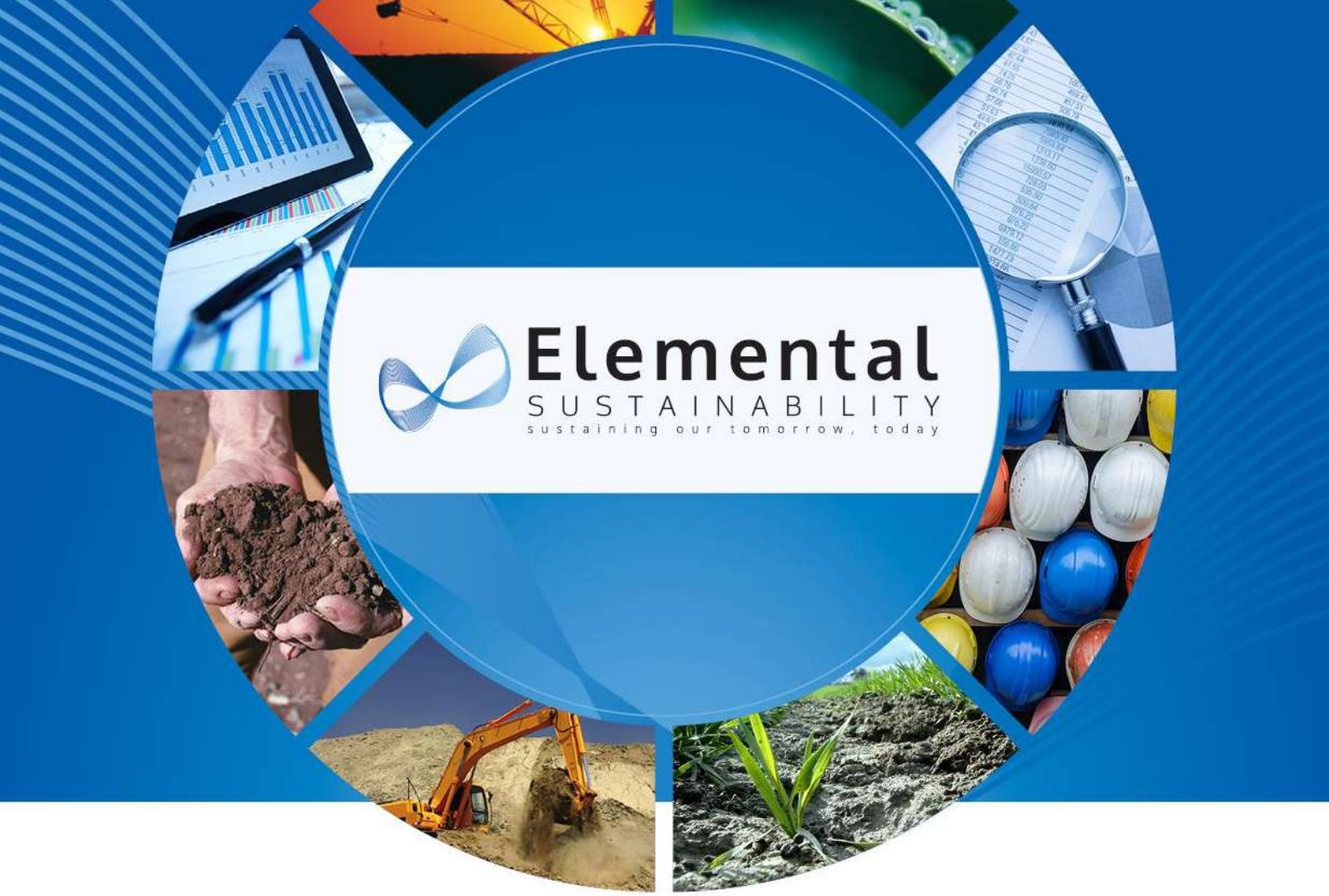
3. Phase I Impact Assessment – Identifying sites, assess their significance, make comments on the impact of the development and makes recommendations for mitigation or conservation.

4. Letter of recommendation for exemption – If there is no likelihood that any sites will be impacted.

5. Phase II Mitigation or Rescue – Planning for the protection of significant sites or sampling through excavation or collection (after receiving a permit) of sites that may be lost.

6. Phase III Management Plan – For rare cases where sites are so important that development cannot be allowed.

Soil, Land Use and Land Capability



Desktop Soil, Land Use and Land Capability Assessment for the Proposed Sylvania Prospecting Project

Final Report

Prepared for:

Sylvania Northern Mining (Pty) Ltd.

3 October 2022

Contact: Kumari Pillay – 072 062 5489
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PROJECT INFORMATION

DOCUMENT CONTROL

Report	Soil, Land Use and Land Capability Assessment for the Proposed Sylvania Prospecting Project
Client	Sylvania Northern Mining (Pty) Ltd
Responsible Person	Petro Erasmus Environmental Assessment Practitioner (EAP) Prescali Environmental Consultants (Pty) Ltd 072 237 7305
Report Number	SNM-SLC-REP-062_22 0.0
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Report Date	3 October 2022

VERIFICATION AND ACCEPTANCE

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Signature		**Signature**	
Date	3 October 2022	**Date**	3 October 2022

DISCLAIMER

In addition, this report has been compiled in line with the requirements of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA) and EIA regulations (2014), as amended. Information reported herein may be based on the interpretation of public domain data collected by Elemental Sustainability (Pty) Ltd, and/or information supplied by the applicant and/or its other advisors and associates. The data has been accepted in good faith as being accurate and valid. This document may contain information of a specialised and/or highly technical nature and the reader is advised to seek clarification on any elements which may be unclear to

SPECIALIST REPORT GUIDE IN ACCORDANCE WITH REGULATIONS

Protocol for the specialist assessment and minimum report content requirements for Environment Impacts on Agricultural Resources (GNR 320, 20 March 2020).

NR.	CONTENT	REFERENCE
2.1	The assessment must be undertaken by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP).	Page 6 – Annexure 1
2.2	The assessment must be undertaken on the preferred site and within the proposed development footprint.	Figure 1
2.3	The assessment must be undertaken based on a site inspection as well as an investigation of the current production figures, where the land is under cultivation or has been within the past 5 years, and must identify:	Section 6.5 and 6.6
2.3.1	the extent of the impact of the proposed development on the agricultural resources; and	Section 6
2.3.2	whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site, and in the event where it does, whether such a negative impact is outweighed by the positive impact of the proposed development on agricultural resources.	Section 6
2.4	The status quo of the site must be described, including the following aspects which must be considered as a minimum in the baseline description of the agro-ecosystem:	Section 6
2.4.1	the soil form/s, soil depth (effective and total soil depth), top and sub-soil clay percentage, terrain unit and slope;	Section 6
2.4.2	where applicable, the vegetation composition, available water sources as well as agro-climatic information;	Section 6
2.4.3	the current productivity of the land based on production figures for all agricultural activities undertaken on the land for the past 5 years, expressed as an annual figure and broken down into production units;	N/A
2.4.4	the current employment figures (both permanent and casual) for the land for the past 3 years, expressed as an annual figure; and	N/A
2.4.5	existing impacts on the site, located on a map (e.g., erosion, alien vegetation, non-agricultural infrastructure, waste, etc.).	Section 6.1
2.5	Assessment of impacts, including the following aspects which must be considered as a minimum in the predicted impact of the proposed development on the agro-ecosystem:	Section 8
2.5.1	change in productivity for all agricultural activities based on the figures of the past 5 years, expressed as an annual figure and broken down into production units;	N/A
2.5.2	change in employment figures (both permanent and casual) for the past 5 years expressed as an annual figure; and	N/A
2.5.3	any alternative development footprints within the preferred site which would be of “medium” or “low” sensitivity for agricultural resources as identified by the screening tool and verified through the site sensitivity verification.	Section 6.6
2.7	This report must contain the findings of the agro-ecosystem specialist assessment and the following information, as a minimum:	
2.7.1	details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	Page 6
2.7.2	a signed statement of independence by the specialist;	Page 6
2.7.3	the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	N/A
2.7.4	a description of the methodology used to undertake the on-site assessment inclusive of the equipment and models used, as relevant;	N/A
2.7.5	a map showing the proposed development footprint (including supporting infrastructure) with a 50m buffered development envelope, overlaid on the agricultural sensitivity map generated by the screening tool;	N/A

2.7.6	an indication of the potential losses in production and employment from the change of the agricultural use of the land as a result of the proposed development;	N/A
2.7.7	an indication of possible long-term benefits that will be generated by the project in relation to the benefits of the agricultural activities on the affected land;	N/A
2.7.8	additional environmental impacts expected from the proposed development based on the current status quo of the land including erosion, alien vegetation, waste, etc.;	Section 6
2.7.9	information on the current agricultural activities being undertaken on adjacent land parcels;	Section 6
2.7.10	an identification of any areas to be avoided, including any buffers;	Section 6
2.7.11	a motivation must be provided if there were development footprints identified as per paragraph 2.5.3 above that were identified as having a "medium" or "low" agriculture sensitivity and that were not considered appropriate;	N/A
2.7.12	confirmation from the soil scientist or agricultural specialist that all reasonable measures have been considered in the micro-siting of the proposed development to minimise fragmentation and disturbance of agricultural activities;	Section 10
2.7.13	a substantiated statement from the soil scientist or agricultural specialist with regards to agricultural resources on the acceptability or not of the proposed development and a recommendation on the approval or not of the proposed development;	Section 10
2.7.14	any conditions to which this statement is subjected;	Section 10
2.7.15	where identified, proposed impact management outcomes or any monitoring requirements for inclusion in the Environmental Management Programme (EMPr); and	Section 8.2
2.7.16	a description of the assumptions made and any uncertainties or gaps in knowledge or data.	Section 2

All specialist reports must be prepared in accordance with Appendix 6 of the EIA Regulations of 2014 (as amended in 2017).

NR.	CONTENT	REFERENCE
a	A specialist report prepared in terms of these Regulations must contain— details of— i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page 6 – Annexure 1
b	A declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 6
c	An indication of the scope of, and the purpose for which, the report was prepared;	Section 2
cA	An indication of the quality and age of base data used for the specialist report;	Section 5
cB	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 6 and 8
d	The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	N/A
e	A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 5
f	Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	N/A
g	An identification of any areas to be avoided, including buffers;	Section 6
h	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 6
i	A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2

j	A description of the findings and potential implications of such findings on the impact of the proposed activity [including identified alternatives on the environment] or activities;	Section 6, 7 and 8
k	Any mitigation measures for inclusion in the EMPr;	Section 8.2
l	Any conditions for inclusion in the environmental authorisation;	Section 8.2
m	Any monitoring requirements for inclusion in the EMPr or environmental authorisation;	None.
n	A reasoned opinion— i. [as to] whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 10
o	A description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
p	A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
q	Any other information requested by the competent authority.	None

SPECIALIST DECLARATION

I, DuToit Wilken, declare that:

- I acted as the independent specialist;
- I performed the work in an objective manner, even if the findings and conclusions are not favourable to the applicant;
- I do not have any financial interest in the undertaking of this project or projects, other than remuneration for the work performed in terms of the National Environmental Management Act 107 of 1998;
- There are no circumstances that may compromise my objectivity in performing such work;
- The contents of this report comply with the relevant legislative requirements, specifically in GNR 320 (20 March 2020) and where applicable Appendix 6 of the NEMA: EIA Regulations (2014, as amended in 2017);
- I have the relevant expertise required to conduct a specialist report of this nature in terms of the National Environmental Management Act (NEMA) (Act no. 107 of 1998);
- I understand that any false information published in this document is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act;
- I am a professionally registered scientist with the South African Council for Natural Scientific Professions (SACNASP);
- I undertake to disclose and provide to the competent authority all material and information in my possession regarding this project as required in terms of National Environmental Management Act 107 of 1998; and
- Based on the information provided to me by the client and in addition to information obtained during this study, I have presented the results and conclusion regarding this project to the best of my professional ability.
- I further declare that I was responsible for collecting data and compiling this report. All assumptions, assessments and recommendations are made in good faith and are considered to be correct to the best of my knowledge and the information available at this stage.

DuToit Wilken

Pr.Sci.Nat. (No. 118911)

3rd October 2022

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DEFINITION OF TERMS

Calcareous	Containing calcium carbonate or magnesium carbonate.
Chromic	Having within ≤150 cm of the soil surface, a subsurface layer ≥30 cm thick, that has a Munsell colour hue redder than 7.5YR, moist.
Erosion	The group of processes whereby soil or rock material is loosened or dissolved and removed from any part of the earth's surface.
Ferralic	Having a ferralic horizon starting ≤150 cm of the soil surface.
Ferralic horizon	A subsurface horizon resulting from long and intense weathering, with a clay fraction that is dominated by low-activity clays and contains various amounts of resistant minerals such as Fe, Al, and/or Mn hydroxides.
Land capability	The ability of land to meet the needs of one or more uses under defined conditions of management.
Land type	(1) A class of land with specified characteristics. (2) In South Africa it has been used as a map unit denoting land, map able at 1:250000 scale, over which there is a marked uniformity of climate, terrain form and soil pattern.
Land use	The use to which land is put.

Lithic	Having continuous rock or technic hard material starting ≤10 cm from the soil surface.
Orthic A horizon	A surface horizon that does not qualify as organic, humic, vertic or melanic topsoil although it may have been darkened by organic matter.
Salinity	High Sodium Adsorption Ratio (SAR) above 15% are indicative of saline soils. The dominance of Sodium (Na) cations in relation to other cations tends to cause soil dispersion (deflocculation), which increases susceptibility to erosion under intense rainfall events.
Sodicity	High exchangeable sodium Percentage (ESP) values above 15% are indicative of sodic soils. Similarly, the soil dispersion.
Texture, soil	The relative proportions of the various size separate in the soil as described by the classes of soil texture shown in the soil texture chart. The pure sand, sand, loamy sand, sandy loam and sandy clay loam classes are further subdivided according to the relative percentages of the course, medium and fine sand sub-separates.

1. INTRODUCTION

1.1 General Background and Project Description

Elemental Sustainability (Pty) Ltd (hereafter referred to as Elemental) was appointed by Prescali Environmental Consultants (Pty) Ltd (hereafter referred to as Prescali) to undertake a Desktop Soil, Land Use and Land Capability Assessment for Sylvania Northern Mining (Pty) Ltd. (hereafter referred to as SNM) as part of the Environmental Impact Assessment (EIA) Process being undertaken for the proposed prospecting right. The proposed prospecting right activities will consist of both Non-Invasive and Invasive activities as outlined in the subsections below.

1.1.1 Non-Invasive Activities

Phase 1:

- Investigate academic data and liaise with communities - Year 1; Duration: 6 Months.
- Desktop study - Year 1; Duration: 1 month.
- Inventories, capture and QA/QC and database creation - Year 1; Duration: 5 months.
- Preliminary site visit - Year 1; Duration: 1 week.
- Regional geochemistry and geophysical interpretation - Year 1; Duration: 4 months.
- Integrate information and define exploration targets - Year 1; Duration: 1 month.

Phase 2:

- Ground geophysics and soil geochemical sampling - Year 2; Duration: 10 months.
- Trenching - Year 2; Duration: 5 months.

Phase 3:

- Drilling - Year 3; Duration: 8 months.
- Logging, sampling, and analysis - Year 3; Duration: 12 Months.
- Geological modelling - Year 3; Duration: 6 Months]:

Phase 4:

- Resource drilling - Year 4; Duration: 4 Months.
- Estimation of resource - Year 4; Duration: 3 Months.
- Pre-feasibility study - Year 4; Duration: 12 Months.

Phase 5:

- Feasibility study - Year 5; Duration: 6 Months.

1.1.2 Invasive Activities

- **Ground geophysics and soil geochemical sampling** *(Year 2; Duration: 10 months)***:** Geochemical sampling campaigns with pre-designed sampling grids of 250 m x 250 m will be undertaken on the prospecting areas.

- **Trenching** *(Year 2; Duration: 5 months)***:** Eight (8) short (25m x 2m x 2 m) trenches will be excavated over the outcrop positions of the defined orebodies. The trenches will be geologically mapped, and the sidewalls of the trenches will be sampled. Once this is complete, the trenches will be refilled. During the trenching and mapping, temporary barriers will be erected around the excavation to prevent people/animals from falling into the trenches.
- **Resource drilling** *(Year 3; Duration: 8 months)***:** Drilling (diamond or RC) of the prospective areas will commence establishing the presence of mineralisation in the prospect areas. Geological borehole logging, downhole geophysical logging, core magnetic susceptibility measurement and sampling will also be carried out. It is anticipated that initially approximately four (4) drill holes will be drilled. Drill holes could vary in depth from 150 m to 350 m, with an average depth of 250 m. The total amount of drilling to be budgeted for at this stage is 750 meters. Depending on the results of this drilling further 1 drill hole totalling 250 meters depth may be required.

Table 1: Sampling site sizes and activities associated with the proposed invasive phase**.**

	Farm Names	
	Altona 696 LR, Gillemberg 861 LR, Non Plus Ultra 683 LR, Teneriffe 682 LR, Aurora 397 LR, Nonnenwerth 421 LR	**Schaffhausen**
Drill Site	10m x 10m Drill Sites 1 Drill site= 100 m^2 Total Drill Site Areas (6) = 600 m^2	10m x 10m Drill Sites 1 Drill site= 100 m^2 Total Drill Site Areas: (4) = 400 m^2
Trenching	25m x 2m x 2m Trench Sites 1 Trench = 50 m^2 Total Trench Areas (25) = 1 250 m^2	25m x 2m x 2m Trench Sites 1 Trench = 50 m^2 Total Trench Areas: (8) = 400 m^2
Contractor's camp	N/A	400 m^2
Rehabilitation and Closure	1 850 m^2	1 200 m^2

The assessment entailed evaluating available desktop soil and land capability data and current limitations to various land use purposes.

1.2 Locality

The proposed prospecting right area (hereafter referred to as the "study site") will be situated on sections of the Farm Altona 696 LR, sections of the Farm Schaffhausen 689 LR, sections of the Farm Nonnenwerth 421 LR, the Farm Aurora 397 LR, the Farm Teneriffe 682 LR, the Farm Gillemberg 861 LR and the Fam Non Plus Ultra 683 LR, within the Limpopo Province (**Figure 1**). Central coordinates for the site are as follows: 23°31'37.15"S, 28°51'48.92"E.

The proposed areas of focus, where the proposed prospecting activities as discussed in Table 1 will take place, is presented in **Figure 2** below.

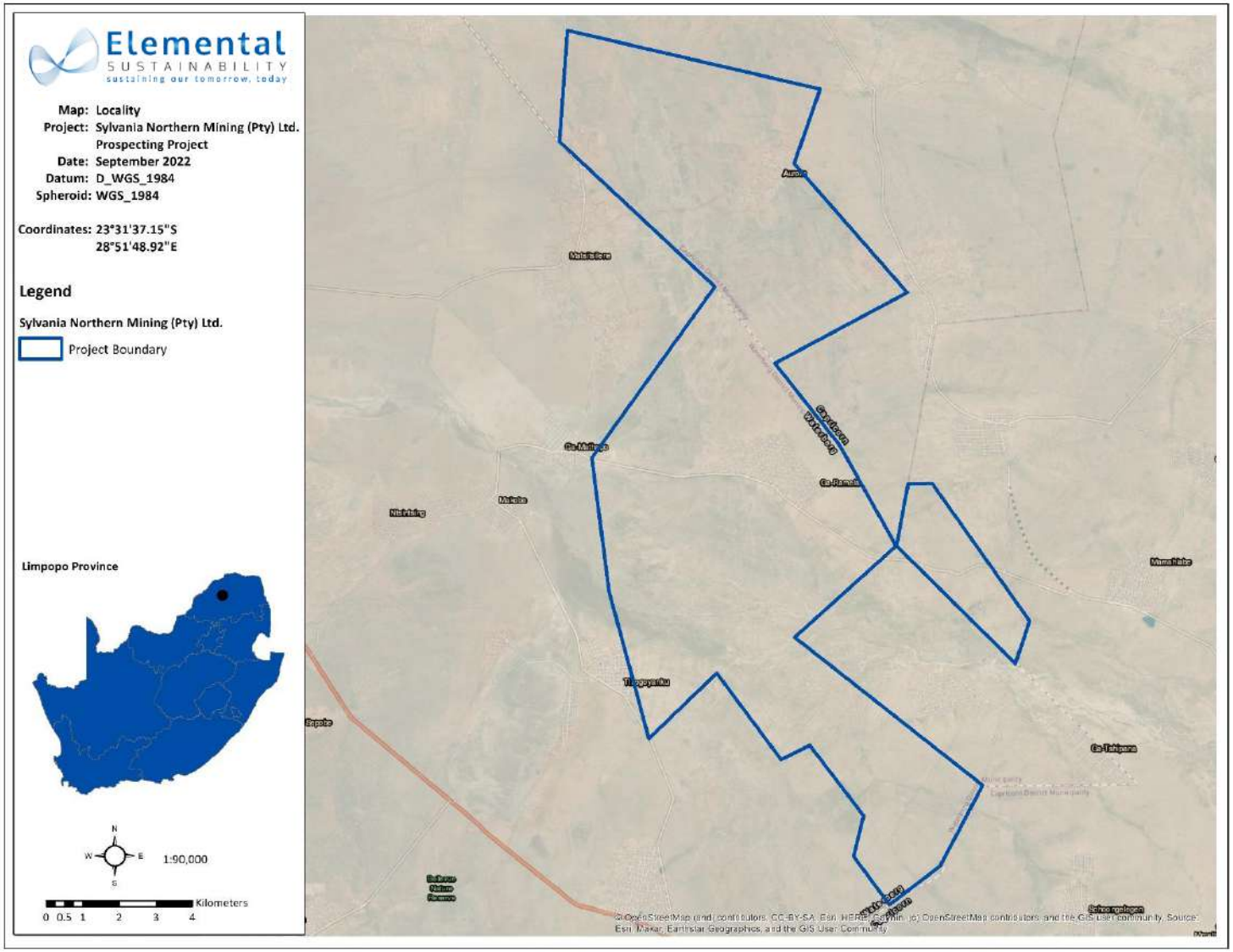

Figure 1: Regional Locality Map of the proposed prospecting project area.

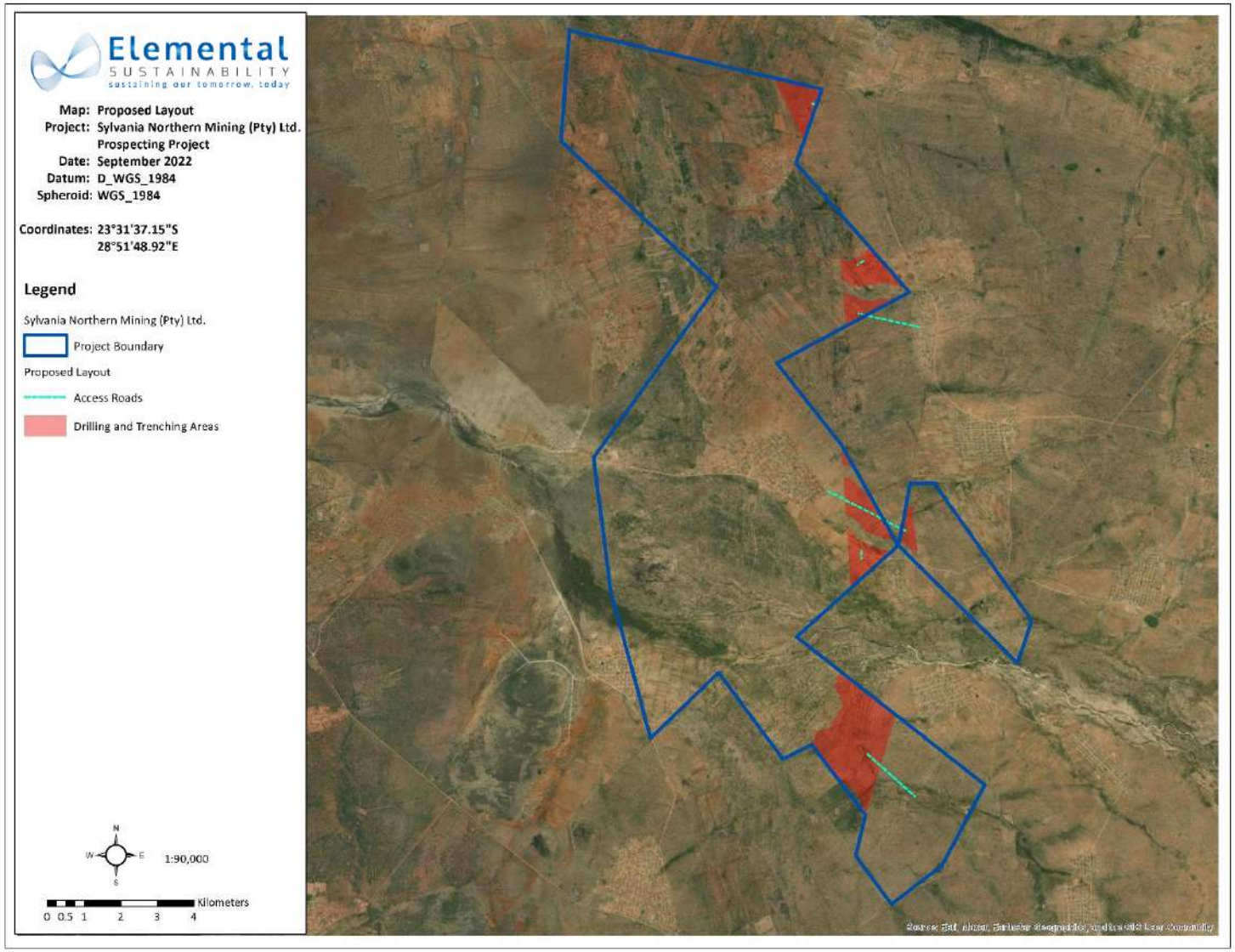

Figure 2: Proposed layout for the prospecting project.

2. SCOPE OF WORK

2.1 Objectives of the Study

The objective of the Desktop Soil, Land Use and Land Capability study is to fulfil the requirements of the most recent South African Environmental Legislation with reference to the assessment and management of these natural resource aspects (stipulated in Section 4). The purpose of the desktop study is to determine and describe the baseline soil properties, land capabilities and land uses associated with the proposed project area from a site survey and desktop data currently available. Mitigation and management measures are recommended to minimise negative impacts and maximise land rehabilitation success towards successful closure at the end of the project`s life.

2.2 Terms of Reference

The Desktop Soil, Land Use and Land Capability Assessment entailed the following aspects:

- A desktop review of existing land type maps, to establish broad baseline conditions and areas of environmental sensitivity and sensitive agricultural areas.
- Classify and describe soils using the South African Soil Classification: A Natural and Anthropogenic System for South Africa (2018).
- Compile various maps depicting the on-site conditions, soil types and land capability based on desktop review of existing data.
- Compile a report presenting the results of the desktop study. Identification and assessment of potential soil, land use and land capability impacts resulting from the proposed prospecting project including impacts associated with the construction, operational, and decommissioning phases of the project.
- Provide recommended mitigation measures and management practices to implement in order to comply with applicable legislation.
- The findings of the study provides a baseline analysis of existing conditions.

2.3 Assumptions

- It is assumed that there are no alternative locations for the proposed activities and that the assessment, therefore, focussed only on the proposed prospecting application area.
- The prospecting activities will only take place in the focus areas as identified. The specific locations of the activities will be identified during phase 1 and the sensitivity of the specific locations will be assessed by the ECO to ensure that the impacts are kept to a minimal and no-go areas are avoided.
- The assessment was undertaken during the planning stage of the project and is based on the information available at that time.

2.4 Limitations

- This study was done only via desktop methodologies and no site assessment or in-field soil sampling took place.
- The study does not include a land contamination assessment to determine preconstruction soil pollution levels (should there be any present).

3. DETAILS OF AUTHORS

NAME:	QUALIFICATION & EXPERTISE
DuToit Wilken Author	• M.Sc. University of Pretoria • Pr.Sci.Nat. (118911) • 12+ years' experience in the environmental management field

DuToit Wilken is an Environmental Scientist with more than 12 years of experience in applying the principles of Integrated Environmental Management, and in applying the Environmental Legislation to a number of development projects and initiatives in Southern Africa. He is registered as a Pr.Sci.Nat. (SACNASP), Natural Scientist, Registration number 118911. He has co-ordinated and managed number of diverse projects and programs related to the Environment and Mining within both the public and private sectors and for national, multi-national and international companies. His interpersonal and organisational skills have enabled him to efficiently direct these projects from initiation to implementation.

He is a specialist in soil and agricultural studies with a focus on mine closure. His M.Sc thesis related to the ameliration of acid mine soils with class F fly ash. He has completed a number of soil and agricultural studies for mine related project.

His proficient report-writing skills have been utilised for the compilation of a wide variety of reports, which include but is not limited to Specialist studies (Soil and Agriclutural Assessments, Closure and Closure Planning) Basic Assessment Reports, Scoping and Environmental Impact Assessment Reports, Environmental Management Plans (Planning, Construction, Operation and Closure), Environmental Audit Reports, Opportunities and Constraints Analyses, Waste License Applications, Water-Use Application Reports and Mining Right Applications.

NAME:	QUALIFICATION & EXPERTISE
Liezl Landman Project Reviewer	• M.Sc. Environmental Ecology, University of Pretoria • Pr.Sci.Nat. (118084) • 7 years' experience in the environmental management field

Liezl Landman is an Ecological Specialist and Environmental Consultant with more than six years of experience in the field of environmental management. Her core experience and expertise are in the mining and industrial sectors, focusing on Ecological and Biodiversity Assessments, both Terrestrial and Aquatic, along with Wetland Delineation and Functionality Assessments, Visual Impact Assessments, Water and Air Quality Assessments, GIS Mapping and SASS 5 Aquatic Biomonitoring.

Liezl is registered as a professional scientist in the field of ecological science and environmental science with SACNASP and a member of the IAIAsa, SAWS, and SASAqS.

4. LEGAL REQUIREMENTS

The following South African Environmental Legislation needs to be considered for any new or expanding developments with reference to the management of soil and land use:

- The Conservation of Agricultural Resources (Act 43 of 1983) states that the degradation of the agricultural potential of soil is illegal. This Act requires the protection of land against soil erosion and the prevention of water logging and salinisation of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.
- The Bill of Rights states that environmental rights exist primarily to ensure good health and well-being, and secondarily to protect the environment through reasonable legislation, ensuring the prevention of the degradation of resources.
- The Environmental right is furthered in the National Environmental Management Act 107 of 1998 (NEMA), which prescribes three principles, namely the precautionary principle, the "polluter pays" principle and the preventive principle.
- An Environmental Management Programme Report (EMPr) is required under NEMA.
- In addition to this, the National Water Act (Act 36 of 1998) deals with the protection of wetlands. This Act defines wetlands as "land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil." This Act therefore makes it necessary to also assess soil for its hydropedological properties.
- Regulations on use of water for mining and related activities aimed at the protection of water resources, GN. 704, GG 20119, 4 June 1999 (GN. 704 of 1999) published under the National Water Act 36 of 1998 aimed at the protection of water resources.
- National norms and standards for the remediation of contaminated land and soil quality in the Republic of South Africa, GN. 331, GG 37603, 2 May 2014 published under the National Environmental Management: Waste Act 59 of 2008 provide a uniform national approach to determine the contamination status of an investigation area; and minimum standards for assessing necessary environmental protection measures for remediation activities.
- It is stated in the above-mentioned Act that the individual/group responsible for the degradation/pollution of natural resources is required to rehabilitate the polluted source; Soils and land capability are protected under the National Environmental Management Act 107 of 1998, the Environment Conservation Act 73 of 1989, the Mineral and Petroleum Resources Development Act 28 of 2002 and the Conservation of Agricultural Resources Act 43 of 1983.
- The National Veld and Forest Fire Bill of 10 July 1998 and the Fertiliser, Farm Feeds, Agricultural Remedies and Stock Remedies Act 36 of 1947 can also be applicable in some cases.

- The National Environmental Management Act 107 of 1998 requires that pollution and degradation of the environment be avoided or, where it cannot be avoided, be minimized and remedied.

- The Conservation of Agriculture Resources Act 43 of 1983 requires the protection of land against soil erosion and the prevention of water logging and salinisation of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.

5. METHODOLOGY

This section provides the methodology used in the compilation of the Desktop Soil, Land Use and Land Capability Assessment report.

5.1 Desktop Assessment

The following data was obtained and studied for the desktop study:

- Land type data for the grid connection corridor was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC) (Land Type Survey Staff, 1972 – 2006). The land type data is presented at a scale of 1:250 000 and entails the division of land into land types, typical terrain cross sections for the land type and the presentation of dominant soil types for each of the identified terrain units (in the cross section). The soil data is classified according to the Binomial System (MacVicar *et al*., 1977). The soil data was interpreted and re-classified according to the Taxonomic System (MacVicar *et al.,* 1991).

    - These maps and the accompanying reports provide a statistical estimate of the different soils that can be expected in the area.

- The newly released National Land Capability Evaluation Raster Data Layer was obtained from the Department of Agriculture, Forestry and Fisheries (DAFF) to determine the land capability classes of the grid connection corridor according to this system. The new data was developed by DAFF to address the shortcomings of the 2002 national land capability data set. The new data was developed using a spatial evaluation modelling approach (DAFF, 2017).

- The most recent aerial photography of the area available from Google Earth was obtained. The aerial photography analysis was used to determine areas of existing impact, land uses within the grid connection corridor as well as the larger landscape, wetland areas and preferential flow paths.

5.1.1 Land Capability Classification

The anticipated impacts of the proposed land use on soil and land capability were assessed to inform the necessary mitigation measures. The land capability of the proposed activities was assessed in accordance with the definitions and system outlined by Scotney *et al*. (1987) and updated for South African soils by the Agricultural Research Council (Schoeman, 2000). The criteria used as general guidelines to place soil and land into capability classes are indicated below. This system is based on the Land Capability Classification system of the United States Department of Agriculture (USDA) Soil Conservation Service by Klingelbiel and Montgomery (1961). The soils were classified into eight (8) capability classes (**Table 2**) based on varying limitations (restrictions for rain-fed cropping) of the following soil parameters:

- Effective Depth (D)
- Soil Texture (T)
- Flood Hazard (F)
- Erosion Hazard (E)
- Internal Drainage (W)
- Mechanical limitations (M)

Table 2: Land Capability Classification (Scotney *et al*., 1987).

Land Capability Group	Land Capability Class	Increased intensity of use									Limitations
Arable	**I**	W	F	LG	MG	IG	LC	MC	IC	VIC	No or few limitations. Very high arable potential. Very low erosion hazard
	II	W	F	LG	MG	IG	LC	MC	IC	-	Slight limitations. High arable potential. Low erosion hazard
	III	W	F	LG	MG	IG	LC	MC	-	-	Moderate to severe limitations. Some erosion hazards
	IV	W	F	LG	MG	IG	LC	-	-	-	Severe limitations. Low arable potential. High erosion hazard
Grazing	**V**	W	-	LG	MG	-	-	-	-	-	Water course and land with wetness limitations
	VI	W	F	LG	MG	-	-	-	-	-	Limitations preclude cultivation. Suitable for perennial vegetation
	VII	W	F	LG	-	-	-	-	-	-	Very severe limitations. Suitable only for natural vegetation
Wildlife	**VIII**	W	-	-	-	-	-	-	-	-	Extremely severe limitations. Not suitable for grazing or afforestation.

Key to the **Table 2** above.

W – Wildlife	F – Forestry	LG – Light Grazing
MG – Moderate Grazing	IG – Intensive Grazing	LC – Light Cultivation
MC – Moderate Cultivation	IC – Intensive Cultivation	VIC – Very Intensive Cultivation

The land capability of the proposed development area was compared to the National Land Capability which was refined in 2014- 2016. The National Land Capability methodology is based on a spatial evaluation modelling approach and a raster spatial data layer consisting of fifteen (15) land capability evaluation values (**Table 3**), usable on a scale of 1:50 000 – 1:100 000 (DAFF, 2017). The previous system is based on a classification approach, with 8 classes (**Table 2**).

Table 3: National Land Capability Values (DAFF, 2017).

Land Capability Evaluation Value	Land Capability Description
1	Very Low
2	
3	Very Low to Low
4	
5	Low
6	Low to Moderate
7	
8	Moderate
9	Moderate to High
10	
11	High
12	High to Very High
13	
14	Very High
15	

The third approach is contained in the Coaltech Research Association and the Chamber of Mines of South Africa Guidelines for the Rehabilitation of Mined Land, 2007. These 2007 Guidelines recommend the following classes of post mining rehabilitated land: arable, grazing, wilderness, and wetland.

- Arable: The soil depth exceeds 0.6 m, the soil material is not sodic or acidic and slope percentage is such that when multiplied by the soil erodibility factor K, the product does not exceed a value of 2.0;
- Grazing: The soil depth is less than 0.6 m but more than 0.25 m;
- Wilderness: The soil depth is less than 0.25 m but more than 0.15 m; and
- Wetland: The soil depths are as for grazing but soil must be used for the construction of wetlands. These wetland soils must be separately stockpiled.

Table 4: Typical Arrangement of Master Horizons in Soil Profile.

<table>
<tr><td rowspan="6">Soil</td><td rowspan="6">Zone in which soil processes are maximally expressed</td><td colspan="4">Arrangement of master horizons</td></tr>
<tr><td rowspan="5">O- Organic</td><td rowspan="4">C- Regic sand (c), Stratified alluvium, (c), Man -Made Soil Deposits</td><td>A</td><td colspan="2">Humic, Vertic, Melanic, Orthic</td></tr>
<tr><td rowspan="2">E</td><td colspan="2" rowspan="2"></td></tr>
<tr><td rowspan="2">B</td></tr>
<tr><td>Red Apedal, yellow Brown Apedal, Soft Plinthic, Hard Plinthic, Prismacutanic, Pedocutanic, Lithocutanic, Neocutanic, Neocarbonate, Podzol, Podzol with placic pan</td><td rowspan="3">G - Horizon</td></tr>
<tr><td>C</td><td colspan="2">Dorbank, Soft Carbonate horizon, Hard Carbonate horizon, Saprolite, Unconsolidated without signs of wetness, Unconsolidated with signs of wetness, Unspecified material with signs of wetness</td></tr>
<tr><td colspan="3">R-Hard Rock</td></tr>
</table>

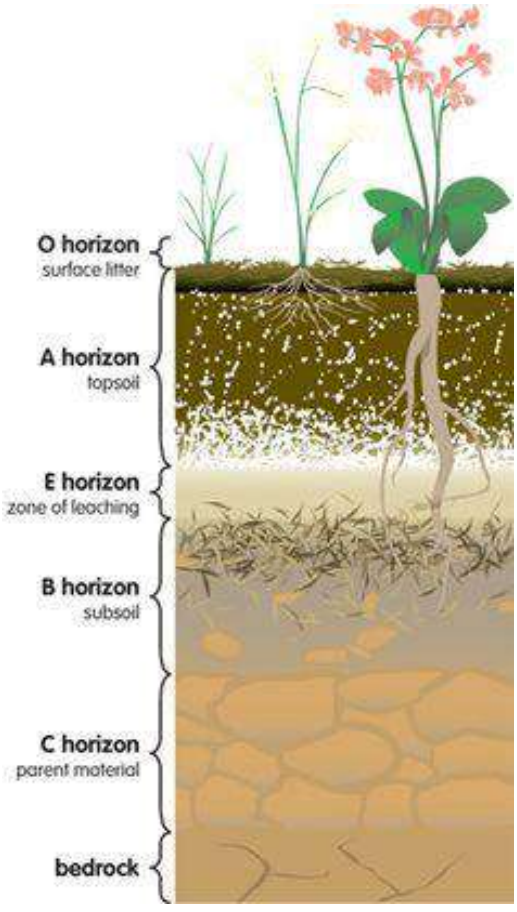

Figure 3: Schematic diagram depicting a conceptual presentation of a typical soil profile.

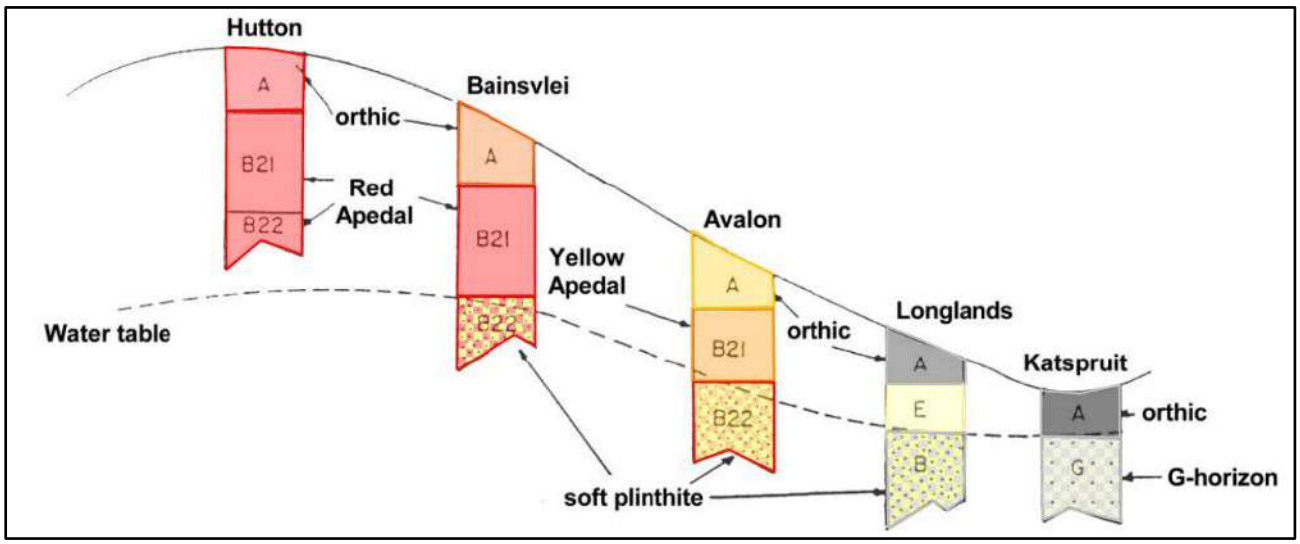

Figure 4: Typical plinthic catena.

5.1.2 Agricultural Potential Classification

Land Capability Classification (LCC) categorises soils into groups based on the ability to sustain typical cultivated rain-fed crops, which do not require intensive site conditioning or amelioration. The capability classification groups individual soil types (soil mapping units) into groups of similar soils (capability units or classes) based on the criteria for the eight capability classes. Land with higher LCC typically has lower crop production input costs, producing higher yields than land with lower LCC (Singer, 2006). The LCC system thus provides an economic estimation of the soil agricultural capability (or potential). The soil agricultural potential for this study was determined based on the LCC, by assigning qualitative criteria ratings such as high, moderate, moderate to low (**Table 5**) to the land capability classes.

Table 5: Criteria for agricultural potential classification.

LCC	Soil Agricultural Potential
I – III	High
V – VI	Moderate
VII - VIII	Moderate to Low

6. BASELINE CONDITIONS AND DESCRIPTION OF AFFECTED ENVIRONMENT

This section of the report provides a description of the status of the environment in which the activities are planned. This ultimately provides a baseline context for the impact assessment of the proposed activities.

6.1 Current Land Use

The proposed prospecting project area falls within the Limpopo Province under the jurisdiction of the Blouberg Local Municipality, situated within the Capricorn District Municipality. The towns / villages of Ga-Ramela, Ngwanallela, Ga-Tshipana, Mokerong, Makobe, Ga-Mothapo, Mosehleng, Rora, Aurora, and Ga-Raweshe are located on, or near, the proposed application area (**Figure 1**). The study site and surrounding area is characterised by a mix of land uses, including natural veld, cultivation (subsistence farming and small-scale annual crops), degraded areas, and urban built-up areas (villages) (**Figure 5**).

6.2 Climatic Conditions

The proposed prospecting project area is situated near Tibane, which is characterised by summer rainfall and very dry winters. The climate can generally be described as hot and dry. An overview of the key climatic characteristics of the region is provided in **Table 6** below.

Table 6: Key climatic aspects of the region (Climate-data.org).

Aspect	Description
Mean Annual Precipitation (mm):	400 - 550 mm
Mean Maximum Annual Temperature (°C):	37°C
Frost:	Frequent

According to the Department of Agriculture in co-operation with ARC-Grain Crops Institute, 350 to 450 mm of rain per annum is required for successful maize production. The project area is very marginal for rain-fed maize production with its average annual rainfall of 415 mm.

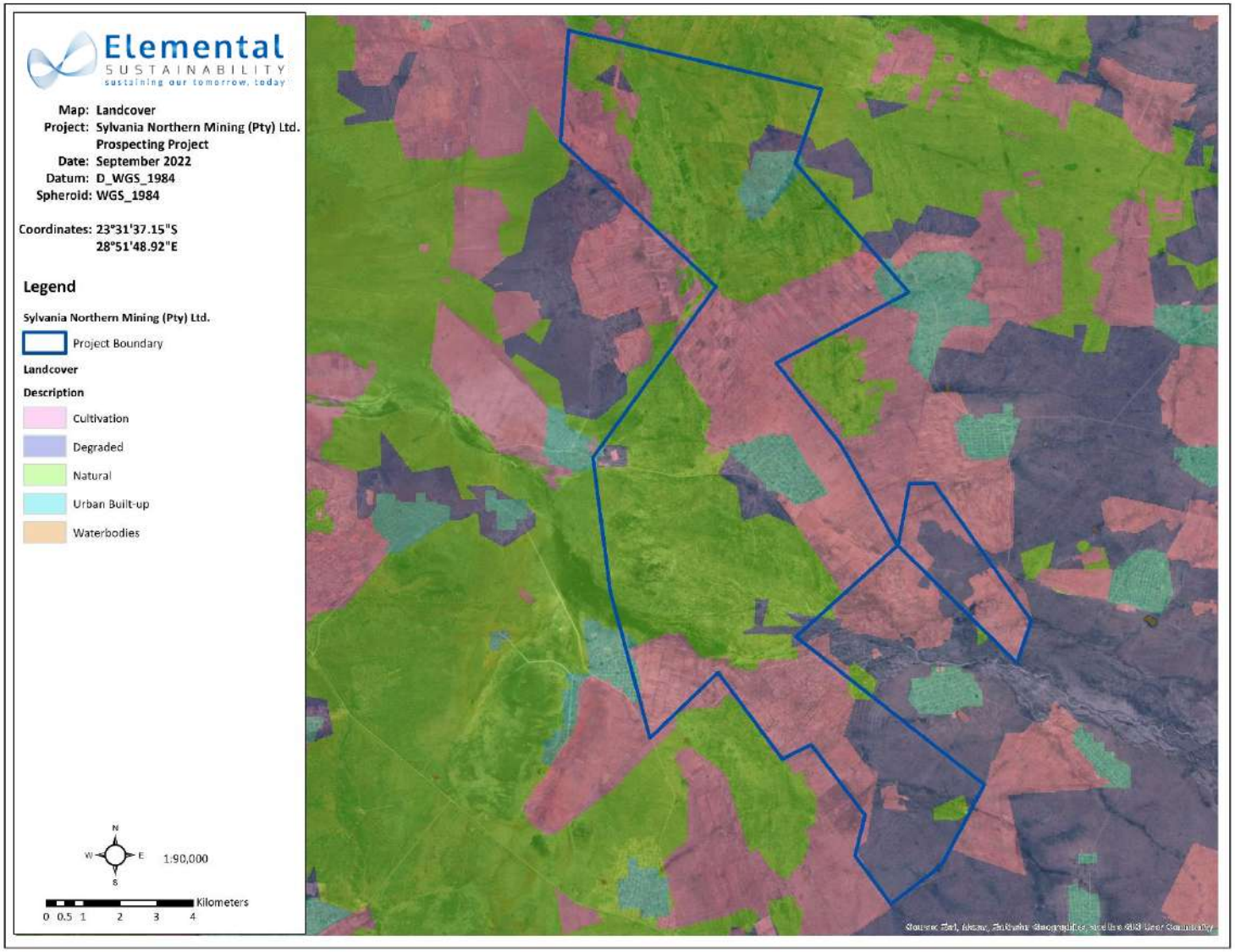

Figure 5: General land cover on the proposed application area for the SPD Mining Project.

6.3 Land Types

The proposed prospecting application area traverses through five (5) land types i.e., Land Type Ae334, Land Type Ae335, Land Type Bd51, Land Type Ia169 and Land Type Fc731. Each of the Land Types are described below:

6.3.1 Land Type Ae334

Land Type Ae334 has three (3) different terrain positions (**Table 7**). The underlying geology is described as Sand of the Quaternary System.

Table 7: Land Type Ae334 Data.

Climate Zone	2275S									
Map Occurrence	2328 Pietersburg (58413 ha)									
Area	58413 ha									
Estimated area unavailable for agriculture	8000 ha									
Terrain Type	A1									
Terrain Unit			**1**		**4**		**5**			
% of land type:			10		80		10			
Area:			5841		46730		5841			
Slope:			1 – 3		1 - 3		1 – 3			
Slope length:			100 - 300		500 - 3000		100 - 300			
Slope shape:			Y		Z-X		X			
MB0, MB1 (ha):			5549		46730		5549			
MB2 - MB4 (ha):			292		0		292			
Soil series or land classes	**Depth (mm)**	**MB**	**ha**	**%**	**ha**	**%**	**ha**	**%**	**Total ha**	**Total %**
Rock		4	292	5			292	5	584	1.0
Zwartfontein Hu34, Portsmouth Hu35	>1200	0	1168	20	37384	80	1168	20	39721	68.0
Portsmouth Hu35, Zwartfontein Hu34	400-600	0	2920	50	4673	10	1168	20	8762	15.0
Shorrocks Hu36, Blinkklip Cv36	600-900	0	292	5	2336	5	1752	30	4381	7.5
Platt Gs14, Glenrosa Gs15, Mispah Ms10	300-400	1	1168	20	2336	5			3505	6.0
Leeufontein Oa16, Letaba Oa26, Herschel Va30	>900	0					1460	25	1460	2.5

Figure 6: Terrain form sketch of Land Type Ae334.

6.3.2 Land Type Ae335

Land Type Ae335 has three (3) different terrain positions (**Table 8**). The underlying geology is described as Medium-grained, yellowish, laminated sandstone of the Makgabeng Formation of the Waterberg Group, also sand of the Quaternary System.

Table 8: Land Type Ae335 Data.

Climate Zone	2275S									
Map Occurrence	2328 Pietersburg (128224 ha)									
Area	128224 ha									
Estimated area unavailable for agriculture	1279 ha									
Terrain Type	A2									
Terrain Unit			**1**		**4**		**5**			
% of land type:			25		60		15			
Area:			32056		76934		19234			
Slope:			1 – 5		1 – 5		1 – 5			
Slope length:			50 - 300		200 - 1000		50 - 150			
Slope shape:			Y		X-Z		X			
MB0, MB1 (ha):			22439		69241		16349			
MB2 - MB4 (ha):			9617		7693		2885			
Soil series or land classes	**Depth (mm)**	**MB**	**ha**	**%**	**ha**	**%**	**ha**	**%**	**Total ha**	**Total %**
Rock		4	9617	30	7693	10	962	5	18272	14.3
Portsmouth Hu35, Zwartfontein Hu34	>1200	0	6411	20	38467	50	3847	20	48725	38.0
Shorrocks Hu36, Portsmouth Hu35, Zwartfontein Hu34, Blinkklip Cv36	400-600	1	12822	40	23080	30	1923	10	37826	29.5
Platt Gs14, Glenrosa Gs15, Williamson Gs16	200-400	1	3206	10	7693	10	1923	10	12822	10.0
Herschel Va30, Arniston Va31, Valsrivier Va40	>900	0					5770	30	5770	4.5

Dudfield Cv46, Limpopo Oa46, Leeufontein Oa16, Letaba Oa26	>1000	0			2885	15	2885	2.3
Stream beds		4			1923	10	1923	1.5

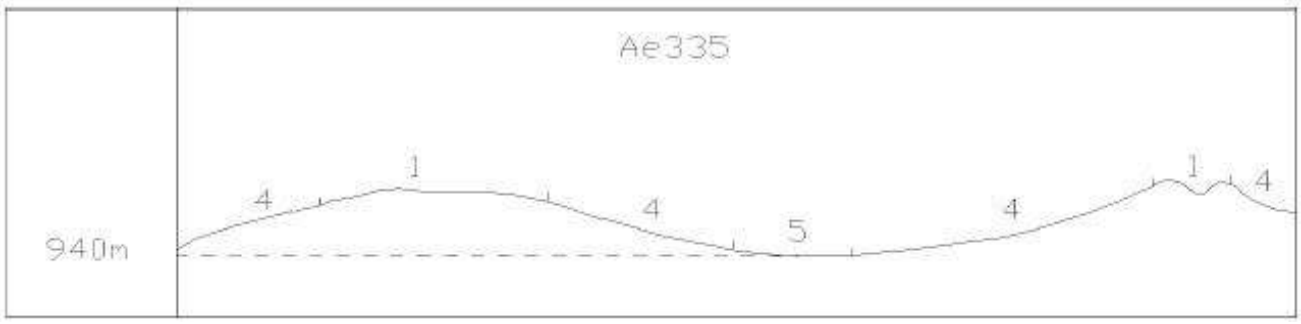

Figure 7: Terrain form sketch of Land Type Ae335.

6.3.3 Land Type Bd51

Land Type Bd51 has three (3) different terrain positions (**Table 9**). The underlying geology is described as Leucocratic migmatite and gneiss, grey and pink hornblende-biotite gneiss, grey biotite gneiss; minor muscovite-bearing granite, pegmatite and gneiss of the Hout River Gneiss. Also sand and alluvium of the Quaternary System.

Table 9: Land Type Bd51 Data.

Climate Zone			2275S							
Map Occurrence			2328 Pietersburg (316053 ha)							
Area			316053 ha							
Estimated area unavailable for agriculture			3150 ha							
Terrain Type			A2							
Terrain Unit			**1**		**4**		**5**			
% of land type:			20		60		20			
Area:			63211		189632		63211			
Slope:			0 – 2		0 – 2		0 – 2			
Slope length:			200 - 500		400 - 3000		200 - 500			
Slope shape:			Y-Z		X-Z		X			
MB0, MB1 (ha):			41719		161187		56890			
MB2 - MB4 (ha):			21492		28445		6321			
Soil series or land classes	**Depth (mm)**	**MB**	**ha**	**%**	**ha**	**%**	**ha**	**%**	**Total ha**	**Total %**
Rock		4	2528	4	5689	3	3161	5	11378	3.6

Shorrocks Hu36, Blinkklip Cv36	400-900	1	22124	35	28445	15	3161	5	53729	17.0
Soetmelk Av36	700-950	0			24652	13	17067	27	41719	13.2
Zwartfontein Hu34, Portsmouth Hu35	350-600	0	6321	10	28445	15			34766	11.0
Makuya Cv34, Denhere Cv35, Torquay Cv44	300-700	1	6321	10	24652	13	3161	5	34134	10.8
Platt Gs14, Glenrosa Gs15, Trevanian Gs17	200-350	3	11378	18	18963	10			30341	9.6
Leksand Av24, Heidelberg Av34, Kareekuil Bv34	500-1000	0			11378	6	6321	10	17699	5.6
Mkambati Kd14, Chitsa Lo32, Winterton Lo13, Wesselsnek Gc25	200-1100	0	3161	5	9482	5	3161	5	15803	5.0
Jozini Oa36, Limpopo Oa46	500-1200	0			5689	3	9482	15	15171	4.8
Mispah Ms10, Loskop Ms12, Kalkbank Ms22	100-400	3	7585	12	3793	2	3161	5	14538	4.6
Lonetree Bv26, Wedgewood Bv35, Bainsvlei Bv36	400-750	0			9482	5	2528	4	12010	3.8
Avalon Av26, Klerksdorp Pn36	700-900	0			7585	4	3161	5	10746	3.4
Paddock We31, Davel We32	200-400	0	1896	3	3793	2	3161	5	8849	2.8
Dudfield Cv46	400-700	0	1896	3	1896	1	3793	6	7585	2.4
Windmeul Av35	400-500	0			1896	1	1896	3	3793	1.2
Shigalo Hu46	700-1200	0			3793	2			3793	1.2

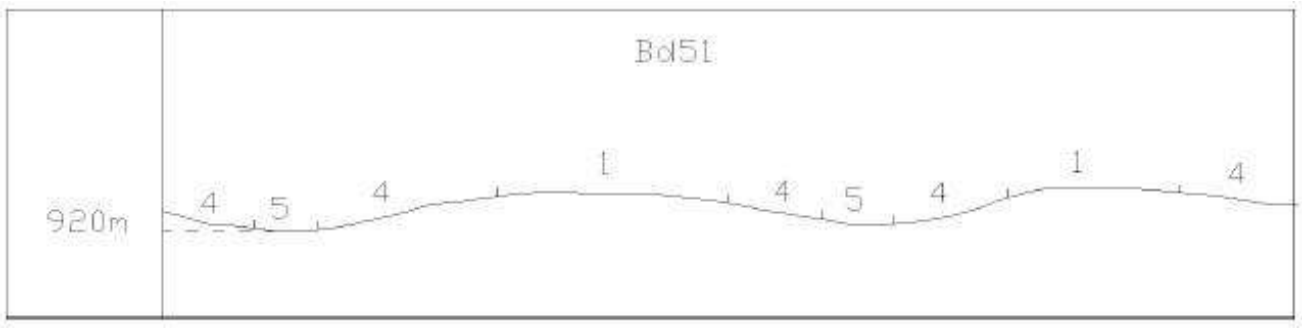

Figure 8: Terrain form sketch of Land Type Bd51.

6.3.4 Land Type Ia169

Land Type Ia169 has two (2) different terrain positions (**Table 10**). The underlying geology is described as sand alluvium and calcrete of the Quaternary System.

Table 10: Land Type la169 Data.

Climate Zone	1835S	
Map Occurrence	2328 Pietersburg (12572 ha)	
Area	12572 ha	
Estimated area unavailable for agriculture	100 ha	
Terrain Type	A2	
Terrain Unit	**4**	**5**
% of land type:	60	40
Area:	7543	5029
Slope:	1 – 4	1 – 4
Slope length:	100 - 800	100 - 300
Slope shape:	X-Z	X
MB0, MB1 (ha):	7543	4274
MB2 - MB4 (ha):	0	754

Soil series or land classes	Depth (mm)	MB	ha	%	ha	%	Total ha	Total %
Jozini Oa36, Limpopo Oa46, Dundee Du10, Calueque Oa45	900-1200	0	2263	30	1257	25	3520	28.0
Letaba Oa26, Shigalo Hu46, Shorrocks Hu36, Portsmouth Hu35, Blinkklip Cv36	900-1200	0	1509	20	754	15	2263	18.0
Mutale Oa47, Arniston Va31, Lindley Va41, Glengazi Bo31, Inhoek Ik20	>1200	0	1131	15	754	15	1886	15.0
Vaalrivier Oa33, Levubu Oa34, Sandspruit Cv31, Dundee Du10	>1200	0	754	10	503	10	1257	10.0
Zuiderzee Va20, Sunnyside Va10	>1200	0	754	10	503	10	1257	10.0
Arcadia Ar40, Antioch Ss27, Willowbrook Wo11	>1200	0	377	5	503	10	880	7.0
Lomondo Gs25, Lekfontein Gs26, Kalkbank Ms22	300-500	0	754	10			754	6.0
Stream beds		4			754	15	754	6.0

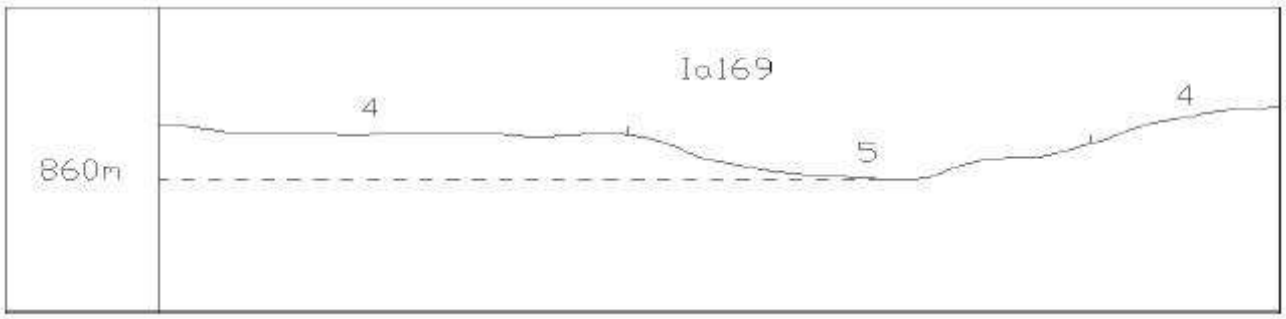

Figure 9: Terrain form sketch of Land Type Ia169.

6.3.5 Land Type Fc731

Land Type Fc731 has three (3) different terrain positions (**Table 11**). The underlying geology is described as alluvium, sand and calcrete of the Quaternary System.

Table 11: Land Type Fc731 Data.

Climate Zone	2275S									
Map Occurrence	2328 Pietersburg (17511 ha)									
Area	17511 ha									
Estimated area unavailable for agriculture	174 ha									
Terrain Type	A3									
Terrain Unit	**1**			**4**			**5**			
% of land type:	15			50			35			
Area:	2627			8756			6129			
Slope:	1 – 3			1 – 3			1 – 5			
Slope length:	10 - 50			100 - 300			50 - 100			
Slope shape:	Y			X-Z			X-Z			
MB0, MB1 (ha):	1051			6567			4597			
MB2 - MB4 (ha):	1576			2189			1532			
Soil series or land classes	**Depth (mm)**	**MB**	**ha**	**%**	**ha**	**%**	**ha**	**%**	**Total ha**	**Total %**
Rock		4	263	10	438	5	306	5	1007	5.8
Dudfield Cv46, Skipskop Cv45	400-700	0	788	30	2627	30	1226	20	4640	26.5
Letaba Oa26, Shigalo Hu46, Shorrocks Hu36	600-1200	0	263	10	2627	30	1226	20	4115	23.5
Lomondo Gs25, Lekfontein Gs26, Kalkbank Ms22	100-300	3	1314	50	1751	20	613	10	3677	21.0
Limpopo Oa46, Calueque Oa45, Jozini Oa36, Dundee Du10	>900	0			876	10	1226	20	2101	12.0

Valsrivier Va40, Lindley Va41, Weenen Bo40, Inhoek Ik20	>1200	0		438	5	919	15	1357	7.8
Stream beds		4				613	10	613	3.5

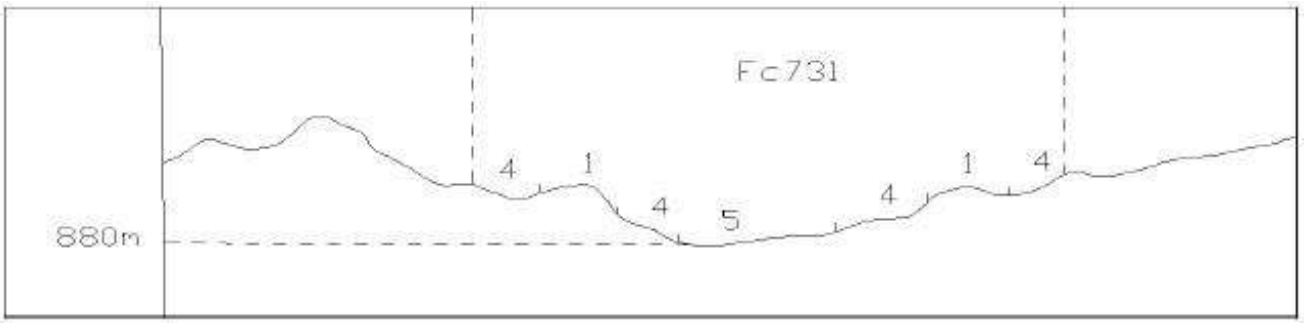

Figure 10: Terrain form sketch of Land Type Fc731.

6.4 SOTER Soil-Terrain Information

According to the Soil and Terrain (SOTER) Landform database, the proposed prospecting right area is situated on two landform types, namely LP3 type landform on the southern section of the site, with the LV3 type landform forming most of the site (**Figure 12**). The LP3 type landform refers to level land, plain at a medium level. The LV3 type landform refers to level land, valley at a medium level. With reference to SOTER Generalised Soil Patterns associated with the area, the proposed prospecting project application area consists of three soil patterns (**Figure 13**). Most of the northern half of the study site consists of red-yellow, well drained soils, soils with a high base status. Soils with limited pedological development occurs in the southern section; these soils are usually shallow, on hard or weathering rock. Lime is generally present in the landscape. The remaining sections are classed as soils with a plinthic horizon; these are red, yellow and / or greyish soils with a high base status. As small section on the northwest border is classed as sandy soils with no profile development.

The SOTER Soil Association map categorises the proposed prospecting project application area as either an "A4" type landscape in the northern and southern sections and as "E1" type landscape in the central south section (**Figure 14**). "E1" is characterised by "*Soils with minimal development, usually shallow on hard or weathering rock, with or without intermittent diverse soils. (Association of Leptosols, Regosols, Calcisols and Durisols. In addition one or more of Cambisols, Luvisols*)". "A4" type landscape is characterised by "*Red, massive or weakly structured soils with high base status (association of well drained Lixisols, Cambisols and Luvisols)*". The dominant soil types, according to the SOTER database, are Ferric Luvisols (LVf) in the northern half and most southern section and Calcic Solonchaks (SCk) in the southern central half of the proposed prospecting project application area (**Figure 15**).

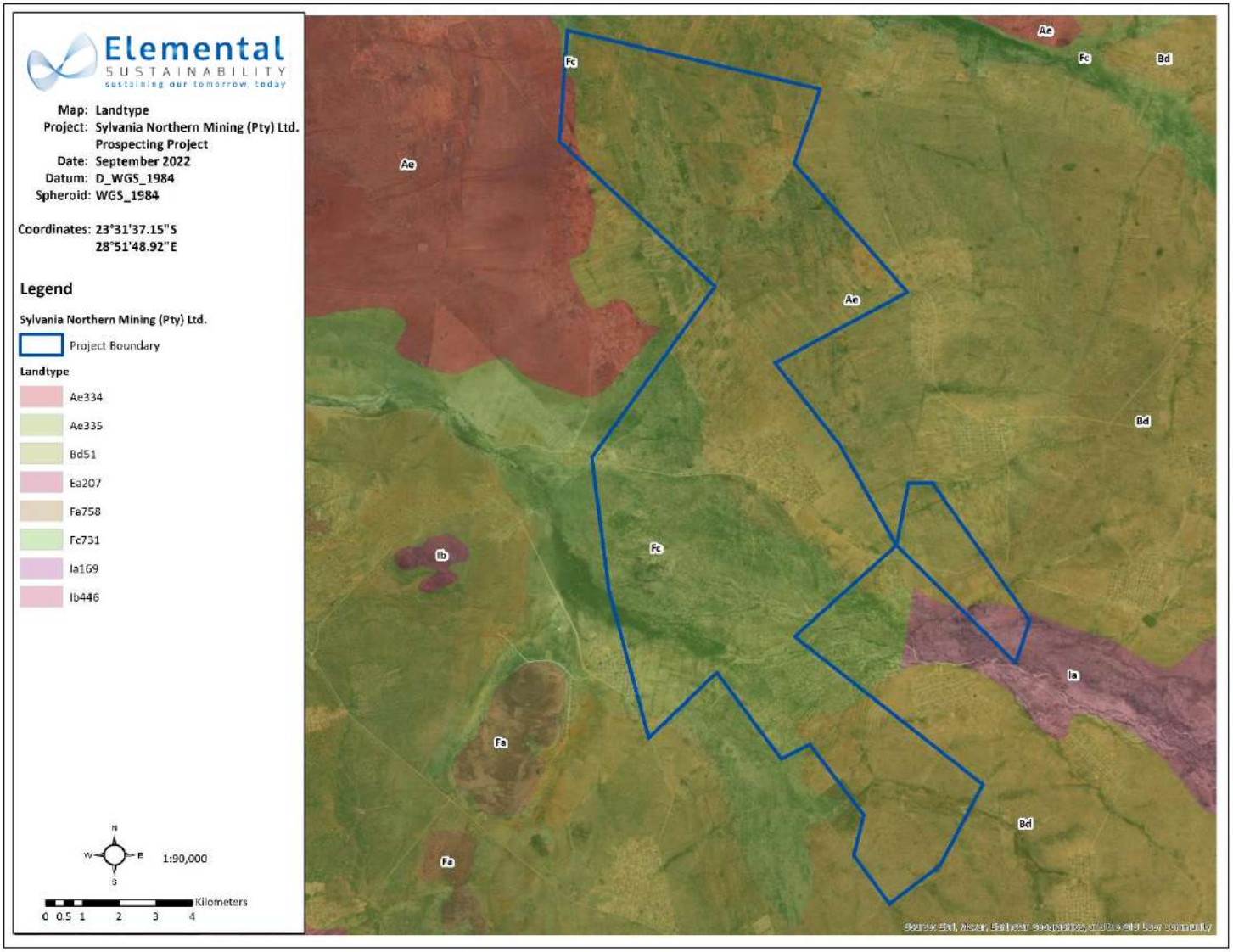

Figure 11: Land Types associated with the proposed prospecting project application area.

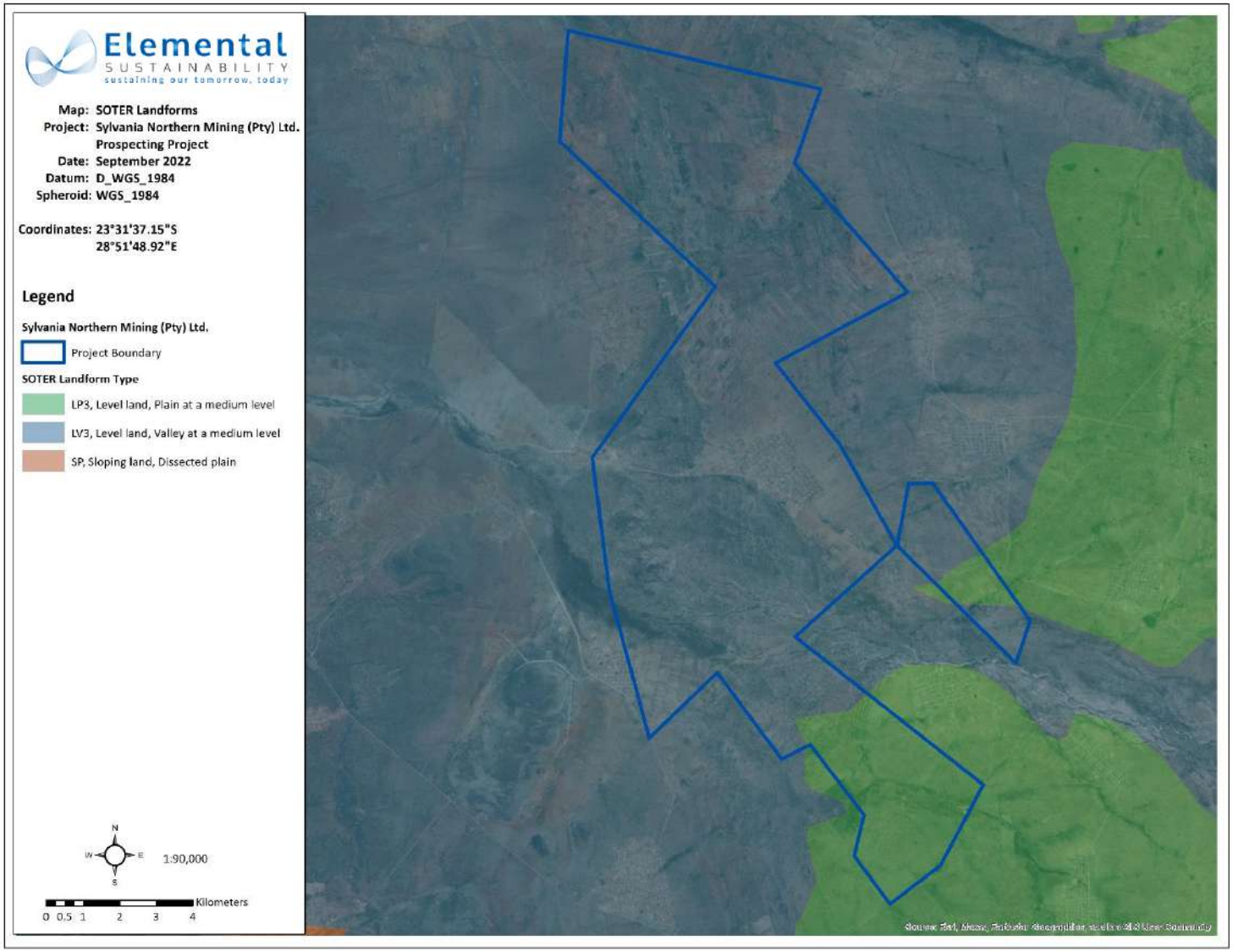

Figure 12: SOTER Landform associated with the proposed prospecting project application area.

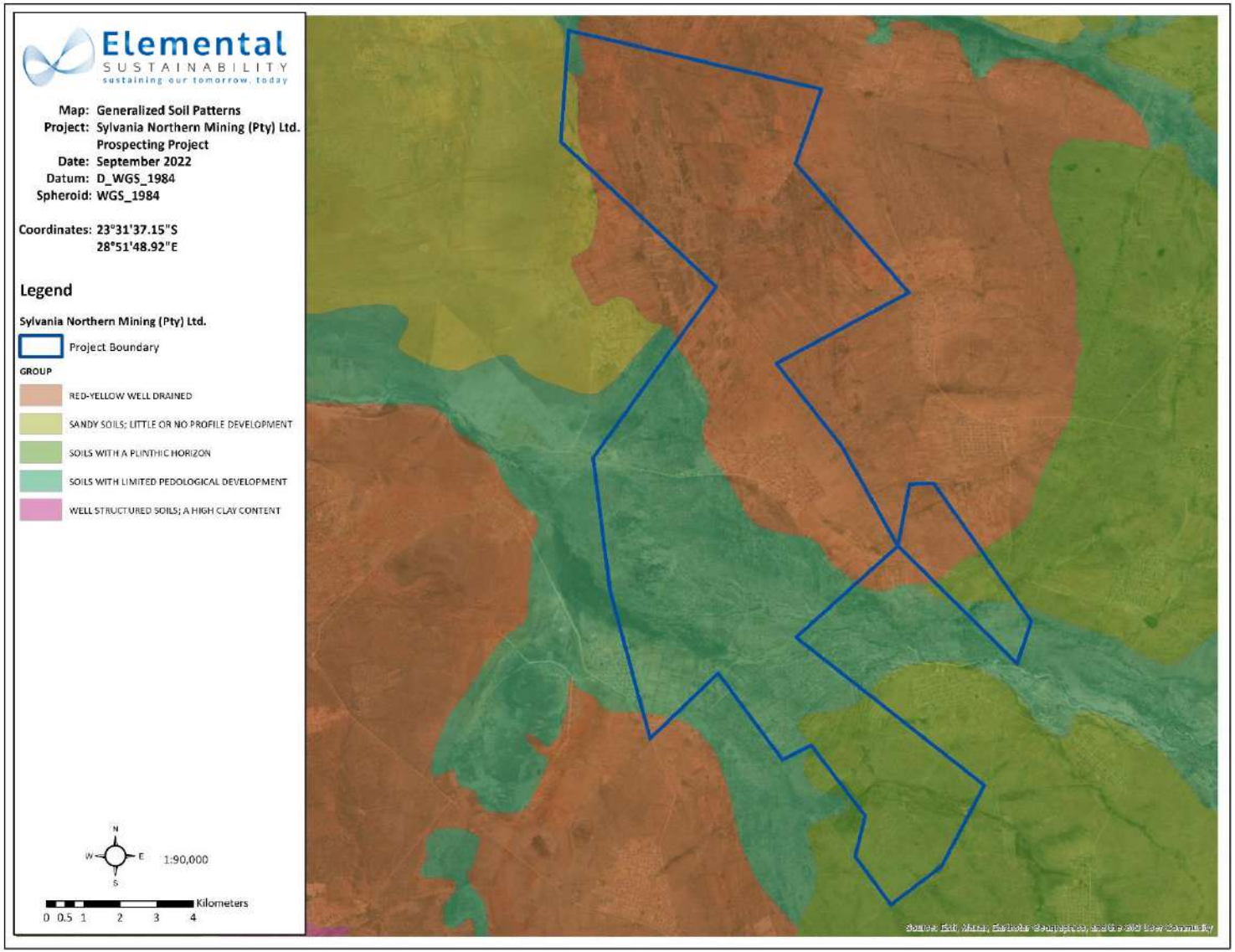

Figure 13: Generalised Soil Patterns associated with the proposed prospecting project application area.

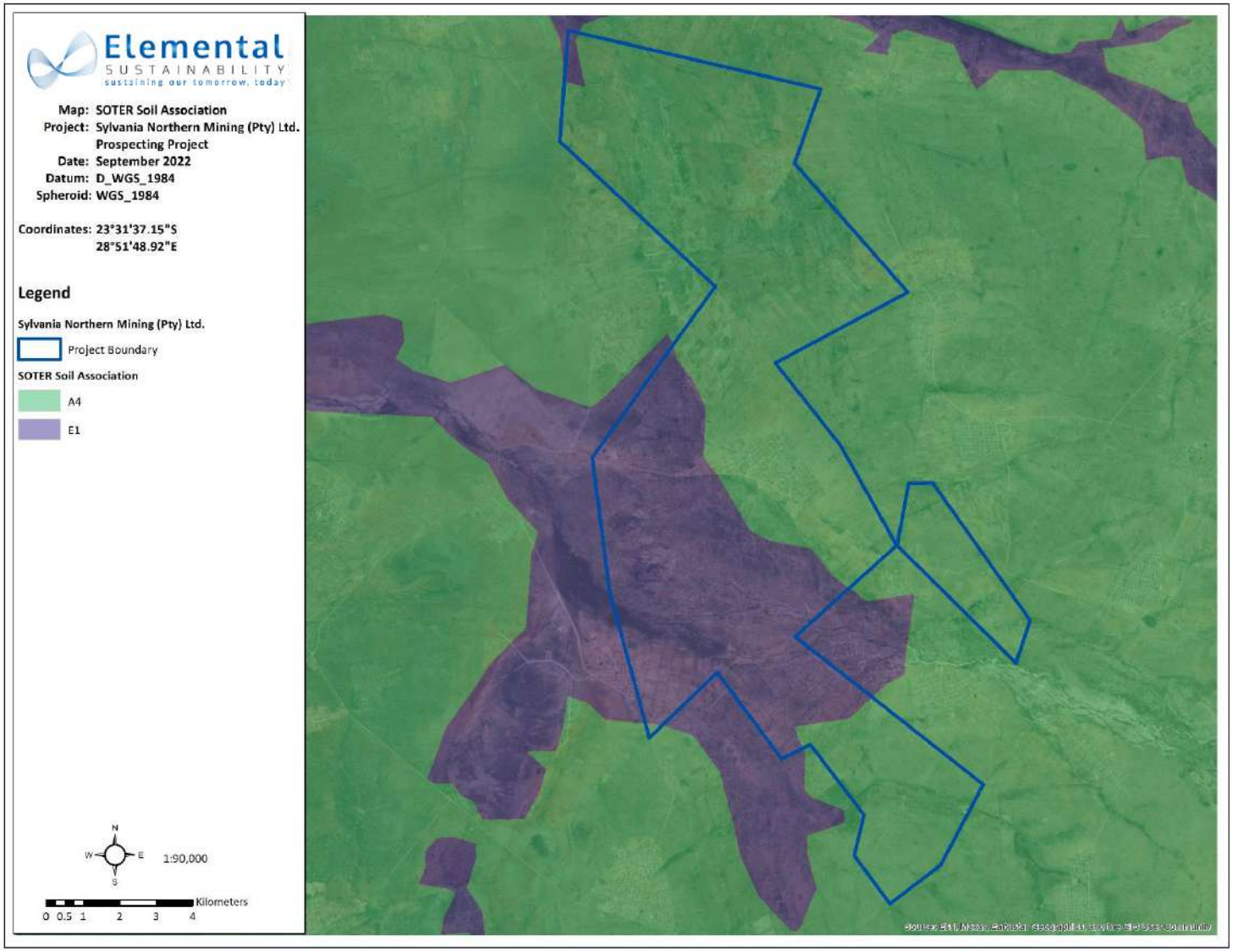

Figure 14: SOTER Soil Association map of the proposed prospecting project application area.

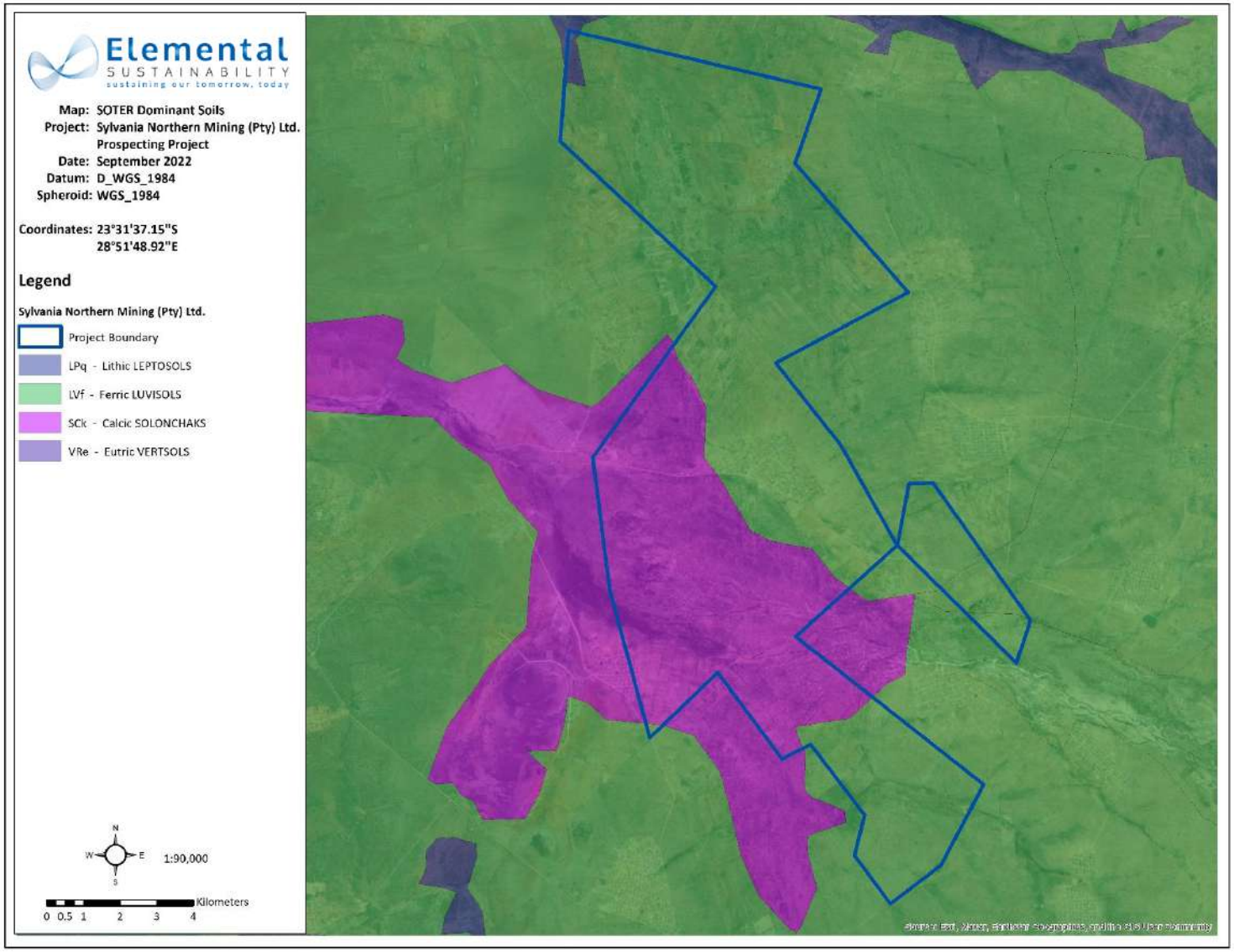

Figure 15: Dominant SOTER Soils associated with the proposed prospecting project application area.

6.5 Land Capability Classification and Agricultural Potential

Land capability can be defined as "*the extent to which land can meet the needs of one or more uses under defined conditions of management*" (Schoeman, 2002). The land capability of an area is the combination of the inherent soil properties and the climatic conditions as well as other landscape properties such as slope and drainage patterns that may inhibit agricultural land use or result in the development of specific land functionality such as wetlands.

The National Land Capability Classification was undertaken at a national scale, using the land type data on a scale of 1:250 000 (DAFF, 2017). Classes 1 to 7 are of very low land capability making it only suitable for wilderness and grazing with a variety of management measures. Classes 8 to 15 are considered to have arable land capability with the potential for high yields increasing with the number of the land capability class.

The distribution of the various land capability classes for the proposed application area, as defined in the National Land Capability for South Africa, is presented in **Figure 16**. The area proposed for prospecting is mostly classed as 06. Low-Moderate to 08. Moderate according to the National Land Capability Assessment (DAFF, 2017), with a small section of the Farm Schaffhausen 689 LR being classed as 09. Moderate-High/10. Moderate-High.

However, in accordance with Scotney *et al.*`s (1987) 8 classes, the proposed prospecting area has a Land Capability Class of 4 (IV) in the northern half and most southern section (**Figure 17**). This means that the land is classed as Arable but has severe limitations (**Section 6.5.1**). These areas are suitable for the following: Wildlife (W), Forestry (F), Light Grazing (LG), Moderate Grazing (MG), Intensive Grazing (IG), and Light Cultivation (LC) (Refer to **Table 1**). A Land Capability Class of 5 (V) is present in the southern central areas. This means that the land is classed as Grazing but has wetness limitations (**Section 6.5.2**).

6.5.1 Class IV: Arable

Land in Class IV has very severe limitations that restrict the choice of plants, require very careful management, or both. It may be used for cultivated crops, but more careful management is required than for Class III and conservation practices are more difficult to apply and maintain. Restrictions to land use are greater than those in Class III and the choice of plants is more limited. It may be well suited to only two or three of the common crops or the harvest produced may be low in relation to inputs over long period of time. In sub-humid and semiarid areas, land in Class IV may produce good yields of adapted cultivated crops during years of above average rainfall and failures during years of below average rainfall. Use for cultivated crops is limited because of the effects of one or more permanent features such as:

- Steep slopes
- Severe susceptibility to water or wind erosion or severe effects of past erosion
- Shallow soils
- Low water-holding capacity
- Frequent flooding accompanied by severe crop damage
- Excessive wetness with continuing hazard of waterlogging after drainage
- Severe salinity or sodicity

- Moderately adverse climate

6.5.2 Class V: Grazing

Land in Class V has little or no erosion hazard but have other limitations impractical to remove, that limit its use largely to pasture, range, woodland or wildlife food and cover. These limitations restrict the kind of plants that can be grown and prevent normal tillage of cultivated crops. Pastures can be improved and benefits from proper management can be expected. It is nearly level. Some occurrences are wet or frequently flooded. Other are stony, have climatic limitations, or have some combination of these limitations. Examples of Class V are:

- Bottomlands subject to frequent flooding that prevents the normal production of cultivated crops.
- Nearly level land with a growing season that prevents the normal production of cultivated crops.
- Level or nearly level stony or rocky land.
- Ponded areas where drainage for cultivated crops is not feasible but which are suitable for grasses or trees.

6.6 Agricultural Sensitivity

In accordance with the Land Capability Classification (LCC), **Figure 18** indicates that the areas where the proposed prospecting activities are to take place is situated in areas of Medium Agricultural Sensitivity and overlaps with areas of High Field Crop Sensitivity for Subsistence Farming (**Figure 19**).

Considering all the baseline properties of the soils, and the weather conditions of the region, the areas proposed for the prospecting application is suitable for small-scale and subsistence dry land agriculture and impacts are expected to be moderate. These baseline land capabilities are also used as a benchmark for rehabilitation, and thus the area can be returned to Class 4 (IV) and 5 (V) during project decommissioning and rehabilitation if effective mitigation is applied. The proposed activities may impact on the subsistence farming, as it overlaps with suitable areas.

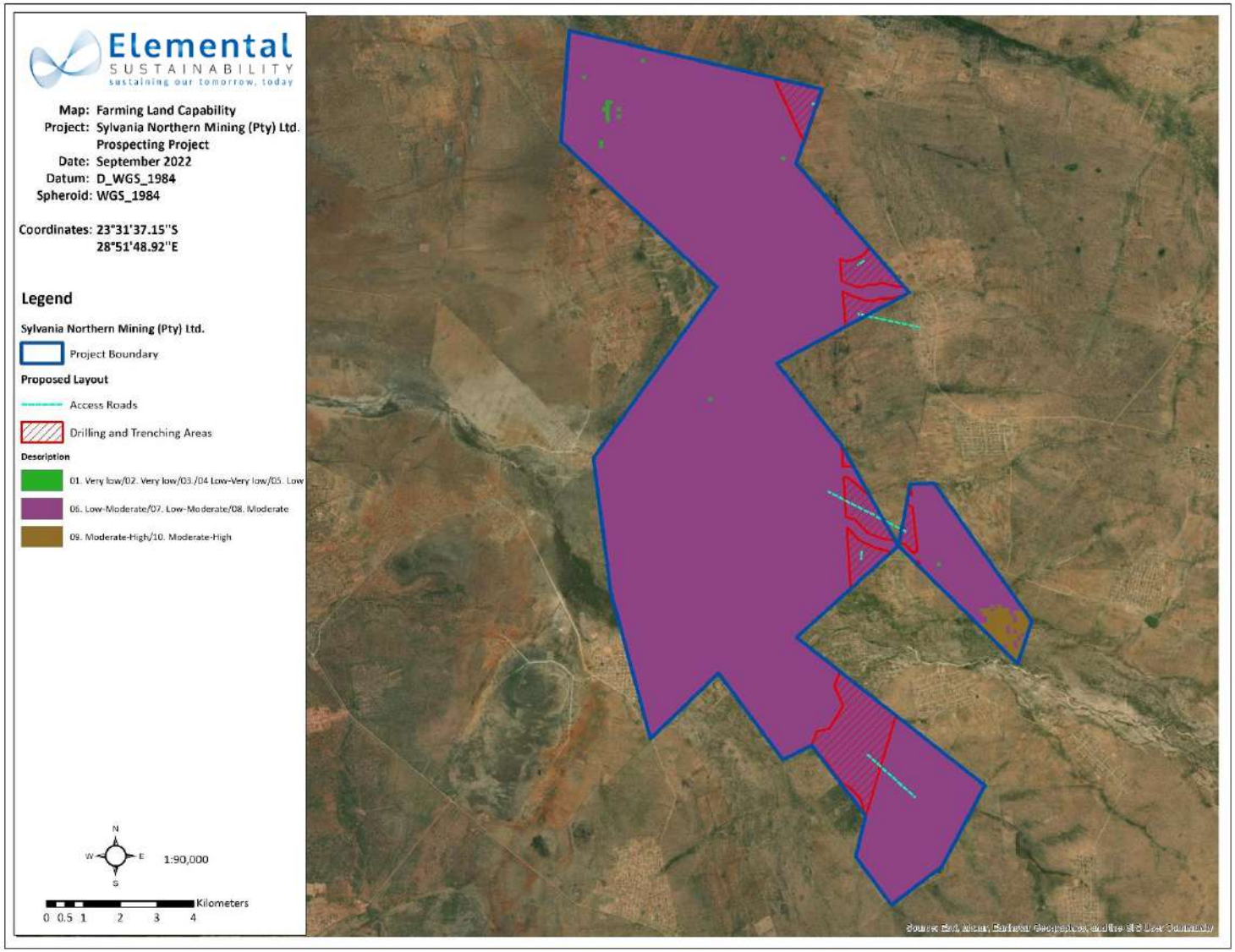

Figure 16: Farming Land Capability of the proposed prospecting project application area (DEA – Screening Tool).

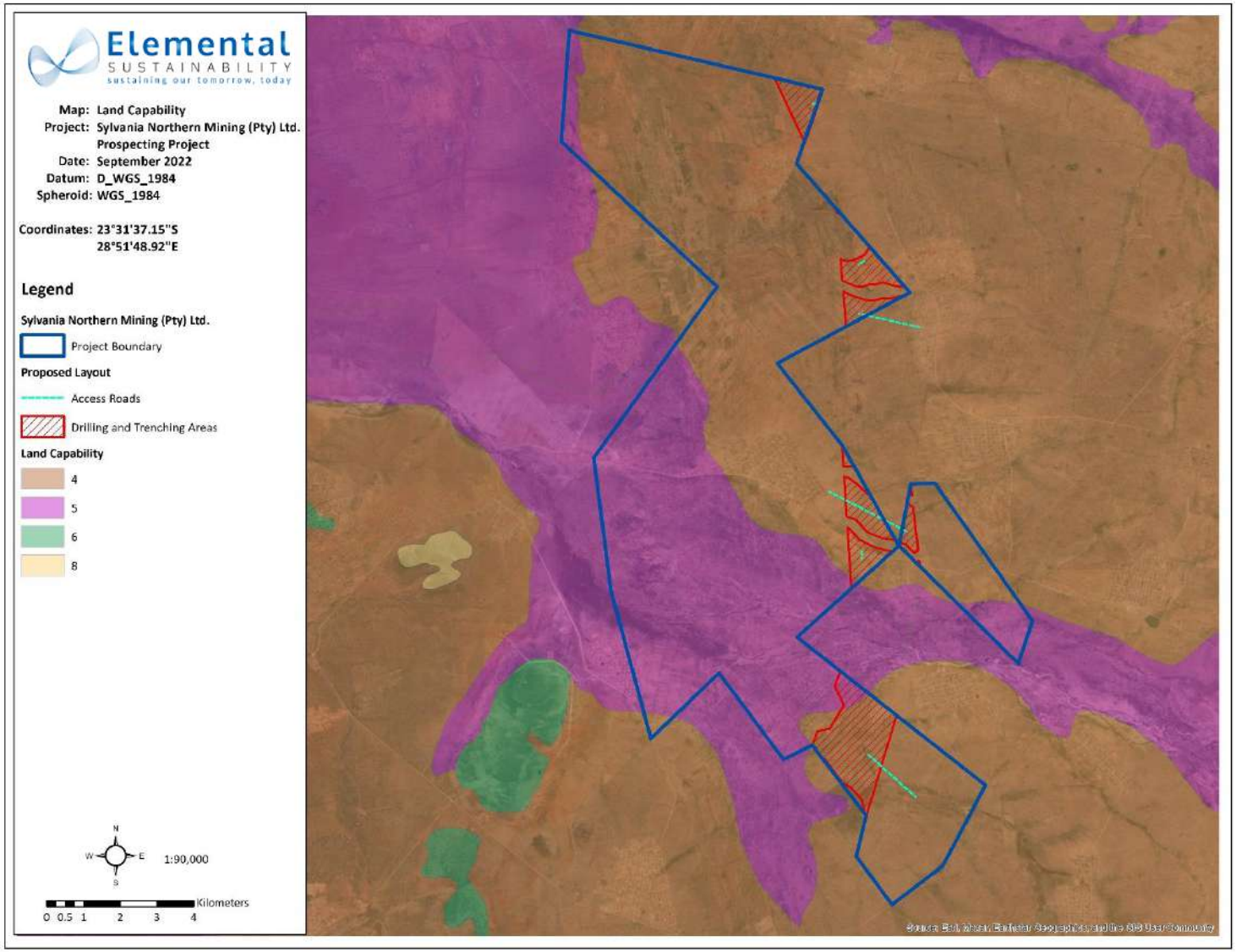

Figure 17: Land Capability of the area according to Scotney *et al.* (1987).

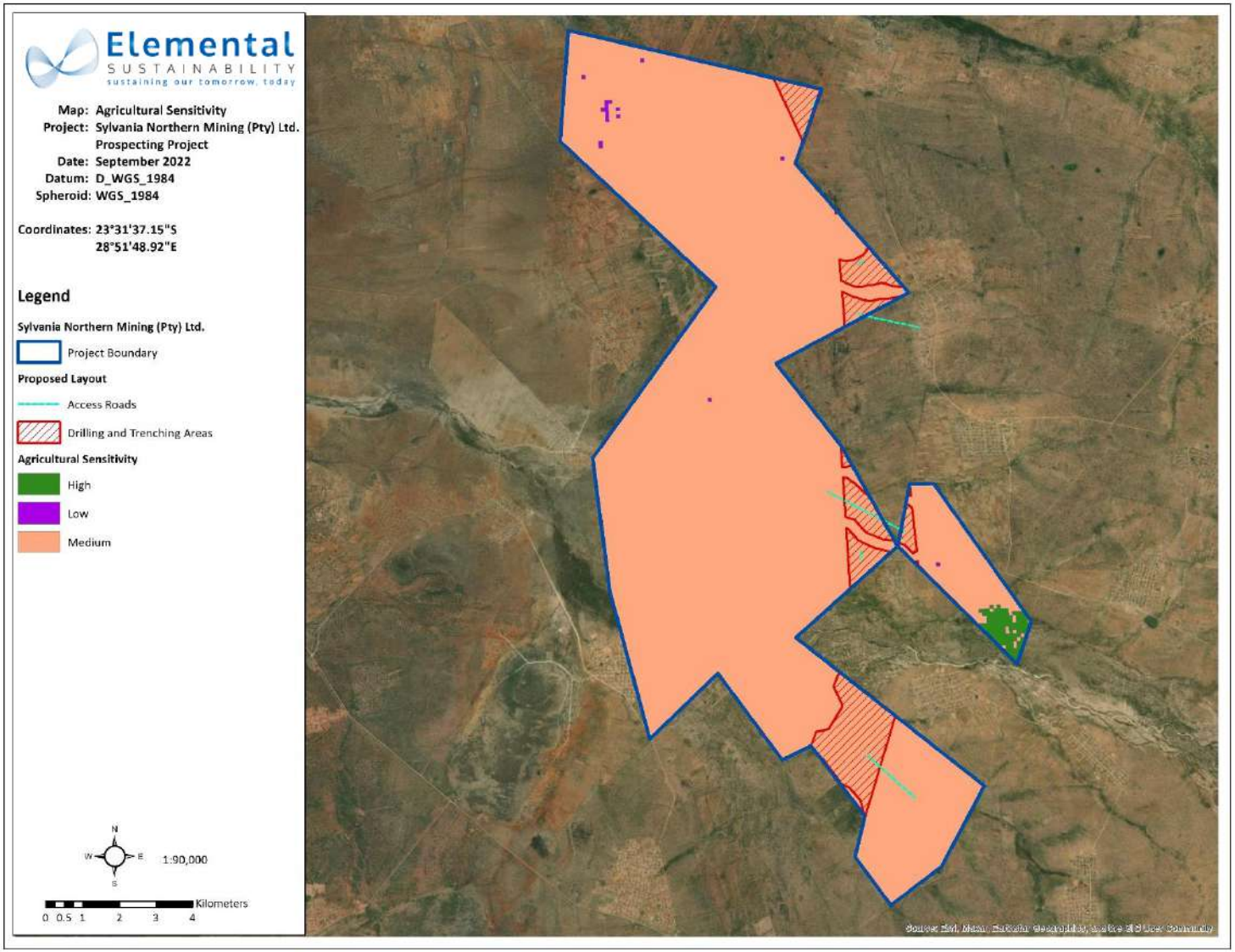

Figure 18: Agricultural sensitivity of the proposed prospecting project application area (DEA – Screening Tool).

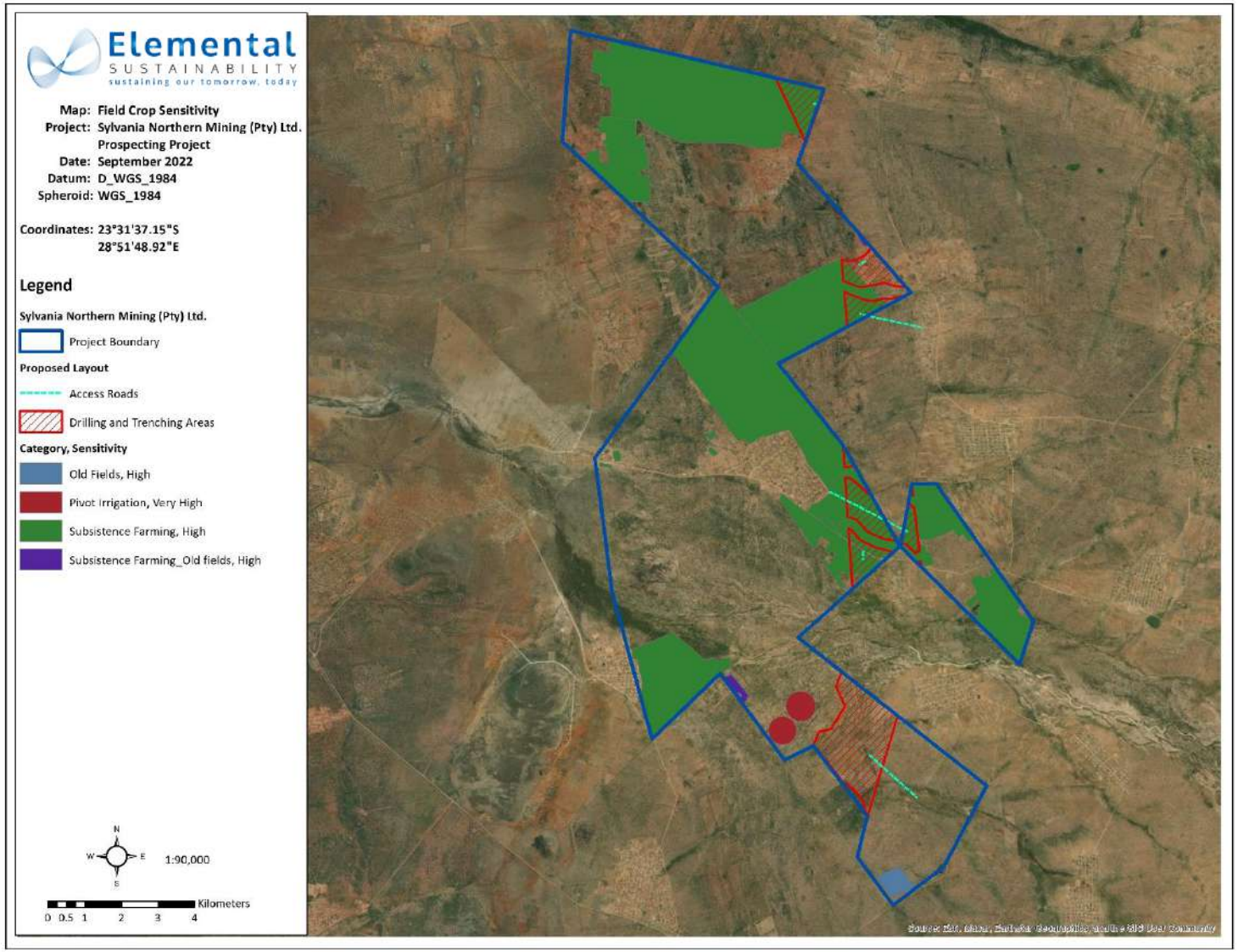

Figure 19: Crop Fields sensitivity of the proposed prospecting project application area (DEA – Screening Tool).

6.7 No-Go Areas

Any Pivot Irrigation (Very High) agricultural area should be considered as no-go areas and no prospecting activities should take place in these areas. No other areas have been identified within the application area that can be classified as no-go areas based on the sensitivity of the soils or agricultural potential.

This report is only a desktop assessment and do not take irrigation areas not indicated into consideration. This report does not take any heritage areas, river systems, drainage lines into or sensitive mountains areas into consideration and the no-go areas or buffer zones from the other specialist studies (i.e., Heritage, Wetland, River assessment) should be taken into consideration.

7. POTENTIAL IMPACT OF THE PROPOSED PROSPECTING ACTIVITIES

The major impact associated with proposed drilling and trenching activities is the disturbance of the naturally occurring soil profiles consisting of soil horizons and will impact the current soil hydrological properties and functionality of soil. Three phases of the project were assessed and consisted of the following:

- Site Establishment Phase – Preparation
- Operational Phase – Invasive Prospecting
- Decommissioning Phase - Rehabilitation

Table 12: Identified activities for the different phases of prospecting.

Project Phases	Activities to Impact
Site Establishment Phase – Preparation	Vegetation Clearance Establishing access routes to sample sites Establishing the sampling camp (stores, ablution, security)
Operational Phase – Invasive Prospecting	Drilling of exploration boreholes Excavation of trenches Rehabilitation and re-vegetation
Decommissioning Phase - Rehabilitation	Rehabilitation Re-vegetation

The main impacts associated with the proposed prospecting activities include the following:

- Soil compaction and topsoil loss leading to reduced fertility.
- The change of land use from natural vegetation (Alteration of the land and its capacity to support current land uses). This includes loss of agricultural soil and loss of grazing land, which could lead to a loss of food production and impact on food security.
- Soil pollution from hydrocarbon spills and contamination of soils by use of dirty water for road wetting (dust suppression).
- Soil erosion due to slope and vegetation clearance.
- Decline in organic matter content and biological activity.

Limited impacts are expected outside of the proposed application area, with the exception along unpaved roads within the region, where erosion can impact on adjacent areas.

8. IMPACT ASSESSMENT

8.1 Impact Assessment Methodology

The methodology utilised to determine the risk of the activities to the environment is explained below.

8.1.1 Assessment Criteria

The criteria for the description and assessment of environmental impacts were drawn from the EIA Guidelines, National Environmental Management Act (Act No. 107 of 1998): EIA Regulations (2014) and as amended from time to time. The level of detail as depicted in the EIA Guidelines was fine-tuned by assigning specific values to each impact. To establish a coherent framework within which all impacts could be objectively assessed, it was necessary to establish a rating system, which was applied consistently to all the criteria. For such purposes, each aspect was assigned a value, ranging from one (1) to five (5), depending on its definition. This assessment is a relative evaluation within the context of all the activities and the other impacts within the framework of the project. An explanation of the impact assessment criteria is defined below.

Table 13: Impact Assessment Criteria

EXTENT	
Classification of the physical and spatial scale of the impact	
Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
Site	The impact could affect the whole, or a significant portion of the site.
Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
National	The impact could have an effect that expands throughout the country (South Africa).
International	Where the impact has international ramifications that extend beyond the boundaries of South Africa.
DURATION	
The lifetime of the impact that is measured in relation to the lifetime of the proposed development.	
Short term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.
Short to Medium term	The impact will be relevant through to the end of a construction phase (1.5 years).
Medium term	The impact will last up to the end of the development phases, where after it will be entirely negated.
Long term	The impact will continue or last for the entire operational lifetime i.e. exceed 30 years of the development, but will be mitigated by direct human action or by natural processes thereafter.
Permanent	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
INTENSITY	
The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself. The intensity is rated as	
Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.
High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

PROBABILITY	
This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:	
Improbable	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0 %).
Possible	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25 %.
Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50 %.
Highly Likely	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.
Definite	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.

The status of the impacts and degree of confidence with respect to the assessment of the significance must be stated as follows:

- **Status of the impact:** A description as to whether the impact would be positive (a benefit), negative (a cost), or neutral.
- **Degree of confidence in predictions:** The degree of confidence in the predictions, based on the availability of information and specialist knowledge.

Other aspects to take into consideration in the specialist studies are:

- Impacts should be described both before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for the full lifecycle of the proposed development, including construction, operation, and decommissioning.
- The impact evaluation should take into consideration the cumulative effects associated with this and other facilities which are either developed or in the process of being developed in the region.
- The specialist studies must attempt to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

8.1.2 Mitigation

The impacts that are generated by the development can be minimised if measures are implemented to reduce the impacts. The mitigation measures ensure that the development considers the environment and the predicted impacts to minimise impacts and achieve sustainable development.

8.1.2.1 Determination of Significance-Without Mitigation

Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact "without mitigation" is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as "positive". Significance is rated on the following scale:

Table 14: Significance-Without Mitigation

NO SIGNIFICANCE	The impact is not substantial and does not require any mitigation action.
LOW	The impact is of little importance but may require limited mitigation.
MEDIUM	The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
HIGH	The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

8.1.2.2 Determination of Significance- With Mitigation

Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation is rated on the following scale:

Table 15: Significance- With Mitigation

NO SIGNIFICANCE	The impact will be mitigated to the point where it is regarded as insubstantial.
LOW	The impact will be mitigated to the point where it is of limited importance.
LOW TO MEDIUM	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels.
MEDIUM	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
MEDIUM TO HIGH	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.
HIGH	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

8.1.3 Assessment Weighting

Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. To establish a defined base upon which it becomes feasible to make an informed decision, it was necessary to weigh and rank all the criteria.

8.1.3.1 Ranking, Weighting and Scaling

For each impact under scrutiny, a scaled weighting factor is attached to each respective impact (**Table 16**). The purpose of assigning weights serves to highlight those aspects considered the most critical to the various stakeholders and ensure that each specialist's element of bias is considered. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance.

Table 16: Description of assessment parameters with its respective weighting

EXTENT		DURATION		INTENSITY		PROBABILITY		WEIGHTING FACTOR (WF)		SIGNIFICANCE RATING (SR)	
Footprint	1	Short term	1	Low	1	Probable	1	Low	1	Low	0-19
Site	2	Short to Medium	2			Possible	2	Low to Medium	2	Low to Medium	20-39
Regional	3	Medium term	3	Medium	3	Likely	3	Medium	3	Medium	40-59
National	4	Long term	4			Highly Likely	4	Medium to High	4	Medium to High	60-79
International	5	Permanent	5	High	5	Definite	5	High	5	High	80-100

MITIGATION EFFICIENCY (ME)		SIGNIFICANCE FOLLOWING MITIGATION (SFM)	
High	0.2	Low	0 - 19
Medium to High	0.4	Low to Medium	20 - 39
Medium	0.6	Medium	40 - 59
Low to Medium	0.8	Medium to High	60 - 79
Low	1.0	High	80 - 100

8.1.3.2 Identifying the Potential Impacts Without Mitigation Measures (WOM)

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1:

Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x Weighting Factor

8.1.3.3 Identifying the Potential Impacts with Mitigation Measures (WM)

In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it was necessary to re-evaluate the impact.

8.1.3.4 Mitigation Efficiency (ME)

The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation efficiency (ME) rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2:

Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency

or WM = WOM x ME

8.1.3.5 Significance Following Mitigation (SFM)

The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact is therefore seen in its entirety with all considerations taken into account.

8.2 Impact Assessment

The impact assessment as presented in **Table 17**, is aimed at assessing the impacts (as listed in Section 7) related to the various activities.

Table 17: Summary of the Impact Significance

Aspect	Potential Impact	Nature	Extent	Duration	Intensity	Probability	Weighting Factor	Significance Pre-Mitigation	Mitigation measures	Mitigation Efficiency	Significance Post-Mitigation
Site Establishment - Preparation											
Soil stripping	Soil Erosion	Negative	1	2	1	2	2	12	• Land clearance must only be undertaken within the prospecting footprint. • Follow adequate soil stripping guidelines. • Unnecessary land clearance must be avoided. • Only the designated access routes are to be used. • The Stormwater Management measures to be implemented where required • Any loss in production or agricultural potential to be compensated where applicable. • Revegetate cleared areas as soon as possible after site establishment. • Keep the project footprint as small as possible.	0,2	2,4
Vehicles driving on the soil surface	Compaction and loss of soil structure	Negative	1	2	1	2	3	18		0,2	3,6
Spillages of hydrocarbons	Soil pollution and contamination	Negative	1	2	1	2	3	18		0,2	3,6
Operational Phase											
Soil stripping	Soil Erosion	Negative	2	3	3	4	4	48	• Current land use practices should not be impacted by proposed activities. All proposed activities must take place on the outer edges of current land use practices, 500 m from any wetlands and 100 m from any rivers or riparian habitats. • Main mitigation of the expected impacts will consist of compensation to the	0,4	19,2

Soil Stripping / Trenching and Drilling	Dilution of topsoil through mixing with subsoil; Loss of topsoil as a resource	Negative	2	4	2	3	3	33	farmer equivalent to the possible loss of agricultural income and food security. • Follow adequate stripping guidelines. • Unnecessary land clearance must be avoided. • Topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks. • If possible, topsoil should be stripped when soil is dry, as to reduce compaction. • Ensure topsoil is stored in dedicated stockpiles, 5 m high and away from drainages lines and surface water. • Soil stockpiles must be dampened with dust suppressant or equivalent. • Soil stockpiles must be located away from any waterway or preferential water flow path in the landscape, to minimise soil erosion from these. • The Stormwater Management measures should provide for a drainage system sufficiently designed to prevent water run-off which will cause soil erosion. • Revegetate cleared areas, which will not form part of operational areas, as soon as possible. • Only the designated access routes are to be used. • Stockpiles are to be maintained in a fertile and erosion free state. • High level maintenance must be undertaken on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills. • Spills of fuel and lubricants from vehicles and equipment must be	0,4	13,2
Soil Stripping / Trenching and Drilling	Decline in organic matter & biological activity	Negative	2	3	2	3	4	40		0,4	16
Soil Stripping / Trenching and Drilling	Loss of water holding capacity	Negative	2	3	2	3	4	40		0,4	16
Vehicles driving on the soil surface	Compaction and loss of soil structure	Negative	2	4	3	4	4	52		0,6	31,2

Soil Stripping / Trenching and Drilling	Loss of land capability and land use	Negative	2	4	4	4	4	56	contained using a drip tray with plastic sheeting filled with adsorbent material. • Spill kits should be available on site and should be serviced regularly. • Waste disposal at the site and during operation must be avoided by separating, trucking out and recycling of waste. • Potentially contaminating fluids and other wastes must be contained in containers stored on hard surface levels in bunded locations. • Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately by trained staff with the correct equipment and protocols. • Concurrent rehabilitation and re-vegetation of the excavated areas should take place.	0,8	44,8
Spills from vehicles, accidental spills of hazardous chemicals	Soil pollution and contamination	Negative	2	3	3	4	3	36		0,2	7,2
Closure / Decommissioning Phase											
Stockpiling of Soil	Loss of Topsoil as a Resource: Compaction and Erosion	Negative	1	2	2	3	3	24	• All trenches and drill sites must be backfilled and rehabilitated. • Backfill should be done in such a manner that topsoil is not mixed with subsoil or material containing rocks. • Deep rip compacted areas to allow for natural vegetation regrowth. • Ensure proper storm water management designs are in place. • Soils must be replaced according to the soil types. • Compaction of the topsoil should be avoided. • Post-closure monitoring and maintenance to be undertaken. • Area to be rehabilitated, re-vegetated and soil amelioration to be undertaken. • Contour slopes to minimise erosion and run-off.	0,2	4,8
Backfilling of soil material layers	Loss of land capability	Negative	1	2	2	3	3	24		0,4	9,6

8.3 Cumulative Impacts

All no-go areas to be avoided to limit any impact on very high agricultural areas. The area is utilised for subsistence farming and grazing. The impact on the local food security on the areas where prospecting activities will take place, will be moderate as the capacity of the area to sustain large number of grazing animals is moderate and high for subsistence farming. With the expected soil degradation occurring and most areas proposed for prospecting overlapping with high subsistence farming potential, a decline in the overall soil quality and health is expected and may hinder the future land use for grazing and crop production on the areas where prospecting will take place.

Rehabilitation of disturbed areas aims to restore land capability. Soil quality deteriorates during stockpiling and replacement of the soil materials into soil profiles during rehabilitation cannot imitate natural soil quality properties. A change in land capability then forces a change in land use. Arable land capability changes to grazing land capability. The impact on soil is high because soil horizons are stripped and stockpiled for later use in rehabilitation or completely removed for analysis during prospecting. Soil fertility will be impacted because stripped soil horizons are usually thicker than the defined topsoil horizons. The impact is only expected on the areas where prospecting activities are proposed.

The cumulative impact on local land capability and land use is moderate on the areas where prospecting will take place and will have a possible impact on the local area as crop production land and grazing land may be lost, which will have a negative impact on food security. The main mitigation of the expected impacts will consist of compensation to the farmer equivalent to the possible loss of agricultural income and food security. This will be higher for trenching impacts than for drilling impacts.

9. COMMENTS AND RESPONSES

No comments have been received yet on the Desktop Soils, Land Use and Land Capability Impact Assessment and if received, this section of the report will be updated to include the comments and responses provided.

10. REASONED OPINION AND RECOMMENDATIONS

The areas where proposed prospecting will take place is situated in areas of Medium Agricultural Sensitivity and overlaps with areas of High Field Crop Sensitivity for Subsistence Farming. As a result of the climatic conditions and the limitations associated with the soils, the area is moderately suitable for small-scale dry land crop production and moderate intensity grazing. The proposed project, on the areas where the activities will take place, will have a moderate impact on soil and land capability as well as current land uses in the areas where the footprint will result in surface disturbance. Cumulative impacts are related to an increase in loss in available subsistence crop farming and grazing area. These impacts can be reduced by keeping the footprints minimised where possible and strictly following soil management measures as presented in this report. If soil management measures are followed as outlined in this report and the land rehabilitated to the highest standard possible, grazing or even crop production will be possible on the rehabilitated land. The main mitigation of the expected impacts will consist of compensation to the farmer, equivalent to the possible loss of agricultural income and food security.

It is therefore the opinion of the author that the activity should be authorised, and that the layout proposed for the development is acceptable from a soil and agricultural potential perspective if mitigation is applied. It follows that the recommendations and mitigation requirements as set out in this report should form part of the conditions of the environmental authorisation for the proposed project.

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APPENDIX A: SPECIALIST CURRICULUM VITAE